Proceedings

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Proceedings

ISEA2009, the 15th International Symposium on Electronic Art, took place from August 23 to September 1, 2009 on the Island of Ireland, in the following cities:

- Belfast
- Coleraine
- Londonderry
- Dundalk
- Dublin

Organised by the University of Ulster
Kerstin Mey, executive director of ISEA2009

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Kerstin Mey - Introduction

ISEA2009, the 15th International Symposium on Electronic Art, is a major international event that offers a premier and unprecedented showcase for creativity and innovation at the intersection of art, design, science, technology and communication. Under the theme of *Engaged Creativity in Mobile Environments* it builds a rich, diverse and vibrant platform for debate, display and networking across and between different disciplines and perspectives.

ISEA2009 is concerned with the incessant changes to physical and virtual environments under the influence of global capital and mass migration. It considers the fluidity and dynamics of personal and social relationships, of private and public domains that are shaped by digital information and communication technologies, which has come to determine the life experience for billions of people. Digital technologies as the fuel of global capital have not only promoted increasingly precarious labour relations. They underpin and challenge the negotiation of political and economic, social and cultural, religious and territorial conflicts and the re/organisation of society and its spaces alongside changing notions of democracy, citizenship and (self-) governance.

The debates and displays at ISEA2009 focus on imaginative, critical and innovative approaches to the radical and rapid challenges posed to the ways in which individuals and communities live, work and socialise in the digital age. The symposium brings together international keynote speakers and experts who are forward thinking in the strategic development and creative exploitation of digital technologies. The event's distributed and multi-modal mode of delivery aims to involve, inform and promote the creative potential of communities in Northern Ireland and the Republic of Ireland in the exploration of the potential of digital technologies for new practices of exchange, networking, (self)organisation, civil engagement and transactions in the real, augmented and virtual world.

ISEA2009 has invited contributions from diverse disciplinary perspectives to eight supporting sub-themes:

The theme ***Citizenship and Contested Spaces*** examines established and common sense notions of citizenship and interconnected value hierarchies particularly in politically, socially and culturally contested contexts. It recognises that, over the past decade, international mobility, forced and voluntary migration have changed the social fabric of many societies. Alongside a growing ethnic and cultural diversity within countries, the nation state as discrete, bounded entity is itself increasingly being eroded under the influence of global capital and digitisation. This thematic focus encourages debates on alternatives to the hegemonic model of democracy, and seeks new visions and creative strategies for citizen practices in contested spaces based on the (perceived) potential of digital technologies.

The theme ***Entertainment and Mobility*** seeks to identify new developments in the areas of media and user interfaces and content production and their relevance for existing and emerging art experience and services. It contributes to the understanding of gaming and mobile expressions, technologies, products, services and media and how these shape new form/at/s of creative expression and interaction or remediate and influence existing art practices, representations and trans/actions.

The thematic strand ***Interactive Storytelling and Memory Building in Post-Conflict Society*** considers advanced strategies of interactive, collaborative and participatory practices that build on, mobilise and explore the long tradition of oral storytelling. Of interest are how stories operate in the formation of memories within post-conflict (but still conflicted) society individually and collectively, and what potential they may have to offer in conflict transformation and identity re/formation. It discusses aesthetic and ethical concerns both within the narrative domain as well as in the technological realisation and dissemination / distribution.

The theme ***Interactive Textiles*** played a prominent part in the conference, and relates to creative and technical production and application processes that challenge and extend conventional methods of working with textiles and their perceived material properties. It aims to give consideration to innovative ways of producing and using textiles, materials and forms that are capable of extending and responding to interaction. This strand profiles fibre and fabric structures that promote expression, communication and enhanced or altered behaviours. What kind of 'second skins', artefacts and constructions can be created that support interactions and context awareness? Where are the hardware, software and material challenges, the ethical concerns, sustainability issues, aesthetic, cultural and activist potential?

Contributions to the strand ***Positionings: Local and Global Transactions*** look at processes of space construction, re-mapping and negotiation in the contemporary situation of global capital, digitisation and migration. Issues of space are highly pertinent in terms of its constitution, perception, appropriation and consumption. These cannot be divorced from a scrutiny of the social, political, cultural and medial conditions under which spaces are being produced, trans/formed, and re/presented. Of particular interest are new and convergent models of space and spatial dynamics, and thus of reality construction, whether real, virtual or augmented, and the challenges these pose to the relationship between local(ised) and global(ised) transactions in the cultural sphere(s) and the re/formation and re/presentation of identities and places connected to them.

Posthumanism operates at the interface of transhumanism and cyborgology, drawing

attention to the convergent spaces of biology and artifice. Its manifestation through a range of bio-political events, along with an aesthetic staging of bioethical encounters ruptures the polarised views of bio-conservatism and techno-progressivism, provoking a series of conflicts that demand multi-layered conceptual apparatus to unravel. The sensory habitus of post-human prostheses initiates the re-staging of design principles to anticipate the demand for new sensory experiences, technologies and services. The theme ***Posthumanism: New Technologies and Creative Strategies*** explores and expands an understanding of how innovative hardware and technologies are constituted by shifts of new art and design forms and how modes of sensory experience alter arts. For example, what kind of experience is generated through imaginations of post-humanity in different art and design forms? What do viewers expect from artists in terms of adopting post-human technologies and modes of sensory delivery? How do we prepare and critically engage new generations of artists, designers and consumers through these technologies?

The theme ***Transformative Creativity – Participatory Practices*** highlights the operations and limitations of conventional (post-modernist) aesthetic models and cultural re/presentation in relation to the clash of different ideological perspectives, vested interests and authority, whether these concern outright economic situations, political power or the relationship between different domains of knowledge production like art and science, or authorship and expertise, production and consumption. Contributions are invited that challenge established templates of creative practice and audio-visual / multimedia re/presentations and their associated hierarchies of value, modes of understanding and agency in society. This strand focuses on the prototyping and probing of innovative ways of dialogic exchange, of collaborative and participatory creative engagement across the domains of creative practice and the ‘production of theory and reflection’. Proposals are thought that reconsider the transformative potential of creativity in society and scrutinise the role of and relationship between artist and collaborators/participants through the use of digital technologies and the generation of innovative/alternative circuits of distribution, debate and social and political inter/action.

Inquiries in the strand ***Tracking Emotions*** reflect on innovative ways of scanning, modeling, simulating, stimulating, reproduction and triggering emotions. The theme takes its point of departure in the different forms and modes in which human emotions are utilised in and integral to creative processes. Where and how can artists and researchers avail of new technologies to identify and measure spectators’ or users’ emotional engagement and patterns of affective response? How do conventional and innovative technologies and techniques aid the distinction between different emotional triggers and experiences? How can artists calculate and direct emotional re/actions and what capabilities do new technologies offer for such manipulations?

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01 Citizenship and contested spaces

Is there space to play?

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Abstract

My research inquiry is concerned with the possible relationship between online virtual game spaces and public participation in local real world democratic processes. In any such inquiry into the possible productive ability or utility of game spaces it is crucial to understand how games operate in the world today. This paper will focus on an apparent dislocation of the relationship between world of play and the lived world of everyday reality.

In the past decade, the rise of massively multiplayer online (MMO) game play has been meteoric, consuming the time of millions of players worldwide. Since 2000 the active subscription base has risen to almost twenty million. Recent research into the demographic trends among players has challenged the common stereotype of the average player as being a solitary male teen. Today most are in their 30's, some 40% of whom are women, about 50% work full-time, 36% are married and 22% have children, and far from being hermits 80% of players play with people they know in real-life. The average time spent in-game per week is 22 hours. (Williams et al, 2008)

The origins of MMO's lie in MUDs (multi-user dungeons) and MOO's (MUD, Object Oriented) of the 1970's and 80's. MUD's were networked, text based adventure games running on university mainframes. Created as hobbies and generally free, players read textual descriptions of rooms, objects, other players, and interacted with the world and each other by typing in commands. MOO's, meanwhile were not explicitly game oriented but were in prototypical 'chat rooms' which served as collaborative environments. Users could program the server and expand its functionality by adding rooms and objects, utilities and automation, eventually forming complex interactive virtual communities.

Perhaps the most famous is LambdaMOO which served as the backdrop to one of the first attempts to understand the culture operating within these communities. Julian Dibbell's 1993 article *A Rape in Cyberspace* detailed the disturbing case of Mr. Bungle. The anonymous user behind the avatar of Mr. Bungle had hacked the LambdaMOO server to run a 'voodoo doll' subprogram which allowed him to control the actions of the other player's avatars. He then forced the avatars to perform outrageous acts on each other. While the effects of these violations on the deeply invested users behind the avatars were personally traumatic, the effect of the incident on the structures of the LambdaMOO and the legal debates emerging in the nascent Internet culture were highly significant. Through a process of deliberation that can be thought of as the first notable attempt to collectively steer the governance of virtual communities, Mr. Bungle's avatar was 'deleted' from the server and thereby the community. Prior to this event the LambdaMOO had been governed exclusively by the programmers who built the system, the 'wizards', who would regularly be called on to arbitrate, Solomon-like, in disagreements, or 'griefs' between users. After the incident a system of ballots and petitions was instituted to allow the users to arrive at decisions while the wizards relegated themselves to the status of back-end technicians, effectively turning the running of the system over to the community itself. (Dibbel 1993)

Today, with the evolution of computer power, Internet speeds and graphics technology vast, fully rendered three dimensional virtual gaming communities have emerged. For some theorists these worlds allow for players to access deep mental realms 'invoked by play, fantasy, myth and saga, states that have immense intrinsic value to the human person'. (Castronova 2006: 68) For others the worlds are inherently utopian presenting the opportunity to simulate certain earth bound rules while ignoring or re-conceptualising others. The social groupings within them, the guilds and clans hark back to a pre-capitalist medieval age or a far-flung future, never satisfied to merely simulate the present. (Galloway 2006) Players within these game spaces are engaged in cooperative social activities, which the theorist Johan Huizinga maintains are the foundations of play. For Huizinga, the core conditions of play are that play is free, play is not 'real' life, play has no moral consequence and that play can happen anywhere and at any time. (Huizinga 1938) Yet however important maintaining the magic circle is within these spaces, and there are good reasons why they should be protected as autonomous play spaces of utopian imaginary, there are other motivations challenging the play element of MMO cultures.

The first economic research into virtual worlds was conducted by Edward Castronova with his seminal *Virtual Worlds: A first-hand account of market and society on the cyberian frontier* on the emergent synthetic economies of MMO's. For four months in 2001 Castronova attempted to understand what people were up to in the virtual world of 'Everquest'. Far from conjuring up utopian worlds of alternative practice, he found players had developed a 'robust, free market economy filled with wealthy, hard-working people'. Castronova's now famous finding was that players earned on average $3.42 for every hour they played while the per-capita GNP of Norrath, the 'country' within Everquest, ranked 77th among the richest countries in the world putting it at that time, somewhere between Russia and Bulgaria. (Castronova 2001)

Value is created in several ways in MMO's. Players can either search out or fight for scarce items such as magic armour, special swords and in-game money. The loot earned gives competitive advantage to their bearers with which they can repeat the cycle, building up their characters wealth and experience further in an often mind numbingly repetitive process known as 'levelling up'. Levelled up characters and/or their weapons, armour and gold, and even wholesale player accounts can then be sold on to other less experienced, time poor yet cash rich players.

With an hourly pay rate of $3.42, it was not long before third party brokers realised the potential for arbitrage, the exploitation of the cost differential between this world, the West and the world of the Global South, or countries where the cost of labour is significantly cheaper. Thus the practice of outsourced 'gold farming' took off. It is estimated that in China today the practice of gold farming employs over a million people working in 'virtual sweatshops'. (Dibbell 2003) A Chinese gold farmer earns roughly 30 US cents an hour playing MMO's in rotating 12 hour shifts producing virtual gold and levelling up characters to be sold generally into the West in a global market worth billions of dollars[1].

Another type of virtual world has recently emerged in the popular imagination in the form of social networking MMO's such as There, The Sims Online, Haboo and Gaia online. Possibly the most famous is Second Life (SL) created by Linden Labs in 2002. SL has an average of 80 thousand concurrent users [2] ,called 'residents', the

1 Virtual Goods News: Over One Million Gold Farmers In China. [Accessed June 5, 2009] Available at: http://www.virtualgoodsnews.com/2009/03/over-one-million-gold-farmers-in-china-70-in-world-of-warcraft.html

2 Second Life charts. [Accessed June 18, 2009]. Available at: http://taterunino.net/statistical%20graphs.html

vast majority of whom live outside the US. Second Life differs from other MMO's in an important way. Linden Labs has put in place the network infrastructure and provided content creation tools for residents who in turn have generated all the content one can see in SL. Its success is based on the decision to recognise the intellectual property rights of user created content while maintaining a *laissez faire* policy towards real money trades of SL currency - Linden Dollars - in the secondary markets outside the world. As a consequence SL has an active developer community in the thousands, many of them highly profitable, who create and sell a range of products and services in fashion, music, architecture, education, training, and entertainment to other SL users. (Ondrejka 2007) In the first quarter of 2009 user to user transactions topped US $120 million [3.]

There have been many claims made recently for social MMO's innate ability to foster collaboration and innovation, revolutionise teaching and learning, reinvigorate political processes. Linden Labs co-founder Cory Ondrejka goes so far as to propose that nations wishing to compete in the 21st century must supplement traditional forms of geographic citizenship with a new category of 'virtual-citizen' that could leverage the creative talent of thousands of dispersed participants in virtual worlds to drive innovation and the knowledge economy. (Ondrejka 2007)

Others question such positivist claims and point to some worryingly ominous trends and behaviours at work in the rhetoric of open-source, play and collaborative peer production. Julian Dibbell suggests that we are witnessing the emergence of 'ludo-capitalism' (Dibbell 2007), a condition of late capitalism that has unhooked itself completely from traditional systems of material production. He points to a trend towards player-produced content as being part of a more general trend of confusing the domains of work and play. Ludo-capitalism conjures up ever more fantastic and fetishistic virtual commodities and services while simultaneously instituting a further instrumentalisation of human relations where the freedom from work of Huizinga's playing subject is merely grist for the mill of a new stage of capitalism.

The phenomena of 'crowdsourcing' is a disturbing case in point. Crowdsourcing is the practice of taking a problem normally completed by an employee or contractor and outsourcing it to the general public or specific communities of interests. The practice

3 The Second Life Economy - First Quarter 2009 in Detail - Second Life Blogs. [Accessed June 15, 2009]. Available at: https://blogs.secondlife.com/community/features/blog/2009/04/16/the-second-life-economy--first-quarter-2009-in-detail

exploits the playful drive common to much open source software development, the inquisitiveness of the amateur tinkerer or garage inventor who work not for profit but for the recognition of their efforts. Examples of crowdsourcing range from iStockphoto, a company sourcing stock photos online from amateurs, undercutting freelance professionals to a fraction of their cost, to Pharmaceutical giant Eli Lilly's R&D initiative *InnoCentive*, where the 'crowd' can take a shot at solving various scientific challenges. Success rates of 30% have been reported and successful 'solvers' get cash prizes while the corporations posing the challenges save millions in R&D. The residents of Second Life reportedly contribute 'more than 22,500 hours of "work" each day, stocking the world with everything from ninja armour to giant tree houses'. (Howe 2006)

It would appear from the practices outlined above that capitalism's recuperation of the utopian imaginary of play in virtual worlds and the wider culture is complete. Yet there are some voices that propose ways out of this seeming totality. In 1996, before the first massively multiplayer games, the Italian theorist Maurizio Lazzarato spoke of the rise of 'immaterial labour' in western postindustrial society. Its forms of work are 'audiovisual production, advertising, fashion, the production of software, photography, cultural activities and so forth'. (Lazzarato 1996) The immaterial worker is engaged in intellectual, technically innovative and creative work, is autonomous, mobile and entrepreneurial and who joins with others in small groups for short projects, which dissolve once completed. Behind the image of independent self-employed worker, is the reality of the precarious 'intellectual proletarian' who finds it difficult to distinguish between work and leisure. Yet this new configuration of labour is troubling for employers in that they are forced to recognise the autonomy of the worker and yet are duty-bound as capitalists not to redistribute the power implied by it. Exploiting this rift Lazzarato proposes an analysis of this new productive force from a position outside of business theory, one that 'can lead us to define, at a territorial level, a space for a radical autonomy of the productive synergies of immaterial labour'. (Lazzarato 1996)

The product of immaterial labour, which can be thought of as a form of communication, is not destroyed with consumption, more that it 'enlarges, transforms, and creates the "ideological" and cultural environment of the consumer' transforming the consumer in the process. With this in mind he seeks to recast the traditional (active) producer – (passive) consumer relationship as one between author and audience. The author is conceived of as a collective diffused multi-variant

productive force, and the audience is active participant for who reception is a creative act. In this arrangement the capitalist entrepreneur is relegated to merely managing and regulating the activity of immaterial labour but is no longer in control of it's function or design, nor it's origins or ends.

Lazzarato's perspective seems to foreshadow Dibbell's finding that the managers and owners of MMO's cannot govern effectively, given that the population of the game, who number in the millions, are actually producing the game itself. One developer confesses to him that 'in aggregate, the players always know your game better than you do'. (Dibbell 2006: 142) Virtual worlds would be empty howling voids were it not for the billions of hours invested by player-producers. He also found that the binding player contracts, the EULA's, are not stone tablets handed down by the gods, but are in fact fluid documents that reflect the ongoing negotiations between players and the game owners, who once again seem to have been relegated to the role of facilitators. For Dibbell these fought over EULA's have some of the characteristics of a social contract or a constitution in the making. (Dibbell 2006: 145)

In keeping with the legal aspect, Edward Castronova proposes a statute of 'interration' (Castronova 2006: 68) to protect virtual worlds from the intrusion of commerce and commodification. Based on the idea of incorporation, whereby corporations are given legal status of personage for the purposes of protecting investors, interration would give legal autonomy to the territories of virtual worlds. With interration real world of commerce and property rights would not apply, thereby reinstituting the 'magic circle' of play. Others modify the concept of interration to allow for the intrusion of real world protection of free speech and constitutional rights. (Balkin 2006: 108)

Ultimately, we should return to the origins of virtual worlds, to LamdaMOO and restate Dibbell's call to consider 'the present possibilities for building, in the on-line spaces of this world, societies more decent and free than those mapped onto dirt and concrete and capital.' (Dibbell 1993)

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Contesting citizenship: participation and political art

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> Individuals, even when undocumented immigrants, can move between the multiple meanings of citizenship. The daily practices by undocumented immigrants as part of their daily life in the community where they reside - such as raising a family, schooling children, holding a job - earn them citizenship claims … (Sassen 2002: 12)

> What intersubjective relationships are possible when image makers, exploring the temporal and spatial co-ordinates of migration across varied locations and public spheres, initiate different modes of collaborative production and fieldwork practices in their research imaginaries?
> (Grossman and O'Brien 2007: 3)

Citizenship or xenophobia: Ireland's dilemma

On June 13, 2008, Ireland's citizens went to the polling stations again, this time to decide the future direction of the European Union under the *Lisbon Reform Treaty*.[1] Ireland's government and the majority of EU member state governments are still recovering from the shock of Irish citizens rejection of the *Lisbon Reform Treaty*. In 2001 the *Nice Treaty*, was also rejected but, under huge European pressure, a second referendum was put to the people and the yes vote won by a narrow margin. At the time of writing similar pressure is being brought to bear in order to ratify the *Lisbon Reform Treaty*.

[1] The Lisbon Reform Treaty is a European Union agreement between member states 'to complete the process started by the Treaty of Amsterdam and by the Treaty of Nice with a view to enhancing the efficiency and democratic legitimacy of the Union and to improving the coherence of its action'. Cited from the *Treaty Preamble*, available at, http://www.lisbon-treaty.org/wcm/index.php?option=com_content&task=view&id=267&Itemid=57 [accessed 19.2.09]. In June 2008 Irelands citizens rejected this controversial treaty in a referendum. Under Ireland's Constitution the government was obliged to hold a referendum. Ireland was the only EU country affording its citizens this democratic decision making vote. Ironically a yes vote would have the effect of removing citizen participation in the European decision making process.

Four years earlier, in June 2004, Irish citizens were invited by the government to vote in a referendum to amend the 1922 Constitution of Ireland.[2] The outcome of this referendum would decide the fate of transnational migrants who successfully entered the State to seek asylum and subsequently gave birth to a child. Before the constitution was amended all Ireland-born children were entitled to the same rights as Irish citizens on the grounds of 'jus soli', whereby nationality is determined by place of birth. An overwhelming 79.8% of the population voted in favour of the government proposed amendment thereby complicitly signing a deportation order for thousands of African, Asian and non-EEA migrants. Meanwhile Irelands government continues to lobby US congress in support of the legalisation of undocumented Irish nationals living in the US.

This paper investigates participatory and dialogical art practices (Bakhtin 1990, Kester 2004), [3]*Relational Aesthetics* (Bourriaud 1998),[4] and *The Politics of Aesthetics* (Rancière 2004).[5] By critically framing, adopting and significantly adapting these methods it is argued that participatory and dialogical art engages directly with 'politics and aesthetics', to mediate multiple and contesting subject positions, drawing attention to untenable and contested rights of citizenship.

In the following example, which will be screened during the ISEA Symposium I will critically frame and describe a specific working method.

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[2] In 2004 Irish citizens voted yes to inserting the following clause into Article 9 of the Constitution: '1. Notwithstanding any other provision of this Constitution, a person born in the island of Ireland, which includes its islands and seas, who does not have, at the time of the birth of that person, at least one parent who is an Irish citizen or entitled to be an Irish citizen, is not entitled to Irish citizenship or nationality, unless provided for by law.' A pdf copy of the Constitution of Ireland - Bunreacht na hÉireann is available at http://www.taoiseach.gov.ie/index.asp?docID=243 [accessed 19.9.09]

[3] Grant Kester citing M. Bakhtin: 'The concept of Dialogical Art practice is derived from Mikhail Bakhtin, who argued that the work of art can be viewed as a kind of conversation - a locus of differing meanings, interpretation and points of view.' in Kester, G. *Conversation Pieces: Community and Communication in Modern Art*, Berkeley: University of California Press, 2004: 10. See Bakhtin, M. (1990) 'Author and Hero in Aesthetic Activity' and 'Art and Answerability' in *Art and Answerability: Early Philosphical Essays by M. M. Bakhtin*, ed. Michael Holquist and Vadim Liapunov, trans. And annot. Vadim Liapunov, Austin: University of Austin Press.

[4] Nicolas Bourriaud first used the term 'Relational Aesthetics' to describe, 'a set of artistic practices which take as their theoretical and practical point of departure the whole of human relations and their social context, rather than an independent and private space.' (2002: 113). In 'Relational Aesthetics' the audience is viewed as a community, implicated in the construction of meaning and often the focus of the artwork itself.

[5] Rancière, J. *The Politics of Aesthetics*, New York, London: Continuum, 2004.

Progress II: a conversation with transnational migrants in Ireland

> The banquet of hospitality is the foreigner's utopia - the cosmopolitanism of a moment, the brotherhood of guests who soothe and forget their differences, the banquet is outside of time. It imagines itself eternal in the intoxication of those who are nevertheless aware of its temporal frailty. (Kristeva 1997: 272)

In January 2008, together with artist Susanne Bosch and supported by film maker Kevin Duffy, ten individuals were invited to participate in this project. All of the group had recently migrated to Ireland (north and south) from countries including, Brazil, Nigeria, Somalia, Poland and The Czech Republic. The project generated a series of intersubjective encounters reflecting Bourriaud's notion of relational aesthetics.[6] These encounters continued between participants throughout the cultural production process and enter the public realm between the participants and audiences when the video is presented in various public contexts. The first stage of this project was to create a dialogue between the participants. This was achieved by generating a blogsite and inviting each member of the group to respond to a series of questions relating to the experience of being a migrant living on the island of Ireland.

The questions and discursive exchanges, which can be read by visiting the blogsite, [7] supported each participant towards generating a personal narrative that was later used to inform and generate a 'conversation' performed in a communal setting, around a dinner table (Figure 1). The event was documented using digital video with the intention of installing the completed video within a museum or gallery environment.

[6] Bourriaud argues that Relational Art encompass 'a set of artistic practices which take as their theoretical and practical point of departure, the whole of human relations and their social context, rather than an independent and private space.' (1998: 113)

[7] To read the participants' dialogues visit http://interfacefilming.blogspot.com

Figure 1. *Progress II,* production still, Dublin, © A. Haughey 2008

What unites these powerful and diverse multi-ethnic voices is the collective knowledge of their personal experiences and stories of contemporary migration. Storytelling and orality has a long tradition in Ireland. It features throughout historical and contemporary Irish culture, including theatre, the novel, poetry and film. Jackson reminds us that storytelling is also a way of participating in the world, creating a sense of belonging and reasserting dignity and self-respect when one becomes uprooted and displaced. He writes, 'To reconstitute events in a story is no longer to live those events in passivity, but to actively rework them, both in dialogue with others and within one's own imagination' (2006: 15). For Ricoeur storytelling is inextricably bound with cultural identity, not a fixed identity but a 'mobile identity', he writes:

> the story of my life is a segment of the story of your life; of the story of my parents, of my friends, of my enemies, and of countless strangers'... with its art of transference and its ethics of linguistic hospitality, calls for this further step: that of taking responsibility, in imagination and in sympathy, for the story of the other, through the life narratives which concern that other. (1996: 6).

In the completed video, *Progress II*, the audience is invited to engage with and extend the intersubjective process. Watching the video spectators can observe and listen to the dinner table conversation. The camera moves continually around the table. The constant movement creates a spatio-temporal frame reminding the

spectator of the transient position of the participants as guests in the host country. The individual dialogues explore the in-between space and transcultural connections between home and the host country. There is talk of loss, misunderstandings and confusion between cultures, the reality of everyday lived experience for migrants in their adopted country. Ricoeur suggests that 'the identity of a group, culture, people, or nation, is not that of an immutable substance, nor that of a fixed structure, but that, rather, of a recounted story' (ibid: 7). Some of the stories are humorous and some are tragic, describing the will to survive in the most dangerous and urgent of times. The conversation recalls Sassen's notion of 'informal citizenship', all of the guests are clearly immersed within the host country with their network of family, friends and associates. Yet for most they still live in a state of limbo where Home has lost its meaning as a fixed and knowable entity. One of the guests, Raul expresses his feelings on home as he speaks to the other guests:

> You realize that things are not forever, nothing is always there and I think you have this job to always rebuild and re-establish [y]our home, and for the last month I was reading this book called 'I Saw Ramallah from Mourid', a poet from Palestine and he was describing some of his friends, that they were refugee's and they are twenty years outside of their home and they don't buy furniture, they don't buy anything because they want, don't want to establish any kind of relationship with the place, because they have this idea that they are going to go back home. And so that's something that I am processing now and I'm trying to be at home wherever I am.[8]

The spectator is also the subject of discussion and therefore implicated within the conversation - an *imagined community* actively invited to participate and reflect upon their own position as host country citizens in relation to the dreams and anxieties of the migrant dinner table guests. In doing so the audience is encouraged to move beyond the aesthetic surface of the video production. I am again reminded of Derrida's notion of *hospitality*.[9] In order to be hospitable the receiving community must be altruistic and open to the aporia, tout autre – every Other is infinitely Other, an impossible paradox but, nonetheless, the tensions within this aporia invoke the possibility of transformative action.

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[8] Raul's dialogue, transcribed from the video, *Progress ll,* Dublin, 2008
[9] Derrida, J. and Dufourmantelle, A. (2000)

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Digital channels, the change in community structures and its consequences for social participation

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Abstract

Digital channels change the structure of communities and thus indirectly influence the political participation of citizens in a society. This paper addresses challenges and opportunities that arise for political participation of citizens through these developments.[1]

The structure of social communities is subject to change. Traditional communities formed around tribal structures. The major integrating factors were shared space and family structures. In the 19th century a new form of community structure developed, this time centred on the concept of a nation. The major integrating factors were a hereditary line belonging to the nation in question and a shared tradition, culture and educational canon (for a more detailed discussion see Gellner 1964 and 1983). During the last decades increased geographical mobility of individuals, increased specialization in education, a growing income gap and the possibility of pervasive digital communication have disrupted these factors. This led in developed countries yet again to a change in community structures. A decrease in participatory activities in local communities has been substituted by a significant increase of activities in online communities. Communities of tribe, nation or location are increasingly substituted by communities of interest or practice. This has consequences for participation by citizens in social institutions.

The field of social network analysis distinguishes between two types of links between people. Let's take a hypothetical person and call him Marcus. Links between Marcus and people who are acquaintances of his, but who are not likely to socially interact

[1] The author would like to thank Pascal Jürgens for the much appreciated advice and guidance - in the last minute of the hour.

with each other, are called 'weak ties'. The other type of link is called 'strong tie'. This applies to links from Marcus to people who in turn are highly likely to interact with each other (Ganovetter 1983: 221ff.). As Mark Granovetter (1973) has argued in his classical article, information travels very fast through a social system in which many individuals are interconnected through a large amount of weak ties. This phenomenon leads to the so-called 'small world effect'. The average distance between social actors in a social system appears surprisingly low, since although people tend to cluster in highly interconnected groups, these groups are connected through individuals with weak ties (for a short overview see Granovetter 2003). The small world effect has received considerable attention by sociologists, epidemiologists and marketing practitioners. These studies focus on how information travels through social systems via social ties.

Although it has been shown that weak ties are instrumental in distributing information, they seem to have little effect on collective action. A reason for this might lie in the relatively high opportunity cost collective action brings to participants while the mere forwarding of information rarely carries any meaningful opportunity costs. It seems for collective action to spread communities connected through strong ties are the most fertile ground. Mobilisation and political persuasion still appear to be most effective when groups of highly interconnected people are confronted with issues that appear relevant to all of them. This common truth from Marketing (Earls, 2007) and Community Organizing (Alinsky, 1971) still holds true in the digital realm. For collective action to occur it is necessary to have a large group of highly interconnected people who share common issues, trust each other and are willing to shoulder the relatively high opportunity costs of collective action. It does not suffice to have a Facebook-Group with 6000 supporters. These supporters may be willing to carry a cause like a fashionable pop-culture-badge. They might even be ready to distribute information about the cause to their social network but this lifestyle-politics alone does not automatically lead to collective action. Why is that?

In classic location based communities the members are connected mainly through strong ties. People tended to live and work in relatively close proximity. There was little mobility. Commitment to a location tended to be long-term. This led to a lot of shared interests. For example, if I expect to live with my family in a specific neighbourhood for the foreseeable future, I share with my neighbours an interest in the development of said community. For this I might accept the opportunity costs of participating in communal activities, local politics, and if need be even collective

action for a relevant issue. The literature shows a marked decline of social participation of that kind (Putnam 2000). This corresponds with a change in society.

Higher job-mobility of people leads to an ever-increasing number of different locations a person is likely to live in. Just because I moved into a house in a neighbourhood does not mean I intend on living there for long. My next move might already be scheduled. So why engage in the local location-based community? Why shoulder the high opportunity costs end engage in local issues, when I know that I and my family will be gone in five years? Throw in the ever decreasing costs of communication and travel into the mix and I can finally discard the dictate of geography.

In the past the group of people I interacted with depended mainly on geography. It was reasonable to work out differences and come to a common understanding since one was likely to be in each other’s company for a while. This is the dictate of geography. This expectation of a shared future led individuals to shoulder opportunity costs and work out differences and maybe even engage in collective action towards a common goal.

Today interaction does not depend on a shared location anymore. I can freely communicate with people all around the world. Our connection can be based on a shared past, a common vocation or interests. These contacts, which are only based on commonalities, do not carry the same opportunity costs of interaction, like the kind where the only common element was a shared location. While this might play towards an individual's need for homophily and thus increase personal wellbeing, it also has consequences for a social system.

The connections people form via digital channels tend to be weak ties. The gang of dwarfs and knights with whom I roam through the plains of Azeroth is not likely to share all that many interests with my Eastern Standard Tribe (Doctorow, 2004) of co-workers who in turn are not very likely to share the passions of my international geocaching community. So while my personal interests are ever more closely matched with that of individuals in my social network, the issues and interests shared by the whole of my social network tend to decrease drastically. Thus this social network loses the ability and interest in common collective action.

This change in the type of connections between community members affects the participatory power of the community in question. People who are connected through strong ties tend to influence each other more strongly, share more common interests and are thus more ready for participatory action. People who are connected through weak ties are more likely to distribute information further and faster but are less likely to convince other members of their community of something they do not already believe in.

Still, recent events seem to tell a different story: a candidate for the US presidency manages to successfully enlist cohorts of digital natives and progressives in his bid for office; Moldovans take the streets while twittering; Iran changes after a contested election in a nation of twittering protesters who inspire the support of Twitterers worldwide. These are only three high profile examples of digitally enabled collective action. How do these examples fit in the argument above? Do weak ties enable collective action after all? Let's have a closer look at one of these examples to gain a deeper understanding of the meaning of the success of these movements and to identify what makes them tick.

One of the highly publicised successes of the 2008 presidential campaign of Barack Obama was his use of online campaign communication. Here, two elements of this online campaign shall be discussed further. First the candidate inspired through his charisma and his message of hope, supporters to contribute personal campaign material. They designed images, cut videos and contributed slogans. These in turn were put on the net and distributed to a large community of interest. This is the power of weak ties at work. Information, in this case the links to community relevant material on the web, gets distributed very fast. This distribution is also an evaluation process. Members of the community decide about the quality of an image, spot or slogan before they click the forward button. The aggregate number of clicks or forwards becomes thus an indicator of the collective wisdom of the community. This phenomenon alone does not yet contradict the argument above: information travels very fast through weak ties. Still, this is not yet collective action in the traditional sense. Just hitting the forward button, does not make me a political activist. This is lifestyle-politics not political activism.

The second aspect of the Obama online-campaign cuts closer to the bone. Through the online-portal myobama.com local supporters were enabled to find likeminded individuals in their vicinity to coordinate and then in turn to collectively organize

campaign events. This is exactly what should not happen if the argument above holds true: online communities are connected through weak ties, which do not lend themselves for collective action. Ergo, online communities do not tend to participate in collective action all that much. But if one looks closer, one finds the reason for the success. This element of myobama.com allowed users with a specific portfolio of interests - here political interest and support of Barack Obama – to find likeminded individuals. But instead of connecting a user from Atlanta to an Obama supporter in Greece the site offered the contact information of other Obama supporters in the greater Atlanta region. Thus, the online community allowed users to form location based communities of interest and with it strong ties to other Obama supporters. The community activities online facilitated collective action through the distribution of relevant information and how-to know how, but the collective action itself still depended on the organisers on the ground. This is the prototype for the combination of community structures on- and offline.

This example clearly shows the blueprint for successful community organizing of the future: the combination of digital communication channels and geographic location. This is already shown in the success of location based services, the beginnings of alternate reality games which mix online profiles with location based cues, and the ever increasing uses of mobile devices. This connection between information distribution via weak ties through digital communication channels and the re-enabling of location-based strong ties is the future for collective action.

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Griots and social media

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During December of 2008, the Greek state and the Greek citizens experienced a rather unprecedented sequence of events, which are now world known as #griots. After the killing of a young student named Alexis Grigoropoulos by a policeman, an almost general outburst broke out in the major Greek cities that lasted three weeks. An astonishing, unexpected feature of the #griots was the use of the so called digital activism, or more specifically the use of social media and cell phones not only for communication and co-ordination purposes, but also to relay the events towards a wider audience.

First, I would like to situate some basic elements regarding the causes that provoked these riots, although the discussions or more accurately the disputes on these causes, is still an ongoing process in Greece.

I think that one should start by considering that our societies are over-saturated by anger. It is a creeping anger, an anger that is not recognized for several social and political reasons - relating to control and discipline matters, and which constitute well known tactics in response to current forms of exercising the power. This anger can be crystallised easily, at once, given the occasion of an incident of police brutality or of a state repression. To this, one should add the fact that the bourgeois society fails permanently to recon its own fruits.

In Greece, the combination of two facts - the desperate immigrants who have been oppressed for years by the Greek state and excluded from the Greek society, and the obscure perspectives of the employed, especially the youth of the petite bourgeoisie, have created an explosive mixture. To this, we should add the continuing Greek tradition of protest and its unique culture of resistance within Europe. The result of this was what we all witnessed during December 2008.

The point of this presentation is to ask the question: What exactly was witnessed and how? Leaving aside the people present at the riots - either as direct participants or by

simply being there - the rest of the Greeks and people abroad perceived and formed their opinions via mediated information. In order to examine this mediated information which formed the opinion to the non-presents, I will refer to some Greek users of social media and bloggers and will add my personal opinion as someone who witnessed most of the crucial events which happened.

An important thing that was put on the map through this new experience of the use of social media by the citizens was obviously the fact that the information ceased to be a one-way stream. The monopoly of news broadcasting - traditionally held by the main stream media - gave way to a complex circulation of information and to new forms termed for example *citizen's journalism*, *reclamation of free information* and to a further extent the *re-definition of the public space.*

To begin with, we should consider the role of mainstream media primarily the TV channels. It is well known by many Greeks that television, the press and possibly Radio broadcasting are corrupt and biased and therefore can try to cover or mislead people regarding the facts. As a blogger named Teacher Dude wrote during the riots:

> For mainstream media the protests and the general unrest have been downplayed or simply ignored. The state-run TV networks follow the line set down by the party in power and whilst not Stalinist in their propaganda style (why lie when you can spin) were no more objective than say, Fox news.

Respectively, compared to the state TV, the private channels followed their own agendas, as the latter are defined by the interests of each channel which represents, in turn, the interests of its own proprietor. Again Teacher Dude says:

> Push the right buttons and you are rewarded with valuable advertising revenue and preferential treatment in competitions for government contracts.

The first two days were the most violent and if someone was watching the Greek TV channels, s/he could form the idea that it was just a minority of marginal people of a specific district - renamed for its alternative and anarchistic style - who were behind these riots. I would like to mention here, for the shake of recording what another blogger named ''vlemma'' wrote at the moment:

> The anarchists in these riots saw the chaos and they were scared to death.

It is true that the European TV broadcasts for the first two days, were repeating the footage and the comments received from the Greek main stream media and it was only on the third day that they were able to get in touch with alternative sources like bloggers and other social media and citizen journalists, in order to start capturing a better picture of what was happening in reality.

As the protests continued from the third day onwards, people began to discover the power of the web - namely social media, and could organise, inform and circumvent the dominant information stream i.e. main stream media. At this point it should be noted that it was not a coincidence that some people being present during the evening of the murder of Alexis Grigoropoulos with their digital camera, and then uploading video documentation to the YouTube, was a catalytic testimony which was not only a staring point for the protests, but also an actual and indisputable testimony of the killing and meant main stream media had not choice but to broadcast it and comment upon it continuously.

As the exegesis was developing during the days after the murder and the use of social media was becoming more and more intense, the appearance of a Greek scene of social media was leading the info stream, and became an info itself for the traditional media. A journalist of a mainstream newspaper Kostas Deligiannis wrote:

> The huge amount of people, considering the Greek reality that used the Internet to distribute information or to depose its own assessment regarding the situation has no precedent. For example in Facebook among the dozens of groups that were created focusing on the death of the student and the riots, only one named as: Alexandros Grigoropoulos r.i.p had 120,000 members. They were mostly students that wanted to express not only their anger but also to use this social media as a tool of social networking and co-ordination of their movements.

The swiftness of reaction of the web communities to the events was indeed remarkable. The immediacy and the accuracy of the footage that was uploaded at YouTube or Flickr, just to mention few social media allowing the uploading of amateur video and photos, was an astonishing fact for both Greek society and the mechanisms of state control. But above all, as the same journalist claims, the most important role was played by the micro-blogging platforms such as Twitter and

FriendFeed that allow the exchange of brief messages. From the first day under the label #griots, original reportages, as well as re-twitterings were assuring the continuous stream of information, not just to the users of these social networks but also to foreign journalistic agencies.

However, it should be noted that regarding the so called trendy social media like Twitter, Friendfeed and Facebook, the majority of users involved in the act of citizen journalism, were not individuals with a background of IT or wannabe journalists focusing to a personal carrier - possibly offered by the main stream media. It was remarkable that many of the users of these alternative media were politically neo-liberals and although they were supposed to be in opposition to the spirit of the events, they were furiously engaged in distributing, criticizing and commenting the whole picture of the events. One simple explanation could be that IT's and geeks of the info sphere saw the #griots as an opportunity for propaganda regarding 'their' brand new tools - in other words, the mush up of the social media. And, obviously, once the public attention was removed from the events, they turned back to their routines such as promoting the latest gadget on I-phone or Android.

Consequently several groups that were formed in Facebook during this period were transformed during the following months into advertising groups which are now promoting entertainment content web sites, commercial musical events and other similar material. But this is something that we face all the time - as a parallel struggle whenever and wherever a major socio-political event arises - for example recently, in Iran. There the incomprehensible social struggle that happened, for the majority of the westerners, is sustained by the social media and this represents a clash between old traditional media and the new media or 'twitter revolution'.

Finally, the digital side of #griots added a powerful argument to the hypothesis that from now on, the 'devastating news' will be first published on the Internet and then published by mainstream media. Of course some are distrustful regarding this issue - claiming that the nature of the social media will not allow citizens to be substitutes for professional journalists arguing that the original records can easily be drawn from an ocean of unconfirmed speculations. Whatever the case, they all agree that there has been a radical transformation of the media landscape as a monopoly of the mainstream.

Urban democracy in Japan

Emma Ota
Dislocate

Abstract

The rise of digital media technologies has been accompanied by the rhetoric of participation, interaction and a new realization of democracy in which everyone is given a voice. In the urban environment digital infrastructure increasingly pervades the physical but, as has been heatedly debated, this does not necessarily offer new freedoms. The urban is an increasingly contested space - public, private and corporate space have become progressively disputed. Our movements are controlled and under surveillance, personal data is collected and ideas of democracy are increasingly equated with consumption. The role of the citizen is a blurred one. What does the citizen belong to and what are their rights and responsibilities? How can new technologies be utilized to counter the very methodologies of control that they are used to promote? How can they offer participation and authorship and form community, particularly in the urban environment? This paper will examine the particular context in Japan in relation to these questions and offer examples of creative projects which have tackled some of the emerging issues.

Japan and particularly Tokyo have been mythologized for the level of saturation of new media technologies, in which everyone is absorbed in their own digital space and also enwrapped within a larger digital architecture. But do these spaces and structures encourage or dissuade a sense of citizenship? The ubiquity of mobile phones, mp3 devices, urban screens, CCTV, credit cards, electronic travel cards, wifi, GPS, electronic signs, signals and sounds is increasing mobility, increasing consumption, but is it increasing choice? Arguably these technologies can be seen as technologies of control and alienation, at least in many of these utilizations, but are these digital technologies also offering new forms of citizenship?

Two key figures whose work will be examined here are Kogawa Tetsuo and Ogura Toshimaru, pioneers in their social activism in relation to emerging technologies, and

who have encouraged much needed critical debate with regard to the impact of these media upon our freedoms and ability to participate in our communities.

Many have claimed that contrary to promoting citizenship and activism in society, media technologies merely offer the opportunity of withdrawal. Japan has become notorious for the phenomenon of ‘Hikikomori’, a name given to individuals who wish to escape society and are characterized as refusing to leave their room and being absorbed in TV, computer games and the Internet. Many have identified media technologies as a stimulus of such withdrawal from society, however this absorption is likely to be only a symptom. But, as a symptom, this expresses the potential to find escape through media technologies, an expression found everyday - as commuters on the train who try to find their own space to withdraw into through their mobile phones, handheld computer games and audio devices. Furthermore it is perhaps interesting that Japan’s Internet cafes, open 24 hours at very cheap rates, are now becoming a place of refuge for the increasing homeless and ‘working poor’: those effectively denied citizenship within the norms of society. This paper will examine the historical/legal context of citizenship in Japan, the situation of certain socially excluded groups, their use of particularly the internet as a form of engagement and mobilization and the potentials to find expression in the public realm through the integration of urban space and media technologies.

Let us examine examples of these socially excluded groups. There is an increasing move towards class distinction and greater divide between rich and poor. A new vocabulary is emerging to describe social groups, such as ‘freeters’, increasingly a derogatory term for workers on temporary contracts. With now one third of the Japanese working population engaged in temporary employment a big shift can be seen in society, but a great stigma is still held against those who do not fit the standard and in some ways are disenfranchised from society. As is evident in many places around the world, marginalized groups are finding an expression through digital technologies, primarily based on the Internet. The Internet offers a selective form of citizenship, in which one can choose which space to participate in and contribute to, one can find a like-minded community, perhaps a safe haven from the prejudices and discriminations experienced in the physical world. This is true of ‘freeters’ also. Online, people are able to engage in highly socio-political debate and vent their frustrations but is this online citizenship finding an expression offline in the public realm?

We must note that in Japan it is illegal to hold any mass gathering, protest, or demonstration without the permission of the Public Security Committee: public space is heavily regulated. This imposes restrictions on expression in public space, as seen in the incident on October 26th 2008, where an event known as Reality Tour brought together 50 activists to see the 6.2 billion yen home of prime minister Aso and to protest against the divide between rich and poor and lack of rights for temporary workers. Three people were arrested for holding a demonstration without the permission of the police authority. As the news website Japan Today reports: 'Meanwhile, video footage of the arrests, which has been uploaded onto the Japanese YouTube site, has received hundreds of thousands of hits from Net users, turning the incident into one of the hottest topics on the country's most popular video-sharing Web site.' This clearly demonstrates the high interest of an online community as to the plight of this small group, expressing a much wider dissatisfaction in society - but what is the impact of this?

Where does the power of the citizen rest? According to independent researcher Ogiue Chiki, notions of power and citizenship have to be divided, they are separate questions. Active participation and vocalization does not entail power necessarily, especially in the use of media technologies. One may find expression through the Internet, engagement in political exchange, but with little impact in actual society. Ogiue comments that many 'Internet users tend to search for connectedness as an end in itself rather than as a means to an end', for many citizenship it is the being-in-common, 'the connectedness' of a group, community or society, rather than contributing to or changing the direction of this body.

We must reflect upon the idea of citizenship in Japanese society, what it means to be a member of society, the responsibilities, benefits and freedoms which this entails. There have been many stereotypes created both within and outside the country, but we can examine the question in terms of an historical and legal perspective of citizenship in Japan. Japanese citizenship is based on *jus sanguinis*, right of blood, you must be born to a parent of Japanese blood in order to have a right to Japanese citizenship. You may not hold dual citizenship in Japan. If you have multiple citizenship you must decide before the age of 22 whether to hold or renounce Japanese citizenship. It is possible to gain Japanese citizenship, but it is a notoriously difficult process.

The concept of the Japanese nation and the Japanese people has been strong throughout centuries in Japan, and citizenship has been equated with affiliation to the nation (and to the Emperor). Myths of Japan created by the gods, old ideas of pure blood, the homogeneity of the Japanese race were used to great effect in the Second World War and Japan's earlier imperial campaigns. Here in Japan's history of colonialism, we witness forced citizenship (even if 2nd or 3rd class) in particular of colonized Koreans. There remains a strong nationalist movement amongst some groups, which still holds sway in politics. It has also been claimed that there has been an ambiguous position towards foreign residents and to Japanese with foreign backgrounds (such as those of second/third generation Korean/Chinese descent), including discrimination and a lack of civil rights.

However, such perspectives are now facing strong challenges through global mobility, economic pressures, an aging population etc, which has led the government to officially recognize the need and benefit of promoting immigration to Japan and a reconsideration of nationality and citizenship. This outlines the political terms of citizenship in Japan, but we must acknowledge that citizenship goes beyond legal/political status.

What does it mean to be a citizen beyond this status? Can citizenship belong to something other than state? Active citizenship can be seen as an expression through participation in civil society. Japan has seen a significant rise in grass-roots political activity, social action, voluntary groups and NPOs, particularly lifted by the Non-Profit Organization of 1998 (the need for such organizations clearly being shown in the government's poor handling of the Kobe earthquake which quickened this bill). Such organizations are increasingly strengthening their action by the Internet and other digital communications. Isa Ducke has pointed out the specific example of the textbook affair (a heated debate over the content of text books regarding Japan's colonial conquests and events of WWII) to show how Internet is playing an important role in activism across the political spectrum (Ducke 2003:207). Abe Shizuka has also pointed out the importance of media technologies on a grass-roots level, seeing increasing uptake by senior citizens: 'One new and important aspect of their community activism is their high utilization of information and communication technologies (ICT) and mobile communication' (Abe 2006). This presents us with citizenship and civil participation on a national, local and community level, not to mention the increasing 'citizenship' to online worlds - where the netizen can be an active contributor to a virtual environment.

The Japanese government is currently engaged in a project to bring the virtual citizen and the physical citizen closer together, a project referred to as ‘Ubiquitous Japan’ (U-Japan). Aiming to complete the first stage of this project by 2010, the objective is to create an 'anytime, anywhere, by anything and anyone' ubiquitous society which is apparently ‘just at our door step’. Not only do they aim to have 100% broadband Internet access by 2010 but they also aim to make all people and all things connected ‘Person to person; person to goods; goods to goods’ (Imagawa 2001). Everything will be transmitting and many will be receiving, an encapsulating media environment. But will such an all pervasive simultaneity of ‘communication’ enable participation and social/political expression? We need to take a critical view of media technology forms that are part of this ‘ubiquitous’ environment and the rhetoric which surrounds them, and to discuss them in terms of enabling or disabling citizenship, and how they may define this very term.

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On Hertzian space and urban architecture

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Abstract

Cities today are complex hybrids of physical and informational space. Brought into being through common everyday techno-social practices, these hybrids rely on the wireless spectrum to enable a variety of media, information and communications events that continually make and remake the spatial conditions of urban life. This essay examines the relations between this Hertzian space and the architecture of urban environments. Building on a longstanding discourse surrounding the material and immaterial limits of urban architecture, it explores how we might begin to think about shaping the Hertzian space of contemporary cities.

Beyond materiality in architecture

> When it is raining in Oxford Street the architecture is no more important than the rain, in fact the weather has probably more to do with the pulsation of the Living City at that given moment. (Cook 1963)

In the introduction to an issue of *Living Arts* magazine published in 1963, British architect Peter Cook claimed that architecture, at least as it was traditionally conceived, no longer played a significant role in shaping the urban experience. This issue of Living Arts was a catalogue for 'Living City,' an exhibition organized by the young British architecture collective Archigram and presented at the Institute for Contemporary Art (ICA) in London. At the time of the exhibition, 'swinging' London epitomized the modernization of British cities in the 50s and 60s (Sadler 2005). The glare of neon-lights, the proliferation of urban advertising, the glitter and glam of new (American) products displayed in storefront windows, or the horror of 'garishly decorated restaurants' (Brooker 1969: 269) - this illuminated 'pop' city became the curse of 'proper' British architects and urban planners. This urban vernacular, 'Living City' claimed, made fussing with the detailing of urban facades or interior lobbies

irrelevant, as their reception by people on the street was fragmented at best, being more influenced by ambient, immaterial and kinetic forces than by the detailed formal articulation of space and material.

Archigram viewed the flotsam and jetsam of urban life not as something beyond the reach of architecture; rather, they sought to bring architecture beyond itself in order to engage the ephemeral qualities constituting the Living City. These were the materials of a new architecture, an urban dynamic composed of light, sound, and other forms of urban communications: 'static communications + motile communications + verbal and non-verbal communications + signs + symbols,' lists one montage created for the exhibit, 'watch it happen + listen to the sound + see it flow' (Sadler 2005: 56-57). Not content with viewing the architecture of the city as a collection of formal, static, immobile, and timeless monuments within and around which life is organized, Archigram called for an urban architecture capable of engaging the less determinate, more ephemeral, untidy ebbs and flows of urban life: 'Situation, the happenings within spaces in the city, the transient throw-away objects, the passing presence of cars and people,' writes Cook, 'are as important, possibly more important, than the built demarcation of space' (Sadler 2005: 59). In order to engage the (contemporary) conditions of its reception, architecture had to become somewhat like the weather - at least, it did if it were to remain at all culturally relevant.

Today, as the dataclouds of the 21st century descend on the streets, sidewalks and squares of contemporary cities, we might ask: to what extent are these Hertzian weather systems becoming 'as important, possibly more important' than built form in shaping our experience of the city? On any given day, we pass through transportation systems using magnetic stripe or Radio Frequency ID (RFID) tags to pay a fare; we coordinate meeting times and places through SMS text messaging on the run; we cluster in cafes and parks where WiFi is free; we move in and out of spaces blanketed by CCTV surveillance cameras; and we curse our wireless provider when its cell towers aren't in reliable range of our place of residence. Hertzian space is all around us, coming in waves of various frequencies, lengths and intervals, embedded in manifold ways within the course of our everyday lives.

Given these conditions, how might we begin to think about how to shape these environments? To what extent can we see this as a way of practicing a new kind of urban architecture? In the passages that follow, I attempt to cast issues related to

urban computing and locative media in terms of a broader and long-standing discourse on architecture and urban space. In doing so, the intent is less to lay professional or disciplinary claim to this still relatively uncharted territory, and more to examine how a dialogue between technology, sociality and urban space might not only offer a new opportunity to bring architecture beyond itself but also to open new avenues for critical exploration in the evolving and related fields of urban computing and locative media.

Enacted space

> The modern city exists as a haze of software instructions. Nearly every urban practice is mediated by code. (Amin and Thrift 2002: 125)

Two years prior to 'Living City,' author and urban activist Jane Jacobs published her influential book *The Death and Life of Great American Cities* (Jacobs 1961). In one extended passage she describes the cycle of daily (and nightly) activity transpiring on Hudson Street, located in her neighbourhood on the Lower West Side of Manhattan. This narrative of a sidewalk 'ballet,' as she calls it, takes the form of a list of casual events, encounters and interactions between neighbours, workers and passers-by:

> Mr Halpert unlocking the laundry's handcart from its mooring to a cellar door, Joe Cornacchia's son-in-law stacking out the empty crates from the delicatessen, the barber bringing out his sidewalk folding chair ... Simultaneously, numbers of women in housedresses have emerged and as they crisscross with one another they pause for quick conversations that sound with either laughter or joint indignation, never, it seems, anything between ... Longshoremen who are not working that day gather at the White Horse or the Ideal or the International for beer and conversation ... As darkness thickens ... the ballet goes on under lights, eddying back and forth but intensifying at the bright spotlight pools of Joe's sidewalk pizza dispensary, the bars, the delicatessen, the restaurant and the drug store. (ibid: 52-53)

If Archigram viewed the city as an environment conditioning our emotions, today the 'feel' of the street is in the process of being defined less strongly by what can be seen with the naked eye. Perhaps taking a cue from Jacobs, Dan Hill describes the

informational ballet transpiring on a typical street today in terms of what we cannot see:

> We can’t see how the street is immersed in a twitching, pulsing cloud of data ... This is a new kind of data, collective and individual, aggregated and discrete, open and closed, constantly logging impossibly detailed patterns of behaviour. The behaviour of the street.
>
> Such data emerges from the feet of three friends, grimly jogging past, whose Nike+ shoes track the frequency and duration of every step, comparing against pre-set targets for each individual runner. This is cross-referenced with playlist data emerging from their three iPods. Similar performance data is being captured in the engine control systems of a stationary BMW waiting at a traffic light, beaming information back to the BMW service centre associated with the car’s owner.
>
> The traffic light system itself is capturing and collating data about traffic and pedestrian flow, based on real-time patterns surrounding the light, and conveying the state of congestion in the neighbourhood to the traffic planning authority for that region, which alters the lights’ behaviour accordingly … (Hill 2008)

To understand the implications of this folding of people, street and data onto each other requires thinking about space in non-visual ways, where formal geometry and material articulation become less relevant than the topologies of networked information systems and their intersection with the socio-spatial practices of daily life. Martin Dodge and Rob Kitchen have suggested that these kinds of 'code/space' need to be understood ontogenetically, that is, as a spatial condition that is brought into being through specific practices that alter the conditions under which the space itself is (re)produced. Building on the work of Adrian MacKenzie (2002, 2003), they differentiate between technicity (the productive power of technology to make things happen) and its realization through transduction (the constant making anew of a domain in reiterative and transformative practices) (Dodge and Kitchen 2003). These assemblages of code, people and space are thus brought into being through specific techno-social performances or enactments within the course of daily life.

The mobile device as territory machine

> Imagine Hegel, Marx and McLuhan encountering the keitai [mobile phone] of the twenty-first century. Georg Hegel is astonished at seeing the spirit of the era dwelling persistently in our palms. Karl Marx complains that it is an alienating fetish object. Marshall McLuhan, his eyes sparkling, chimes in that it will turn the whole world into a village - no, a house. But in the next moment, he comes upon a realization that appals him. 'But wait!,' he exclaims. 'My wife and children will have the equivalent of a private room with a twenty-four-hour doorway to the outside world, fully equipped with a TV, a bed, and even a bathroom. Where would my place be in such a house?' (Fujimoto 2006)

Today, traditional approaches to 'programming' space – defining a set of functional requirements and normative activities or uses that a space is designed to support – are complicated by contemporary everyday practices involving mobile devices and wireless information systems. In Japan, for example, the mobile phone has been described by Kenichi Fujimoto as a personal 'territory machine' capable of transforming any space - a subway train seat, a grocery store aisle, a street corner - into one's own room and personal paradise. Born out of the so-called 'girl's pager revolution of the 1990s,' the mobile phone became a key weapon in a young Japanese girl's arsenal for waging gender warfare against older 'raspy and thick-voiced' oyaji intent on peeping at young female bodies from behind a newspaper. Armed with her keitai, speaking freely in a high-pitched voice, 'wearing loose socks and munching snacks,' these kogyaru 'couldn’t care less if a subhuman oyaji peeked at their underwear or eavesdropped on their conversations' (Fujimoto 2006: 98). Transforming the paternalistic communities of city streets and subway cars into private territories for women and children, these techno-social practices re-made space in the Japanese city in new ways.

In the West, spatial practices involving the iPod are perhaps more familiar. Michael Bull (2000) has studied how people use these devices to mitigate the contingencies of daily life. On one level, the iPod enables one to personalize the experience of the contemporary city with one's own music collection. When you're on the bus, at lunch in the park, or shopping in the deli, the city becomes a film for which you compose the soundtrack. The iPod also provides gradients of privacy in public places, affording the listener certain exceptions to conventions for social interaction within the public domain. Donning a pair of earbuds grants a certain amount of social

license, enabling one to move through the city without necessarily getting too involved, and to some extent absolving one from responsibility to respond to what is happening around one. Some people use earbuds to deflect unwanted attention, finding it easier to avoid responding because they look already occupied. Faced with two people on the sidewalk, we will ask the one without earbuds for directions to the nearest subway entrance. In the same way, removing earbuds when talking to someone pays the speaker a compliment. So, in effect, the iPod becomes a tool for organizing space, time, and the boundaries around the body in public space.

What's significant here is that as these mobile devices become ubiquitous in urban environments (and in many places they already are), the technicity of architecture as the primary technology of space-making is challenged by the spatial transductions these devices afford. Regardless of the formal geometries and material arrangements of a space as defined by architecture, and irrespective of the normative activities or uses encoded (or elicited) by its spatial program, these devices and the ways in which we use them have in fact become as important as, if not more important than, architecture in shaping our experience of urban space.

Conclusion

Urban computing and locative media hold the promise to achieve what architecture and urban design have long aspired to: opening up the design of urban space to more inclusive and participatory processes resulting in urban architecture that is adaptable to the increasingly ephemeral forces at play. Realizing this promise involves shaping the ambient qualities of Hertzian space as if it were a weather system of sorts, and structuring the techno-social practices that continually re-make the spatial conditions shaping our experience of the city. Such an immaterial urban architecture may find little acceptance within a profession so highly invested in the material practices of the real estate development and construction industries. Yet if architecture is to remain relevant vis-à-vis urban space, it may have no choice but to grow beyond its current professional and disciplinary boundaries. At the same time, if urban computing and locative media are to be considered in terms of their potential to critically engage urban conditions, their practices need to be re-evaluated in the larger framework of everyday life and urban public space.

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02 Entertainment and mobility

Entertainment and mobility

Ralph Borland and Tim Redfern
SMSage

1 Introduction

This paper describes the electronic art project SMSage. SMSage is a security camera that speaks using a text to speech algorithm. After greeting passers-by identified through broadcast names of their Bluetooth devices, it asks to be sent SMS text messages, which it recites, verbatim at first, and then rearranged and spliced with previous messages. SMSage was exhibited at Conflux 2007 in Brooklyn, New York, and will be exhibited as part of ISEA 2009, in Dublin. This paper, written by the project's authors, describes their motivations and intentions for the project, and situates it in relation to existing fields of practice: the creation of platforms for expression by the public, through text-message or otherwise; works that interact with surveillance networks; and cutup poetry production. They describe the modification and construction of hardware and software elements to enable the project's behaviour. Some observations from the public installations to date are noted, and some recommendations for progressing the project conclude the paper.

2 Intentions and motivations for the project

2.1 A public address system

Our starting point with the project was the desire to create a public address system that anyone could speak through, probably over their mobile phones. It would displace the voice or presence of the person using it and provide them with an anonymous public voice. We discussed telephone bars from the 1970s, where more social interaction was enabled through the use of an intermediary device. The user would be able to ventriloquise – Speaker's Corner, but through an avatar.

We discussed the idea of creating a platform that someone could talk through on their mobile phones, an amplified mobile phone in a public space, out of reach. SMS rather than voice appealed to us – delivering a message to someone to read out, rather than speaking directly yourself. That imagined experience of making something else speak, which would carry on speaking after you had left, appealed to us – the creation of a character, a personality.

2.2 Creation of a character

The first purpose of the camera housing was as a disguise; but then it became a character. That seemed fitting if we want to upset the relationship of people to technology, to present them with a device that will only partially follow orders. We gathered photos of security cameras and discussed their ubiquity, near invisibility and authority.

We saw the satire inherent in using a security camera to house an electronic character that was dysfunctional, unsuited for its purpose, eccentric, erratic, and even verging on the insane. Thus emerged the character 'SMSage', a 'mad sage' who uses SMS.

2.3 Commentary on surveillance

With a security camera chosen as the character, the project inevitably started to refer to surveillance. We were aware of talking cameras recently installed in Britain, and the idea that our camera would not be telling people what to do, but engaging in communication with the public, appealed to us. It would be no mere conduit for the

operator’s voice, but would reverse the normal flow of command, making a security camera that would converse rather than command.

3 Situating SMSage in relation to other work

SMSage refers to several other individual projects and can be situated in relation to existing genres of artistic practice.

3.1 Public Address Systems using SMS

Johannes Gees’ ‘Hello Mr. President’ and ‘Hello World’ projects use personal communications technology to provide platforms for public expression. ‘Hello Mr President’ was an intervention at Davos during the World Economic Forum summit of 2001, which allowed the public to write messages to world leaders to be projected on a mountain above a summit that was otherwise closed to them.

'SimpleText' (Tim Redfern, Jonah Brucker-Cohen and Duncan Murphy, 2003) creates a public platform for public comment, which audiences utilised in humorous, satirical and unforeseen ways. The audience create an audiovisual show entirely through text messages which the system uses for Google image searches. One of the resulting images becomes an element in an evolving collage, while the text is simultaneously fed to a text-to-speech engine.

'Dancing Robots' (Tim Redfern, 2005) is a project which allowed passers-by to control a public installation of off-the-shelf toy 'Robosapiens' via SMS. Users were invited to request genres of music, to which the robots would dance. The system was also equipped with a very simple ability to converse: a few pre-composed responses to obvious obscenities or confusing texts. Despite the simplicity of the interaction, the log files reveal people‘s willingness to interact with a system as if it has a character or is alive.

RECEIVED: 14:20 **Rave**
(the installation replies that it doesn't do rave)
RECEIVED: 14:20 **Fuck of den**
(the installation replies that this is a family show)
RECEIVED: 14:21 **I wil smash dat windo an break ur neck u muppet**

Figure 1. Example transcript from the 'Dancing Robot' logs.

3.2 Surveillance

There are many contemporary projects engaging with urban surveillance. Most aim to increase public awareness of surveillance, or help people evade it. The Surveillance Camera Players perform plays for surveillance cameras, their immediate audience both camera operators and passers-by - like other projects which have involved requisitioning surveillance footage of staged scenes to produce photographic portraits or short movies (such as those by Manu Luksch) - they suggest a practice that makes creative use of surveillance networks, producing different products than their intended ones. The Institute for Applied Autonomy produced online maps of surveillance-free walking routes in Manhattan; and projects like Michael Naimark's 'Camera Zapper' and Filo Art's 'IRASC' produce equipment that 'blinds' cameras with lasers or infrared light.

SMSage does not tap into the information flows of other public surveillance networks or help people to avoid surveillance, but makes use of surveillance networks as a means of disguise, mimicking a node on the network. It draws attention to surveillance through breaking with the silent conformity and near invisibility of existing surveillance cameras and it makes creative use of surveillance networks by using one of its components as the basis for a character, performing a kind of impromptu theatre.

3.3 Cutup and algorithmic poetry

Auto-combinant poetry has a long history. Before the availability of computers methods used to assemble 'random meanings' included the I Ching, seances, paper cutups and audio tape. In the 20th century, the Surrealists and Dadaists made an art

of cutup poetry. William Burroughs cut up words on his tape-recorder. The idea behind the apparent illogic of paying attention to 'meaningless meaning' is that it triggers the reader's (or listener's) subconscious to produce an infinity of interpretations. Using a computer to rearrange data opens the potential for algorithmic ordering and subtle variations along an axis - from randomness to structured reordering of material.

SMSage moves between verbatim repetition of user input, and nonsensical recombinations of data. 'Song of Solomon' (Ralph Borland and Julian Jonker, 2006) is an audio installation that also makes use of randomness and orchestration. In reproducing the iconic South African song 'Mbube' aka 'The Lion Sleeps Tonight' from a collection of bar-long snippets of over a 100 remixes of the track, it selects and combines the musical elements so that the original 1920s recording of 'Mbube' can always be heard at 20 minute intervals in the cycle of the piece, before dissolving into a cut-up of remixed elements.

4 Technical parameters and development

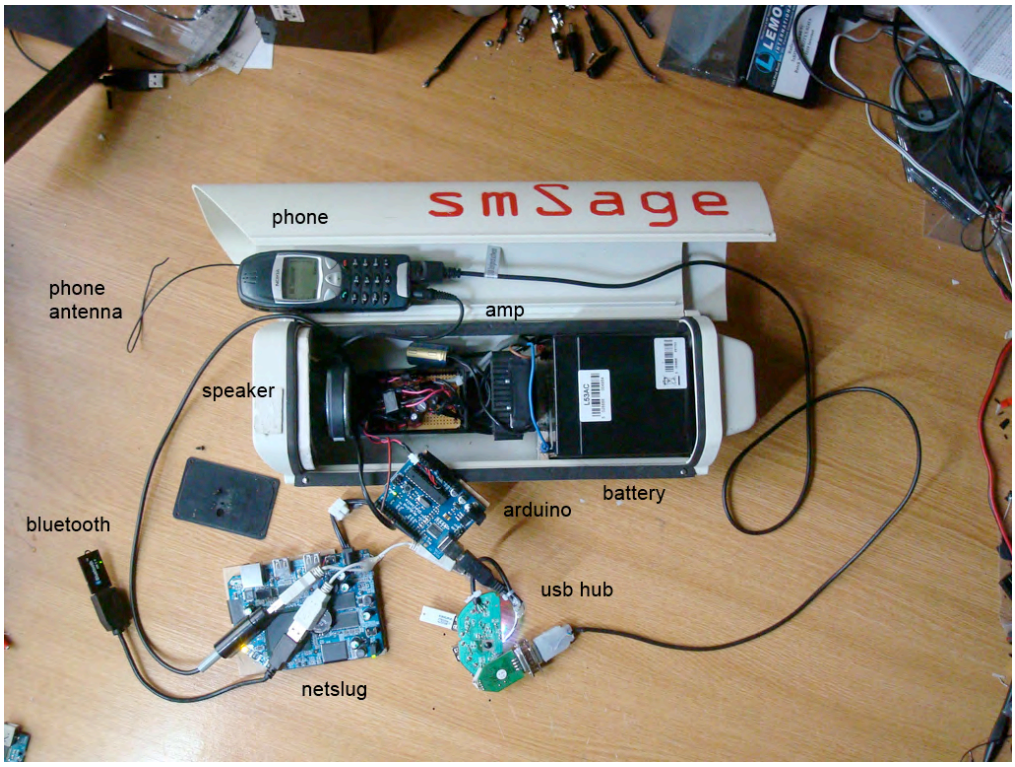

Figure 2. Components of SMSage

The design of SMSage reflects the need for a compact system that runs on battery, incorporates a sound system and has a computer that can perform speech synthesis, discover Bluetooth devices and transceive SMS messages.

4.1 Hardware

Computer: We investigated the option of using an embedded microcontroller before deciding upon an 'NSLU2' embedded Linux device which would allow a range of connected peripherals, and have enough memory and processing power to implement speech synthesis and text manipulation algorithms to imbue SMSage with 'personality'.

The NSLU2 is a consumer product called a 'network storage link'. Linksys, the manufacturers, condone the repurposing of the device, and thus several variants of Linux have been ported to it, allowing it to be used for a wide variety of applications.

Peripherals: SMSage requires a USB storage chip, Bluetooth and audio interfaces, and a mobile phone handset connected via a USB-serial interface. Using these peripherals with embedded Linux is convenient, with all of the drivers being included in the kernel rather than having to be tracked down individually.

Sound: The USB audio interface is amplified through a 40w mono amplifier to a 9cm speaker, with a volume control. The sound of SMSage is loud and clear enough for urban environments.

Power: In order to extend the life of the battery, we built an efficient switching power regulator developed by John Arthur. An 'arduino' microcontroller was also added to turn off the amp when not in use, and to allow SMSage to monitor its own battery level.

Additional work was needed to allow SMSage to turn on & off with a predetermined schedule. Using the ‘watchdog’ program, also developed by John Arthur, required that the driver for the x1205 chip be 'backported' to the older Linux kernel used.

Technical development of SMSage was blogged at http://eclectronics.org/blog

4.2 Software

SMSage is written in the interpreted language 'python'. Text-to-speech is performed by 'Flite' an open-source speech synthesiser optimised for small mobile devices.

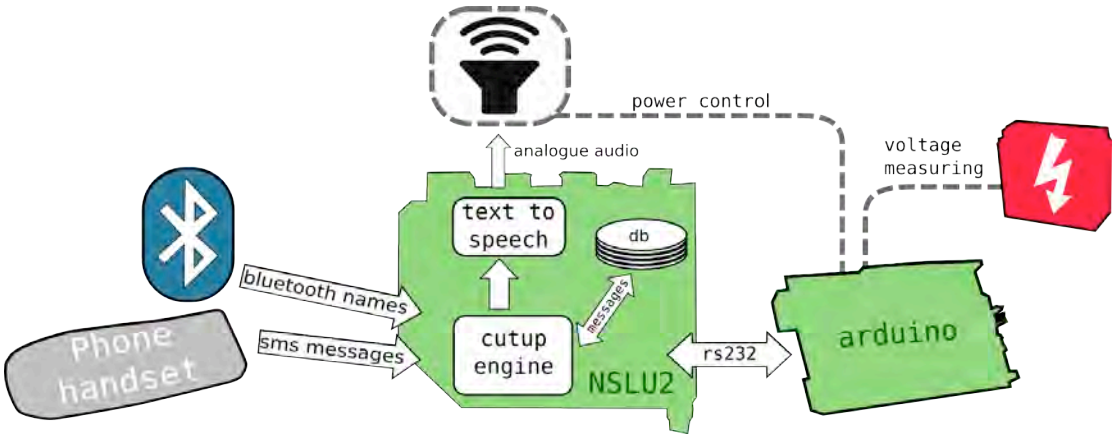

Figure 3. SMSage hardware/software architecture

The SMSage algorithm speaks phrases which may be requests ('Why not send me a message?'), greetings ('Hi there Nokia 6288'), or cut-up and rearranged SMSes. As new messages may be received before the cycle of an existing cut-up structure has finished, the algorithm maintains multiple 'threads' of conversation - allowing SMSage to continue several conversations simultaneously, emphasising the wandering mind of the character.

SMSage employs several strategies in cutting up the messages. All messages received are stored in a database to be re-used, with patterns based on morphing one phrase into another by replacing words one by one, 'branching' between phrases where a word matches, and replacing individual words suggested via bigram analysis (a way to capture the flavour of language by statistically examining the likelihood of one word being succeeded by another).

SMSage also manipulates the speed and tone of the synthesised voice to add variety and emphasis to the phrases. Flite's rather basic options for changing voice make for non-naturalistic vocal effects, which in the case of this project suited the synthetic 'technology gone awry' character of SMSage.

```
                I like texts. text me at 086 3039460
[received]      I know Conor casby
                I know Conor casby
                I know Conor casby
                hello Nokia 6288, sms me at 086 3039460
                what's up, Nokia 6288 and Nokia 5800 XpressMusic, I know Conor casby
                Pick up your litter!
[received]      Hey Connor, What do you think of the exhibition?
[received]      I want you i want you to take me home
                Hey Connor, you i want you to take me home
                Hey Connor, you i want you Conor take me home
                Hello there Fozzie and Hot stuff ! where are you going?
                I want i want you to take me home
                Hey Connor, you me a message
                I want know want you to take me home
                I want know want you Conor take me home
                I want know want Conor take me home
[received]      I love camels
                I want Connor, you me a message
                I love of the exhibition?
                I want you to take me home i can see you, you want me, you touch, i feel
                I want know want Conor take me home
                I love of the exhibition?
                I know of the exhibition?
                I know of Conor exhibition?
                Hey want know want Conor take me home
                I know Conor casby
                I know of Conor casby
                Hey want What want Conor take me home
                want I know Conor casby
                I want i want you to take me home i see you, you want me, you touch, i feel
[received]      Hey Connor, What want think of the home
[received]      Bum bum chin chin
                hello Nokia 6234, W595, Ninafive and Fozzie, sms me at 086 3039460
                I want i want to take me home i see you, you want me, you touch, i feel
[received]      But Connor, you're stuck to the wall!
                Bum bum Conor chin
[received]      Hey dont go home yet
                want I know Conor me home
                Bum bum Conor casby
```

Figure 3. Transcript of SMSage conversation illustrating the character of interaction that this system creates. (NB Conor Casby is an artist who achieved notoriety in March 2009 by hanging unflattering nude portraits of the Irish Prime Minister, Brian Cowen, in the National Gallery of Ireland).

5 Early findings

Observing the public interacting with SMSage reveals some possible tension between the project as performance or as public address platform. Passers-by are amused and engaged by a voice talking unexpectedly out of a piece of urban infrastructure, especially so when it addresses them by their Bluetooth device name. They are, at this stage of engagement, still ‘audience’; they seem slower to become ‘users’ of the project by sending it text messages. There is the possibility that in creating a public-address platform with a personality, we make users less likely to see it as a conduit for their input.

The project’s use of Bluetooth name detection to exhort passers-by to communicate with it was initially a secondary feature of the project, but public interaction has

shown it be a compelling part of the interaction. It produced subversive comedy, and ironically recaptured the camera-housing's function as surveillance device, in revealing personal Bluetooth names such as 'Hotstuff', 'Shifty Sanchez' and 'Rashers' which may not be intended for public broadcast.

SMSage's repeated vocal addresses to one 'Rashers' served to undermine the taciturn nightclub bouncer whose nickname it had uncovered. The reaction of authority figures to the project reinforces its potential for subversion; during a permitted installation at Trinity College, Dublin, an uninformed campus security guard was enraged by this voice that emanated from what he assumed was 'his' security camera.

6 Conclusion

SMSage aims to be a thought provoking and amusing audio sculpture which undermines the authority of surveillance networks and provides a temporary anonymous platform for public commentary. The realization of the project built on user-modifications of the Netslug computer, made possible by open source software and knowledge-sharing communities. Early public testing offers some tentative findings around the tension between the project as spectacle or as tool.

Moving forward with the project, we envisage testing it in different types of settings to hone the interaction experience and encourage more user input. We plan to introduce more sophisticated language-processing techniques, and incorporate additional inputs over an Internet connection.

References

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'Song of Solomon' http://ralphborland.net/sos

NSLU2 Linux community - http://www.nslu2-Linux.org/

'An efficient voltage regulator', John Arthur
http://johnarthur.wordpress.com/2008/06/08/an-efficient-voltage-regulator/

Intimate bidirectional interaction between external displays and mobile devices

Kyle Buza
BuzaMoto

Abstract

We describe a system and technique for allowing mobile device-carrying users to leverage camera-equipped external displays to enhance their ability to manage, navigate, and interact with data sets of varying size. In particular, we have built a system that allows users to use external displays as an extension of their own device display through the transfer of selected device context to the external display itself. The user may then navigate and interact with this data using the device. We also demonstrate a more general use case, supporting a public kiosk-style of interaction, wherein multiple users have the ability to affect the content visible on the external display. These users may select and transfer any of this content to the device, where it may be interacted with and sent back to the display for future visitors to experience or modify.

1 Introduction

The past few years has seen a substantial increase in network-enabled mobile device adoption. As the popularity of these devices increases, we proceed ever closer to a world where ubiquitous computing is a reality. While the ultimate realization of a truly pervasive computing environment is not yet on the horizon, opportunities exist for us to consider this model when designing mobile device-based interactions. Taking this proliferation of mobile devices into consideration allows us to focus on short-term goals, such as how to integrate the devices with existing digital artifacts such as external displays and projection surfaces in a meaningful way.
In this paper, we present two scenarios for enabling a form of intimate interaction between a mobile device-carrying user and an external display surface by means of an outside-in camera based tracking approach. In the first, the display is treated as a blank canvas, allowing the end user to leverage its screen real estate to interact with data sets that would otherwise be difficult, if not impossible, to interact with on a

screen limited device such as a mobile phone. Utilizing the display in this way, the user may navigate and locate relevant information using the mobile device as a remote control, relocate the object to the device, and continue to interact with it on a more intimate level. We also demonstrate how this external display can be used for peripheral information visualization while the user's focus remains on the device. In the second scenario, the external display is treated as a repository for public information: by gesturing with the mobile device, the end user may pull data elements out from this public display, modify them, and place the modified version back into the external context for future visitors to interact with.

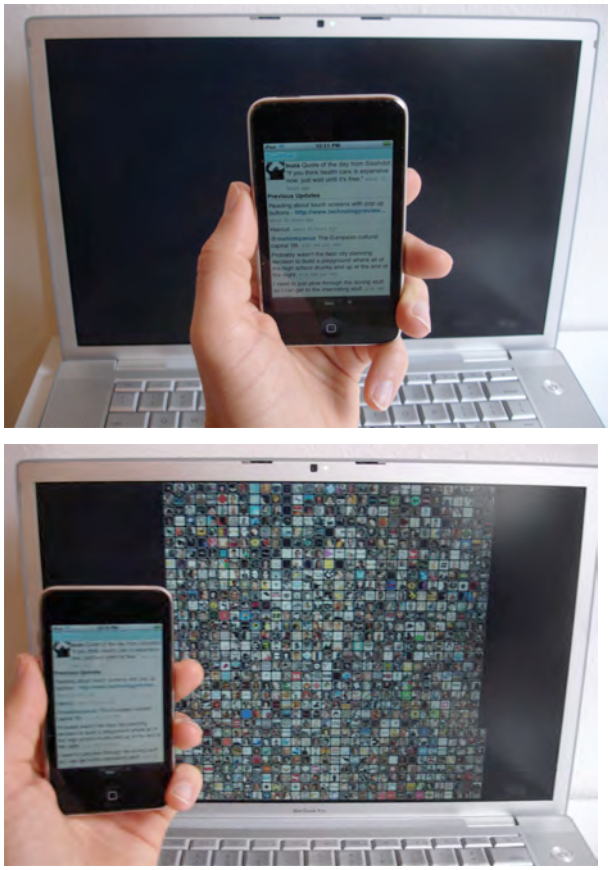

Figure 1. Transferring context from the device to the external display. The position of the device is first detected by the built in camera, and data is transferred to the external machine for display.

The structure of this paper is as follows: In Section 2, we discuss relevant related work with respect to spatially aware handheld interaction devices. Our treatment of the display as an interactive visualization surface is described in Section 3, and as an interactive content repository in Section 4. Our vision-based tracking approach is described in Section 5, and a brief discussion is presented in Section 6.

2 Related work

Following the work of George Fitzmaurice (Fitzmaurice 1993) regarding spatially aware devices, various techniques have been proposed for using mobile devices as input mechanisms for external displays (Olwal 2006; Olwal, et al, 2009), physical objects (Reilly et al, 2006) and digital whiteboards (Rekimoto 1998). The techniques used to enable these types of interactions range from marker-based tracking (Rekimoto 2000, Ballagas 2005), markerless tracking (Rohs 2007), RFID (Want et al, 1999), using the device trackpad to control an on-screen cursor (Myers et al, 1998), using the device display itself for 'outside in' tracking (Miyaok 2004), to optical flow techniques (Wang 2006).

The most closely related work to date is the LightSense system (Olwal 2006), which tracks the LED present in some mobile devices to determine the relative position of the mobile device with respect to an external display. Additional detail (map data, for example) is displayed on the mobile device as it is tracked over the external surface, similar to the approach by Yee (2003). In this paper, we place an emphasis on the interactive affordances created by conceptually separating the device and external display, as opposed to the technical details underlying a particular approach.

3 The external display as visualization surface

Perhaps the most significant challenge of designing user interfaces for mobile devices is due to limited screen real estate. As mobile devices are defined by this reduced form factor, it is unlikely that this challenge will be alleviated in the near future. Thus, we sought to find a way to allow users to leverage the screen space

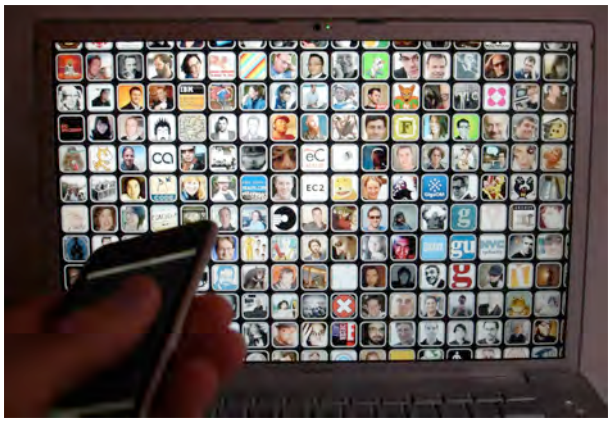

Figure 2. Navigation using the touchpad.

offered by external displays in order to interact with data originating from the device itself: in other words, to treat the external display as an extension of the mobile device context.

In the example presented here, we demonstrate how a user can leverage an external display surface to navigate a large collection of users from the popular social networking service Twitter[1]. In this scenario, a user approaches the external display and gestures towards the screen to allow the device to be recognised by our custom vision-based tracking system. Once recognised, the external system initiates a TCP-based communication session with the device in order to determine the appropriate data set to display (in this case, a collection of Twitter users associated with the user's account) (Figure 1). The external system then loads the requested data and displays it in a 2D presentation mode, suitable for translational interaction (along the x, y coordinate axes) by the user using the touch sensitive display of the mobile device (in this case, an Apple iPhone). The user now has the ability to navigate the larger set of user icons associated with his Twitter account on the external display (Figure 2). Should the user find an object of interest while navigating this collection, our system supports an additional mode of operation where object selection can take place. In this scenario, the user can gesture in front of the on-screen icon of interest to indicate to the tracking system that additional metadata be sent to the device from the external display. Selection becomes apparent to the user when the object appears on the mobile device in a manner reminiscent of the Magic Lens (Bier et al, 1993) (Figure 3), apparently revealing the object located behind the device.

3.1 Peripheral visualization

Upon selection of an object from the external display, associated metadata is transferred to and displayed on the device (in this case, the Twitter user profile WWW page of the selected user). At this point, the focus of the user is transferred back to the mobile device, as the relevant WWW page is viewed, and the content shown on the external display remains static. In this situation, we would ideally like to continue to leverage the computational resources and screen space of the external display if possible, while allowing the user's attention to remain on the device itself.

1 http://www.twitter.com

Figure 3. Object selection is done using an external camera to track the relative position of the device. The external machine determines which object should be selected based on this position, and an object ID is sent to the device.

To accomplish this, we implemented a visualization[2] based on the Twitter data of the currently selected user. As this visualization is both a computationally and network intensive task, the visualization takes some time to complete, and proceeds slowly as the relevant data is processed (Figure 4). In this way, the external display begins to slowly reveal relationships present within the data that the user may find insightful.

4 The external display as content repository

Using a technique identical to the one described in Section 3, we have implemented an additional interaction technique wherein the display contains a pre-defined data set. In this case, the data is a collection of rendered web pages, displayed side by side. This collection is interactive, allowing the user to navigate and select elements

2 The set of Twitter users within two degrees of separation of the currently selected user is obtained, and used to show those users that are most popular within the set. Lines are drawn to highlight these relationships.

and interact with them directly on the device. In contrast to the approach outlined in the preceding section, this collection of data is modified only through subsequent interactions by visitors. Additional pages may be added or removed from the display as the product of the interactions of passing visitors. In our current implementation, our vision system is unable to discriminate between multiple users whose devices reside within the camera field of view, although this might be accomplished through a more well defined collection of device-attached markers.

5 Tracking

Device tracking is accomplished through a simplified marker-based approach implemented using Intel's OpenCV computer vision library[3]. In contrast to traditional

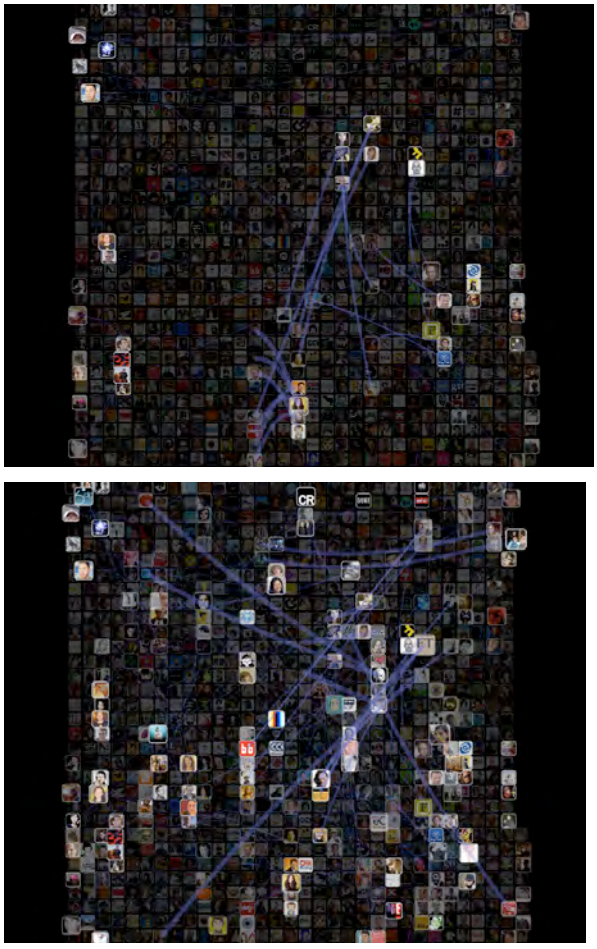

Figure 4. Peripheral visualization of data associated with the currently selected Twitter profile. This visualization proceeds, as the user's attention remains focused on the device itself.

3 http://sourceforge.net/projects/opencvlibrary/

approaches, such as those used by the ARToolkit[4], where a complex symbol is printed and attached to the objects to be tracked, our approach uses a marker composed of a single rectangle only. We found that markers suited for 3D tracking are extremely sensitive to lighting conditions, which is problematic for any system that may hope to be placed within a non-ideal lighting environment. The issue with existing marker-based approaches under non-ideal lighting conditions is that the object to be tracked may be found by the underlying tracking system with irregularity. Because we only require simple tracking within a well-defined region under general lighting conditions, we chose to use a more simple marker which can be consistently detected at low computational cost. The trade off with this approach, however, is the presence of false positives by the tracking software. Because we only track simple shapes, it is possible for these shapes (unrelated to the marker itself) to be detected in the frame. We minimize the impact of these false positives by forcing the user to tap the screen to verify that they are in fact attempting to select the highlighted object (i.e. the object believed to be the selected object by the tracking system). This technique has proven to work well under a variety of lighting conditions.

6 Discussion

The system presented in this paper, while only of prototype quality, shows promise with respect to potential interaction mechanisms between mobile device carrying users and external display surfaces. We are currently interested in adapting our system for projected surfaces, which pose a number of additional challenges, particularly within our device tracking software. We are also actively continuing work on the peripheral visualization techniques described in Section 3.1, as we believe this to be an extremely interesting research area.

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The impact of location-based mobile games on group formation and urban environmental experience

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1 Introduction

The widespread and constantly increasing use of mobile phones with location detection capabilities presents opportunities for ubiquitous, 'always on' applications of ICTs. Such technologies may be employed for communication purposes, leading to the appearance of locative media. Due to their successful combination of physical and digital environmental elements, locative media can offer a unique experience when used for communicative, gaming and entertainment purposes, as demonstrated by a number of relevant implementations. In this paper we describe such an implementation of a location-based mobile game (LBMG) system called LOCUNET and highlight some results and conclusions drawn from a study of its use.

The LOCUNET project primarily aimed at formulating a comprehensive theoretical framework of locative media use as a communicative practice. This framework synthesises aspects of a number of theories on human behaviour, communication, and play. This paper is a follow-up to previous work that presented the theoretical foundations of this project and the general principles behind its inception. It describes an LBMG activity that took place in Athens, Greece for the purpose of evaluating the theoretical framework of LOCUNET and presents findings that are regarded as particularly relevant and useful to designers of location-based communication and entertainment media.

2 A brief description of the LOCUNET system and activity

The LOCUNET project attempted to investigate the inherently multidisciplinary activity of locative media use at three levels:

> The first was the interaction between the individual user and the mobile device (‘HCI level’),

the second was the interaction among several users via the mobile device (‘CMC level’) in the context of group organisation and
the third was that of the users’ spatial knowledge of the hybrid environment generated as a result of locative media use.

In this paper, findings that pertain to the second of these levels are presented and discussed.

2.1 The activity

A location-based, game-like activity was organised in order to evaluate the project’s underlying theoretical framework, which has been presented elsewhere (e.g. Rizopoulos et al, 2008; Diamantaki et al, 2007; Diamantaki et al, in press). Participating users (who carried mobile GPS-enabled devices) were placed in two teams that competed against each other in an attempt to capture a number of digital objects that were scattered throughout the play area. The activity took place in an area of central Athens that was considered well suited to pedestrian traffic and contained numerous features that could promote playful behaviour (e.g. hiding places, elevation, bridges, footpaths, etc.). Each mobile device displayed a map of the area, centred on the user’s present location. This map was graphically enhanced so that certain environmental elements that are particularly useful to pedestrians (such as bridges, gardens, parks, etc.) would be highlighted.

As players walked around the play area, certain objects appeared on their screen depending on their actual geographic location. If players were close to an object, they could 'collect' it. A collected object remained in a player’s possession for a maximum of two minutes unless intentionally dropped sooner. Once the two-minute time limit had been reached, the object was automatically 'dropped' at the player’s location. The same player could not pick up the same object, if it was not picked up by a different player. Players were thus implicitly required to collaborate in order to capture most of the objects. An object was 'captured' when dropped on a specially designated area called 'team headquarters'. The team that had captured most of the objects by the time the activity was completed won.

In addition to objects, another type of digital element present was the 'info pack'. An info pack was essentially a container of digital information (text, sound, images, or video) associated with a physical location. Users accessed an info pack’s content in

the same way they collected an object (i.e. based on proximity); however, info packs could not be picked up. Additionally, users could create their own info packs by typing text or using the phone's inbuilt camera to capture a photo.

2.2 The technological infrastructure

The system consisted of two components, the client and the server. A file created with a specialised authoring tool that was designed as part of the system was loaded on an application that ran on the server, which communicated with the client devices for the entire duration of the game. Each client device used mobile Internet to transmit GPS data, user commands (e.g. objects picked up or dropped) and content (text, images, etc.) to the server, which updated the game state accordingly at approximately 5-second intervals.

3 Description of the evaluation procedure

3.1 Methodology

The evaluation procedure was essentially user experience research, consisting of two runs of the activity described above. The total number of participants was 17, with a mean age of 28 (S.D. ≈ 3.75). None of them had any previous experience in using locative media, and their familiarity with online gaming varied.

After a short briefing session and immediately prior to the activity (which lasted for approximately one hour), participants were asked to fill a demographics questionnaire. After the activity, the participants filled questionnaires about the usability of the system, the communicative practice they engaged in, their attitudes towards locative media, and their perception of the environment. They were also asked to produce sketches of the environment they had navigated so as to give an indication of their spatial memory as a result of experiencing the activity. Subsequently, they participated in two focus groups, one about the experience of using the system (complementary to the quantitative usability evaluation methods) and another one about group-based communication during the activity.

During the activity, the participants' actions and movement were tracked at all times and stored in a log file on the server. This allowed for concurrent observation and subsequent analysis of spatial behaviour and movement patterns. Additionally, all

user-generated traffic (e.g. messages, objects carried, info packs accessed or created) were also displayed and logged on the server.

As it may be surmised from the description above, the research team opted for a varied and multidimensional methodological approach, combining several research methods, both quantitative and qualitative, at all stages of the research (i.e. before, during, and after the activity).

It should be noted that the findings discussed herein are not conclusive, but indicative of trends, since the small number of participants did not allow for extensive statistical analysis.

3.2 Results and discussion

The participants believed that the criteria of group formation were adequately met during the activity, in spite of its short duration. The qualitative analysis of our data confirmed this result, indicating that certain conditions (e.g. as per Goffman 1990) generally considered necessary for group formation were fully or partially met, pointing to a group formation process at its early stages. Furthermore, the adoption of rules encouraged some form of social organisation, resulting in a situated activity system (Goffman, 1990). It was also found that the participants assumed certain roles in their groups (e.g. 'leader', 'coordinator', 'efficient team member', etc.).

Additionally, users experienced a strong sense of immersion into the hybrid environment. The majority of the users perceived the activity as taking place in both the urban (physical) space and the (virtual) space of the screen.

Users who characterised the game experience as dangerous were more annoyed by the presence of passers-by and experienced lower levels of immersion in the hybrid environment. In addition, users who perceived the game as taking place in private (rather than public) space, or in a space that was equally public and private, were more annoyed by the presence of passers-by compared to those who considered the activity as taking place in a public environment.

Users were positive towards both the activity described herein and locative media in general. The participants' ability to immerse themselves into the hybrid environment was found to relate to favourable attitudes, and perceiving the game as public also

enhanced the quality of the experience, since it is related to greater immersion, less annoyance by passers-by, while at the same time minimizing possible feelings of danger. The positive assessment of the activity was also related to feelings of presence in both the physical and the virtual environmental context, which may result in an enhanced view of certain environmental elements.

All participants engaged in interpersonal communication in the course of the activity. The possibility of employing interpersonal communication may be regarded as an advantage of locative media compared to more conventional information and communication technologies. Interpersonal communication may also help users address some of the limitations of CMC.

4 Conclusions and future work

The evaluation results point to certain suggestions that may be useful to designers of urban multi-user activities supported by locative media.

Users were favourably disposed toward the possibility of participating in such an activity, and its relative novelty was a factor. The participants considered their experience satisfying and pleasurable, and none of the perceived disadvantages of the activity were attributed to the factors pertaining to group dynamics or social behaviour in general. This fact may suggest that group dynamics are an important factor in the participants' experience of the use of such media and the satisfaction they derive from it.

Passers-by can significantly influence the experience of locative media use. In general, users who feel inhibited by the presence of passers-by tend to perceive them as intruding on their personal space, and are less likely to experience feelings of immersion. The perception of the game's nature as public or private has a similar effect on experienced immersion. Users who consider a location-based activity predominantly public feel less annoyed or threatened by passers-by and derive greater pleasure from participating. Consequently, they experience greater feelings of immersion.

Additionally, positive assessment of the experience of participating in location-based activities seems to be facilitated by feelings of presence in a hybrid environment consisting of both a physical and a virtual component. Furthermore, users who

suggested that certain environmental elements were enriched by new meanings as a result of their participation in the activity are more likely to evaluate the experience of the game as positive.

The evaluation showed the potential of locative media to facilitate social interaction and group formation among users. Although the groups formed in the context of the specific implementation described in this paper were task- or performance-oriented, the evaluation results indicate that, even when the users do not know one another or the duration of the multi-user activity they participate in is short, the participants' behaviour may point to a process of group identity formation that is at an early stage[1].

The role and impact of interpersonal communication during locative media use points to the inherent hybridity of locative media. Computer-mediated communication has a number of well-known limitations, and users of locative media may overcome them by taking advantage of the hybrid spatial context of locative media use. Interpersonal communication during locative media use may also help establish group identity by promoting interaction among group members.

The conclusions described herein are only part of our investigation of locative media use in urban contexts. Future studies and experiments with a greater number of users are planned. Furthermore, the LOCUNET system is scheduled to be improved - in terms of usability and functionality - with the inclusion of a desktop component, so that remote users may also take part in location-based activities. Furthermore, the activity scenario will be enriched, since a more complex scenario is assumed to allow for more complex forms of social organisation and communicative practices to emerge.

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[1] The participants collaborated efficiently towards attaining their common goal, thereby creating a *situated activity system* (Goffman, 1990); they experienced a sense of spontaneous involvement, as well as a sense of belonging to the group, and took steps towards assuming discrete roles.

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Mobile anime and the Cockpit Comics

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> Through these new technologies, the contradictory stereotypes of Japaneseness have assumed new forms; the new technologies have become associated with the sense of Japanese identity and ethnicity.
> (Morley & Robins 2004).

Japanese comic images, often used in old and new media, benefit from a plasticity consolidated by the new technologies, which allows them to have singular viral properties. Animation, by having an origin in comics and later called *anime*, are impregnated with references to the nuclear holocaust. Since the post war period they have developed and conquered a ground of their own - pertinent and propitious with new media such as videogames. These days Japanese animation and their by-products are meant to perform storytelling among young people - in a post-conflict society - which is still Japan.

What is at stake here is a reduction of the language of new media - which is still in mutation. This is exacerbated by the Western world where it becomes a parasite of the predominant electronic visual culture through online media. It is important to point out that this new language of media, because it is revolutionary, breaks apart the distinctions between animation, videogame and film, reducing everything to an animation by-product that disseminates the 'niponic' graphic culture in a 'western' format. Nevertheless, whether it is in form (graphic technologies) or in content (semiotics, narrative, message), Japanese animations are impregnated with references of machines, representing a new form of announcing the Japanese obsession for robotics, humanoids and cyborgs. In fact, Japan's strategy to deal with the post-war period was entirely the posthuman mission: in general, research on technology, and specifically, computers, media and robotics. It can be said that Japanese animations move into videogames, blurring boundaries between genres

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and formats. Questions arise on the new hybrid products - as culturally demonstrated, and an analysis is needed on interactivity and how this combines with cyberspace. In these hybrid processes a new 'mediatic' language is emerging with its own codes, illustrations and narratives. The 'niponic' response to the post-conflict period is to use new interactive (mobile) media - to build memories of Japan's history in young people's minds - using fictional products. Thus the creative strategy of the posthuman in the use of machinery and high technology ends up as everyday entertainment products and mobile media.

Japanese comics and animation unveil a tendency towards a fatal impulse; a mixture of negative experiences of the World War II legacy, and, a powerful modernity. We might say that *anime*, Japanese animation, possesses an offensive modernism, and, a creative postmodernism in its language. When one speaks of anime one must keep in mind its driving-force: the Japanese sense of self-regulation in people and institutions as a desire to strive to become something better. Sloterdijk is one of those authors who believes that 'each age has its own way of being unpleased with the world. Every discontent towards the world, which has become aware of itself, brings along the germ of a new culture[2]' (Sloterdijk, 2002: 67). Undoubtedly this 'new culture' - spreading virally across the world - includes anime. The world of Japanese comics in manga and their translation into animation provides substance to a growing graphic culture; a decisive culture in the posthuman era.

Graphical cultures have expanded to a powerful position, thanks partly to information technologies. Today's unprecedented broadcast through the use of desktop terminals and mobile platforms has made anime central to this graphical culture - and is surprising the Western world. During the last decade the iconic masterpieces, the animation film genre of anime, were evident and noticed because of their cyberpunk narratives and the graphical violence of its imagery. Ever since *Ghost In The Shell* (Masamune Shirow), through to *Akira* (Katsuhiro Otomo, 1988), and until *Appleseed* (Kazuyoshi Katayama, 1988), a core-element is how animation has promoted (new) technology.

Between the 90s and our decade of 00, the static images of Japanese comics (manga) have absorbed features from the digital universe until they became a third kind of product - *interactive manga*. Selin Özgüzer's *Interactive Manga: A Prototype*

[2] This excerpt was translated by myself.

For Multi-Linear Visual Narrative (2007), and Scott McCloud's *Understanding Manga* (1996) chart this process of development. Currently we cannot avoid the obvious - the alliance between computer-generated image and the language Japanese manga provided. In motion, anime gave rise to a popular niponic culture, with a very particular style easily accessed by young people of the Western World. Next-generation videogame console have also pushed forward this revolution in graphical cultures. And they have allowed videogames, such as *Viewtiful Joe* (2004), to be transformed into electrifying beat-em-up videogames. In other cases, such as *Rogue Galaxy* (2007), epic stories had a renaissance in education-driven videogames. One must not forget too that innovative interfaces appeared in portable game consoles with games like *Patapon* (2008) and *Locoroco* (2006) for the Sony PlayStation Portable. The first of these games involve interaction by means of sound in order to command characters, through the controlling of powerful rhythms and triggering onomatopoeia. The second of these games transports us players into a universe of friendly curved characters living in a coloured world, where all things have an elastic life.

However, most of Japanese videogames exploring the 'cute doll' culture did not always have this departure point. Generally speaking, the anime universe in videogames has been much more focused on more aggressive storytelling. Historically it has happened ever since *Akira* was adapted to be a videogame in 1994 for the home computer Commodore Amiga 500. This was a time when a realm of coloured and aggressive imagery was unleashed on consumer's screens. It can be said that we find in the world of anime a constant type of imagery capable of generating more images - these are fertile in mutations. Mostly that is all they have to offer, whether it is in shape of organic mutations, cyborgs or mechanical transformations. We do however find convincing fantasy worlds in fictions like those that videogame producer Hideo Kojima makes for Sony PlayStation Portable in Metal Gear Solid: Portable Ops (2006). Metal Gear Solid is a videogame series in which Ashley Wood's concept art drawings assume a life of their own - so it invites the player to step into a mobile universe of special military operations - which leads the player to be the ultimate agent.

For everyone who witnessed the videogame world in desktop platforms, for example trying Ghost In The Shell (1997) in the original Sony PlayStation game console, to have nowadays a handheld game console with a battery lasting for several hours, a big LCD screen and stereo sound speakers, good storage capacity and video to TV-

output, is somehow something typically new age, for sure. In order to better understand the phenomenon all we have to do is to get a copy of *Ace Combat X: Skies of Deception* (2006), an aircraft videogame for Sony PlayStation Portable made by Namco Bandai Games America. By playing this game we observe that the player actually steps into the aircraft universe. We know that the simple fact of playing with headphones on has changed game experience. Also the player feels like he is inside a military aircraft, as if he is 'inside the cockpit'. Stereo sound in this case highlights the immersion effect in a game experience, so the Sony PSP basically works out as a sort of 'Game-Walkman'.

Moreover, in *Ace Combat X: Skies of Deception*, the fabulous 3D landscapes, the music score resembling a soundtrack of an action film based on a Tom Clancy's book, are not the primary elements in this media by-product. The inclusion of comics imagery (while the game levels are loading), in manga style, makes clear the argument that portable media devices can turn the player into a 'reader' of Cockpit Comics, whose language expands into the game experience as an extension. Another element that has always been present in the equation of anime imagery and videogames is the representation of robots (a posthuman leitmotiv). Matthews provides the answer: 'while robotics and anime have originated in very different ways, as both advance they are forming a unique and multi-faceted symbiosis' (2004: 1).

The Japanese animation style that has become more and more a convention in audiovisual communication for adults is anime and since it's beginning anime targets young men. Japanese animation is an oriental animation genre that has become globalized, mostly through the Internet, online file sharing software and its ramifications continue in filmmaking, advertising and music. In Japan anime continues the path opened by manga, the niponic bi-coloured comics that now become digitally coloured and 'flashed' in portable media platforms. The static black-and-white drawings have developed into 'made in Japan' videogames - which are nothing other than interactive, three dimensional versions of static manga. Reading comics in the street, playing PSP in Tokyo's metropolitan train, are now regular habits - like reading a newspaper in the Western world. In the contemporary world a merge occurs between mobile media platforms and the graphical discourse of manga. The result is a portable universe of interactive experiences which gathers still imagery, video clips, popular Japanese music (J-Pop) and electronic entertainment (videogames).

If there is a country that has a mobile media, post-conflict society, that place is Japan; not the original Japan in its deepness of Kyoto, but Tokyo and Osaka, Nagai and Nagasaki. From the country that dedicates itself to designing the future - Japan builds household gear for playing and recording images, robotics and cutting-edge computation - we observe a coming true of the mobile media society. Spontaneously the high-tech country managed, after the post war period and the considerable stakes at that time, to raise an empire based on machines; through the creation of both the motorcycle and automobile industry, computers, videogames and animation. We see a common element in all things coming from Japan: the videography exported to the whole world, which carries the branding 'Japan, Inc.'

The manifestation of a culture of accuracy, by means of image-machines and their respective machine imagery, has produced a colossal industry of consumer electronics - such as Sony, NEC, Sanyo and others from animation, videogames and special effects industries like Studio Gibli, Gainax, Square-Enix, Namco, Kojima Productions, Sony Computer Entertainment, Nintendo. This has made it possible for Japan to export a lifestyle, and thus, a national culture was shaped in a graphical culture – anime. The country that created portable videogames, electronic screens and 3D animation, is now able to conquer the West only with imageries (this is one strategy). At the same time it continues to promote videography through new mobile media - society's mediatization. This new mediatization begins in robotics. For a better understanding, robots as the latest generation e.g. Honda Asimo, are true portable computers which are able to walk, run, communicate and comprehend human beings. So the ultimate posthuman mobile media are, most definitely, robots.

As an example of a mobile media society the last sixty year's Japan is synonymous with technology, exactness and sophistication. However there is no attempt to disregard a cultural patrimony raised upon hierarchies and in the art of serving well. The Japan of our time is a place carrying these same values within anime and videogames: a hypermediatized world of technology where game's and animation's characters are submitted to an enormous cult and devotion. We can barely separate the place where the mediatized characters begin and the real dolls end; where does fiction begin and where does the film director's and the videogame designer's fantasies end up? Whatever the case, a core issue stands in-between, filtering all discourses: the prevailing technical discourse.

The now global culture, of anime and videogames, is a technical culture extending throughout computers and networks, game consoles and portable media platforms. To be inside the new technical culture means to consume images from that very global, graphical culture; it is to be consumer and someone who interacts with something, it is to participate in digital fantasies, and the latter can be experienced anywhere. The mobility phenomenon turns the consumer, not just into a spectator, but rather an agent - as mobile as the images he consumes. Therefore, by keeping in mind that today's communication portable devices gather in themselves Internet access, videogames, podcasts, music and movies display, we may conclude that these are inexorably nomad centres for raising social networks. So the new generation of online networks actually departures from nomadic technologies.

By selling 'Japanimation' worldwide, Japan introduces in mobile media, a new generation of anime - that of mobile anime. And in my view it seems that it is a brand new regime of anime videography which spills out into portable devices, such as PDAs, Nintendo DS or Sony PlayStation Portable. On closer examination we learn that the transition from Japanese manga comics into the new media are worthy of analysis. They help establish a new generation of Cockpit Comics - my perspective on the anime phenomenon. As in the 80s, when everyone could carry portable sound systems like 'ghetto blasters', or carry a Sony Wallkman tape player with headphones, today there is options for games. We can use an online computer, play movies on the desktop game console, however the real tendency is to consider everything flowing into a nomad system. This already happens in the latest generation platforms such as the Sony PSP. Real videography for the mobile media society can only emerge from the mediatized society itself: slowly it spreads in all directions, as inevitably, Entertainment merges with Mobility.

After the release of imagery, the entire graphical culture exhibits passive and interactive audiovisual sequences, and these manifest themselves as warfare elements, a battlefield of images. These images get so intense that the consumer's only choice is to shield behind a cockpit of their own, in a similar fashion to that described by Steiner (1998) - concerning the 'sound capsule' phenomenon of yougmen in pop music culture. However this time the world of manga comics, anime animations and videogames' electronic entertainment become one sphere of digital content - the mobile-island of just one spectator, player, user, reader and netizen.

In a world in which images are frequently more repeated and public, stereotyped and conventional, where cliché rules and originality is taken as a threat, the consumer using mobile media devices brings something new with him. After all, this consumer may watch whenever and wherever he wants his favourite contents. Such a consumer is someone that becomes a mobile-island before the huge media-continent chasing and trying to seduce him. Just like a 'reality pilot' (Timothy Leary 1994) controlling his own coordinates, his course, focusing the screen and carefully listening to his favourite audio record, the mobile anime consumer behaves as if he is standing inside a military aircraft's canopy. This is to say, totally isolated from outdoors, behind the fuselage of a technical instrument designed to fly in any direction. As long as it is technically aided, of course, the power remains in the pilot's hands. Cockpit Comics are some of the contents available which the mobile media society consumes in the mobile images genre.

In the text *My Own Private Tokyo* (2001) William Gibson states that 'if you believe, as I do, that all cultural change is essentially technologically-driven, you pay attention to Japan'. Similarly the text, *Modern Boys And Mobile Girls* (2001), Gibson tells us that 'Japan is the global imagination's default setting for the future'. He highlights the new generation of mobile crowds, an entire youth class addicted to mobile media trying to carry the world with itself and doing so, lives in a futuristic fashion. Gibson believes that the '"Mobile Girl" is '(...) that ubiquitous feature of Contemporary Tokyo Street Life, a schoolgirl busily, constantly messaging on her mobile phone'. Even Japanese advertising, or in Western advertising designed to reach Japanese markets, there is much focus toward the usage of portable media, such as cellular phone, for instance, where one could watch anything in a world without walls, with no geographic restrictions. Such is the case of the 'V3 Razr Advert' (2003) TV spot for Motorola's 'Hello Motto' campaign where everything around a female character can be reduced back to the cellular phone, step by step, folding into the cell phone: everything is easily accessed wherever we are. The graphical language is a viral language with fans all around the globe, it conquers us with its perfection, sophistication, and the highly syncopated audiovisual editing borrowed from post-MTV video clips.

Recent film artworks such as Larry & Andy Wachowski's *Speed Racer* (2008), have been inspired in the realm of the violent, coloured and sped-up, full of poetical movements and advertising messages; animations of anime. Other anime artworks such as *Voices of a Distant Star* [Hoshi No Koe] (Makoto Shinkai, 2002), show a girl driving a mechanoid machine in outer space exploration. She says that she has to

keep working in her 'robotic cockpit' because she thinks the world exists as far as the network phone signal reaches her cellular phone. As long as she is online, she is still living. By the time no network signal reaches her phone, she stands offline, kept out of the real. Once inside the canopy, the machine's cockpit, she observes the threat: cold space and alien outdoors.

If we go back in time we understand that anime was not always as volatile as it is nowadays, neither was it as colourful or interactive. Anime had its acme in mass media during the 80s with the iconic TV series of Osamu Tezuka's (2002-2004) *Astro Boy* (Eiichi Yamamoto, Rintaro, Fuyunori Gobu, 2006). To go back further back in time we see that it all begining in the pages of drawings made by Osamu Tezuka. Tezuka was fascinated, after graduating in medicine, in consuming Walt Disney films. Inspired by Bambi, the crying and gigantic eyes, smiling and joyful characters, a new graphical culture was born for consumption outside the movies public screen format. With the new portable media displays, animation universes turned out to be revolutionary global, and intimately private at the same time.

Out of the contemporary constellation of anime and videogames some icons stand out: some are more directly influenced by media, others by Osamu Tezuka's comics, and others by the imaginary of undefeatable robotic machinery. We also have the challenging and suspicious virtuality of *The Matrix: Path of Neo* (2005), the multimedia language of *Metal Gear Solid* (1998) transformed into comics in *Metal Gear Solid: Digital Graphic Novel* (2006). Also we witness the ludic psychedelicism in the videogame *Rez* (2001), the dream-like landscapes of *Ico* (2002) and *Shadow of The Colossus* (2005). Knowing what seems to definitely be comics, and what is a videogame is an increasingly hard task. Two decades ago the genre crossing was proposed in the game *Comix Zone* (1995), which allowed players to play coloured interactive comics in the SEGA Genesis game console. After the release of Nintendo's Dual Screen, and Sony PSP, the opportunities multiplied. But videogames like *Devil May Cry* (2001) and *Bushido Blade* (1997), both strongly inspired the 'shoguns' culture and their role smoothed the transition from desktop games to mobile games.

In last year's International Symposium on Electronic Arts edition (2008), in Singapore, in the panel entitled 'Animated Ideas', Professor Hiroshi Yoshioka, who researches anime culture, stated that 'young people communicate with each other through anime if they don't know the language'. Later he said that anime possesses

an 'unanimous language, global language'. Yet for this researcher it is interesting that 'an established culture' is changed by anime. In order to have a clear understanding about the relevance of anime around the world Hiroshi Yoshioka states that 'Japan is exporting more anime than automobiles', is doing investments in 'content creation': films, videogames, stories'. He also believes that manga and anime are fully respected and well-known cultures today, though they weren't in the 60s nor the 90s: they suffered enormous criticism due to their violent and sexy escathology. Ultimately it was believed that children developed aggressive behaviours. Hiroshi Yoshioka responds by saying that 'Japanese is cool, no culture contamination'. Even so, we cannot forget that he is said this at a time when the influence of anime and videogames is very obvious in the cultural mainstream. It is also widely known that anime is politically empowered in Japan.

From the technical culture point of view, the researcher Hiroshi Yoshioka agrees that 'comics and anime share media technique, content, format, IT technology in novels, (and) digital language'. Most importantly Yoshioka defends the notion that one does not 'create a frontier between media and aesthetics'. In other words, the researcher should not believe in the division between media and creativity, rather as he suggests 'anime organizes experience in a different way, a video language. A Media aesthetics of its own'. It is the case that a certain 'Japaneseness' exists within the anime imagery coming from Japan - for these imagery portray the 'Japanese way of life'. Since the early days anime is related to anima (Latin), which addresses us to motion; in the same trend that animation addresses us to 'give life', to 'make interpretation of life', according to Hiroshi Yoshioka. The researcher considered that 'anime is not to the Japanese, although it shows Japanese culture'. When I asked him if there was any industrially convenient or purposeful connection between anime and videogames, Yoshioka replied that 'it is an extension, it is not forced'.

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Cyber City Oedo 808 Vol1-3 [DVD] (DVD LTD, 1999)
Ghost In The Shell (Oshii, Mamoru, 1996)
Ghost In The Shell 2: Innocence [DVD] (Oshii, Mamoru, 2004)
Ghost In The Shell Stand Alone Complex [Série de Animé] (Kamiyama,Kenji, 2002)
Ghost In The Shell Stand Alone Complex 2nd Gig [Série de Animé] (2005)
Interstella 5555: The 5tory Of The 5ecret 5tar 5ystem [DVD] (Takenouchi, Kasuhisa, 2003)
Laputa – Castle In The Sky [DVD] (Miyazaki, Hayao, 1986)

Neon Genesis Evangelion [Série de Animé] (Anno, Hideaki, 1995)
Parprika [DVD] (Studio Image, Kon, Satosh, 2006)
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Space Battleship Yamato [Série de Animé] (Academy Prod, Matsumoto, Leiji, 1975)
Spirited Away ['Viagem de Chihiro'] (Miyazaki, Hayao, 2003)
Steamboy [DVD] (Otomo, Katshiro, 2004)
Street Fighter II The Animated Movie [DVD] (Sugii, Gisaburo, 1995)
Vision of Escaflowne, The [Série de Animé] (Akane, Kazuki, 2000)
Voices of A Distant Star [Hoshi No Koe] [DVD] (ADV Films, Shinkai, Makoto, 2002)

Videography / Videogames*

(Title, Software, House, Publisher, Year: Platform)

Ace Combat X: Skies of Deception (Namco Bandai Games America, 2006: PSP)
Akira (Ice, 1994: CBM AMIGA 500)
Bushido Blade (Lightweight Co, Square Soft, 1997: PSX)
Comix Zone (Sega, Sega of America, 1995: SEGA Genesis)
Devil May Cry (Capcom, 2001: PS2)
Final Fantasy X (Square Co, Square Electronic Arts LLC, 2001: PS2)
Ghost In The Shell (Exact/Ultra, THQ, 1997: PSX)
Ghost In The Shell: Stand Alone Complex (SCEJ, Bandai, 2004: PS2)
Ico (SCEJ, SCEE, 2002: PS2)
Locoroco (SCEJ, SCEA, 2006: PSP)
Martio Kart DS (Nintendo, Nintendo of America, 2005: DS)
Metal Gear Solid: Ac!d (Konami Japan, Konami of America, 2005: PSP)
Metal Gear Solid: Ac!d 2 (Konami of America, Konami Japan, 2006: PSP)
Metal Gear Solid: Portable Ops (Kojima Productions, Konami of America, Inc., 2006: PSP)
Metal Gear Solid 2: Sons Of Liberty (Konami Japan, Konami of America, 2002: PS2)
Metal Gear Solid Digital Graphic Novel (Kojima Productions, Konami of America, Inc., 2006: PSP)
Patapon (Japan Studio, SCE, 2008: PSP)
Project Sylpheed (GameArt, Microsoft Game Studios, 2007: XBOX 360)
Rez (UGC, SEGA, 2001: PS2)
Rogue Galaxy (Level 5, SCEA, 2007: PS2)
Shadow Of The Colossus (SCEA, 2005: PS2)

Tekken: Dark Ressurrection (Namco Bandai Games, 2006: PSP)
Viewtiful Joe (Clover Studio, Capcom USA, 2004: PS2)

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MOTOROLA, Hello Motto, 'V3 Razr Advert' (2003)
NINTENDO, Mario Kart DS, 'MarioKart_DS_TV' (2005)
SONY COMPUTER ENTERTAINMENT, LocoRoco, 'LocoRoco Japanese Commercial #3 PSP Long' (2007)
SONY COMPUTER ENTERTAINMENT, Sony PlayStation, 'PS9_tv' (2007)
SONY COMPUTER ENTERTAINMENT, Sony PlayStation Portable, 'PSP Ad' (2006)

Mobile tagging and Mixed Realities in art

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Introduction

The objective of this paper/presentation is to describe the potentialities of mobile tagging as a tool for increasing and spreading the effects of Mixed Realities, including the field of Arts. In this sense, we will start by introducing the main concepts and some examples of Mixed Realities, followed by the concepts and examples of mobile tagging, showing that they are connected and benefit each other.

Mixed Reality (or MR) refers to the fusion of the physical and virtual worlds to produce new environments and visualizations where physical and digital objects co-exist and interact in real time. On the other hand, mobile tagging is the process of reading a 2D barcode using a mobile device camera. Allowing the encryption of URLs in the barcodes, the mobile tagging can add a digital and/or online layer to any physical object, providing several levels of Mixed Realities related to that object.

The uses of these levels of Mixed Realities have applications in several areas - from medicine and engineering to the arts. This paper/presentation will use some artworks as examples to illustrate the functionality of the mobile tagging for creating mixed reality.

Mixed Reality

According to the Virtuality Continuum concept (MILGRAM, 1994), Mixed Reality is anywhere between the virtual environment and the real environment, comprising stages of reality, augmented reality, augmented virtuality and virtuality, as shown in Figure 1.

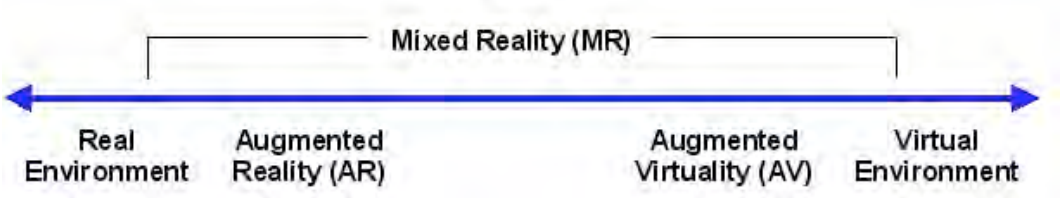

Figure 1. Virtuality Continuum (source: Wikipedia, 2009)

Examples of Virtual Reality are the immersive caves, where the interactor dives into the virtual environment. Some examples of Mixed Realities applications are:

MINI Cabrio – car advertisement (Youtube, 2009-2).
SPOILER - game (Youtube, 2009-1).
BMW - engine maintenance (Youtube, 2009).
Arcane Technologies - educational and military applications (Arcane, 2009).

Several kinds of devices and technologies can be used as tools for Mixed Realities, such as glasses, gloves, monitors, computers, cameras and mobile devices (PDAs and cell phones). Due the pervasive nature of the mobile devices, their potentiality for increasing the dissemination of Mixed Realities is enormous and can be leveraged by Mobile tagging as described next.

Mobile tagging

Mobile tags are 2D-barcodes that can be scanned by mobile devices in order to decode the information kept in the barcode.

There are many types of 2D-barcode (tag) and it is possible to encrypt many kinds of data into them. However, regarding mobile tagging, the most common encrypted information is URLs. The process of mobile tagging can see in the Figure 2.

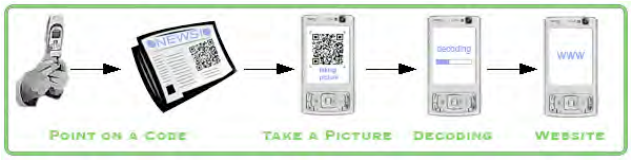

Figure 2. Mobile tagging process (source: Mobile tagging Blog, 2007)

The most used patterns of 2D-barcodes for mobile tagging are QR Code (Quick Response Code) and Datamatrix. While conventional bar codes (Figure 3) are capable of storing a maximum of approximately 20 digits, a QR Code (Figure 4) is capable of handling up to thousand characters and all types of data, such as numeric and alphabetic characters, Kanji, Kana, Hiragana, symbols, binary, and control codes (Denso-Wave, 2009).

Figure 3. Conventional barcode storing the number 123456

Figure 4. QR Code storing the URL http://www.martha.com.br/

According to (Denso-Wave, 2009), the capacity of storage of a QR code is:

QR Code Maximum Data capacity	
Numeric only	7,089 characters
Alphanumeric	4,296 characters
Binary (8 bits)	2,953 bytes
Kanji, full-width Kana	1,817 characters

Nowadays, although mobile tags are still a novelty for most countries, they are starting to spread as the 3G mobile technology becomes available around the world. The QR codes' use is very common already in Japan, and Datamatrix is more widely used in Europe, especially the UK. Most of the new models of mobile devices come already with the mobile tags (QR code and Datamatrix) reader. Older versions of

devices can install a QR code reader, such as i-nigma (www.i-nigma.com), enabling the scanning of them.

A very interesting use of mobile tagging as mixed reality is the Semapedia.org (www.semapedia.org), which stimulates the use of physical places present in the Wikipedia which maps them. In this sense, each place is provided with a new layer of dynamic information coming from the digital online world, thereby increasing their use.

Mobile tagging in art

There are several interesting examples of exploring mobile tags in Art. We will present three artworks using QR codes that range from traditional arts (painting) to electronic interactive arts. The first example is the painting *Pure Love* by Eric van der Vegt (2009) as seen in Figure 5.

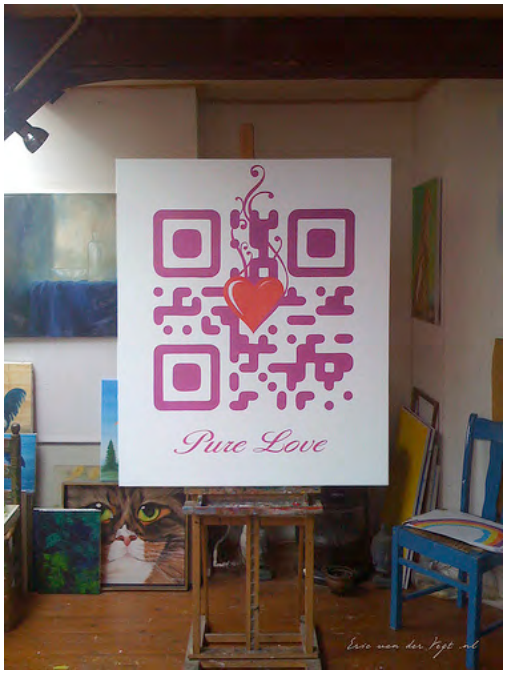

Figure 5. Picture of the artwork *Pure Love* by Eric van der Vegt (source: Eric van der Vegt, 2009).

Another example is the artwork *Sensitive Rose* (Gabriel, 2008), which builds an interactive compass rose formed by QR codes that navigates into people's desires (Figure 6). This work is a large projection (3 x 3 meters) and all the interactions happen through the projection by scanning the dynamic QR codes for participating.

The work was launched in November of 2008 and has already received more than 800 interactions (May, 2009).

Figure 6. Screenshot of the artwork *Sensitive Rose.*

Another interesting artwork that uses QR codes is *Suite 4 Mobile Tags* (Beiguelman, 2009), which proposes an exercise of random and anonymous collective musical composition. By pointing a phone w/ QR-reader to a display (Figure 7), participants play a ringtone. The result is a sudden and temporary suite which plays with; hi and low tech, the portability, the confusion between public and private, music and noise.

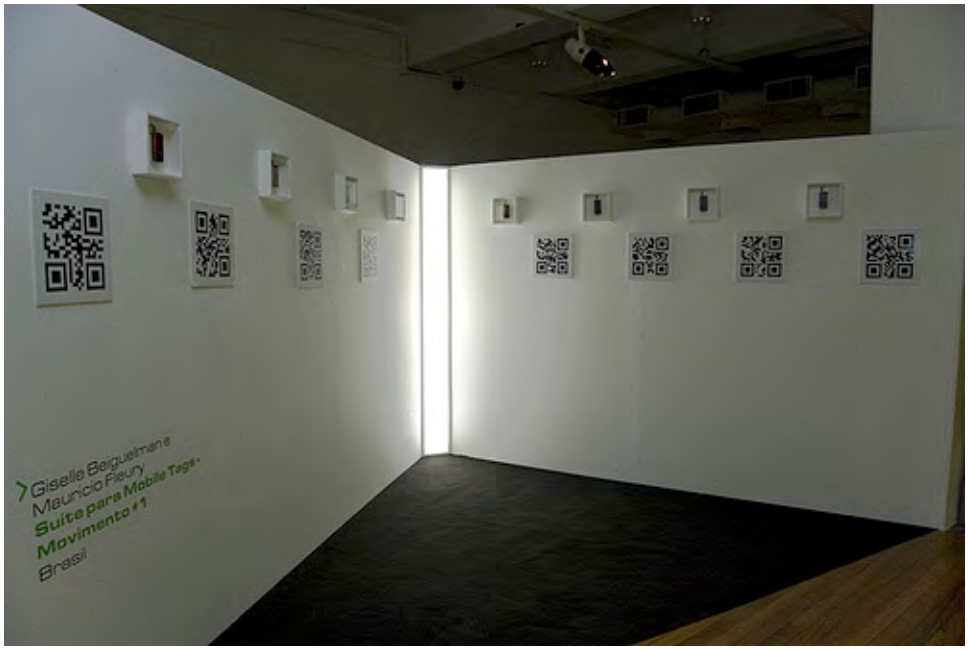

Figure 7. Installation *Suite 4 Mobile Tags*
(source: http://farm4.static.flickr.com/3367/3445893408_9fd3bf4d8f.jpg?v=0)

Conclusion

Since mobile tags are simple tags that can be placed on virtually any physical object or person, added to the fact that cell phones with camera have become a very inexpensive and pervasive device, the mobile tagging process can be said to be one of the easiest and simplest way of creating Mixed Realities. The use of mobile tagging can range from expanding the information on packages, bus stop routes, museum objects, to art. Mobile tags work like physical links to the web, allowing virtually anything can be part of an expanded Mixed Reality environment.

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Stories on the run: narrative structures for mobile cinema

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Introduction

In the past few years it has become clear that a new form of location-based cinema is emerging that combines visual storytelling with mobile technologies. The 2008 release of GPSFilm now provides the tools to create and view mobile cinema on 90% of the world's mobile devices. GPSFilm is an open source application that makes it possible to use GPS coordinates to delineate 'neighbourhoods' and then associate video with each one. This new form of film-viewing experience uses the location and movement of the viewer to control the story; a movie is revealed by walking or riding through spaces. As content has begun being created for the system, further investigation into story structures for mobile cinema is now possible.

It's not about the hardware or the software

New mobile technologies should be enabling, not defining. All cinema is a type of technology-mediated storytelling and emphasizing the delivery medium only restricts its potential. One of the lessons of the 20th century is that cinema's myriad delivery systems - projectors, broadcast, cable, VHS, DVD, computer - are never going to be fixed and therefore will never determine the formal properties of cinema. Mobile cinema is not made unique by the mobile hardware, it's simply one more delivery system.

Equally restrictive is an emphasis on the computational elements needed to view cinema that is tied to physical space. While movement among story points in physical space seems to closely match the hyperlink model, jumping among virtual post-it notes does not necessarily form a story. Mobile cinema is not necessarily 'an original type of computational visual narrative' (Pan 2004). By emphasizing the computational properties, location-based cinema becomes limited by an implied history with hypermedia-based narrative structures.

Mobile cinema may better be defined by a broadened context to a film-viewing experience where the movement of everyday life drives the story. Location-based narratives may be received best in situations where the users are commuting, strolling in neighbourhoods. Instead of using GPS to isolate the user as a roaming dot, it can be used to delineate contexts by recognizing borders and zones as story spaces. Story can better be connected to environments. Mobile cinema should use GPS technology to generalize, not specify.

The problematic definition of story

Each delivery or presentation technology introduced doesn't affect the nature of cinema, but of cinematic storytelling. Theatrical films were closer to the novel in nature, while television introduced serialization, computers introduced malleability. YouTube is still cinema, but a radical rewriting of our conceptions of cinematic narrative.

A firm definition of story is always going to be arguable, as are the definitions of narrative and plot. The purpose of this paper is not to delve into that discussion but to begin with one of the least contested definitions. Bordwell and *Thompson's Film Art: An Introduction* 'consider(s) a narrative to be a chain of events in cause-effect relationship occurring in time and space …. All the components of our definition - causality, time, and space - are important to narratives in most media, but causality and time are central.' (Bordwell and Thompson 2004: 69).

The three components listed - causality, time, and space - compile the most accepted form of storytelling (and probably the most Western). However, it's interesting that Bordwell and Thompson admit that space is the easiest to drop out of the equation. Mobile cinema can take advantage of this leniency towards fictional space by replacing physical space into the formula.

The malleability of time in narrative is a bit more difficult. It is important to note that it is not linear time, often manipulated in storytelling, but perhaps a contextual time… a time frame. Recording is linear, but narrative is not. The primitive machinery of earlier film technologies took the loose, malleable traditions of oral storytelling and made them fixed and linear. Using the cause-and-effect structure of the novel as its foundation, cinema became considered as something viewed while seated and

stationary. However, this is not a formal property of the medium, it was a limitation of the technology.

Finally, the requirement of causality needs to be reconsidered. The lack of causality was one of the failures of hyperlink storytelling and probably why many of the early experiments were interesting only as formal exercises, but rarely compelling as stories. E. M. Forster's classic delineation between story and plot in his *Aspects of the Novel* is completely tied to causality - 'The king died and then the queen died is a story. The king died and the queen died of grief is a plot' (Forster 1956). While causality seems to offer a more compelling experience, it is not a requirement of story.

Navigational storytelling

Mobile cinema should seize the opportunity to tie to the rich history of navigational storytelling. Cave drawings, cathedrals and amusement parks have all used viewer journey to reveal story. Aboriginal songlines reversed the relationship by using song cycles to identify landmarks and navigate vast distances. An even broader view of ambulatory narrative suggests that models may be available from experimental theatre (Fluxus), artist practices (artists who walk, e.g. Richard Long), and media theory (Situationist derives). By releasing it from the hyperlink, computational model, location-based stories can be found in several structures that have pre-existed in narrative history including:

Timeline Variations
Each neighbourhood presents an alternate moment in the story timeline - flashbacks, premonitions. This structure begins with a traditional linear timeline but allows it to be scrambled without damaging the cause-and-effect structure of the overall story.

Point-of-View Shifts
Different regions can reveal various characters and their unique perspective on the event, as if role-playing by neighbourhood. This approach is similar to Kurasawa's 'Rashomon' where four different testimonies are given about the same event.

Shared Event
Different zones can represent a star topology of the repercussions of a shared event among groups, individuals or environments. Alejandro Gonzalez Inarritu's film

'Amorres Perros' used the central event of an automobile accident as the intersection figuratively for three distinct narratives.

Visual Perspective Shifts

Mobile cinema can be used to see an event from different physical locations where each simultaneous view reveals more information and drama. The theatrical film 'Vantage Point' used this device clumsily but one can visualize how this could work well with mobile cinema. Standing on one side of a courtyard, the film could reveal information that is different from standing on the other side.

Genealogy Structures

In 2006, the Guardian newspaper printed a map of the London Tube subway where every line was a musical style and each station an artist that fit that genre. The GPS Film code could easily transform that map from a conceptual exercise to reality; each section of the story space could relate to a different music style, genre, or culture… the neighbourhood as jukebox. The same could be done with genres of film (travel the German Expressionist line…), art, or a host of other intersecting historical threads.

Rhizomatic Structures

Each neighbourhood can tied to a unified, rhizomatic model where exploration reveals a larger connected design (e.g. the Greek constellation structure). In this model, the structure itself becomes the goal, and the content used to lead to a larger revelation.

Documentary

The established framework of who, where, when, what, and how can be neatly layered on to story spaces … with each neighbourhood answering one type of question.

Summary

Compelling cinema is effective emotional sequencing, creating an affecting journey for the viewer. Cinema, fixed or mobile, is a type of experience design, and should be approached from the narrative possibilities instead of the technological histories and limitations.

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Memories, mobiles and creative art practice

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Memories and the camera phone

Personal, collective and cultural memory has emerged as an important area of inquiry (see for example Hirsch 1996; Bal, Crewe, J and Spitzer 1998; van Dijck 2007) and it is within this field of memory studies that we situate our discussion on camera phones and creative art practices. Central to our investigation is the notion of photographs and video works as memory sites. We commence our discussion by locating mobile phone cameras and digital photography within the discourses surrounding the indexical nature of photography and its relation to documenting events.

Photographs and home movies have long been associated with memories (see for example Sontag 1989; Barthes 1981; Hirsch 1996) and have influenced our understanding of life events, as well as the construction of memories in the 20th century. Our compulsion towards 'capturing experiences photographically could be seen as a way of learning how to deal with our emotions and to recognize the existence of an inner life that usually escapes explanation' (Riviere, 2005: 181). The mobile phone is challenging traditional practices of recording and archiving memories of our personal and/or shared experiences and this is highlighted by the increasing adoption of the mobile phone as a tool to create and share digital mnemonic artefacts. The proliferation of the mobile camera phone has arguably given rise to a growing sensibility of the historical qualities of personal and collective experiences that play out in the everyday. More and more we see ourselves as participants in history rather than links in a chain representing a relatively stable way of life.

The convergence of the mobile phone and the digital camera, commonly known as the ‘camera phone’, has arguably reconfigured the role of photography in daily life. Whereas once people tended to take photographs to document life milestones such as births, marriages, anniversaries and travel to exotic places; recently there has been a shift to documenting everyday events. The advent of the camera phone has

transformed image capture from a consciously planned activity to one that can occur spontaneously.

In the past, the use of movie and still cameras necessitated a conscious act: unless people remembered to carry cameras they could not take still and moving images of events, people and places. Now, the simple act of carrying a camera phone means that moments in our daily lives, ranging from the significant through to the banal, can be easily documented for future reference, therefore negating the need to remember to bring a video or stills camera. The expression ‘If only I had my camera’ now appears outmoded as camera phones continue to proliferate, infiltrating our public and private lives.

This has substantial implications for creative practice and the construction of memories because our photographs and movies constitute memory sites that help frame our memories of events, people and places. In this paper we theorise the use of mobile phone cameras in our creative practice. We also explore the contemporary obsession with documenting the everyday of the ‘here and now’ to construct and form memories of these moments in future times and places. After all, capturing a moment in time is not just about the creation of visual artefacts to aid the remembrance of past events, but is also a means of enabling individuals to locate themselves in the present.

Mobile phones are intimate personal devices that are ideal for capturing ephemeral sights, sounds and experiences of the everyday. Their use has become second nature and they are an integral part of a postmodern habitus. We use them to communicate with others, for entertainment, to find our way through city streets, to meet people and to capture and share moments of personal significance. At the touch of the button, we can dip into the mobile phone’s archives, and images selected from a photo gallery can instantly fill the small screen sitting in the palm of our hand. The ‘Kodak moment’ has now been replaced by the ‘mobile moment’. As noted by Fivush 'memory of our past is not relegated to a dusty archive, but lives in the moment, in a constantly evolving dialectic between our self and others in the telling and retelling of who we are through what we remember' (2008: 55). The mobile phone provides us with a dynamic method of carrying and accessing our personal histories, promoting the visiting and revisiting of treasured memories in the form of images, video and SMS messages. According to Gye:

> … changes to the ways in which we capture, store and disseminate personal photographs through the use of devices like camera phones will have important repercussions for how we understand who we are and how we remember our past. (2007: 279)

Our remembrance of past events are becoming more and more imbued with the prominent grain and cool green hues that are now widely recognisable aesthetic traits of video and images captured on camera phones. For many, our memories of prominent events such as the London bombing (2005) and execution of Saddam Hussein (2006) are shaped by the camera phone footage that filled countless television screens across the world. Camera phones continue to penetrate our everyday lived experiences, and in doing so, play a vital role in changing our relationship with technology and moulding our memories of the past, present and future.

Emerging mobile aesthetics

Images and video captured on the mobile phone are generally not afforded the same status or prestige so often attributed to visual mediums such as photography and video art, but this may also be viewed as an advantage, as it frees both the artist and the viewer from the intellectual baggage associated with more traditional visual media forms.

In images and video taken with mobile phone cameras, light can create unexpected effects. Composition can be difficult, especially in bright light when the screen is difficult to see. Colours can be distorted. When enlarged, images may contain echoes of Impressionism, Pointillism or Fauvism because of digital artefacts. Video may take on a nostalgic cast because of the apparent surface skin created when projected onto a large screen. These characteristics have much appeal for visual artists.

A quick search of Google yields a list of visual artists who have extended their creative practice to include the use of mobile phones. For example, Patrice Elmi (Wong 2007) has mounted exhibitions of camera-phone art consisting of colourful abstracts of urban settings. Despite the limitations elucidated above, for Elmi the principles of visual language such as composition and lighting still apply. Other exhibitions of note include Mark Amerika’s 'Mobile Phone Video Art Classics' (2007)

and Maryland's Contemporary Museum's group show titled 'Cell Phone: Art and the Mobile Phone' (2007). In 2008, a film called 'Mankind Is No Island' made using camera phones won both the People's Choice and Best Film Award at Tropfest in Australia. In an interview with Antony Funnels, in response to a question about the quality of mobile phone footage, the director Jason van Genderen stated that:

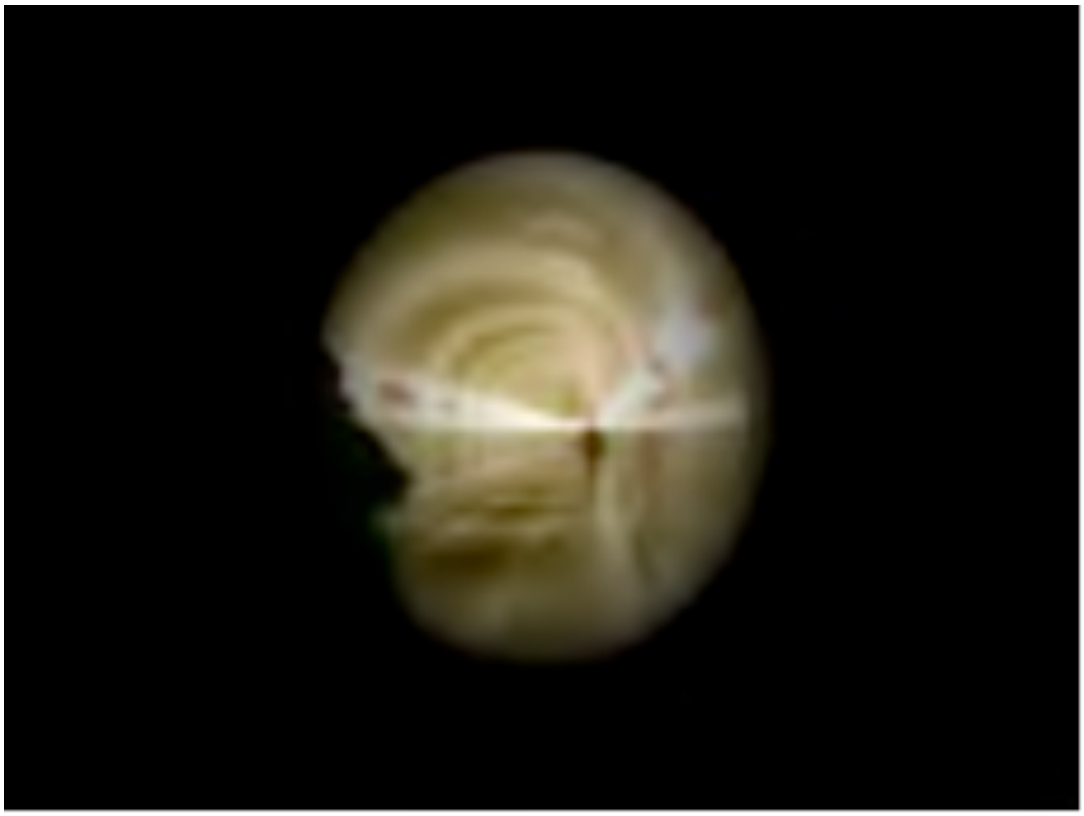
> I think that the quality of the phone footage probably worked with us in this instance, because our film was about talking about how we relate to the homeless communities in both Sydney and New York. And so the gritty, sort of feel of those pictures tended to work. And we kind of played with that; I think there was a bit of a sensation there at times during the edit, to look back and if a shot was a little bit jerky to sort of go in and try and smooth it out, but I took all of that out at the end of the day and thought it was better to see the picture in its raw state. And we only did a very, very light colouring on the pictures as well. So we tried to keep it as natural as we could, just so that we really, we brought across what we saw on the street when we were walking around. (http://www.abc.net.au/rn/mediareport/stories/2008/2384099.htm)

Clearly the aesthetics offered by mobile phone cameras have broad appeal for visual artists, filmmakers and photographers. Furthermore, the camera phone is far subtler than a video camera allowing novel approaches to filmmaking. A mobile aesthetic also lends itself well to conceptualisations and metaphors of memory. Mobile phone art coupled with digital image and video editing allows for the subversion of traditional narrative structures in a way that encourages the interrogation of memory sequences and the relationship between time, actual events and remembered events (Downing 2000). The footage shot with a camera phone has a raw quality that evokes an atmosphere of authenticity, a vicarious sense of being there that can be used to great advantage in creative practice exploring discourses of memory.

Memory sites made by mobile phones

The ubiquity and almost constant presence of mobile phone cameras makes them ideal for creative practitioners exploring constructions of memory. In this section we present two works that interrogate the formation of memories. They are visual texts made using camera phones. The videos and images captured function as after images that have become inscribed in ,and help build, memories. We use loops,

gaps and interruptions as narrative strategies to conjure feelings of vicariousness, belatedness and displacement in relation to actual and imaged past events.



Screen shot of 'Elbe Tunnel' (2007).

'Elbe Tunnel' (single channel video, 00:01:56) by Berry, engages with the road movie genre interrogating discourses framed by the search for belonging. It shows the old tunnel under the Elbe River in Hamburg, which is imbued with ambiguity – it is at the same time a symbol of German modernist aspirations and a memorial to the awful consequences of these aspirations. The tunnel dates from 1911 and has a modernist almost Bauhaus feel. It featured in the 'Odessa File', a movie about a Nazi conspiracy. The old Elbe Tunnel is a place imbued with ambiguity and nostalgia in post-war Hamburg. While viewers may not consciously make the connection between the red clad figure in the video with Keneally's symbol in the movie 'Schindler's List', the splash of red against mainly sepia like tones in Elbe Tunnel draws the eye and opens a dialogue regarding the significance of the figure. The viewer is invited to add the narration and to attribute motives and intentions to the figures and their own part in the story that is always belated.

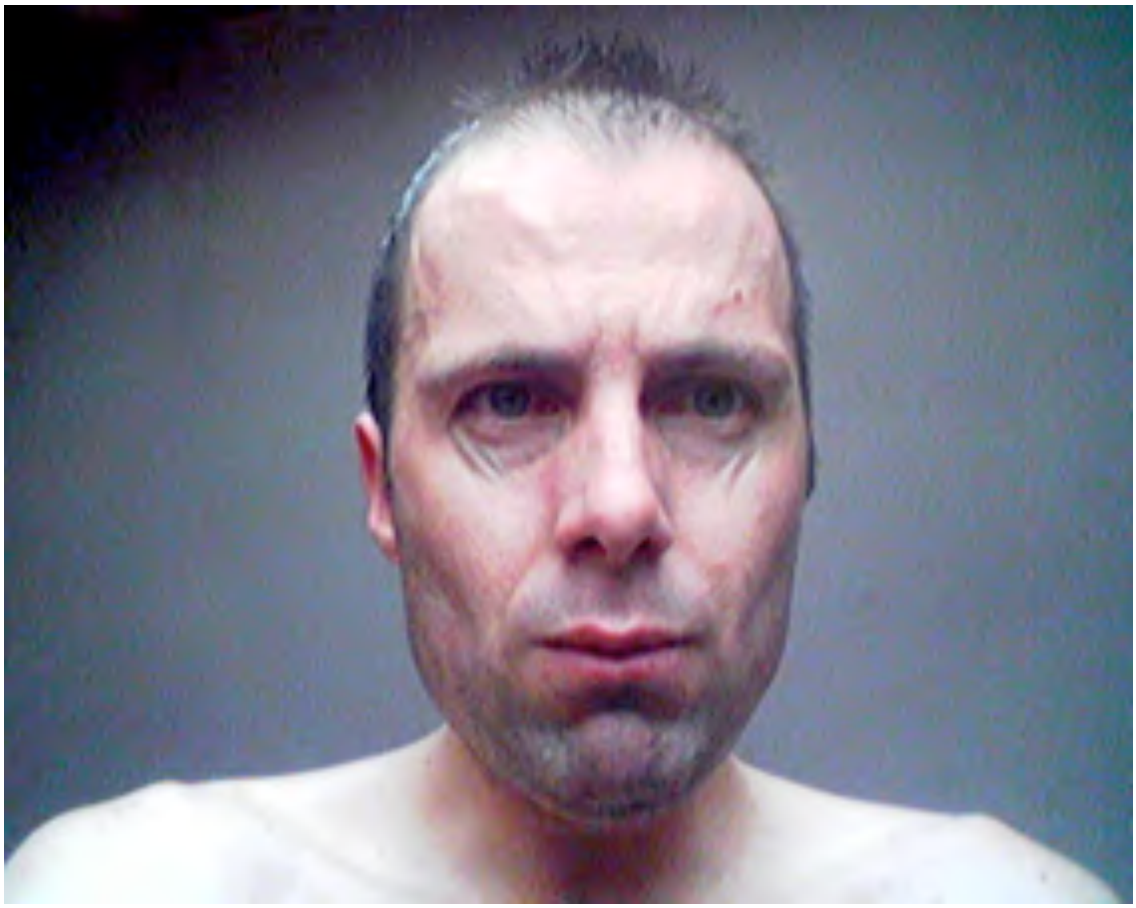


Image from 'Recovery' (2008).

'Recovery' (digital images/artist book) is a sequence of self-portraits taken by Keep which documents the road to recovery from a life threatening illness. Van Alphern (1998: 24) observes that the: 'vision of the individual subject who had the experience becomes the bedrock of evidence'. In the case of the Recovery project, the self-portrait, as seen on the small screen of the mobile phone was shaping personal experiences and recording future memories of the event. The resulting images provide a visual record of the changes in the subject's appearance as his health slowly improved over a twelve-month period, but they also helped aid recovery by providing evidence of the journey to wellness.

These images are highly personal and provide the viewer with a sense of the subject's physical changes during the recovery process. According to Sturken (1999: 235), 'the "work" of confronting traumatic memories is thus to give them representational form and to integrate them into one's life narrative'. The portability of the mobile phone meant the subject was able to record and review these images at anytime. Each photograph became a mnemonic device that bore clues to the past, aiding the remembrance of a former self and igniting traces of the person who

existed before the onset of illness. The mobile phone in this situation became an extension of personal memory and the resulting images remain as the mnemonic artefacts. These creative works act as memory sites, capturing the people, places and events that form the evidence of our existence.

Conclusion

The portability and technical capabilities of mobile technologies significantly alters relationships with media and creative practice, presenting new opportunities and strategies for artists to interrogate and interpret the ephemera of everyday experiences. Our interactions with mobile media provide innovative ways to revisit past experiences and instigate new modes of self-expression.

The images and footage created using a camera phone is digital - thus creative artists can use them to re-imagine and reconfigure memories. They are a part of the *remix culture* identified by Manovich (2007). Sequences are readily repeated; temporal relations can be tampered with using narrative devices such as flashbacks and flash forwards through editing; time itself can be manipulated so that an event that occurs in the space of a second can be extended over one minute. In this way past experience can be revised to shape our remembrances.

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PEGASYS: an interactive panoramic cinematic presence generating art system

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Abstract

The desire to experience other places through audio-visual means has long been of interest to humans and as technology advances so too has the formalisation of systems for exploring time, space and location based engagement. Research into developing an artifact for a practice-based PhD has led to the production of an interactive panoramic cinematic presence generating art system. This computer-based art system engages participants within a panoramic audio-visual landscape. The aims of this research assist in determining best practice and technologies for creating and exhibiting a presence based computer mediated experience through a real-time video networked system. It integrates multimedia technologies, human-computer interaction (HCI) and digital networked systems drawing from research into digital immersive environments, augmented reality, cinema and aspects of Cybertherapy. Digital art permits the artist to re-create new spaces from 'real-life' places. The system herby referred to as PEGASYS provides the participant with three exploratory experiences of a natural environment. The footage provides content for all three stages of interaction within the system. This digitally reconstructed landscape provides a close encounter with the Australian bush, with running water, wind and flora. Crystal Pool is a private sanctuary buried deep within Sydney's Royal National Park and PEGASYS provides a panoramic reproduction of this peaceful habitat re-distributing it for public exhibition.

The research aimed to generate a presence experience for participants using photorealistic data of a natural location rather than creating a virtual landscape. However the real-time documentation of this Australian landscape required intensive post-production digitization in order to recreate the 360-degree panoramic vista. PEGASYS tells tales in all three stages, making it difficult to tell what is real and what is constructed. The results challenge the projects aims as the constructed digital

space becomes a digital representation of its original location, thus a reality construction defines our relationship to the seeming ‘realness’ of the space. Inside PEGASYS ‘Crystal Pool’ is trans/formed from an inaccessible remote location into a place for contemplation and play for all, but issues of truth in the context of beauty and reality have changed this place, appropriating its texture, warmth and life. Thus, despite the research aims, PEGASYS converts Crystal Pool into a virtual landscape. Collaboration with Tobii Technology through London University’s SMARTlab INTERfaces project makes possible the realization of a hands free eye gaze control interface, facilitating a biotechnological interaction that utilizes our ability to see in a human-computer orientation. PEGASYS provides an explorative experience of a new reality construction for those who cannot locate themselves physically (eg. wheelchair bound) and others. By facilitating opportunities for explorative creative play the digital content aims to provide participants with new experiences, new memories and vitally, a sense of a newly discovered place within the world. Sharing location-based art systems enables all participants to engage in a dialogue with themselves and then with others, facilitating the possibility for explorative play and reposeful relaxation amidst the beauty of a natural habit as yet untouched by civilization.

Context

Methodical investigations into creating (therefore facilitating the aims and objectives of the research) and measuring (with participants as user testers) the outcomes of an artifact designed and produced as part of a practice based research (PBR) project (Candy 2006) have resulted in the manufacture of an interactive panoramic cinematic presence generating art system (Cornock and Edmonds 1973); PEGASYS. Research scientists experiment within virtual reality (VR) systems in order to gauge participant’s responses (Witmer and Singer 1998; Freeman, Avons et al. 1999; Waterworth and Waterworth 2006) and evaluate any presence indicators they might establish. VR systems comprise of a psychological experience, namely inner presence and a technological component currently called media presence (Coelho, Tichon et al. 2006). Photorealistic displays now facilitate the potential of digital media artist’s creativity in building computer-based systems that create digital places as immersive environments for spectators as participants. This PBR project aimed to create an immersive environment utilising high definition video and binaural sound clips distributed in a surround-sound system using video-on-demand through eye control technology in order to generate and measure presence engagement.

PEGASYS was therefore created to test participant's presence engagement within a natural setting, a remote perfectly natural environment as yet untouched by 'civilized' man. The system meets its aims in as much as preliminary testing revealed deep engagement with the landscape was possible and that participants engaged in and detected varying levels of presence as they navigated the 360-degree audio -visual digital content.

A Practice Based Research methodology

PBR methodologies rely heavily on the act of 'doing'. Each interaction or new development of the proposed work or system facilitates growth and understanding; each stage of the process allows for new development and fosters the relationship between the artist and the work. Since the canvas, so to speak, is continually changing, the methodology for interpreting the outcomes must provide us with a structure that facilitates our search for answers. There are three main stages of research-in-practice that are undertaken throughout this projects process; they are (1) the formalisation of the evolution of the concept, (2) the experience of that concept having been realized in the form of an interactive art system (object/ artifact / prototype) and (3) qualitative data gathering and analysis of audience experience. As this research process is structured around concepts developed from a cinema / video context these three phases are hereby referred to as pre-production, production and post-production. The location was documented by placing 7 Sony HVR-HD1000E cameras on a revolving purpose-built plate and the construction and implementation of a binaural sound recording device. A paper discussing the framework of PEGASYS in its production phase was presented by the author at OZCHI 2008 (Moss and Edmonds 2008). The paper discusses how the system provides engagement with the natural terrain incorporating site-specific performance. As previously discussed PBR employs a number of techniques to facilitate new knowledge, in this case the research methods of Bilda, Edmonds and Candy (Bilda 2006; Bilda, Costello et al. 2006; Bilda, Edmonds et al. 2008) were considered in detail for the deployment of creating an interactive art system. Bilda et al prescribe a Model of Engagement that situates the artist's requirements with the systems deliverables keeping in mind the users needs. This Model of Engagement was deployed in the construction of the system adhearing to current research practices into presence engagement and the artist's ability to creatively manipulate digital media.

Preliminary evaluation study and results

PEGASYS evolved through the secure network structures provided by Creativity and Cognition Studios (CCS 2003) at the University of Technology in Sydney, Australia. Here the immersive interactive system was created in order that it be exhibited and tested as a digital art experience in the Cyberworlds section of Sydney's Powerhouse Museum, namely Beta_space (Beta_space 2006). As this project was undertaken to explore physical and psychological engagement within immersive digital environments for participants of museum and gallery spaces preliminary data collection was conducted with participants at CCS interaction laboratory in early 2009. Preliminary user testing of the digital media content (audio and video clips) facilitated analysis of the system in production providing new knowledge about the characteristics of the media content and human-computer interactions; highlighting the apparent relationships with both negative and positive attributes. The purpose of the study was to determine if the projects aims were being met in respect to creating media that assisted in generating presence engagement. Interactivity was not included in this study.

With permission, the Independent Television Commission Sense of Presence Inventory (ITC-SOPI) questionnaire (Lessiter, Freeman et al. 2000) was adapted and served along side with a voice recorded interview as the basis of a user centered design methodology for data collection. Part A of the questionnaire contained 6 questions and is interested in the participants thoughts and feelings directly after exposure to the media. Part B contained 38 questions and referred to participant's thoughts and feelings whilst they were engaging with the display environment. 25 participants, 12 male / 13 female (11 of who claimed to be experts in the computer field) underwent a 40 minute process of observing and then responding to the digital media content. In keeping with current theories of testing presence the revised questionnaire distributed the data into four components namely; 1) Engagement -13 questions, 2) Ecological Factors - 6 questions, 3) Spatial Presence – 19 questions and 4) Negative Effects – 6 questions. A Likert scale of 1 – 5 was used to measure the outcomes, where 1 represents 'strongly disagree' and 5 indicates "strongly agree'.

By examining Engagement as an example of data identifying inner presence we can see that 80% of the participants had the 'sense that they had returned from a journey', found the content appealing, felt themselves 'being drawn in', felt absorbed

in the media and enjoyed themselves. 76% would recommend the experience to their friends. Due to the lack of interactivity only 60% would have liked the experience to continue, felt involved in the display environment, responded emotionally and lost track of time. 40% of participants indicated that their experience was intense and 48% were ambivalent in respect to experiencing sadness that the engagement was over. 92% agreed that they vividly remembered ‘some parts of the experience’.

In contrast, results on Ecological validity/ naturalness, which incorporates aspects of media presence, indicated that the displayed environment (a natural setting) was not meeting its aims. Only 48% agreed that the ‘environment seemed natural’ and 44% that the content ‘seemed believable’ while 52% felt that ‘the displayed environment was ‘part of the real world’ and 64% that ‘the scenes depicted could really occur in the real world’.

Spatial presence is commonly referred to as physical presence and perceptual immersion. Transmitting a sense of physical space, spatial presence transports the participant into the landscape thus producing ‘a sense of being there’. As this study included no interactivity results were as predicted. It is the very nature of participatory interactivity that provides access to the qualities of spatial presence which data analysis of this study revealed to be negligible.

Participant’s experiences of negative effects were tested against whether they felt tired, dizzy, suffered eye strain, felt nauseous, disorientated or had a headache, all of which produced very low results with tiredness ranking the highest at 32%.

This preliminary study therefore indicates that despite the fact that the displayed environment is a digitized photorealistic reproduction of a natural setting, participants were not overwhelmingly convinced. It was interesting to note that as a majority the ‘computer expert’ participants were more inclined to judge the content by its technical flaws than the bulk of others who tended to see ‘glitches’ as artistic interpretations.

The initial jerk when panning began was slightly jarring but became less noticeable with time. As someone who works with a lot of video I also found it hard not to devote all of my attention to the technical execution of the environment, especially the technical flaws such as stitching errors. Quote from Participant #13 – computer expert

It was intriguing that the characters, as they crossed over sections, morphed, you know they went from one and then they split into another and I actually saw that as perhaps a little artistic addition to it, not a technical glitch as such. So I quite liked that. Quote from Participant #3- non expert

Future work

Ongoing manipulation of the visual media is aiming to address issues of displayed naturalness and ecological validity where color grading and intensive editing will further assist the aims of achieving media presence. Stage two of the production phase sees the implementation of a gaze control interface to enhance spatial presence. Co-joining eye control technology with human ability will produce an outcome that facilitates deeply rewarding interactivity embedding participants in new relationships with the remote natural habitat. The post production methodology for user testing the system with participants in late 2009 (Beta_space) includes a more rigorous and disciplined approach than the preliminary study, incorporating Lucy Suchman's well theorized practice of video recall into the investigative process (Suchman and Trigg 1991). Data analysis will provide results about the systems ability to meet its aims and produce new knowledge about human computer engagement in relation to current theories of presence.

Figure 1. Still frame of 'Crystal Pool', PEGASY Stage One 180 degrees by Sarah Moss 2009

Figure 1. Still frame of 'Crystal Pool', PEGASY Stage Two 180 degrees by Sarah Moss 2009

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Art and mobile augmentation: the brave new world of graphical tagging

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Abstract

This paper - based on research for an art-practice based PhD at Duncan of Jordanstone College of Art & Design (University of Dundee) in Scotland - examines current trends in graphical tagging, particularly in art practice where it can be used as a vehicle for exploring conceptual issues such as the ephemerality of the digital medium, de- or re-materialisation of the art object and how artworks can be augmented and viewed in their settings.

What is graphical tagging?

Graphical tags are two-dimensional barcodes which can be read with a mobile phone camera. In most cases a URL is embedded in the tag, which when 'scanned' links to a mobile-optimised website. This way, the user can avoid the frustrating task of typing URLs on small keypads to access websites from their phones.

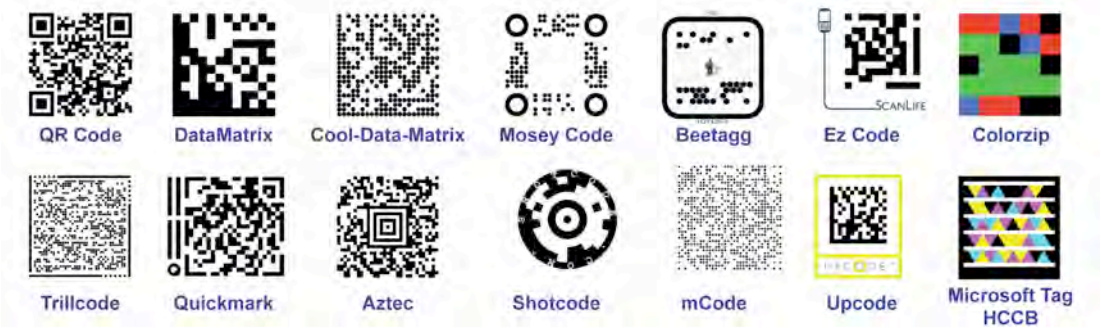

Figure 1. A selection of current graphical tags

A large number of graphical tags are currently in use, the most common being the QR code, where QR stands for Quick Response. In this way a machine such as a consumer-end camera phone can read the code quickly and then interpret it via reader software.

Figure 2. Narita Village, (2007)

In Japan, almost all mobile phones now come with graphical tag readers as standard. Figure 2 shows a restaurant in a small Japanese village (December 2007). Customers scan the graphical tag (highlighted) with their mobile phones to claim a free drink voucher redeemable at the restaurant. Graphical tagging has been implemented in Japan since 2000, and in 2009 has growing audiences in Europe for advertising, tracking parcels, festival ticketing and providing discount e-vouchers.

For audiences outside Japan, many phones ship with readers. Companies like Kaywa, I-nigma, Quickmark, and I-matrix create free readers for users to download and install on their phones. In theory, this makes the technology cheap and easy to roll out to large audiences, however, adoption of the technology on a global level has been slow. Given the wide variety of tags and readers available, the most prudent business practice would be to gain the largest market share and develop standards which can then be used in collaboration with telecommunications companies. This is the case in Japan with Densowave partnering with NTT DoCoMo and in Australia with Telstra releasing QRious codes which can be accessed for free by Telstra customers.

Unfortunately in the UK, at the time of writing, no such partnerships between telcos and graphical tagging developers exist. Obstacles such as the lack of constant inexpensive mobile Internet access persist for users. This has a knock on effect both in terms of hindering artistic development and creating difficult logistics for curators and gallery audiences.

Artists using graphical tagging

The Pet Shop Boys, Banksy, Michele Pred, Pedro Morales and Yuri Suzuki are some artists who are experimenting with graphical tagging, many linking to text on screen or to a URL. These are early works in the field, yet to fully exploit the capabilities of mobile 2.0 technologies which – when technical considerations allow – can widen levels of interactivity with personalization and database driven content.

In 2008, the Pet Shop Boys created the music video 'Integral' which used animated QR codes. However the codes are displayed so quickly that users are unable to access content behind them from the video. The Pet Shop Boys do invite participation by providing enthusiasts with a PDF of all frames used to animate the codes in the video. This is an interesting way of engaging the public, using a music video as the platform for promotion of the concept, the website for public engagement and then a YouTube group (YouTube, 2008) to publish user-generated content based on their work. This viral approach, although innovative, has not had many responses, with only nine videos (as of June 2009) posted to the group.

The well-known graffiti artist Banksy created a work near Waterloo station, London, which incorporates a QR code linking to an entry about him in Wikipedia. His subversive approach - producing ephemeral works in public places - shares many issues with digital artworks, surrounding archiving, 'originality' and permanence of a material object. The use of graphical tagging within this adds to those ideas, though in the Waterloo station work he does not explore the functionality or scope provided by the mobile phone to augment his work any further than to provide a 'digital signature'. Interestingly, by default, relationships between digital and material artworks and the spaces they are consumed in are raised through Banksy's own gallery presence in Second Life. The great irony of this is that the works he produces in the physical 'real' world are problematic in the gallery space and are sold in-situ by enterprising art dealers, with the ownership and ephemerality issues passed on to the buyer.

In 2007, American artist Michele Pred, in collaboration with Semacode Corp, created a tapestry work of a datamatrix code called 'You Are What You Buy', first exhibited at Los Angeles Art Gallery and selling for $US1800. When the user scans the work with the phone provided, text appears on screen saying: 'You are what you buy'. Pred states: '[The work is] supposed to make a statement about American consumer

culture ... In our society its about what car we drive and what we wear that makes the person' (Walcoff 2008). Pred draws interesting metaphors with the use of tapestry. The work originally was a print, but she claims that she is aiming at a larger statement through the use of thread by claiming; ' We're a part of the fabric of life, and technology is a part of that fabric of life as well'. (Walcoff 2008). The work is reminiscent of Barbra Kruger's 'I Shop, Therefore I Am', however a piece like Pred's has the potential to take these ideas much further with mobile-web interactivity.

Another artist creating textile-based work which incorporates QR codes is Venezuelan Pedro Morales, who has created a series of works called 'Puras Flores' (Pure Flowers). Of the series he states:

> Puras Flores is a digital work whose scale invariability is shaped by QR codes patterns. This fractal characteristic proposes aesthetics marked by ones and zeros, whites and blacks. (Roger 2008)

Puras Floras is handmade using cloth and leather flowers, so there is a lovely juxtaposition of challenging a digital device to 'read' something that is analogue and handmade in nature. Morales has since gone on to experiment with other types of graphical tagging such as Microsoft HCCB colourcodes to create more customized linking and to explore a wider range of aesthetics.

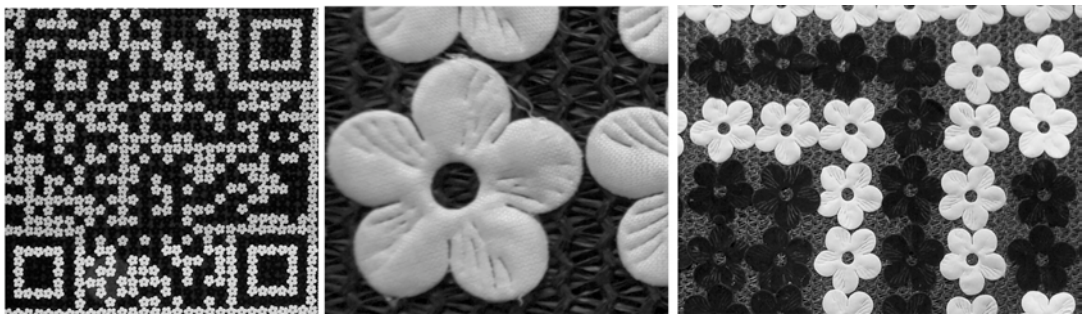

Figure 3. 'Puras Floras' (2008) Pedro Morales, courtesy of the artist

In May 2009 at Futuresonic, artist Yuri Suzuki invited participants to take part in his QR code facilitated work 'Graffiti Radio'. Located around the streets of Manchester as part of the festival, Suzuki explores the potentials of the mobile web, using the QR codes to link to Internet radio stations. Whilst physically located in the streets of Manchester, the QR codes link to the virtual audio spaces created by online radio.

Studio practice and exhibition: a case study

To gain a deeper understanding of the challenges faced by artists, actually making works oneself often provides the greatest insights. As part of PhD research into graphical tagging as an artform, an invitation from the Hannah Mclure Centre in Dundee to make a series of works embedded with graphical tags for their 'Signals in the City' exhibition (March - May 2008) was accepted. This became a means of testing the technical aspects of producing works, as well as enabling investigation into how graphical tags facilitate user interaction in a gallery environment. The studio-based process allowed for the identification of technical issues when implementing works in the gallery and is used as a case study in this paper.
Two series of works were created - 'RGB: Medium is the Message' comprised of three large-scale screen prints of QR codes which have been altered to appear more organic than standard pixel-based codes. This way the latitude of what the phones could actually read, in terms of distortion of the codes, colour and upscaling were investigated.

Figure 4. 'RGB: Medium is the Message' (2008), S. O'Callaghan

The other series, called 'home.html', was a photographic series of six works, underneath which a QR code was printed in red ink - reminiscent of Japanese prints. The QR codes link to websites about each of the locations that the images were taken in and were printed at small sizes in order to test the effects of small scale and lighting in a gallery environment.

Exhibiting graphically tagged artworks

Initially the works were developed using Nokia N70 phones with i-nigma reader software installed. N70s have a Symbian operating system with a 2MP camera and have a wide latitude in terms of lighting and being able to read the heavily distorted

codes of 'RGB: Medium is the Message'. Orange provided sponsorship of the exhibition with mobile web access and three Nokia 6300 phones which - according to the i-nigma website (www.i-nigma.com) - were compatible with their software. When installing the exhibition it transpired that this combination of phone and software was unreliable in this particular gallery situation.

A number of variables had to be considered, such as the phone operating system, lens capabilities, responses to lighting conditions, handset software, and the operator's additional branded software. Narrowing this down was difficult, particularly since the 6300s were delivered late to the gallery with little time for testing, so the problems were not fully resolved in time. Given the short lead-time for troubleshooting, in this case the solution was to buy more N70s as backup phones and exhibit with both handsets. This was not ideal, but highlighted the value of testing and retesting the hardware and software, under a variety of conditions, and not just in the studio where the works are made, rather than relying on the manufacturer's advice. Following these experiences, further investigation is currently being undertaken at Duncan of Jordanstone College of Art & Design to identify a range of reliable handsets paired with reader software appropriate for gallery use.

Observations in the gallery

Figure 5. Signals in the City, privateview, 2nd March 2008

When viewing the works, it was observed that users gravitated towards the newer, more attractive 6300s rather than N70s, highlighting the importance of product design and material aspects of objects. A plinth displaying the phones and instructions was located to the right of the works on the wall. The natural tendency for viewers was to pick up a phone, take it to the nearest artwork and then work their way left along the wall from there.

People viewed the works in the order in which they were hung along the wall, as they would with conventional two-dimensional works in a gallery. This is interesting given the nature of the works is actually non-linear and there was no need to do this.

Most people spent a while with the technology if they couldn't work it at first, and many spent more time looking at the online content than had been expected. Such behaviour is encouraging for artists, suggesting that gallery audiences are interested in engaging with such works. An audience who hadn't been considered was children, and, surprisingly, they were often the most responsive participants, spending longer engaging with the works than many adults. They also were quicker to experiment with and implement the technology, often helping out their adult companions if they had difficulties.

Graphical tagging as a vehicle for critical investigation

Artists embedding graphical tags in their artworks have the potential to explore relationships between the physical, tactile world and that of virtual, digital media through the notion of mobile augmentation (Chan 2008). Artworks which employ graphical tagging can have a physical presence in the 'real' world where the graphical tag is displayed, whilst simultaneously leveraging the interactivity of the mobile medium to augment environments and objects with digital content. This then raises critical questions about materiality and space in relation to an artwork augmented with graphical tagging.

If one goes back to Lucy Lippard's *Dematerialization of the Art Object* and the ideas behind conceptual art of the 1960s where the physical form is secondary to the concepts behind the work (Lippard 2001), mobile-augmented works raise interesting debates surrounding further dematerialisation of the art object. When digital media was adopted by artists in the 1990s, theorists such as Lev Manovich advocated that even without a material output there still was a 'new media object' fulfilling a defined set of criteria (2001: 27 - 48). When one examines the impact of graphically tagging an object which has a material presence and location in time and space, a shift in paradigm occurs, adding to the conceptual landscape of digital media and materiality. The digital content that may be latent within the object, and released through scanning a code, has the potential to mediate co-presence in the viewer, where they are physically in the space where the object exists, but may also be in the virtual

space determined by that content. The object becomes bipartite where it can exhibit material form, yet have undergone a process of dematerialisation through digitisation.

The actual spaces/places in which these art 'objects' are being viewed, interacted with, or consumed shape how they are received by their audiences - where the semiotics of a given space can affect their experiences. The actual physicality of one's environment becomes much more important when people interact with the space itself as well as with the artwork. The potentials provided by the graphical tagging of physical art objects means that the boundaries between real and virtual become blurred, through the viewer's ability to be physically present in one space and virtually present in another, augmented by content on a mobile phone.

Conclusion

The possibilities for imaginative, playful and questioning artworks are many - however graphical tagging is still a nascent and technically fraught tool for artists to work with. The newness of the technology means that there are opportunities for groundbreaking and experimental works in a range of technical, material and conceptual areas, which build on critical debates in contemporary art. The main obstacle facing today's artists working in this field is the commercial telecommunications industry itself, where there are so many variables to be considered when making such works that artists are often daunted by the prospects of unravelling what is appropriate for their needs. Art practice-based research is currently being undertaken to identify ways in which artists, curators and galleries can circumnavigate these problems. This hopefully will create a path and set standards, which can guide other artists who wish to explore this medium.

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An 'on-the-fly' pseudo model-based Augmented Reality

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Keywords: location based entertainment, Augmented Reality, mixed reality, interactive spaces.

Introduction

Throughout the years, Augmented Reality has become more and more popular due to its usefulness in many applications for different areas: entertainment, education, interactive media, and simulation. At the core of Augmented Reality is the ability to accurately register virtual objects in all dimensions of the real world. It is essential to track accurately physical locations and orientations of real world objects with respect to the observer’s viewpoint.

Vision-based marker tracking, like ARToolkit 0, is a common low-cost technique which makes use of fiducial markers. In order not to use these unnatural markers, researchers have been relying on pre-created 3D models of the subjects being tracked. Whether using edge based (0, 0) or feature based (0, 0, 0) techniques for model tracking, 3D models of objects or scenes need to be created beforehand (model-based tracking). This requirement limits the interaction within AR applications. The production process for the creation of AR environments can be time-consuming and unfeasible in some situations.

In this paper, we present a new system for digitizing three dimensional objects supporting an 'on-the-fly' pseudo model-based Augmented Reality. Based on current model-based tracking methods, we develop a method to digitalize 'on-the-fly' 3D models used for AR tracking.

To digitalize 3D models for an object, we use infrared (IR) techniques. A pen-like device, equipped with an IR light is used as the control device. Two calibrated cameras track this IR light to compute the 3D position of the pen. Dragging this IR

pen along edges and feature points of an object, enough information can be derived to define the 3D model (Figure 1). Model-based tracking algorithms can then be used to superimpose virtual objects on top of the object being tracked, or use this object to manipulate other virtual contents or interactions.

This approach introduces a simple, interactive, effective digitalized 3D model. The novelty of this proposal is that physical objects can be 'digitized' easily, and an accurate spatial model of the physical objects is not required. It leads to a novel way to create 3D virtual models, where 3D virtual models can be interactively created in 3D spaces.

System overview

System Setup

Our system can be set up in small areas, for example, a working table as in Figure 1. Two infrared cameras, needed to track the position of the infrared pen, are mounted in fixed positions above the table. Instead of using normal cameras, we use Nintendo Wii Remotes. This low-cost device can detect IR sources at up to 100 Hz - which is very suitable for real-time interaction systems. Once the intrinsic parameters (focal length, the centre of projection, distortion parameters etc.) and the extrinsic parameters (the locations of the two cameras in the workplace) of the two cameras are computed during the calibration process, the 3D location of the IR light and the 3D digitizer, can be computed easily by using triangulation techniques 0.
Equipped with a head-mounted display (HMD), a user can view both the real world and the virtual objects. With the digitizer device, he/she can digitize any real object. For example, a user can mark a book and a virtual avatar will appear on top of the book, talking about the content of the book. Furthermore, the device can also be used to create any new 3D model. With it, users can draw 3D models directly in the real world space. This gives the ability to check the model from different perspectives as well as its size in the real environment.

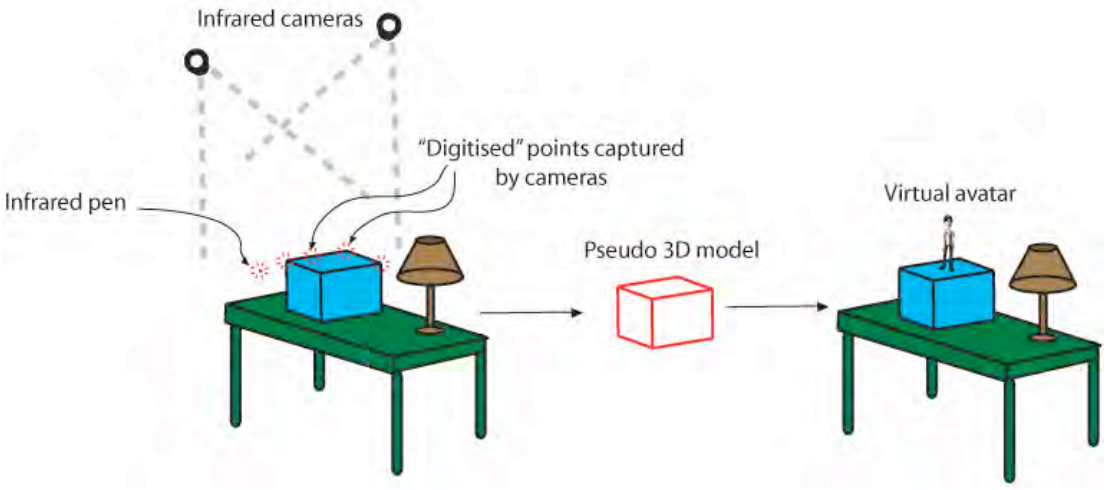

Figure 1. System design overview.

On-the-fly model digitizing and tracking method

The working place is tracked by using a variant of Parallel Tracking and Mapping for Small AR Workspaces (PTAM) 0. Instead of simultaneously building and tracking the map as described in the paper, in our system, the map of the workplace is built beforehand, and only the tracking part is in use. This tracking part will compute the camera pose in the workplace framework. As the IR light is tracked by the two cameras, which are fixed relatively with the table, the light's 3D position and its 2D projection image in the camera viewpoint can be calculated. Thus, using this method, 3D structure as well as the texture of any object can be captured. After that, by using a similar approach as in 0, the object pose can be tracked seamlessly in the following frames.

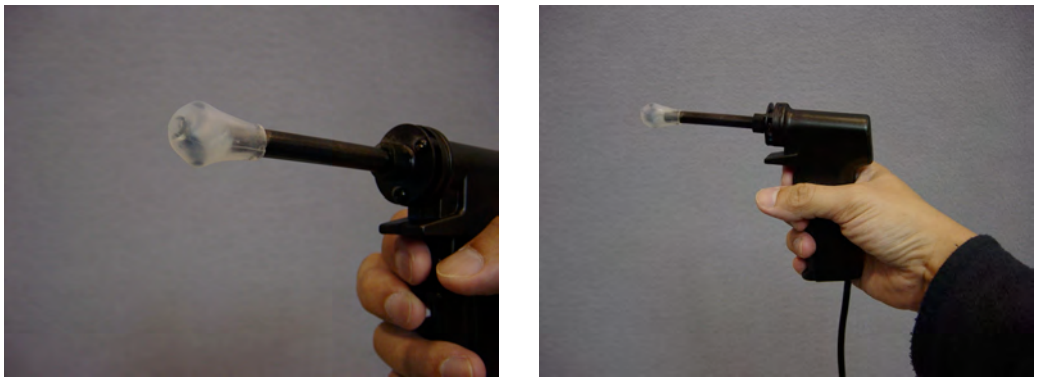

Figure 2. The 3D digitizer

The 3D digitizer

The 3D digitizer is essentially a handheld pointing device equipped with a button at the handle and infrared light-emitting diodes (LED) at the tip (Figure 2). The button, once pressed, turns on the infrared LED. The LED are encapsulated in a small dome shape cap which helps to diffuse the infrared light so that the infrared light is visible from a wider angle by the Wii Remote cameras. This is essential as there will be instances when a user points the digitizer away from the cameras and if it were not because of the diffused dome, the cameras would lose track of the infrared LED.

Further applications of the 3D digitizer

An improved version of the 3D digitizer (Figure 3) allows users to perform more sophisticated tasks such as drawing 3D lines in different colours. A separate hardware menu controller allows users to choose a different thickness of stroke and colour by pressing its buttons. In addition to this the HMD lets the user see what he is drawing in the 3D space. The user holds the menu controller in one hand and the 3D digitizer pointer on the other.

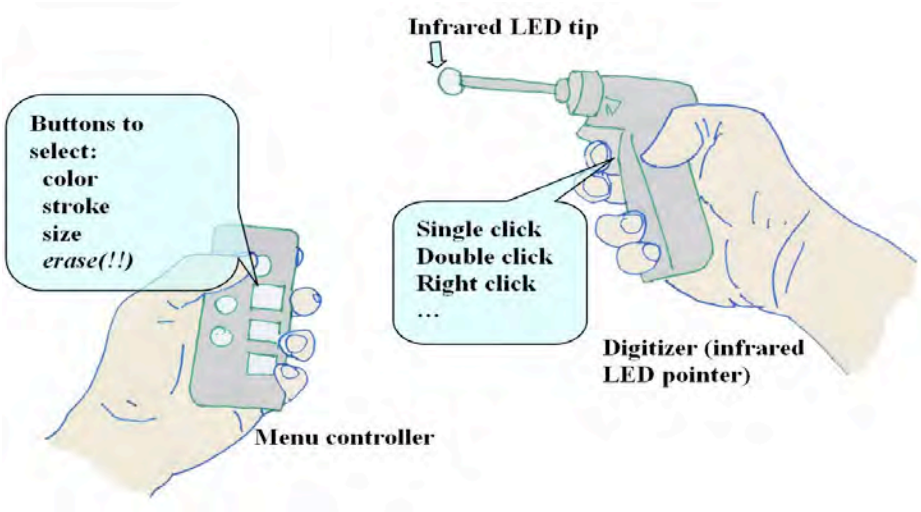

Figure 3. The improved version of the 3D digitizer

The 3D digitizer with menu controller is an innovative tool which allows the user to intuitively draw objects in 3D space. This is a total paradigm shift from drawing a pseudo 3D object on a computer's 2D screen using commercially available software. Users would use the digitizer and the menu controller just as they would use a conventional mouse and keyboard. In addition, it has the advantage of offering a

much bigger drawing space; the area is as big as the Wii Remote cameras can cover, compared to the desktop size area of a conventional computer interface.

Conclusion

With the use of our tools, the space around us becomes dynamic. Virtual spaces are created, constructed and mapped to the real physical space. The space(s) is no longer constituted of physical artifacts alone; the spaces are real and virtual. At the same time, virtual space can be destroyed (by eraser tool) with the click of a few buttons. The human user becomes the mediator between the real and virtual spaces; and he himself is engulfed in this mixed sense of connectedness with the spaces.

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Does routine make a boring life?: the visual representation of time and space using mobile technology

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1 Abstract

This paper proposes an idea for new software which graphically represents a person's movements around their environment. It demonstrates how emerging technologies can be combined in ways to implement the idea and suggests exciting applications of such software. It suggests how we can find the optimum way to visualize this movement and how. over time, we can utilize that information for many functions. The end data from such tracking technology has benefits for the individual and the multitude. This opportunity for innovative development has emerged due to new promising software and devices, which combined in new ways opens exciting possibilities. Enabling people to envision their own movements over time by representing it graphically on a screen is achieved using tracking software, through the subjects' mobile.

2 Introduction

Why track people's movements around their environment? Before discussing the technical details it would be beneficial to explain what the potential applications of such software are. Visual information obtained in this manner could be used as a tool to help create the following; (a) a Generative/software artist's apparatus, (b) an urban planning device and/or (c) a means to assess your life.

2.1. A Generative/software artist's apparatus

Generative art is a picture that has been generated in a random manner, produced by computer software. By tracking an individual over a certain time period, the random element may be the movement of the character around their environment, it could develop a picture/image that would be both abstract and relevant to the individual. This gives the tracked person the opportunity to act as the key pattern

architect. It is anticipated that the resulting graphics created by such software could produce aesthetically pleasing imagery. The imagery could be used as a tool for the Generative/software artist to exploit.

2.2. An urban planning device

Hovgesen examines the potential benefits of urban tracking technologies:

> GPS based tracking theoretically makes a precise survey of spatial behaviour possible, including routes travelled, durations of stay, and with registration of movements at the micro-scale as well as the macro-scale. Thus tracking greatly improves the basis for the evaluation of urban form as well as many aspects of urban design. (Hovgesen 2008)

If we were to track hundred's of subjects in an urban area, it is envisioned that we will be able to identify where people tend to cluster or cross paths with each other. The system may be used to help in town planning or advertisement placing.

2.3. A means to assess your life

Software representing people's movements would give people the means to assess their own life. For example, after reviewing the imagery produced by the software, the subject may notice how regimented their existence has become. Can this be evaluated as having a boring life? Can a jumbled pattern be considered a more exciting life? If the software is used in conjunction with mood tracking, can it be assessed if someone is happy in work or at home? Perhaps the software can act as catalyst to change one's life:

> 'Break your routines' has long been a favourite maxim … but it's increasingly supported by neuroscience. Making even tiny, seemingly irrelevant changes to your daily patterns - taking a different route to work or rearranging furniture - can stimulate nerve cells and boost production of neurotrophins, which help brain cells thrive. (Burkeman 2007)

3 Technical background

The technology required to implement the above ideas will now be discussed. For this project there are two areas that needed to be explored, information visualization and mobile phone tracking. For information visualization, a wide range of techniques are available for the graphic artist to investigate. Mobile phone tracking is a new emerging technology with many groups of actors trying to establish themselves as the dominant software provider. Tthis report will look at potential software's that could be used to implement this product.

3.1. Information visualization

Information visualization focuses on the use of software tools to scrutinize substantial amounts of abstract data. It is the understanding of information without the use of words or numbers. By using graphical techniques, information visualization can help people understand and analyze a wide range of data. Using various technologies/software which will be discussed later, various methodologies were investigated that could be used to represent the information obtained from the mobile devices. Before the various visualization techniques are discussed, it should first be established what form of information needed to be collected. While later investigation may identify further requirements, the initial investigation suggests the following details are necessary: latitude and longitude details of the user, amount of time at a given location by the user, what task the user is doing in that location and the attitude/mood of user at that given time in that location.

3.1.1. Information visualization software

Research found that there are some software packages which could be used to create the graphics needed with the information obtained during tracking. These packages are Flash/Flex, DEGRFA, Ilog-Elixir, and Nodebox, amongst others.

Flash/Flex: One of the first software packages researched was Flash CS4 with its powerful Actionscript 3 language. It was thought that this package (along with its sister package Flex) would be ideal for this kind of product, due to ActionScript 3 which gives the programmer far more tools to play with then previously. Because Actionscript has become so popular, there is now much 3rd party software that can be used with Flash/Flex such as 'DEGRAFA', 'ILOG Elixir' and 'Flare'.

NodeBox: NodeBox allows you to create visual output with programming code. The application targets an audience of designers, with an easy set of state commands that is both intuitive and creative. NodeBox uses the Python language and has many powerful libraries that can be used in more complex graphs.

After examining the aforementioned software options, it was decided that Nodebox would be my preferred choice - because it has an easily accessible programming language from a graphic point of view. It has many features that would be ideal for a project like this such as Database and PhotoBot, which would allow the programmer to draw on the tracking information and manipulate imagery.

3.2. Mobile phone tracking

Mobile phone tracking locates and tracks the current position of a mobile phone - even on the move. This can be achieved by various means including GPS, GPRS and tracking the roaming signal. This, along with software installed on your computer, can help track and keep records of an individual’s location and movement over time. Software that was thought appropriate at the moment is ‘Google maps’ and ‘Trail guru’.

3.2.1. Google maps

Google Maps is a free application and technology provided by Google. It has created a map of the earth that powers many map-based services; many third parties have used this service to create tracking software. Trail guru is one such party.

3.2.2. Google Latitude

Google Latitude is an app that makes your phone a 'location-aware mobile'. It was developed in conjunction with Google maps. Latitude allows other people to follow the user using the app on their phone. Using both these technologies it is possible to follow a mobile phone over a period of time and extrapolate their longitude-latitudes coordinates.

3.2.3. Trail guru

According to their site ‘Trail guru is for visualizing, exploring, summarizing and sharing the outdoors.’ You can download Trail guru to your iPhone and capture your outdoor activities using the iPhone 3G's integrated GPS. With Trail guru you can check your movements on Google Maps, in Google Earth, and/or see key statistics and graphs. You upload your GPS tracks from your device after your excursion. This is achieved by exporting your files as .kml’s. These files can then be downloaded from their site, or from your phone. You then load these files onto Google Maps or Google Earth. From this we can extrapolate the information that is needed for the graphs.

After examining Google Latitude and Trail guru, it was decided that Trail guru would be my favoured choice; this is because it has a far better tracking technique. Google Latitude does not keep accurate enough records for my objectives.

3.3 Implementation of technologies

The Trail guru iPhone Application is installed on an iPhone, this will capture your trail and how long you are in a given location. I was able to extrapolate the information recorded using Trail guru and Google maps, extracting the latitude and longitude data. At the moment this is a manual process, but it could be automated, in effect creating a bridge between all applications (See Fig. 1). The information is then converted from latitude/longitude to an x,y coordinate. To do this we have to pick a latitude/longitude coordinate to act as 0, 0 on the graph. (See Fig. 2) The time in a given location is also recorded in Trail guru. As of this moment this information has not been extrapolated from the ‘.kml’s files, but research is currently being carried out to achieve this. For the purpose of this demonstration we shall use estimated results. Finally, these x, y coordinates and the estimated time in a particular area are hardcoded into NodeBox. Nodebox converts the information into a visual graph. This graph then changes over time showing the individual’s progress. (See Fig. 2)

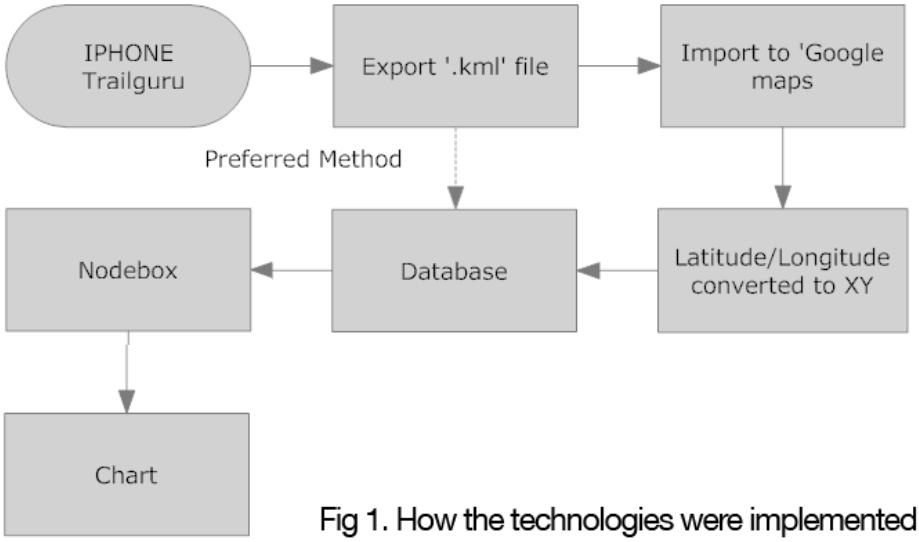

Fig 1. How the technologies were implemented

4 How the information is presented

The visualization of information is fundamental to this project; the chart has to be both easily comprehended and implemented efficiently. In a bubble chart, values are represented by the position of the bubble on the x and y axis, the bubble size also represents a value. After comparing various graphs, it was decided that the most appropriate technique would be a variation on the ‘bubble chart’: the areas of the chart representing two distinct properties - the physical area the individual moved in and the 24 hours that the movement occurred.

To determine the physical area, we first gathered the data regarding the individual’s movements; this data comes from the latitude/longitude positions. The size of the map is then established. It has to include as many of the coordinates as possible without making the map too unmanageable. In this case the map was 8km x 8km as the individual’s movement occurred mainly within this location. Additionally the area of this map also represents 24 hours. When we create the ‘bubbles’ representing the time in a specific location, the area of the bubble will be proportionate to the area of the rectangle. (See Fig.2 below).

4.1. The use of Icons

It was thought that using simple colour coded circles to represent time would not convey enough information when the graph was assessed. Why not also represent what they are doing? Therefore, in one ‘bubble’ we would have 3 separate pieces of information. This would make the chart more intuitive to the viewer. Icons were thought to be the most appropriate means of representing such data. Icons could be devised that represent a person’s most common tasks, for example, Rest, Errands, Work, Play and Meal.

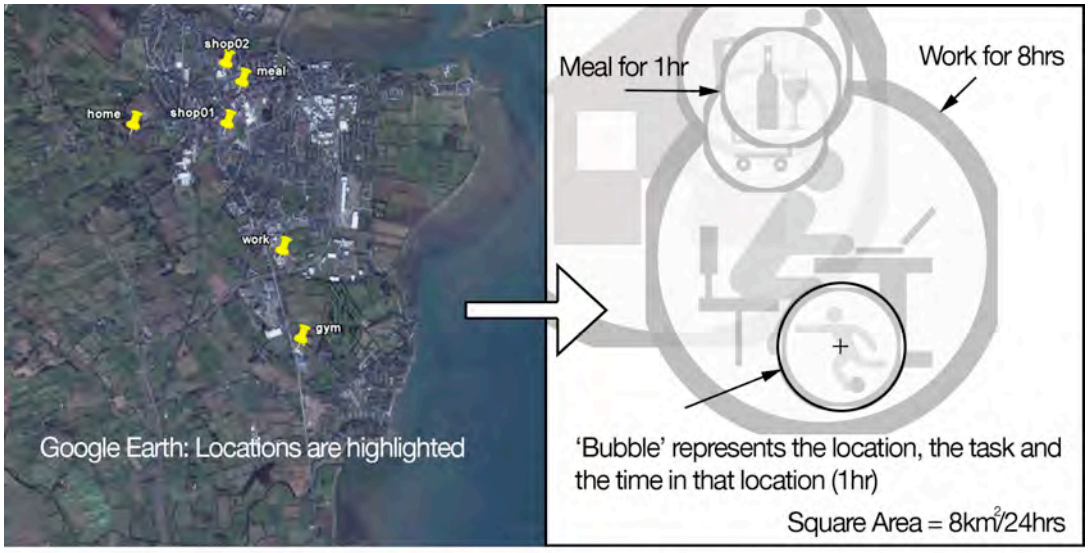

Fig 2. On the left is the information from Google maps, on the right is a bubble chart produced from Nodebox with the available data

5 Conclusion and future studies

After partially implementing a trial section of the project it was found that the graphs were sometimes too difficult to comprehend. This was due to the fact that icons tended to cluster, as the individual would shop, work and eat in geographically close areas. How the bubbles are presented may need some tweaking to make them more understandable to the viewer. More research needs to be carried out on tracking the individual’s mood and task, perhaps using software to capture a person’s colour choice in a particular moment (this representing their mood) and adding this to the database. This should give some interesting results regarding the user’s feelings in a particular period and location. Further investigation will also need to be carried out on

extrapolating time data from Trail guru's figures. The entire process needs to be streamlined, with the ideal situation being that Trail guru's records go straight to a database that Nodebox can then call on. More investigation will need to be undertaken on the graphs taken from individuals. But they do show patterns in people's lives.

In conclusion it was found that the emerging technologies presented demonstrated some fascinating possibilities when used in combination with one another. These possibilities suggest exciting new applications for mobile technologies. The Author invites interested readers to comment or collaborate in this research.

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Urban sonic activation on wheels: *Ghost Scraper*

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Abstract

A custom built urban machine equipped with microphones, wheels, embedded computing, networked with wireless communication was used in a quest for hidden layers in the urban environment. This paper describes a tool for urban interactive sonic action - *Ghost Scraper*, a solar powered unit consisting of two networked and mobile modules for creating amplification of sonic properties hidden in urban material, such as walls, streets, buildings, staircases and more. Ghost Scraper is used as an urban tool, activating the sonic landscape. Layer by layer Ghost Scraper looks for sonic activity of ghosts, buried in the architecture of the city. Ghost Scraper is a tactile machine and easy to use and several people can search for activity at the same time.

This paper examines sonic properties of the urban landscape and mobility - in the creation of temporary urban spaces when activating hidden layers. This is part of ongoing research concerned with bridging data spaces, urban landscape and interactive sonic spaces, using custom built sonic tools. This paper's context can be seen in the light of early experiments and implementations of wireless communication technology from the early 20th Century. Pioneers in wireless communication, such as Thomas Alva Edison and Guglielmo Marconi both developed wireless radio machines, to be able to detect and communicate with the dead.

Keywords: Sonic art, music technology, interaction design, urban space, alternative energy, creativity, networks, embedded computing, situated art, trans-disciplinary research, ghost communication.

Introduction

Ghost Scraper is a conceptual tool for discovering sonic properties of ghosts in urban space and activating these and making them detectable. The challenge for the participant is to use a very simple interface to engage with the urban surroundings, - to reveal hidden sonic structures and memories in the materiality of urban space, in building materials, roads, staircases, and buildings - in a quest for sonic activation of the space. The act of listening is a central part of this activity.

In this paper Ghost Scraper is described; a solar powered, networked sonic activator on wheels, an urban device used to augment invisible sonic layers embedded in urban space's materiality and making these layers auditory. Ghost Scraper is a custom made interactive apparatus, using embedded computing, networks, solar panels, real-time audio processing, on wheels, to engage the audience in participation and reflection of sonic evidence in the city, whether it is invisible layers of imaginary memories, or the electronic presence of ghosts in the city's material. More information can be found at moolab.net

Ghost Scraper

Prototyping for sonic exploration of ghosts in urban space is the focus of the research project Ghost Scraper. The physical interface is developed to explore urban space and activate its sonic properties, and is part of research in technology, sonic art, networks and mobility. It is designed as a tool to examine the relationship between sonic imagination and creativity, play and urban praxis.

Design

The design criteria at the centre of the prototyping process can be characterized by the elements - mobile, small, local, and connected. The prototype design focused on the participatory model, where several audience members use interconnected devices.

Ghost Scraper is designed using embedded networked computers, running Linux for ease of implementing hardware and software. One of the design criteria was designing for a tiny, lightweight computer system as the processing unit. Ghost Scraper is equipped with contact microphones to uncover sonic properties of urban

materials. For audio processing in real-time and networking, Ghost Scraper uses Pure Data anywhere (Geiger), a clone of Pure Data for embedded computers. All sounds 'discovered' by Ghost Scraper are processed by Pure Data in real-time. One important part of the research is the implementation of audio processing software on embedded computing and integrating tools for various wireless communication systems, and integration of sensor systems. Ghost Scraper is designed as an autonomous and standalone device and it is for this reason equipped with wheels for mobility. The sonic output is through headphones.

Wheels

Ghost Scraper is equipped with wheels, to facilitate mobility in the city and as conceptual glue - existing between a pet, a toy, and a vehicle. To move around in a city we use vehicles such as cars, bicycles, buses, motorcycles, wheelchairs, and baby carriages. A dog you have on a leash to accompany you around while it sniffs out the environment for marks by other dogs. Ghost Scraper has a leash and wheels to detect ghosts.

Ghost Scraper network

The networked used is a local network, independent of the Internet, a personal area network (PAN). The units in Ghost Scraper network have to be within 30 meters in proximity. The Ghost Scraper units are connected over the network and they inform each other of findings through auditory signals.

Green play

Ghost Scraper uses solar energy. Its use is therefore limited to season and location, as there has to be sufficient solar energy to charge the unit's power system.

Play with imaginary spaces

Ghost Scraper is equipped with several contact microphones for sonic exploration of urban material and urban places, and the use of these microphones is a tactile experience for the audience or user. In order to have a sonic experience the urban material has to be used in a tactical sense, using the microphones to explore the surroundings.

Sonic activation

Sonic activation using Ghost Scraper is a speculative and imaginative action; a search for a sonic presence in materiality we do not yet know if it exist. We can imagine a story, an object, or a ghost from the auditory information - coming from examining urban materiality - when placing the microphone over the staircase, park bench or concrete wall. This is sonic activation. It is like giving an auditory face to a place. The act of listening has a central place in this exploration.

Ghost communication and activation

Wireless transmission has, since its inception, been connected to detection of the presence of ghosts and ether voices. Several sources mention Thomas Alva Edison and an apparatus he constructed - *Valve*, in the early 1920s: an apparatus where deceased people could communicate with the living from beyond. (Sconce 2000: 60). The possibility to communicate with the beyond was, according to sources, 'by the use of a delicate apparatus similar to the valve used in wireless telegraphy' (A.K. 1920-21: 132). Although no known record exist of this device, the valve technology was a rectifier for transforming alternating radio signals into direct current signals - to be able to detect wireless information. Edison had discovered already, in the 1880s, the principle of how to detect wireless oscillations, called the *Edison Effect*, but never applied this discovery to commercial use. Several engineers continued the development of Edison Effect such as J.A. Fleming, Lee De Forest and Edwin Armstrong into an *Audion*, a controllable detector of wireless information. (Brice 2001: 63). Another pioneer in wireless communication, Marconi, in his radio science research, tried to build a device that could receive voices of all people who had lived (Sconce 2000: 61). In the 1970s the Latvian psychologist Konstantin Raudive modified radio devices to listen to voices of the dead. According to a transcript from one radio session made by Raudive, the ghosts expressed a preference for radio transmission with the words: 'Bit by bit only through radio' (Sconce 2000: 186-187). This hybrid area of sonic ghost detection, wireless communication and urban information raise several questions: Can we create a link to the dead through wireless communication? Are there detectable sonic memories embedded in our surroundings?

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Fragments of place: revealing sense of place through shared phone images

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Abstract

In this paper we describe the design and implementation of a web-based site-specific interactive installation. This participative work encourages camera phone users to send their own photographs and corresponding text tags by multimedia messaging service (MMS) to be incorporated into a visual display in real-time, thereby enriching the shared experience of a specific event situated in a particular place.

Introduction

> If space is […] a simultaneity of stories so far, then places are collections of those stories. (Massey 2005: 9)

Large-scale events have always been fundamentally social, but today they are also characterised by the recording and documentation of activities. Digital photography, in particular, has recently enabled us to easily record and share all aspects of our lives. These records often have an inherent narrative quality and generally serve two purposes. Firstly, for the self they act both as a documentation of memories and secondly, from a social perspective they enable the sharing of experiences with those who are not present at the event. The records act as a currency for social connectedness but they also connect the individual, and indeed all participants, to a shared time and place. This raises the question of how these records or stories can be woven together in ways that encourage people to construct new meanings of place.

The phenomenal success of the multimedia enabled mobile phone is obvious, and its widespread adoption has been well documented, but less is known about the situated use and emergent practices that are evolving amongst phone users. These

new patterns of behaviour often revolve around the collocated and shared nature of image and text creation, as Salovaara et al (2006: 1212) state, 'picture sharing is […] contingent on the social settings where pictures are created'. Results of their research into camera phone interactions indicate the 'importance of the active role of technology in constructing people's experience', and it is this interplay between lived experience, recorded imagery and text, and the immediate and subsequent sharing and representation of this created data that is of interest in this paper.

Technology and sense of place

The recording of large-scale events illustrates a most modern of dilemmas: does the desire to record cause us to witness events increasingly through the window of a digital camera, thereby somehow degrading the experience of actually being there? In short, the collision of real and virtual worlds.

Increasingly technology enables us to inhabit both the virtual and real worlds. Such technology offers a number of bridges between these worlds but in so doing places an increased tension on the sense of place and subsequently the identity of the individual. Identity has many components that have to be woven into our everyday lives. It is possible that a 'fragmentation' of identity is part of our experience of modernity (Benjamin 1997). Today identity is just as much about stitching multiple identities in separate virtual places as it is with their physical counterparts (Hall 1991). Our sense of place, both physical and virtual, contributes to our feeling of presence and the subsequent identity that is created, maintained and communicated. It is at the border of these physical and virtual worlds that sense of place increasingly resides and it is communication technologies that must provide the crossing points between these worlds. Perhaps it is the camera phone, with its ability to record and connect us, that is at the vanguard of such technologies.

Place as experience and meaning

Traditional views on sense of place (Relph 1976: 44 and Wagner 1972) characterise the experience as a fusion of meaning, act and context. Indeed, Relph suggests that it is not just the identity of a place that is important, but also the identity that a person or group has with that place, in particular whether they are experiencing it as an 'insider' or 'outsider'. Fragments of Place seeks to stimulate debate concerning the impact of technology on sense of place, particularly those personal technologies that

have now been fully assimilated into the daily lives of so many of us. Increasingly people are using their mobile multimedia phones rather than standard digital cameras to capture memories of places and events that are meaningful to them. In 2007 nearly 500 million picture messages were sent in the UK alone, with nearly two million of those being sent on New Year's Eve (Mobile Data Association 2008). At such events a large collection of media is created by participants, which raises the question of whether the collective experience of the participants and the content they have generated can be shared and presented in a way that enhances the overall experience of that event.

The work

The experimental work that is discussed in this paper was designed to explore the 'sense of place' experienced by people engaged in interaction with a publicly sited, participative installation. It was designed to invite and encourage the sharing of people's personal images of a particular time and place, normally kept hidden on mobile phones. The installation was demonstrated at a public arts and music venue in central Edinburgh for three weeks during the 2008 Edinburgh Festival Fringe, the world's largest arts festival. The installation itself consisted of an Internet enabled computer connected to both a plasma screen within the bar area of the venue, and to a projector that displayed the work onto a wall in a foyer area (Figure 1). The installation was populated initially with photographs and text tags created in the early days of the festival season.

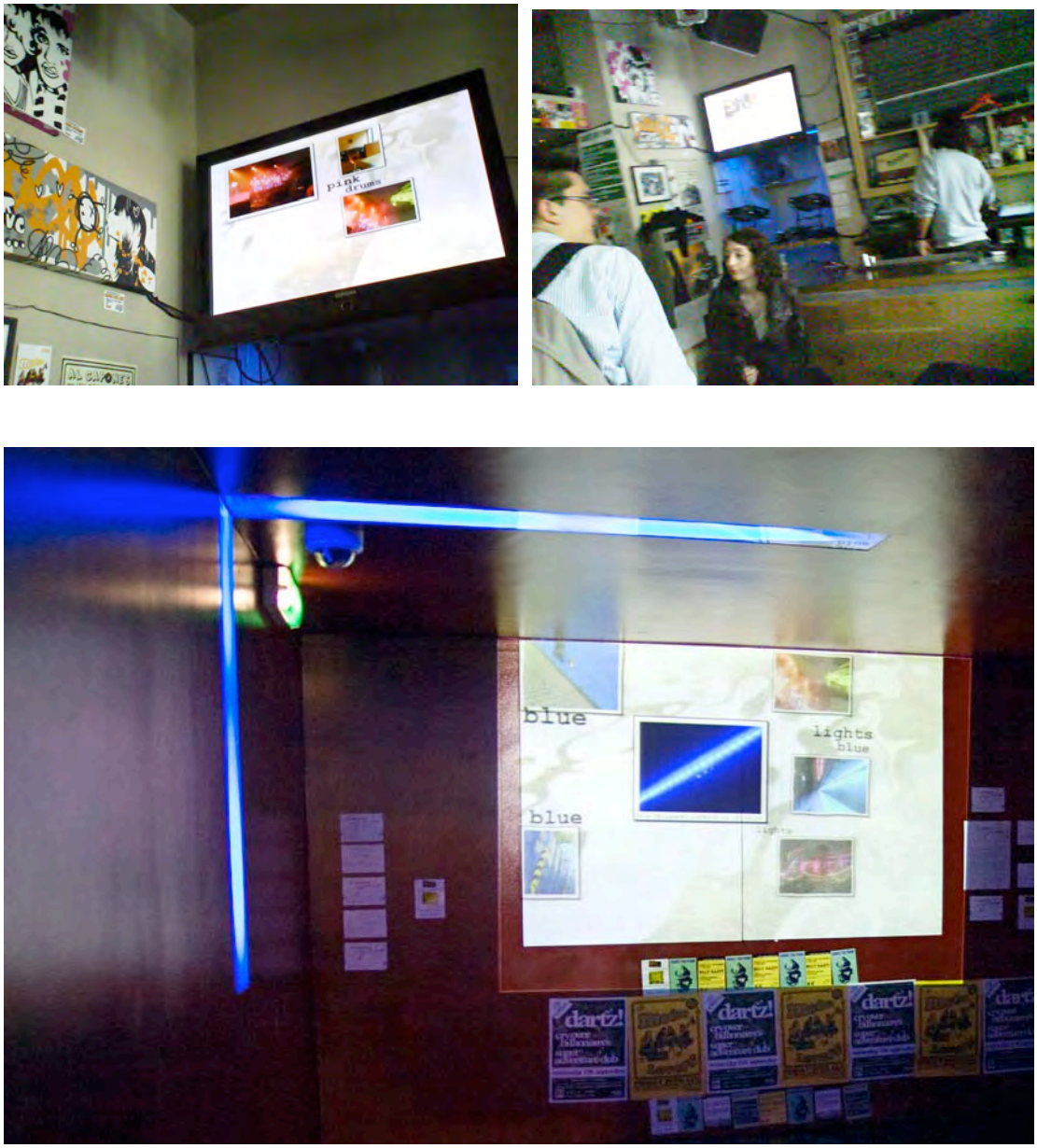

Figure 1. Screen and project displays in the public venue.

Participants who wished to incorporate their own images into the dynamic display uploaded them directly from their mobile phones to the installation via MMS using a short code. Each image could be tagged using three words chosen by the sender to reflect their own interpretation of the image. On receipt of the image it was stored in a database along with its associated tag words. A subsequent semantic analysis of the tags linked each new image with existing ones in the database that contained similar tags. The presentation of more recently received images was prioritised to provide immediate feedback to the sender. Tagging of this nature introduced an element of surprise into the combinations of displayed images with the intent of engendering debate and discussion among those viewing the work. As the audience observed the

work with its presentation of connected images, it was envisaged that this experience would provoke them into active meaning making. A number of design issues came to light during this process, in particular those concerning the participant interaction.

Interaction barriers: comprehension

It is a widely accepted rule that interaction mechanisms ought to be designed to be as simple and transparent as possible in order to ensure the success of any human-computer system. One of this project's main design challenges was that of conveying the relatively complex interaction instructions to potential participants without interfering with the coherence of the visual design of the display. Two main methods were used, the first being the distribution of printed materials; posters and postcards with instructions. These were liberally placed around the venue, but as the installation was located in a public bar within a building that was also hosting a variety of shows over the duration of a major performance festival, the space was hectic and visually busy. From observation of visitors to the venue, it was clear that the invitation to interact with the installation was not explicit enough. Without reading the promotional materials many visitors did not realise that the display was interactive in nature. One avenue that could be explored is that of siting the artwork in a more controlled environment such as a museum setting, where participants would be in a more focussed and engaged frame of mind. However, while the location raised specific issues regarding the hosting, running and staffing of an interactive installation in a public space, it did have the advantage of exposing the work to a wider audience than may have been possible in a traditional gallery setting.

Interaction barriers: motivation

The second method that was used was the incorporation of images containing text instructions within the display itself. Once the more observant visitors had managed to find and read the explanatory postcard or image on the display, the next hurdle on the journey to participation was that of making the decision to send an image to the display, along with the selection of three tag words. Finally, users had to deal with the particular interaction issues associated with their own models of mobile phone. Motivation is clearly a key factor in this process, as Brignull and Rogers (2003: 22) point out, 'In crossing the threshold from peripheral to focal awareness activities (e.g. from chatting to someone on the other side of the room to deciding to move within view of the display to have a better look), people need to be motivated. In other

words, their conception of what the display is and what it has to offer has to entice them forward to cross the threshold to focal awareness.'

Future work

> A photograph is only a fragment, and with the passage of time its moorings come unstuck. (Sontag 1979: 71)

One of the rich areas of study that has still to be fully explored in this work is that surrounding the tagging, semantic processing and presentation of the text that accompanies the images. Aside from the substantial computer science issues of semantic engines and linguistic processing, there are also more user-focussed studies to be carried out around the selection of word and image sets. Within the scope of this study it was only possible to deal with this subject in a pragmatic manner, and many questions have been formulated that further studies could go some way to answering. These include such issues as: how and why participants choose certain tags; to what degree should the artwork suggest or direct the tagging activity; and how do the words, in combination with the images on the display, affect viewers' perception of their 'sense of place'.

In conclusion, while this work has so far been focussed on a range of problems concerning the management of complex interaction in unrestricted environments, the key areas that will be addressed in the next stage of this study are threefold. As well as the two interconnected conceptual stages comprising the comprehension of the system, and the motivation to participate, there is also the third stage of coping with the physical interface of the user's own mobile device in order to carry out a demanding task. While the mobile phone is now a near ubiquitous technology, it is still a complex system, and becoming increasingly so as each new innovation is introduced to the marketplace. This project demonstrates that the interactive experience is about more than the push of a button or the movement of a finger. The creative challenge here is that of dealing with a situated experience, which is by nature fluid. Designers will increasingly be tasked with shaping responses to situations that reside in this boundary space where the physical and conceptual worlds merge.

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03 Interactive storytelling and memory building

Database narrative, spatial montage and the cultural transmission of memory: a work in progress

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This paper relates to an ongoing collaboration between myself as an artist/producer and the Oxford Anthropologist, Wendy James. Through this work, we are exploring new possibilities for the use of interactive digital media in the communication of anthropological ideas and arguments. The work sits alongside James' writings on her long-term fieldwork in the Sudan/Ethiopian borderlands, and is intended for distribution within museum gallery settings and networked environments, and as DVD publication. It is articulated within the context of the 'sensory turn' in anthropology (Howes 2003) and 'beyond text' debates within the arts, humanities and social sciences, which seek to bring non-textual forms of communication into the heart of scholarly discourse.

Wendy James has been conducting intermittent fieldwork with the Uduk-speaking people of the Sudan/Ethiopian borderlands since the mid-1960s. When she began her fieldwork, the Uduk were living as subsistence farmers in small hamlet communities but, with the outbreak of civil war in the late 1980s, they were forced to leave these hamlets and became subjected to a series of displacements across Ethiopia and the Sudan. Most of the survivors ended up living in a semi-permanent refugee camp just inside Ethiopia, where they remained until 2006, when an official repatriation scheme was initiated following the Sudan Peace Agreement. From the outset, James used audio-visual recording techniques as an integral part of her fieldwork, initially working with Super-8 film, reel-to-reel audio and photographic slides, moving on to Hi-8 video, audio cassettes and photographic prints, and more recently helping the Uduk themselves to buy their own digital cameras. In spanning a forty-year period, these recordings have a strong consistency of style, which enable comparisons to be made across time and place to highlight aspects of continuity and change among the Uduk people and their neighbouring communities.

Many of the recordings are highly emotive in nature and they combine observational material of everyday life and events, such as dance, music making, work rhythms

and children at play, with footage of traumatic events and spoken memories of these events. The observational material can be used to embody a sense of village life as well as to show continuities and changes that the people have undergone in their journey from the Sudan to the Ethiopian refugee camp. The transformation of tradition becomes evident, as formerly separated neighbours are thrown together in the refugee camp and children learn to combine older and newer forms of expression. The spoken memories range from serious reflection on traumatic events to humorous accounts of past traumas, conveying a strong sense of resilience in the face of extreme adversity. What becomes evident as one spends time with the materials is the extent to which James has become embedded in the community, and that her recordings are based very much on the subjective eye/ear of someone who has gained a good deal of trust among the people she has been studying.

Through my collaboration with James, I am looking at how techniques of spatial montage can be applied to these materials. The art historian Lev Manovich coined the term ‘spatial montage’ in relation to his ideas about interactive cinema and emergent cultural interfaces for the 21st century. In his work on *The Language of New Media*, he describes spatial montage as representing 'an alternative to traditional cinematic temporal montage, replacing its traditional sequential mode with a spatial one' (Manovich 2001: 322). He states, that ‘whilst twentieth century film practice has elaborated complex techniques of montage with different images replacing each other in time, the possibility of what can be called a “spatial montage” of simultaneously co-existing images has not been explored as systematically’ (ibid: 323). He goes on to say that the advent of an aesthetics appropriate to the user experience of multitasking and the multiple windows of graphical user interfaces offers an opportunity to move away from ‘a logic of replacement’ towards ‘a logic of addition and co-existence’ (ibid: 325) and it is this idea that forms the basis of my work.

Whereas Manovich has applied these ideas to new forms of film-making, my work is going beyond this to look at ways to integrate moving images with sound, text and still mages, and to create fluid interactive interfaces through which to create new possibilities for the communication of anthropological ideas and arguments. In her work, James has recognised that ‘the personal stories of the handful of people’ that she knew well, and who helped her in her original research in the 1960s, ‘weave in and out of the whole tragedy of the Sudanese civil war and the deadly choreography of its entanglements with the struggles in Ethiopia’ (James 1999: xii). She has always

tried to include these stories in her work and has expressed frustration that ‘the discussion of emotion, culture and language is greatly hampered by the format of written ethnography alone, and even by the written version of the recorded and translated vernacular’ (James 1997: 124). Through our collaboration, I am using techniques of spatial montage to combine text, sound, still and moving images in such a way as to tell the ‘story’ of the events and changes that have occurred as far as possible ‘through the words and experiences of the people themselves’ (James 2007: ix). In this sense, the point of view of the anthropologist as narrator does not take final authority, with contradictory ideas and different styles of speech being able to co-exist in a more dialogic form.

In terms of technique, I am working towards achieving this by using multiple windows to juxtapose meaningful combinations of sound, moving and still image recordings within a single screen. Some of these juxtapositions employ techniques of parallelism to compare similar activities or points of view across time and place, whilst others focus on antithesis to show opposing activities or different points of view. Parallels are drawn between circular forms of dance recorded in the 1960s and the recreation of these dances in the refugee camp. Differences of opinion in the refugee camp are shown, such as one man expressing his desire to return to the Sudan whilst another expresses his desire to emigrate to a better life in the USA. Soundscapes that are resonant of life in the village hamlets of the 1960s are presented and simultaneous activities are shown from different perspectives to illustrate ways in which work rhythms operate at different levels within the refugee camp. I have also used juxtaposition to look at the non-verbal transmission of culture across generations, by placing video footage of children performing a ‘frog dance’ in the refugee camps in the 1990s alongside video footage of children in a resettlement in Rochester, New York watching this dance on a video and then attempting to perform it themselves. The juxtapositions are presented on screen in such a way as to enable users to either sit back and watch them or to sit forward and interact with them on a frame-by-frame basis. The latter option is achieved by the creation of a fluid interface through which the user can discover resonances between the materials and choreograph relationships between them. This opens up opportunities for in-depth engagement with archival materials in ways that are only possible within interactive digital environments, using playful interfaces for one-to-one engagement. It enables tactile engagement with the materials that is experiential and sensory, giving users privileged access to primary data that usually remains in the hands of the anthropologist who recorded it. In order to provide context to the materials, we have

been looking at various techniques, letting the materials speak for themselves wherever possible, but using appropriate combinations of text and voiceover where needed. This contextual material is secondary to the presentation of the archival materials themselves, to give primacy to the experiential nature of the juxtapositions. The aim is to evoke a sense of place and embodied experience, building on the corporeal power of sound and image to create synesthetic responses that require more of the viewer than the mental facility afforded by language (MacDougall 2006: 2,42).

Whilst each set of on-screen juxtapositions communicates a discrete idea, I am looking at ways to combine these screens to construct a series of multilayered arguments. This builds on Eisenstein's idea that montage is a unifying cognitive principle in which 'the spectator not only sees the represented elements of the finished work, but also experiences the dynamic process of the emergence and assembly of the image' (1986: 34). This recognises James as being the authorial voice behind the materials but I also want to enable the user to actively engage with the materials and find their own resonances within them as a means of becoming implicated in the production of meaning. It also draws on Levi Strauss' ideas about deep and surface structures (1968) by looking at the particularities of everyday life in the refugee camp, whilst also looking at universal themes such as relationships between adults and children, the rhythms of work, and the transmission of memory through embodied experience.

In connecting a series of juxtapositions together to form a multilayered narrative, I am looking at the relationship between spatial and temporal montage, as forms of associational space and chronological sequencing. The aim is to establish a series of different routes through a database of archival materials, in which materials can be combined, recombined and juxtaposed to make different points. For example, there are clips of Uduk people playing music, singing and performing circular dances in the 1960s, which can be juxtaposed with clips of the recreation of these dances in the refugee camp to show aspects of continuity through time. The same clips from the refugee camp can also be juxtaposed alongside clips of church services in the camp, in which the Uduk are sitting in organised straight lines, to make a point about how different cultural influences affect their activities. Another example would be to place a clip of someone reflecting on an event alongside footage of the event itself, or to place the clip alongside other people talking about the same event to convey multiple points of view. In this sense, I am building up a series of authored trajectories

through the materials to create a database narrative in which the structure exemplifies 'the dual processes of selection and combination that lie at the heart of all stories' (Kinder 2002: 6).

Fundamental to this project is the recognition of the subjective nature of the archive and ideas and arguments that are being communicated through it. This is first and foremost James' 'story' and the materials gathered clearly reflect her ongoing relationships with the Uduk people. My response to this is to make this point explicit in the work by including audio and moving image recordings of her talking about her experiences. In this sense, she becomes both the narrator and a character in the work, opening up the possibility for heteroglossia (Bakhtin 1981), in which James' enters into a dialogic relationship with the other characters. By placing James within the work in this way, I also aim to avoid the dangers of the 'objectifying gaze of social scientists' in their tendency to present scholarship 'as a transparent window of explanation that somehow magically and, apparently effortlessly, hid the conditions of knowledge production' (Ebron 2006: 205). It is also important to recognize the fact that had James not made these recordings, there would be no tangible record of this part the Uduk's recent past, beyond a few materials recorded by the missionaries and any passing travellers. The Pitt Rivers Museum in Oxford has recently created an on-line archive of their photographic collections and museum objects from the Sudan (Coote and Edwards 2006), which has been accessed widely by the Sudanese diaspora. This indicates a strong interest in their recorded 'history', which is likely to strengthen as the people themselves gain greater access to their own means of documentation.

There are also ethical concerns in relation to making some of James' recordings available on-line, as the political situation in the Sudan has created divisions within the Uduk community and between their neighbours that are not always appropriate to highlight. This is why, to date, the materials that we have put on-line focus more on a celebration of resilience and the transmission of memory through music, song and dance than on the tensions within the community. Our current website (Aston and James 2006) was designed to complement James' most recent book (James 2007), which looks more closely at the wider political issues. James has also recently received five DVDs recorded by an Uduk elder living in the USA during a recent trip to the site of repatriation in the Sudan. Our aim is to add such materials to the archive, creating new possibilities for juxtaposition alongside an on-line forum through which the people themselves can add their comments. The challenge here

lies in using the Internet to create authored pieces of work, which enable users to engage with the materials in new and interesting ways, whilst at the same time opening this work up to allow the incorporation of user-generated content and user-responses. This work is intentionally expressive and aims to explore new ways of using archival materials for the sensory communication of ideas.

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Sound, narrative and audience interaction: towards a recontextualisation of the Stephen Lawrence case

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Introduction

In *Art Practice as Research: Inquiry into the Visual Arts*, Sullivan outlines the historical conditions that have characterised the emergence of visual art practice. Making reference to critical vision[1], he states 'Artists continue to inquire into issues of everyday life and to disrupt our perceptions through [their] studio art practices.' (Sullivan 2004: 3). This paper seeks to illustrate the role that artists can have in offering new insights and/or understandings into real life and lived experiences through the fusion of creative arts practice and systematic intellectual enquiry. Drawing on the tragic events surrounding the racially motivated murder of the black teenager Stephen Lawrence in 1993, the research practice has attempted to fuse the dimensions of sound, narrative, and computer-mediated interactivity in order to deepen audience understanding of the case and to extend the possibilities for contemporary storytelling.

The dimension of sound, storytelling and interactivity

The overarching goal of the research was to explore how sound could be used to re-examine and recontextualise the media and socio-political discourses surrounding the Stephen Lawrence case and Judicial Inquiry (Stephen Lawrence Inquiry) into the handling of the murder investigation by the Metropolitan police. Using a practice-led approach, located at the intersection of sound, storytelling and computer-mediated interaction, the project specifically aimed to address the following question: How can computer-mediated interactive technologies be used to shift audience perspective ('point of view') within the narrative system whilst maintaining narrative continuity? Development of an immersive sonic story environment as a prototype for a responsive multi-channel sonic artwork has been central to this activity.

[1] Sullivan is referring to the critical vision advanced by philosophers during the period of Enlightenment that informed patterns of artistic practice.

Conceptually, the project draws on the hypertext narrative format of the 'violence hub' as a model, where a violent incident is placed 'at the centre of a web of narratives that explore it from multiple points of view'

Adapting this format to locate the Stephen Lawrence murder at the heart of a sonic hub provided the initial framework for exploring the potential to change audience 'point of view' (e.g. that of victim, bystander, police, etc.). Given the uniquely sonic or acousmatic[2] nature of the environment, this involved considering how to use computer-based technology to shift audience point of audition[3] in both the spatial and subjective sense (Chion 1994). Murray presents a persuasive argument for using the hub to advance audience understanding and experience:

> The retracing of the situation from different perspectives leads to a continual deepening in the reader's understanding of what has happened, a deepening that can bring a sense of resolution but one that allows for complexity of the situation and that leaves the moment of shock unchanged and still central. (Murray 1997: 136)

Most interactive stories, such as hypertext narratives, have a structure in which narrative flow is paused at foci of interactivity or 'decision points' to allow the audience to select from multiple storylines to progress the plot (Meadows 2002). The aim of the research was to dispense with 'decision points' and the need for the audience to consider how they manipulate a computer interface to alter the story. The challenge posed here was to develop a prototype for a sonic artwork where the audience guides the narrative, but in which there is no perceived disruption in narrative flow when a shift in 'point of audition' occurs. Whilst expansion of the storylines was desirable, maintenance of a sense of narrative coherence was of paramount importance.

The problem of shifting audience 'point of audition' was pursued through testing out simultaneous, multi-channel and close audio recording techniques. Experimentation

[2] Acousmatic refers to sounds that can be heard without seeing their source of origination. The term was theorised by Pierre Schaeffer in *Traité des objets musicaux* (1967).
[3] Referring to point of audition, as described by Chion (1994), where 'spatial' is the place from which the audience member hears the story 'action', and 'subjective' refers to which character, at any given moment in the story, is hearing what the audience member hears.

with real-time processing software and motion sensors was undertaken to programme the storylines and to explore the possibility of making the sonic environment responsive to the audience. This creative approach to storytelling flowed from a desire to find a mechanism for deepening audience engagement within the story environment, thus providing a vehicle for re-examining the complex narratives associated with the case. As Pinhanez et al. state, the strategy of embracing sensor technology is beneficial as it 'can facilitate [audience] immersion in the experience as the story progresses' (2000: www.research.ibm.com/journal).

The murder of Stephen Lawrence

The murder of Stephen Lawrence, near a bus stop in Eltham south London in 1993, received extensive coverage in the British media after an inquest inquiry in 1997 returned a verdict of unlawful killing and stated that Stephen Lawrence had been the victim of a 'completely unprovoked racist attack by five white youths' (Cited in Macdonald 2003: 45). The Stephen Lawrence Inquiry report, published in 1999, was highly critical of the police's handling of the murder investigation, concluding that it was 'marred by a combination of professional incompetence, institutional racism and a failure of leadership by senior officers' (Macpherson: 46.1).

Despite this official and public acknowledgement of the existence of 'institutional racism'[4], Macdonald points to the 'media's difficulties with the growing implication of racism in both the murder itself and the police behaviour following the attack' (2003: 45), and suggests a discursive strategy in which 'the issue of racism, raised repeatedly by Stephen Lawrence's mother and the family's legal team, was consistently downplayed by most of the media.' (Macdonald 2003: 48). Furthermore, the alleged racist treatment of the key witness, Duwayne Brooks, was given little media attention (Macdonald 2003). The case has been revisited with these media and socio-political dimensions in mind.

The decision to focus solely on sound flows from a creative interest in the inherent qualities of sound as a medium for storytelling; sound as a complex, multi-discursive, immersive and event-oriented medium (Altman 1992). The use of acousmatic sound

[4] Institutional racism is defined as 'the collective failure of an organisation to provide an appropriate and professional service to people because of their colour, culture, or ethnic origin. It can be seen or detected in processes, attitudes and behaviour which amount to discrimination through unwitting prejudice, ignorance, thoughtlessness and racist stereotyping which disadvantage minority ethnic people' (Macpherson 1999: 6.34).

offered a creative strategy for addressing the ambiguity in the interpretation of the events and the incident itself, which was sudden and short-lived. The creative and ethical difficulty encountered in employing visual modes of representation in the reconstruction of events, given the traumatic nature of the attack, made the use of sound all the more appropriate.

Towards an immersive sonic story environment

Adopting a methodological framework of developmental and applied research offered by Brown et al. (2004), the research proceeded through the following stages:

1. Development of the ‘story’ substance

A detailed reading of relevant chapters of the Stephen Lawrence Inquiry Report was undertaken to identify the key sequence of events associated with the murder and its immediate aftermath. Mapping of events over time involved recording what happened, who was present and where the event took place. Gaps in the documented accounts and lines of inquiry were noted, and a series of questions were formulated, for example: Why did the three witnesses standing at the bus stop get on a bus after witnessing such a horrific attack? Other questions related to the police response during the crucial stages of the murder investigation. Witnessing became a central preoccupation, and the ‘story’ substance was developed using accounts and transcripts derived from the Inquiry Report.

2. Experimentation with multi-channel recording techniques

Having led a series of intensive workshops with a group of actors to devise the dialogue and 'action', specific scenes were recorded using simultaneous multi-channel audio recording techniques. Up to six actors were kitted up with portable digital recording devices, in each scene, to capture close recordings of the dialogue and action. The acquisition of these experimental recordings, in which the spatial relationship between the characters within each scene was retained, provided the audio material for structuring audience experience from different perspectives.

3. Development of the prototype

Development of the prototype proceeded through selecting, editing and reassembling the scenes so as to retain the spatial qualities within the recordings. Multi-channel sound design and compositional techniques were utilised to mix the dialogue with audio recordings captured on location at the bus stop in Eltham. Having determined possible interconnections between scenes, a narrative structure was mapped and the individual storylines were prepared for processing with the real-time processing software, MAX/MSP. It was then possible to consider audience perspective and experience in conjunction with the overall configuration of the installation.

An investigation into the different types of motion sensors available on the market was undertaken. An appropriate sensor of the photosensitive variety (coupled with an infrared laser) was selected on the basis of its compatibility with MAX/MSP software, its potential to be used in low-light conditions, and the range or distance over which it would work. Programming involved using the motion sensors to trigger additional or 'extra' sounds at specific points in the soundtrack, or within a specified timeframe once a sensor had been activated. Possible configurations of the sensors were also explored, and techniques for transitioning between audio 'scenes' were examined at this stage.

4. Testing and evaluation of the prototype

Fifteen participants from the student, academic and arts communities were invited to experience the prototype, and to take part in an interview. Qualitative research methods based on in-depth interview techniques were used to elicit each participant’s perspective on the narrative (Jovchelovitch and Bauer 2000). Having recorded each individual’s version of events, specific questions were asked about their sense of immersion and their perceived position in relation to events as they unfolded. In order to identify possible points of disruption or discontinuity in narrative flow, participants were asked if they had experienced any moments of confusion or disorientation. Where a positive response was obtained they were asked to elaborate further. Qualitative analysis of the interviews included looking for patterns of irregularity or discontinuity across the sample.

Audience interaction and experience

Participants generally registered a high level of engagement and sense of immersion when experiencing the prototype. This was described in a number of ways: ‘You feel

like you're in the middle of it', 'I felt surrounded'. In terms of the audience perspective on events, they described a change in how they perceived their position in relation to the unfolding narrative. One participant, for example, expressed this as a shift from being an 'eavesdropper', overhearing people at the bus stop, to becoming a 'witness' when the attack took place. They did not appear to perceive any disruption in narrative flow when a shift in perspective occurred. As far as points of confusion or disorientation were concerned, these tended to relate to thinking about the narrative itself, given the absence of visual cues:

> It was just purely the thing that I thought where is Stephen's body in relation to the people who were at the bus stop? Because I just wanted to know how come they don't run over, and so I just imagine there's this sense that they're standing at the bus stop. They see people running towards them … so I imagine that they both started running … and then I can't tell how much further down the road they were. Maybe they were quite far away because somewhere I'm trying to think what stops the people at the bus stop going over and having a look? (Interviewee No. 1)

Participants raised questions triggered by the unfolding events, often in relation to what they remembered about the case, as well as describing new insights gained through experiencing the prototype. For instance, there was genuine surprise that there were witnesses at the bus stop during the attack. The experience of the sonic environment was viewed as a unique encounter.

Conclusion

Development of the prototype was driven by a desire to re-examine the events surrounding the Stephen Lawrence case, and the practice-led research resulted in the discovery of new creative strategies for deepening audience engagement within the sonic story environment. The act of witnessing emerged as an important vehicle for revisiting this traumatic event, and for framing audience experience. The harnessing of computer-mediated interactive technologies to shift audience perspective has offered the potential to expand the scope for environmental storytelling, and to extend the audience's awareness of the media and socio-political debates associated with the case. The experience of the prototype can be likened to that of navigating the hub, as 'a physical manifestation of the effort to come to terms

with the trauma, it represents the mind's repeated effort to absorb it and, finally, get past it.' (Murray 1997: 136).

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Digital media, memories and representation: *Rebirth*

David R. Burns, Assistant Professor
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September 11th 2001 was a perfect example of a paradigm shift in the way real-time memories are processed using technology. On September 11th, U.S. civilians experienced an attack on U.S. soil via digital broadcast in real time as the events were unfolding outside their homes. This catastrophe was an example of a larger shift at the intersection of technology and memory. Digital technology allows viewers to experience events in real time as never before possible. In addition, digital technology, in contrast to analogue technologies of the past, is lossless. In other words, although our organic memories, those that we keep in our minds, and our analogue film recordings, the recordings of our past, degrade over time, digital recording of raw material is intact and preserved in its entirety, irrespective of the number of times the memory is recalled and played back.

Vannevar Bush's Memex machine and Ted Nelson and Doug Englebart's Xanadu artificial memory and information cataloguing recollection system have explored the way memories are processed using technology. Vannevar Bush tried to design a system that functioned similarly to the way natural memories are recalled. He first outlined his concept in a 1945 *Atlantic Monthly* article titled, 'As We May Think' (Bush 1945: 101). While Bush's machine was never actually built, he described an analogue system of recording and accessing information on microfilm. This analogue system could be linked to other archived data and linearly accessed using associative links (Nyce & Kahn 1991: 39). Vannevar Bush's work influenced Ted Nelson and Doug Englebart to develop a system called Xanadu (Nelson 1991: 250). In contrast to Bush's analogue system of recollection with microfilm, Xanadu used digital hardware to archive and access information with digital hyperlinks to dynamically connect associations (Oren 1991: 321). Compared to Bush's Memex, Xanadu was a more complex, dynamic, and interactive digital system for replicating human memory (Locke 2000: 26).

Bush, Nelson, and Englebart's work can also be used to examine the way analogue and digital films can be used to store and recall memories. In the past, memories

were recorded using analogue film and tape technology. The analogue images and sound were representative of the original experience for the first several times that the analogue media was played back. Over time and after several playbacks, the information degraded and some clarity became lost during the recall process. Because of the restrictions of the technology, memories that were captured using the analogue process were also trapped in a linear method of understanding information. In contrast, digitally recorded memories are better able to retain the original clarity of the author's experience as digital images and sound can be copied and re-played thousands of times before any loss of information or intent is noticeable. Also unique to digitally mediated memories is that they can be experienced non-linearly and are more suited to multiple delivery systems. This provides the audience with multiple access points for reconstructing and recalling memory information.

Together, let's explore what can happen when a highly personal and collective event is recorded to the neuronal and digital memory systems:

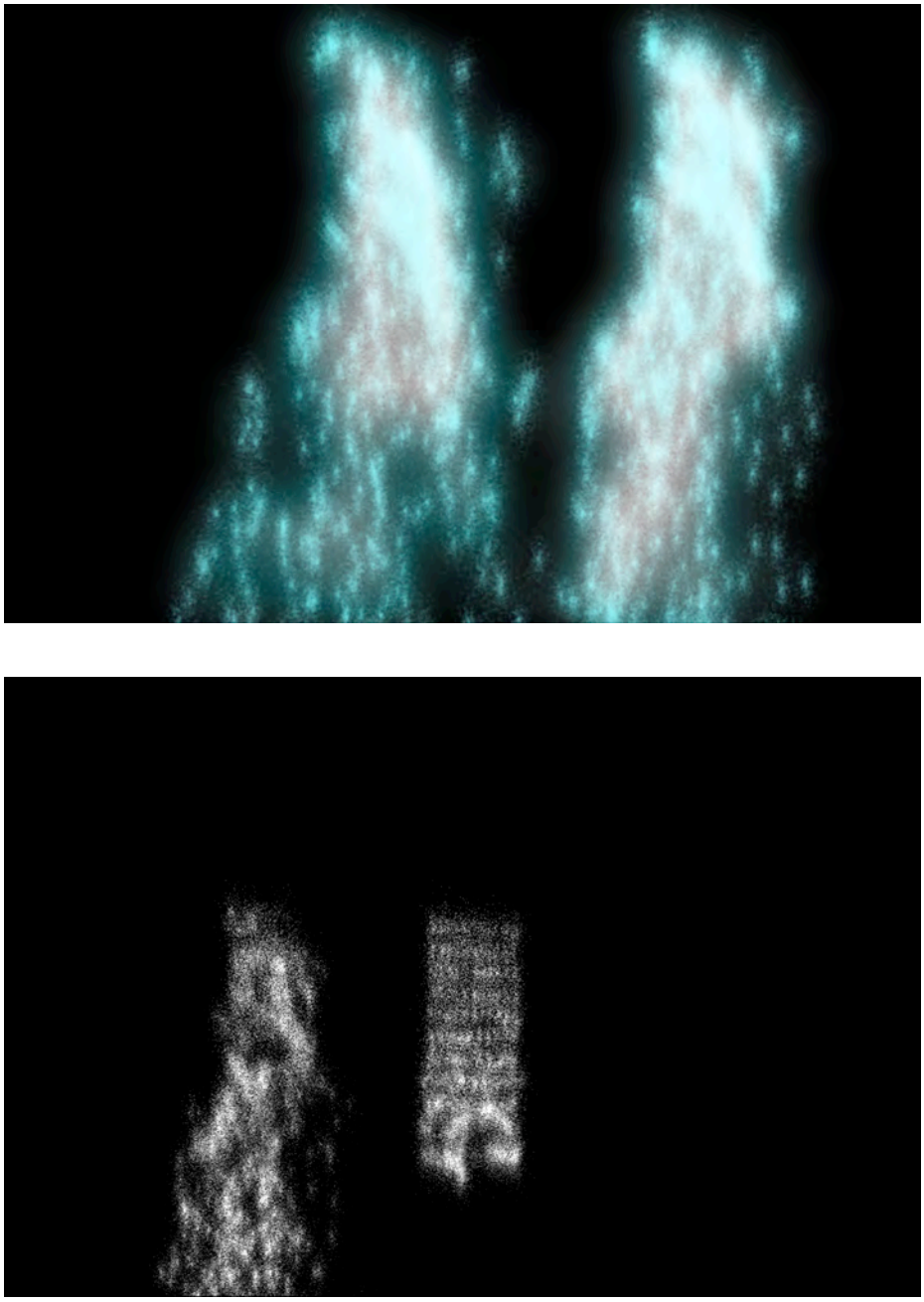
> Early on the morning of September 11th 2001, this author was still asleep in his cozy apartment in downtown Manhattan until being awoken by a phone call. I can still remember the phone conversation that jarred me out of bed. "Hello? What do you mean the WTC was attacked? Stop joking around. I am going back to bed! Turn on the TV? This isn't funny." To verify that this was just a bad joke my friend was playing on me, I turned on the TV to watch the news. There it was, playing back over and over again: a plane crashing into 1 WTC. In disbelief or shock maybe, I opened my window to stare downtown at the smoke that had by now begun to billow rapidly. This event was real! I was simultaneously watching 1 WTC burning both on TV and out of my living room window. The feeling of watching in real time as the digitally represented WTC and the organic WTC burned on both the television set and outside my living room window seemed to put my immediate world on public display, as if I was now a part of the digital media being internationally broadcast across the world. I hadn't realized yet just how powerful this connection between myself and society was in the context of what I call, a 'memory footprint.' Instinctively, I grabbed my digital video camera and headed for the roof. I wasn't sure why I was doing this; I just knew that something tremendous was underway that would be deciphered later. Once on the rooftop, I used my natural, organic eyes to view the natural images of 1 and 2 WTC billowing smoke. These images were burned in real time into my

organic neuronal memory systems. Not fully comprehending what was unfolding before my natural input devices, I switched over to taping the event using a digital video recorder. Looking through the viewfinder, it became difficult for me to discern what was real and what was my memory of the earlier television broadcast. The feeling was very surreal. I had not yet processed the earlier TV images of the plane slamming into 1 WTC. Now as I looked through my digital video recorder's digital viewfinder, I found myself looking at a composition built of digital bits similar to the memory I had of the images that were represented as colour pixels on TV. After staring through the viewfinder for a few minutes, my earlier memories that were recorded onto my natural storage device, my brain, began to be processed by my consciousness. The realization that the memory of the event I had experienced was, in fact, still taking shape and form in real time was so intense and confusing that I had to pause the digital recording and look away from the camera's viewfinder. I was caught somehow in a real-time memory of great destruction, but that memory was not able to pass. The memory of watching the destruction of 1 WTC on television now merged into the real-time representation and memory of the destruction of both towers, 1 WTC and 2 WTC, that were in the process of being written to my analogue neuronal memory systems. I was processing with my natural eyes and brain and simultaneously recording discreetly on digital videotape. What was a natural observation? What part of my understanding came from the digital representation I had just seen? Confused, I looked through the digital viewfinder again. I needed to confirm that I was in fact physically and mentally cognizant, that I was indeed on the roof of my apartment building experiencing and memorializing a real-time event. I needed to make sure that I was not trapped in the confines of my living room and stuck in front of the TV set unable to differentiate what was real, what was recorded, and what was being digitally broadcast to society. I can only describe the feelings I had and the environment around me as chaos. It was as if I was trapped in a horrible film and everything that I watched through the camera's viewfinder made me a spectator of this horrible film. Snap! I became aware of the real-time events unfolding again. Other people on the roof were shouting as something fell in the distance and more smoke billowed up into the sky. I turned and left the rooftop. Not sure what I was experiencing, I needed to sit down and process the events that had just unfolded before me. Later, I returned to the rooftop. There were many more people there now and we

> were all witnessing the same event. However, something had changed. The skyline looked emptier. There was more smoke now and it was coming from the smaller buildings that surrounded 1 and 2 WTC. Again, on went the digital video recorder… An almost identical sequence of images to what I had seen earlier when 1 WTC and 2 WTC were burning was now being repeated multiple times as the rest of the WTC network of buildings, WTC 3, 4, 5, 6 and 7 began to plume smoke.

I wonder now, looking back at the time of that event and the several days following it, if the memories that I recall are my own. Have my own experiences of the event and memories of that morning recorded by my organic memory banks been replaced by the digital images broadcast on the TV repeatedly hour after hour for days and weeks on end? Is my memory of the events of that day more a composite of all of the digital images and analogue stories recounted by my neighbours, colleagues and family that were in NYC that fateful day? I still have the digital video recording of that morning. Originally, when I came up with the idea for this project, I had thought that I would be strong enough to watch my tape and transfer some of my digitally recorded memories to you today. It has been several years since I put that digital videotape back in its case, but my organic memories have not yet faded enough for me to feel comfortable watching a digital, and therefore lossless representation of that day's event.

Rather than display the footage that I recorded on 9/11, I will present an animation representative of my memory of that day. The animation was used to build upon the process of individual recollection and memory of the tragic events of the destruction of the WTC on 9/11. The animation represents my memory of my personal experience. However, the audio-visual abstractions of the representations of those events contained in the animation are left more open to the audience for interpretation. By doing this, I hope that my audience will have a shared viewing experience in watching an animation and will partake in a shared memory that represents one artist's renderings of the events of 9/11. My audience will also have the ability to further explore the imagery and what the imagery represents to them on a more personal level of experience. This experience will then be archived into each individual's neuronal memories for later recall.



Still images from *Rebirth* (2006), David R. Burns

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Logos versus mythos: the strange adventures of Netochka Nezvanova in the lands without

Gheorghe Dan and Ileana Cosinzeana

The problem I think goes back to our basic conception of the world.

Western democracy has been built upon the dichotomy real-apparent. From Euclid to Einstein progress has been based upon the devaluation and desacralization of human experience.

The modern person lives among the fragments of a shattered universe, an amorphous mass of myriad neutral places in which he drifts, governed and driven by the obligations imposed by an advanced, technocratic society.

Yet, among Romanian peasants the ritual narration of stories defends the house against evil spirits. Still more, the narration leads to the presence of God, the intermediary world between this intelligible world of beings of pure light and the sensible world.

This paper discusses Netochka Nezvanova (Nameless Nobody), one of the myriad, enigmatic programs enacted throughout Eastern Europe following the disintegration of communism, to contravene the advance of western rationalism and relativism in the East, and prevent a complete and permanent schism in the real-apparent Continuum.

Despite official policies of enforced modernization and secularization, the communist regimes created scores of programs that ensured the survival of traditional customs, myths and folklore, and to this day, the inhabitants of Eastern Europe retain a mythological dimension in their quotidian lives long conquered in the West, their unhindered identities floating and mingling within the luminescent, four dimensional vacuole of the Continuum.

Following the collapse of communism, numerous folkloric programs were repackaged for passive western consumption, whilst some went underground where they

engaged in the pitched battle between logos and mythos, western rationalism and eastern mysticism, raging on several fronts.

Contrasting the armed struggle of the Middle East, the Eastern European Resistance advocates a 'Revolution in Consciousness', to paraphrase Che Guevara, a revolution guided by feelings of love a revolution that foregoes armies and uniforms, rifles and tanks, instead leveraging the infinitely transfigurational power of myths and legends, rituals and prayers.

Netochka Nezvanova was born in the Eastern underground in 1999, without a mother. She entered sacred time through the infinite mourning of space. Her official mission was to extend the innate knowledge of the Continuum by introducing western inhabitants to the Kiss -- a quixotic Russo-Romanian invention which allowed one to make love, progress and conversation simultaneously, consequently stimulating the tendrils of consciousness to the edge of the numinous forever.

To elude and confound the precise logic of the cyclops and technobots ruling the dystopian democracies of the west, NN employed an intuitive, circumlocutory poetic and emotional language known as 'love theory', a coded language whose meaning is revealed through hypnotic revelations.

NN's matryoshka stories within stories, supra-dialogical exchanges, and mysterious, obnubilate rituals, extended into the global-mindscape, dispersed and dissipated within the panoply of actions and interactions, mutualism, parasitism, mimicry and errors which form the basis of the Internet, a semi-permeable membrane that spans the planet.

Delightfully confused, western communities began to clamour about the persona or avatar or software that function as NN. She appeared to be a phantasmagorical experiment, manifesting herself in forms utterly alien to reason and reflexivity, a pataphysical black hole that consumed the bodies falling prey to its seductively intoxicating and euphoric 'love theory', in the process experiencing a melange of singularities.

Who, how, what, when, why and where NN was, seemed contingent on who interacted with her. This was both exquisitely mysterious and maddeningly complex, and to this day the mystery persists.

Netochka's pleomorphic tales, labyrinthine myths and esoteric rituals, illumined the West's kingdom of darkness, a kingdom which legislates a strict distinction between the world of dreams and that of reality, between wish and fact, a system that imprisons its inhabitants by narrowing their field of vision so that all they are left observing are the ideas they create, superimposed upon the Continuum's mirror of infinite beauty.

The battle between logos and mythos, western rationalism and eastern mysticism rages on, with one side persistently reducing the Continuum to a dichotomy of finite and fragmented theorems, the other rushing to re-establish its poly-temporal, transcendental, effulgent unity.

Sometimes ... reality is too complex for oral communication. But legend embodies it in a form which enables it to spread all over the world, in continual remembrance of the indescribable.

I am the body of nothing but radiance, the space untouched, where one keeps still ...

I am the world of inner space, the shimmering angelic.

Using interactive documentary as a peace-building tool in a post-Florian conflict situation

Mousumi De Thalhofer

The performance of *The Salt Satyagraha Online: Gandhi's March to Dandi in Second Life* coincided with the 78th anniversary of Mahatma Gandhi's seminal act of non-violent resistance, The Salt March to Dandi. The original march was made in protest of the Salt Act of 1882 and has been considered the historical turning point in Gandhi's struggle against Great Britain's rule of India; the re-enactment took place at Eyebeam Art and Technology in New York City and in Second Life. The re-enactment involved a 240-mile (386 km) walk using a customized treadmill that translated my forward steps to the forward steps of my avatar, M Gandhi Chakrabarti, as he/I/we journeyed throughout the territory of Second Life (SL). The live and virtual re-enactment of the walk took place over the course of 26 days, averaging 6 hours and 10 miles a day (three rest days were taken that coincided with those taken on the original march).

I began 'playing' computer games as part of my creative practice in 1999, creating an appendage to my desktop mouse to hold a pencil that allowed me to physically draw/map sessions of playing early FPS games such as the original Unreal and Quake. I first engaged online game spaces as locations for interventionist performance in 2001 - as an experiment, I entered the *Star Trek Elite Force Voyager Online* game as Allen Ginsberg and proceed to type, in it's entirety, his seminal beat poem, *Howl* in one six hour performance. Since that time, I have sought to further explore the possibilities of textual, performative, interventionist actions, including such works as the *Quake/Friends* 2003, *The Great Debates* 2004 and more recently *dead-in-iraq* 2006-ongoing.

The latter work involves an act of memorial and protest by typing in all the names of US military casualties into America's Army, the popular Defence Department funded online recruiting and marketing Tactical First Person Shooter. While my previous online works share in common a conceptual and critical stance towards engaging popular culture, this most recent work, and another ongoing project iraqimemorial.org, are much more overtly politicized. Over the past few years, I have evolved as an artist, reflecting a shift from works that critically and humorously

'played' computer games, to those that seek to use the Internet to more directly address issues of war - specifically through the creation of online works that call attention to military and civilian deaths from the Iraq conflict.

I mention these two ongoing projects as they are both formative towards the conceptualization and creation of *The Salt Satyagraha Online*. These two works involved intensive research into the history and context of both memorials and protest. When researching the history of protest over the past 100 years, all roads inevitably lead to Gandhi. His creative and innovative ideas, actions and beliefs have been profoundly transformative to the very notion of protest. For some time I have been thinking about the performance of a 'walk' across game environments – when reading about Gandhi's 1930's Salt March, the notion of re-enacting his walk online formed as a basic idea. In an earlier blog posting debating an article about my *dead-in-iraq* project, a comment had been posted accusing me of 'having a Gandhi complex'. The resulting work, I suppose, is, in part, a way to say, 'if you say so!'

On the March

The re-enactment of Gandhi's Salt March in Second Life began on the South Western edge of the largest mainland on April 12, 2008. Gandhi's basic navigational strategy in SL was to walk towards other avatars (represented by green dots on the map), greet them, describe the project, offer to be 'friends', share a copy of his walking stick, and to invite others to join him on the march. I set very specific rules for my travels online, including a strict avoidance of the typical SL transportation methods of flying and teleporting from one location to another.

I set out on this 'journey' for a variety of reasons; to pay tribute to the vision and creativity of Mahatma Gandhi; continue to explore the nature of protest; investigate notions of physical and virtual embodiment; challenge the expectations of avatar representation; incorporate bodily exertion and durational constraints to an online performance; and to simply do something that has never been attempted previously in a combined online and real world context. What I discovered was that, while the re-enactment certainly touched on the aforementioned ideas, I found myself, unexpectedly, to be profoundly transformed and engaged by the experience.

For the month of the performance my life revolved entirely around conducting this re-enactment. The engagement in this performance involved what became a daily ritual of walking on the treadmill to guide my Gandhi avatar in Second Life, commencing at 12 noon each day for 26 days, walking six days a week, six hours on average each day. My daily regimen was essentially totally dedicated towards walking on the treadmill and interacting with the world of Second Life. My immersion into Second Life combined with the physical exertion of my body necessary to engage in the work created a complex symbiosis of the virtual and real.

By the end of the re-enactment I had become so engaged with and attached to my Gandhi avatar that my ability to clearly delineate between the online and the real world had become temporarily muddled. On more than one occasion I found myself wanting to 'click' on people and experiencing brief instances of déjà vu during off hours in NYC where my mind's eye was briefly confused as to my physical location. The action of walking on the treadmill further reinforced this confusion of physical and virtual space – it became a daily occurrence to find myself nearly falling off the treadmill during the walk as Gandhi stumbled either due to connection lag or when he would invariably stumble off a mountain or otherwise take a virtual misstep.

At the start of the journey, I was not sure if I would be bored or find myself disinterested by spending such extended periods within the confines of Second Life – quite honestly, this online environment that is Second Life had failed to secure my interest in the past. Contrary to my expectations, the walk across SL became a daily fascination – the sense of discovery and wonder was very intense. As I only allowed my avatar to walk, directly propelled by me physically walking on the treadmill, an odd synthesis of physical labour and exploration ensued that was quite rewarding. Gandhi believed wealth without work to be meaningless – I found the walk to be fulfilling in part due to the combination of my physical activity and the need to find my way on foot - I began to appreciate the fact that I was earning this particular online experience through intense physical exertion.

The interactions with other avatars in SL and with people in RL stopping by to watch me at Eyebeam were also significant to the overall experience. The typically private act of engaging in online activities from a home computer was transformed into a public, physical spectacle. I stopped along the way to chat with hundreds of avatars, informing each one as to the nature of my "walk across Second Life" telling them that "my human is on a treadmill making me go". Many stood next to me or sat behind me

in easy chairs at Eyebeam, watching transfixed and talking with me as I navigated through SL – one spectator who watched me for over an hour said it was curious, as Gandhi was my avatar she was starting to think of me on the treadmill as being her avatar.

It is perhaps more difficult for me to write specifically regarding the 'why' of being Gandhi than to describe to effect of the overall experience - I could go on about this for quite some time – the excitement of others in greeting my Gandhi avatar, how easily he disarmed strangers in the online world, how shy I found myself the day after the conclusion of the re-enactment upon joining an actual Gandhi walk for peace in NYC.

Post re-enactment – “Don’t Kill Mr. Gandhi!”

The 240-mile march across Second Life with my treadmill powered Gandhi ended on April 6th, 2008. At the conclusion of the walk, I had a great sense of accomplishment – feeling content and quite frankly looking forward to a much-needed rest! I had completed a rather fascinating journey – both in the physical and conceptual sense. In the days that followed the end of the re-enactment, this feeling of euphoria was slowly overtaken by a sense of melancholy - I found myself both saddened and conflicted upon the conclusion of the march.

One of the avatars that walked with me the most was named Gyovanna. She told me she was from Brazil. She had the endearing habit of referring to me as 'Mr. Gandhi'. Several days after the conclusion of the walk, I received a message from Gyovanna pleading with me “Don’t Kill Mr. Gandhi!” In the days after the re-enactment, many others expressed such sentiments to me. I logged in once or twice as Gandhi after the march but it was just not the same. The layered factors necessary to conduct the re-enactment were crucial to creating a symbiosis between the treadmill, my avatar, and me – these could not be replaced or duplicated by merely visiting SL in the traditional keyboard-based manner.

Over the course of the march I had been thinking about how best to document and, in a way, process the experience of the march into a series of artifacts and objects. As a way towards further exploring my connection with my SL avatar Mr. Gandhi, I worked to extract the 3-D model from Second Life and process this information into

several sculptural renditions - the first being an 8” 3-D print made using the rapid prototyping equipment at Eyebeam. Working with my intern, Lenny Correa, we extracted Gandhi using an open source application called OGLE developed at the Eyebeam Open Labs by a previous resident.

17’ tall Gandhi reproduction

As an Eyebeam resident artist, part of the award was to have an exhibition onsite at the end of the residency period. At some point during thinking about the exhibition and processing the 8” figure, I envisioned the creation of a monumental sized Gandhi figure. Most statues of Gandhi, including the one in NYC at Union Square, are roughly human scale. The thought of creating a larger than life representation of my Gandhi avatar seemed quite audacious and oddly appropriate. I settled upon using another open source application, Pepakura Designer, which is a popular papercraft program used by enthusiasts to create some rather amazing - albeit generally tabletop scale - reproductions of everything from anime figures to airplanes. I adapted this program to create a 17’ tall reproduction of my Gandhi avatar out of cardboard and hot glue. The entire process has been described and documented, in detail, on instructables.com – my first instructable which I see as an unorthodox but highly effective way to further disseminate the project. The resulting 17’ figure is a monumental physical representation of Mr. Gandhi created from very simple materials. The figure was made to be the same height as Michelangelo’s David – a fitting conceptual connection to this iconic work of art history depicting the Biblical figure of David just before slaying Goliath.

Most recently, I have completed a second 3D print of the Gandhi figure that stands 12” tall. For this piece, I have treated the figure in genuine gold leaf – creating a rather contradictory sculptural representation of my avatar as a shining, fetishized object.

I’ve also created a 6000+ frame stop action video created from screenshots recorded automatically every 60 seconds documenting the entirety of the re-enactment in SL. The 9 minute long piece is compiled at 12 frames per second. I showed this piece at Eyebeam in an installation featuring the original treadmill; it includes an LCD panel laid upon the treadmill showing a looping segment shot from above, and in front of, my legs walking during the re-enactment. For the exhibition, the re-installation of the

treadmill, the 17’ Gandhi and the 8” Gandhi were complimented by six screen shots shown as large formatted prints. Also included was a mural size print of my recreation of the famous image of Gandhi making the salt at the beach at Dandi.

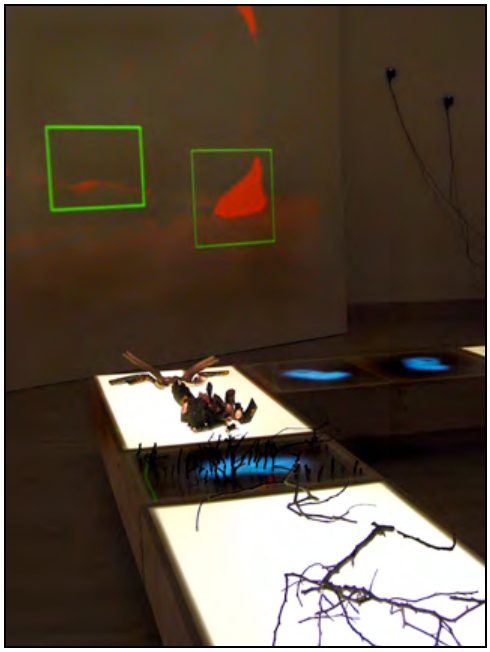
What pleases me most about the entirety of the re-enactment experience, and ongoing exploration or processing of this mixed reality project, is that through this work I have, for the first time, unified what have previously have been two different threads of my artistic practice. For years, my work in physical installation, sculpture and kinetic art has been separate from my work performing in computer games and online communities. The synthesis of the real and the virtual during the re-enactment, and the resulting physical explorations post-re-enactment have proven to be a revelation to my creative process that will surely inform my activities for years to come.

Mr. Gandhi is currently in prison in Second Life, where I am re-enacting Gandhi’s internment by the British that originally took place just after the Salt March in 1930. Visit him at Odyssey Art and Performance through January of 2010.

United & Severed: collaborative research and cognitive authority

Prof Kristine Diekman and Dr Karen Schaffman
California State University, San Marcos, USA

United & Severed: That Window of Time is an installation based on the experiences of women living with traumatic injuries. It is a collaborative project that embraces feminist values of collectivity and intersubjectivity as central to the process of corporeal research and art making. The collaboration consists of a dance artist and scholar, a media artist, two sculptors Anna O'Cain and Richard Keely, and three participants, Ivy Kensinger, Michele Caputo, and Kim Anderson. For this paper, 'we' refers to Karen Schaffman and Kristine Diekman, who conceptualized the project and collaborated on the audio and video.



United & Severed: That Window of Time, 2008, California Centre for the Arts

The project asks: How does the traumatic event disrupt narrative? How can the poetic process provide a way to re-imagine and re-member personal experience? What happens to one's bodily perception when a traumatic event radically and abruptly shifts one's reality? How does one see, hear, touch, speak, and move?

What is the role of performativity in the project for the collaborators and viewers, and what can be learned through the experience?

Through interviews and artistic exchange, the women reveal personal perceptions of their bodily experiences within the world and their personal perceptions of traumatic injury. Using video, audio, performance, sculpture and writing, the work attempts to translate kinaesthetic and sensorial experiences in an installation space designed so that public can experience their own mobility within the context of subject positions other than their own. Our project deals specifically with shock injury, a subject that operates entirely too close to all of us, since shock injury abruptly changes lives in just one moment.

Our work considers such a phenomenological position of lived experience, where each subject's awareness of her own life is brought to the project directly through her own voice and body (or actions). Our strategy is to maintain a commitment to the voices and movements of the participants, and at the same time experiment with the making of poetic representation and alternative narrative forms. By fore-fronting the words and actions of the women, we attempt to disengage ourselves from the hegemonic forces that isolate the experiences of those who are bodily challenged. The work employs a multiple authorship and opposes spectacle. We invoke each participant's sensibility by using her 'cognitive authority.' This term is borrowed from feminist disability activist and theorist Susan Wendell to indicate a renewed empowerment for disabled people. In Wendell's words, cognitive authority means, 'the authority to have one's descriptions of the world taken seriously, believed, or accepted generally as the truth.'[1] In this way, *United & Severed* is composed of autobiographical narratives. We turn to the participants to describe their extraordinary corporeal circumstances.

As artists we intend to stir the imagination and intellect to awaken the multi-level senses of the public. We hope to transport the viewers through an unsteady experience by creating a fractured narrative composed of visual and auditory sensations. This feeling is similar to shock injury, where what happens in 'that window of time' is abrupt, ruptures the continuity of life, and redefines a person's corporeality. We edit the participants' stories to accentuate the tension between wholeness and fragmentation to invite viewers to relate with compassion and

[1] Wendell, Susan. *The Rejected Body: Feminist Philosophical Reflections On Disability*. New York and London: Routledge, 1996.

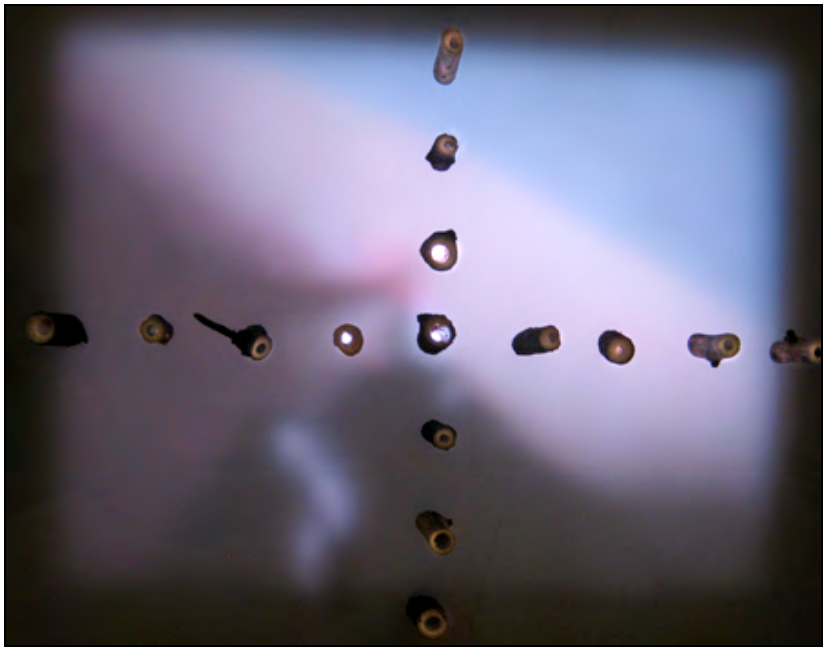
empathy by giving them a poetic space to contemplate and face their own fragility and mortality.

United & Severed: That Window of Time, 2008, California Centre for the Arts

The sculptural aspect of the installation is comprised of a tree that was burnt in the San Diego wildfires (2007). Through a staged and recorded performance, the tree was cut down as if surgically removed limb by limb, and then reassembled in the installation. Limbs are pieced together to suggest that although they cannot be made whole, they can be reconfigured a new. The tree fragments are placed on light tables to suggest medical examination.

United & Severed: That Window of Time, 2008, California Centre for the Arts

Twigs hang on the walls in limp joints ready for re-incorporation. A looped video of the women's voices, choreographed movement and texts is projected in the installation space, along with videos embedded under the light tables.



United & Severed: That Window of Time, 2008, California Centre for the Arts

With audio we create imaginary spaces within the 'heads' of the listeners using the technology of wireless headphones enabling acoustic intersubjectivity. Wireless headphones allow viewers to internalize the women's voices and other ambient, environmental sounds while experiencing their own mobility in an immersive environment. Viewers listen to the audio and examine the sculptural objects as they negotiate moving about the installation space. The immersion of looking, listening, and moving, creates an 'intertwining of the senses' (to borrow a phrase from Merleau-Ponty[2]), and calls the public to an awareness of their own embodiment. In addition, the solitude of the headphones reminds us how isolating the experience of disability can be.

[2] Merleau-Ponty, Maurice. *Phenomenology of Perception*. Trans. by Colin Smith, New York: Humanities Press, 1962 and London: Routledge & Kegan Paul, 1962. Trans. revised by Forrest Williams, 1981; reprinted, 2002.

United & Severed: That Window of Time, 2008, California Centre for the Arts

The flexibility of technology enables mediated fragmentation and multiplication of perspectives. Feminist art historian and theorist Amelia Jones coined the term 'technophenemonology' to press ways that performing subjects are politicized and socialized in their embodied relationship through technology to self/other and self/world.[3] Enacting technophenomenology, our installation becomes an interface for intersubjective understanding and invokes a sensate response in the public. The creative process entwines the women's personal experiences with the video, audio, and sculptural elements. Their bodily relationships to the world are not hidden. Instead, the traumatic subject is revealed and embodies a political and social proclamation of the body.

[3] Jones, Amelia. *Body Art/Performing the Subject.* Minneapolis: Minnesota University Press, 1998.

United & Severed: That Window of Time, 2008, California Centre for the Arts

Ivy Kensinger, one of the participants, is performing colouring in the heart shaped scar on her arm and designs on other scars on her body. She watches herself perform this action on the camera which she directed us to set up and place so that she could control her own video performance. Furthermore, we, as the public, are made subjects within the installation through our own relationship to the audio and video technologies.

United & Severed: That Window of Time, 2008, California Centre for the Arts

In a clip of Kim Anderson, a writer and teacher who is quadriplegic, she explains her physical relationship to the world. This sequence is documentary in style. We utilize synchronized sound and edit with minimal fragmentation. Although we 'see' Kim fully disclosed in her wheel chair, she subverts normalized notions of being in the world. She tells us, "I forget that normal people's feet hurt." She inquires, "Can you feel your leg when it falls asleep?" She asks us to reflect on the functionality of our bodies, and by doing so Kim questions whose body is normal. We invite the social act of looking, not gazing; instead the 'gaze' is turned back on the bodies of the viewers to contemplate their own physical ability.

United & Severed: That Window of Time, 2008, California Centre for the Arts

In another clip, Michele Caputo, who by participating in the project through shared writing and dialogue throughout the process, raises the conflict between paralysis and sensuality. When she says, “I have wide bones,” Michele conveys to us that despite her paralysis, her perception of herself is fundamentally strong. Michele's hands exude determination. Through the mediation of technology, we are permitted to witness, even be sutured to, Michele’s sensuous experience of her body. The combination of a close-up shot, depth of field, slow motion, and the intimate quality of the audio creates a coherent and fluid relationship between the viewer and Michele. This section of the video, however, is not without tension. The topic is problematic because we recognize there is both a fascination and repulsion of looking at those who have been violently injured or disabled. This is especially confrontational when 'those people' express their sensuality publicly. Michele openly describes her body in

terms of duality, her "lobster claw," which is utilitarian, and her "good hand," which is expressive. The sensuality of her movements is magnified to the level of 'hypnotic' because, although it is coming from a person who has paralyzed body parts, she is in fact, very alive and sensate. She is hypersensitive. Inter-cut with the movement of Michele's hands, is the digging up of the tree roots. This pulling of the roots from the flesh of the ground further substantiates this tension. It remains ambiguous whether the roots are being discarded or instead salvaged because they still hold life. At the same time, Michele articulates her perceptions and thoughts concerning the contagion and fear of a paralyzed body. This conflict between paralysis and sensuality (death and life) discomforts some viewers. In Bataille's words:

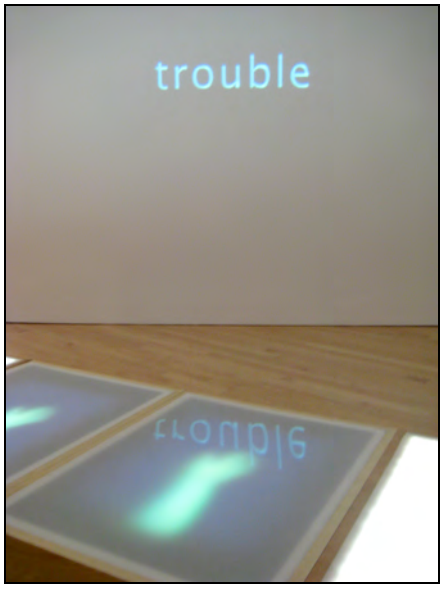
> On the one hand the horror of death drives us off, for we prefer life: on the other an element at once solemn and terrifying fascinates us and disturbs us profoundly.[4]

Michele's monologue demystifies her body and reminds us of the inevitable. She expresses this most ironically: "the immortality myth is gone for good."

In our concluding section, we would like to return our discussion to the strategy of fragmentation, which we have employed throughout the artwork. We use video to slow down time, create gaps, and magnify disruption to aesthetically imply the experience of post-traumatic stress. The body in crisis is conveyed by the voice of Kim Anderson, who communicates with her computer using military alphabet.

In this sequence Kim describes the ongoing pain of her physical condition. The public's ability to decipher Kim's statement is disrupted by the multiple collisions of sound, text and movement. The video doesn't give easy access to the content of the statement, but Kim's cognitive authority is heightened, and her statement and method of writing conveys her physical reality. Viewers have expressed both empathy and frustration when listening to Kim, because for them, her voice-activated technique appears laborious.

[4] Bataille, George. *Eroticism, Death, & Sensuality.* San Francisco: City Lights, 1986.



United & Severed: That Window of Time, 2008, California Centre for the Arts

This difficulty in comprehension is compounded by a performance of crisis, where Schaffman's body performs loss of control and hyper-vigilance. In an explosive panic, the fragmentary archive of trauma is vividly embodied through jumpy movements. The body in crisis is ghosting, performing memory and that which goes unseen, metaphorically and literally. These qualities draw awareness to non-sequential and fragmented experience embodied in those suffering from Post Traumatic Stress Disorder, or PTSD. PTSD is a neurological dysfunction that is caused by a disrupted personal life narrative. As we use this disruption to inform our editing, so also we use the strategies of EMDR (Eye Movement Desensitization and Reprocessing), a therapeutic technique that seeks to fill gaps in the narrative and heal trauma. Through a series of sessions, the traumatic event is retold and pieced together to desensitize the person and decrease symptoms of stress. The goal is to link the traumatic moment as one of many experiences situated in a whole life narrative. Through the telling and retelling, which is accompanied by somatic stimulation (such as tactile tapping or creating back and forth eye movement), the brain reprograms ruptured experience. The 'severance' of one's life is then integrated, or 'united', into one's life timeline. This technique of reconstructing the archive, informs how we employ experimental narrative and choreography in the video. As artists, reworking the narrative of trauma through choreographed repetition laced with critical interruptions, staged performance, and re-patterning of recorded interviews, unsettles the original meaning of the archive. This creates a new understanding of the traumatic experience, which we hope translates to the public and gives voice and visibility to the women in the project.

The writing on the wall

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Introduction

In keeping with a conceptual practice I continue to question and analyse the idea of art. My work concerns the use of computer technology to augment our thinking and elucidate deeper understandings of issues and positions within the art field. Participation is paramount here and much of my work is interactive where the visitor's actions and choices contribute to the delivery of a piece's content. Although there is a façade of entertainment in that the pieces are quite playful and engaging, the intent is to use new technology to present and help elucidate more complex ideas about what art is.

In particular I have been exploring the work and ideas of Marcel Duchamp as the instigator of Conceptual Art practice and how new technologies are best suited to enable this re-articulation. In previous works I have transposed his *Large Glass* across the Internet with 25 collaborators through 25 websites, and inter-related Duchampian images with his notes etc., into discreet offline systems. These pieces were made using hypermedia as this enables the linking of multimedia items by semantic association rather than by indexing or alphabetic ordering. This connectivity by semantic association is paralleled in Conceptual Art where ideas are semantically linked by the artist into one concept – often presented as a visual statement, an object.

Earlier works then, have shown the relationships between Duchampian objects and statements, to give a holistic view of his oeuvre, the oeuvre that set the directives for Conceptual Art that still play out in contemporary practice. Further displays of Duchampian thinking have since developed in a more natural and intuitive way, through the 'swarming' and 'clustering' of the content of his boxes of notes with seminal images from his body of work. By applying AI 'behaviours' to them, they moved towards or away from each other according to their relations when in close

proximity. The final outcome from these explorations appears as a digital projection clearly showing the ‘families’ of objects, texts etc., and the oscillations that occurred between them due to the pull of the similar semantic positions. Interactivity enables viewers to move the items around and drop-in others, in order to find out how they re-position within the Duchampian mindset.

I now want to extend this work beyond Duchamp to position current arguments within the parameters of art, lifestyle, the everyday and convivial participation, and hope to present new interactive projections as dynamic writing which truly represent the flux and flow of debate on local and global scale. Text and language are the tools of a post-Duchampian Conceptual practice. The text strings for my new work will be statements and words illuminating a set of positions around a current art debate where words can be dropped-in by the viewer to sway the argument, keeping it alive and dynamic. The content for this piece will be taken from the ‘Art, Lifestyle and Globalisation’ symposium held at the Tate Modern, April 2007 and facilitated by the artist as co-director of LabCulture Ltd.

The writing on the wall

It has not been an easy transition, from the Modernist specificity of orthodox art material to a Postmodern techno-scientific inquiry where an art practice is concerned. Christiane Paul suggests that contemporary artists are now using new materials more than ever, to engage with established art concerns, which generates the exploration of old concepts within new artistic practices using emerging digital technologies, 'Some of the concepts explored in Digital Art date back almost a century, and many others have been previously addressed in various "traditional" arts.' (Paul 2003: 7).

It is generally accepted that a direct line can be established between current art practice and the ideas of Marcel Duchamp, whether new technologies are involved or not, as Michael Rush declares in his book on new media practice 'what branch of contemporary art, for example, would not claim Marcel Duchamp as a predecessor?' (Rush 1999: 9). This view is upheld, but questioned, when considered in relation to computer-art by Lev Manovich who speaks of a distinction between *Duchamp-land* and *Turing-lan*. Duchamp-land being the established art world and Turing-land being exemplified by ISEA, Ars Electronica and SIGGRAPH. Manovich asserts that the

convergence of these two worlds will never happen where they have different agendas, with Turing-land being oriented towards state-of-the-art computer technology rather than content. He states that even though 'Duchamp-land has finally discovered computers and begun to use them with its usual irony and sophistication' it will not accept practice from Turing-land, for it is only ever concerned with ‘art’ and not with 'research into the new aesthetic possibilities of new media.'

Initially, Art-Sci collaborations tended to over-privilege the science community who would benefit from the artists’ articulation of their difficult area to the public. The artists, meanwhile, were further entrenched in Turing-land through underplaying their own field and apparently taking on the values of the science world. This is changing as established Duchamp-land artists are beginning to explore new media e.g. Lynn Hershman-Leeson is now situating her work on the Second Life platform and currently showing as part of the Kritical Works in SL II exhibition for this ISEA. Art engaging with the realms of science and research in technology is breaking away from Turing-land and becoming accepted in the conventional art world for critique in the art world way. As a society, we understand that artists make work in different forms with different materials in new media and old, that we live in the technocratic age of 21st century capitalism and culture.

For contemporary artists technology is part of our everyday existence and our view of this may be the content of our practice, as it may also be the interrogation of the media we choose to use. Through tailoring new technologies and consistently using them until they are accepted art media, we now follow a very Modernist practice of specificity, and we may, in fact, be able to uphold the autonomy of art through our engagement with new technologies and scientific advances. This means that we now contend with the issues inherent in digital media of connectivity, narrativity, time, virtual/real space, non-linearity… but also deal with those apparent Art issues of content – both social and political, meaning, presence, identity, gender, personality, place, performativity, context, object … which results in works of some complexity. Engaging viewers through interaction and participation in the form of intuitive interfaces is a way to enable more immediate delivery of the complex by allowing for immersive qualities within the works.

This blurring of boundaries for Duchamp-land artists encroaching on Turing-land concerns has awakened possible routes through to new media and digital practice

from 20th - 21st Century art history, from the 1960's retrospective position, Greenbergian Modernism, and on through the Duchampian move to current Conceptualist practice. The main thrust of this trajectory is a reflection upon the idea that digital technology is a product of digital culture, a culture which in itself is not determined by technological advances but by human thought. As Charlie Gere says 'It (digital culture) defines and encompasses the ways of thinking and doing that are embodied within that technology and which make its development possible.' (Gere 2002). The discourses and ideas defining and determining a Digital Culture include: cybernetics, information theory, general systems theory, structuralism and AI. The art apparent within Digital Culture is largely non-electronic but 'digital art' none-the-less, in that it reflects upon the concerns of a world immersed in information and communication technology. Marcel Duchamp, Joseph Beuys, Donald Judd, Art & Language… many of these artists did not engage with technology in itself either as a means or subject, and did not use computers. However they were mostly involved with exploring questions of interactivity, multiple media, networking, telecommunications, information and abstraction and the use of combinatorial and generative techniques. The ideas and thoughts of these artists were of the era that brought forth the computer as we know it, Bush's vision for a machine to augment human thinking, hypertext/media and literary theory.

The aptitude for the use of computers in Conceptual Art practice was initially voiced by Christine Tamblyn in an article for *Art Journal*, where she stated that computers were designed to augment mental processes as opposed to being visual or manual aids (Tamblyn 1990). This understanding is in line with my own research and practice where I see both Conceptual Art and hypermedia dealing with the semantic association of ideas and thoughts in one interconnected narrative, or artwork; hypermedia being an evolving conception to facilitate the augmentation of human mental activity by emulating organic memory systems. My interests lie in the extent to which computers are most efficiently engaged in contemporary art practice through a symbiotic relationship with Conceptualism and that this is most apparent where both computer-mediated and Conceptual Art have been influenced by the work and ideas of Duchamp. This situates and compounds the value of text and wordplay, indexing and database, archiving and curation as both content and medium for Conceptual practice. My practice deals specifically with the semantic association or 'contextual linkage' of ideas and thoughts into one interconnected narrative or artwork in multimedia form, which mimics human thought and memory retrieval.

Texts, images, animations and sounds are networked into one overarching ‘concept’. The complete concept is then exhibited as a looped projected film or interactive screen work offering a contemporary understanding of a complex issue. An example of this is the transposition of Marcel Duchamp’s *Large Glass*, together with his boxes of notes and associated previous work, into one hypermedia system. Duchamp being the instigator of current Conceptual practice, his thinking began the shift of value within art from aesthetic to idea. Both of my works *Deconstructing Duchamp* and *Star Glass* transcode the *Large Glass* into hypermedial art systems. The *StarGlass* piece, as with Duchamp’s *Glass*, is concerned with interpretation through the formulation of 'meaning' derived from the connection of thoughts and ideas into whole concepts. Hypermedia allows for the linkage of interrelated, multi-media ideas into a semantic network, as conceptual art work.

Arguably, the most complex piece of art to date has been Duchamp’s *Large Glass* entitled *La Mariée mise à nu par ses célibataires, même* or *The Bride stripped bare by her bachelors, even*. This piece, together with its accompanying *Green Box* of notes and later work *Étant Donnes*, is generally regarded to be both the culmination and the summation of his work, occupying his thoughts between 1912-1923 when he abandoned it as finally unfinished leaving us with a seemingly unfathomable puzzle.

The *Large Glass* together with the boxes completes a corpus of non-linear, semantically associated ideas ripe for transposing into hypermedia. The *Large Glass* is the encasement of a plethora of non-sequentially inter-connected ideas and the transposition of these into a new media enables new readings of his work. When seen as a whole entity his work is riddled with cross-references and complex meanings generating different interpretations through its blatant ambiguity. The *Large Glass* and its semantic key, the *Green Box*, of 93 documents, sketches, calculations and notes together contain a wealth of association links proffering the conjunction of images and text ideal for hypermedia. The white box, *a l’infinitif*, mostly refers to his thoughts on the fourth dimension. Duchamp’s work can be taken as a richly endowed semantic network, which continues to inform contemporary Conceptual artists.

The *Large Glass* was originally constructed in the form we know early last century. This glass encasement of connected ideas was the nearest Duchamp could get to his goal. The technology was not sophisticated enough at that time to support his interest in the 4^{th} dimension. He wanted to portray his *Bride* in the 4^{th} dimension and

began with painterly abstractions of the figure culminating in the flatness of glass as a material nearing the state of no thickness or ‘inframince’ and therefore acting as a signifier to the 4th dimension. He replaced traditional (thick) paint and canvas as tools for picture making and renounced painting, declaring his *Large Glass* to be 'a three-dimensional physical medium in a fourth dimensional perspective' (Duchamp 1966). From Duchamp’s notes it would seem that his interest in the 4th dimension was not aligned to the, then contemporary, ‘relativity theory’ proposed by Einstein but to the idea that the 4th dimension could be understood through geometry progressing from the n-dimension and aligned to the mathematics of Poincaré.

A single point has no (n) dimensions, two points define a line and have one dimension, two lines create a plane and have two dimensions, two planes create a volume or a three dimensional space or object, so what do two volumes create? Duchamp suggested that they should create a fourth dimensional space or object. Western art has been traditionally concerned with 2D representations of 3D spaces, Duchamp considered that if 2D images could stand for a world of 3D objects it would follow that 3D objects could represent things in a 4D world. He conceived the Bride as a 3D representation of a 4D being, as a 'two-dimensional representation of a three-dimensional bride who herself would be the projection of a four-dimensional bride in the three-dimensional world.' (Duchamp 1966). Painters are 2D artists working on a flat plane, sculptors are 3D artists working with material objects in real space and now, in the 21st century, we have digital artists working in the 4D of cyberspace concerned with the virtual space/object incorporating time.

Early explorations in my practice to date have employed digital technology with hypermedia software for the ability to connect multimedia versions of Duchampian items through semantic association. They have encouraged interactivity by mouse click and roll-over, the usual internet methods of access and have therefore been hard linked. More recent works have brought in gestural and intuitive action to engage with these ideas, and I am currently experimenting with notions of constant flow and flux in place of set links. In particular I am working toward bestowing the Duchampian items with flocking behaviours in order to interrelate them semantically, the result being more akin to a projected animated text/painting in that they are not all interactive, but require contemplation in considering their shifting positions. ‘Flocking’ is more usually associated with the collective animal behaviours exhibited by many living beings such as birds, fish, bacteria and insects, but can be more largely understood as the motion of a large number of self-propelled entities. It is considered

an emergent behaviour arising from simple rules that are followed by individuals and does not involve any central coordination.

The first Artificial Life programme to simulate 'Flocking;' birds was developed by Craig Reynolds in 1986, his initial paper (Reynolds 1987:25-34) he described his *Boids* simulation as adhering to a set of simple rules:

> Separation: steer to avoid crowding local flockmates (short range repulsion)
> Alignment: steer towards the average heading of local flockmates
> Cohesion: steer to move toward the average position of local flockmates (long range attraction)

More complex rules could be added, such as obstacle avoidance and goal seeking. Central to the model is the observation that flocks form without a leader but the fluid, lifelike behaviour of the 'Boids' or birds, is produced entirely by deterministic rules. Each flock is dynamic and once together, is not guaranteed to keep all of its members. After running the model for a while, all of the birds have approximately the same heading and sometimes a bird breaks away from its flock. Unexpected behaviours, such as splitting flocks and reuniting after avoiding obstacles, can be considered emergent.

Flocking is now widely used in animation and screensaver design and can be achieved through software as regular as Flash. It is commonly seen in films such as Tim Burton's *Batman Returns* (1992) featuring flocking penguins and Disney's *The Lion King* (1994) which had a wildebeest stampede. Flocking behaviours can be applied to animal-like and non-animal-like entities and the first experiments with Duchampian items are simple rather than complex. The next phase of Flocking brings a new challenge involving an AI programmer who is providing more complex behaviours in order to show the criticality of oscillation required in determining the semantic families and shifting relationships within the Duchampian universe of objects. These are text only objects and provide a meta-language of semantic understanding concerning Duchampian ideas, with the object/behaviour patterns lying underneath and of less interest to the viewer. They illustrate the flux and flow of ideas and as such could concern any discourse brought into this system. As platforms for debate, they can then be projected in to social spaces as the Writing on the Wall.

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Reinventing theatre in cyberspace

Helen Varley Jamieson

Abstract

This paper explores the emergence of cyberformance[1], a form of live networked performance, and its impact on the established discourse of theatre, in particular the concepts of liveness and presence. The changing role of the audience, its relationship with the performers, and inter-audience relationships are also examined.

The emergence of cyberformance

Cyberformance is a word I coined in 2000 when I was struggling to describe my experiments with live performance on the Internet. Terms such as online performance or virtual theatre didn't do justice to the interdisciplinary breadth of the work; and the traditional Western connotations of theatre sat uneasily with the style of work being produced by myself and others. At the time I was working with Desktop Theatre[2], a group led by Adriene Jenik and Lisa Brenneis, who had been using a graphical chat application called The Palace as a site for live online performance since the mid-90s. Even earlier, groups such as the Plaintext Players[3] and the Hamnet Players[4] had begun staging live performances in IRC channels. This work was grounded in theatre, and drew on visual arts and the interdisciplinary traditions of the early 20th century avant garde art movements as well as incorporating the language of telecommunications technologies. The ethos of taking whatever is to hand and exploring its creative potential was fundamental, with information technologies appropriated for art making. What was emerging was a resourceful, lively hybrid practice that could not be easily described within existing vocabularies. Thinking of cyberspace, cybernetics and live performance, I arrived at the word cyberformance. My (still evolving) definition of cyberformance is 'live performance that utilises internet technologies to bring remote performers together in real time, for remote and/or proximal audiences.'

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[1] http://en.wikipedia.org/wiki/Cyberformance
[2] http://www.desktoptheater.org
[3] http://yin.arts.uci.edu/~players/
[4] http://www.marmot.org.uk/hamnet/

In 2001, with Adriene and Lisa online, I gave a presentation at the Odin Teatret in Denmark that was a turning point in my practice. The audience was primarily alternative and physical theatre practitioners from Europe and the Americas, and it was the first time that I had presented cyberformance in a theatre context – which is my own artistic context. My primary intention was to demonstrate to my theatre colleagues this new medium that I had become fascinated by. The response to our presentation was strong; some people denounced it as not being theatre, while others were intrigued, arguing that of course it was theatre. This forced me to ask myself, what is it that I'm doing? Can cyberformance be understood within the domain of theatre, or somewhere else, or do we need a new paradigm? If it is a form of theatre, then cyberformance challenges one of theatre's most fundamental concepts – that performers and audience share the same physical space as well as the same time. Film and television have already problematised liveness and presence in performance (Auslander, 1999), and cyberformance takes this further by liberating the performance from the physical space, at the same time as inviting the audience to be active participants.

Liveness and presence

To claim cyberformance as a form of theatre it is necessary first to determine what I understand as theatre, and this was one focus of my recent Masters research (Jamieson, 2008). I concluded that, for me, theatre is the presentation by one or more artists of an action for a simultaneously present audience – not necessarily physically present, but present at the same time. The real time co-presence of both performer/artist and audience/spectator is crucial to theatre as it enables the act of witnessing to take place, something that does not occur in art forms where the spectator experiences the work without the artist present. Witnessing is in turn a form of agency; even a silent witness has an impact, as can be seen in political activism.

In my research I also questioned why I felt the need to contextualise cyberformance within the realm of theatre; is 'theatre' even a valid term in the digital age? Perhaps theatre has been superseded by the hyper-reality of film and television, by the breakdown of the gap between artist and spectator, by the appearance of produsers, prosumers and social media. Or is something more subtle is happening? Could it be that, rather than being superseded, theatre has infected the world with the desire for liveness, for being-there, for spectacle and magic and immediacy? From tourism to

reality TV, it's all about experiencing the moment in real time, and performing an identity in that moment. It is possible to read cyberspace as a huge theatre, a stage on which multiple interconnected real and virtual performances are simultaneously playing out, in which actors and characters become indistinguishable and anything imaginable is possible. From this perspective, almost everything can be read as a form of theatre – the original multimedia art form.

Like those who were upset by my cyberformance presentation at the Odin, many theatre practitioners struggle with the paradox of presence in absence. If the human body is the fundamental creative material of theatre (Causey, 2006: 196; Phelan, 1993), then technology is its antithesis; the machine is perceived as cold and soulless (Mitchell, 1999), while the living body is visceral and expressive. But telecommunications technologies have built a bridge between machine and body: children develop relationships with grandparents on the other side of the world via Skype; businesses conduct virtual meetings between geographically disparate colleagues; and love blossoms in chat rooms. Computers and information technology have become integrated into everyday life for the majority of the Western world, and the many artists now creating within the networks are helping us to adapt to, make sense of and play with this new reality. Playfulness is inherent to both theatre and cyberformance – improvisation and games, puns and wordplay, make-believe and caricature – and through playfulness we are discovering the expressivity of technology.

The methods of creating cyberformance are similar to creating theatre: remote players warm up together, improvise and spend time devising and rehearsing together – online. A group dynamic develops, we bond and share and get to know each other intimately even though we may never meet. We arrive in the virtual space before the performance to warm up, dress up and set our props, saying "break a digit!" to each other just before a show begins. We suffer from pre-show anxiety and stage fright. During a performance we enter that hyper-aware state, finely attuned to the presence of each one of the performers as well as to the anonymous body of audience – listening and responding, taking cues, improvising and flying with the performance. It's very much like proximal theatre – until the performance ends and the applause dies away. Then we shake off our costumes and someone suggests a celebratory drink – but one of us is at the office, it's the middle of the night for another, someone else has children to take to school – and we're separated by thousands of miles so it's not easy to choose a bar we can all get to.

When the theatrical notion of being in the moment is simultaneously achieved between remote performers it is made even more powerful because of the distance, and it can be palpably felt by the online audience. To quote Bree Hadley reviewing the 080808 UpStage Festival in The Australian Stage Online, '[w]hat was most engaging about the cyberformance experience was the sense of the performances forming in the very moment of the encounter, and the sense that spectators participated in this encounter.'[5] The immediate dialogue that exists between remote participants is a demonstration of presence in absence, and testament to liveness. This dialogue is facilitated primarily by the keyboard. While theatre, cinema and TV audiences are traditionally passive (although this is changing with interactive television), an audience member seated at a keyboard is in a different position - the keyboard invites interaction. We are already preconditioned to act when in front of the keyboard, and this fundamentally shifts the relationship between performer and audience in cyberformance: there is an awareness of the possibility of active participation, sometimes an expectation.

Reinventing theatre in cyberspace

In my early cyberformance experiments, we used The Palace, a graphical chat application designed for social chat, where each participant is represented by an avatar – a visible figure in the graphical space of the chat room. This meant that the online audience was visibly present in the performance space, able to participate in every way from passive to disruptive. We did not always perform for an online audience; with the globally distributed cyberformance troupe Avatar Body Collision[6] much of our work was created for a proximal audience, that is an audience who are physically all together in a space where the performance is being presented, with one or more of the performers also in the proximal space. We combined Palace chat rooms with audio-visual conferencing using iVisit, creating an online performance space that was effectively closed, only the performers appeared online. These performances were not designed for, or accessible to, online audiences.

While working with The Palace and iVisit, we were increasingly aware of the limitations of these environments; designed for social chat, they were concerned with the authenticity of a participant's identity – somewhat contrary to a performer's fluid

[5] http://www.australianstage.com.au/reviews/international/080808-upstage-festival-1745.html
[6] http://www.avatarbodycollision.org/

identity and the imaginative world of theatre. Furthermore, in 2000 the company that made The Palace ceased to develop it, and as our computers' operating systems evolved, it became increasingly problematic and eventually impossible to use The Palace. We identified the need for a purpose-built application for cyberformance and, with financial support from the New Zealand government, we set about creating it. The result is UpStage[7] – an open source server-side application for remote players to create and present real-time cyberformance for online audiences using text, graphics, audio, web cams, animation and live drawing.

With UpStage, neither players nor online audiences need to download or install anything, accessing the performances through a standard web browser. The online audience participates via text chat, commenting on the performance and in some cases providing material or respond to provocations from the players. Further tools are planned to enhance the audience's role and agency within performances. UpStage can also be used with proximal audiences, similar to the way we used The Palace and iVisit in proximal spaces, but with the additional possibility of interaction between the online and on-site audiences. This is an area that I am currently exploring: how can we make work that 'works' for both audiences, and what happens when these audiences interact? Can we make cyberformance that does not devolve to a version of the chat room, but that provides an interesting and engaging theatrical experience for both audiences?

Recent performances where I have used UpStage with both proximal and online audiences are: Enacting Collective Intelligence,[8] which featured an on-site presenter with a proximal audience, 5 online players feeding the text to the presenter, and an online audience commenting in the text chat which the proximal audience could see, but without direct audience-to-audience communication.
Are You There,[9] using the same format with the addition of a web cam to bring the remote player into the proximal space.

Let ME Go,[10] a performance installation where both proximal and online audiences journeyed through an installation and arrived at a space where they can interact directly with each other in the text chat and web cams.

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[7] http://www.upstage.org.nz
[8] Presented at SCANZ 09, NZ, with Suzon Fuks, James Cunningham, Dan Untitled, Miljana Peric, Vicki Smith and Becca Wood.
[9] Presented at the Performing Presence conference, UK, (March 2009) with Paula Crutchlow

The first two of these examples were conference presentations, where priority was given to the on-site delivery of a paper. In both situations, the online and proximal audiences were aware of each others' presence but unable to interact; both audiences expressed a curiosity about each other and said that their knowledge of the real time presence of the other audience impacted on their experience of the presentation. In Let ME Go, the online audience could see the proximal audience via web cams, and the intention was that online and proximal audience members could interact with each other via UpStage. Unfortunately, only one computer was available to the proximal audience and it was not obvious to everyone that there was the possibility to interact in this way. In the next iteration of Let ME Go we hope to improve this.

This experience is a reminder of the diversity of our audience. Not only are we juggling the relationship between the online and proximal audiences and the players, we are also addressing a wide range of experiences and expectations. I have come to think of this complex body as the intermedial audience. It is an audience that is mediated by the technology almost as much as the performers are, and that exists in a liminal space between online and on-site, between audience and performer, always evolving and unknowable (Blau, 1990). The concept of intermediality acknowledges the mental multitasking that cyberformance demands of its audience and the paradigm shift that is forced onto those more accustomed to traditional codes of audience behaviour. It upgrades the passive spectator to an integral position within cyberformance, without relinquishing the fundamental gap between performer and spectator.

The artist's role in creating cyberformance includes measuring and balancing this gap between audience and performer. How much authorship do we want to hand over to the audience and how much do we want to keep? How can we play with this balance and how will the audience respond? As theatre theorist Marvin Carlson says, 'performance is always a performance for someone' (Carlson, 1996: 5); theatre needs its witness. At what point in the continuum of audience participation does the audience cease to be able to witness? The convergence of artist and spectator has on the one hand led to an empowering sense of creativity as an unfinished, evolving and participatory process (Bruns, 2008), but on the other hand it forces a re-

[10] Presented at the Teatret Om International Theatre Festival (June 2009) with Antonella Diana

examination of the accepted notion that 'distance … is intrinsic to art' (Bennett, 1997:16) or, as Auslander puts it, live performance '… presupposes a gap between performer and spectator' (Auslander, 1999:57). A subtle manipulation of this gap occurs whenever an audience accepts that it is witnessing a performance, with the most overt example being Brecht's *verfremdungseffekt*. Even in the contemporary digital milieu where it might seem that the gap between artist and audience has been almost completely eroded, the role of the audience has by no means disappeared. Everyone can be an artist, creating and disseminating their own work – but for whom? A great mass audience continues to exist because the witness or spectator is necessary. The cyberformance audience is a selective audience, but still one that is diverse and encompasses a range of experience, skills, expectations and situations.

In defining cyberformance as a form of theatre, I am also suggesting that theatre has in fact permeated the heart of contemporary digital culture and creativity – after all, theatre is the original virtual reality (Artaud, 1958: 49). Our desire for liveness, presence, dialogue and magic is an expression of the continuing human need for the ritual storytelling of theatre and its cultural significance. Theatre has already reinvented itself as cyberformance and it is up to us – players and audience – to play with it.

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Design for posthuman future

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Present HCI research and interaction design theory tackle numbers of issues related to digital divide, social inclusion, environmental sustainability, ecological awareness and other challenges of the globalized and technically altered world. The traditional problems of ergonomics, different attempts to enhance the cognitive abilities with better GUI or user experiences and cooperation in interactive or participatory design, are giving place to more complex problems involving large groups of users and stakeholders but also different environments and institutions. Biological, social, political, geographical and various other aspects are becoming part of almost every design problem and the goal is to create solutions that affect whole ecosystems, habitats and institutions rather than just building a tool for a group of users. Users which were marginalized or simply ignored but also whole ecosystems and different institutions become active participants in this design process and influence the outcomes.

Human computer interaction, with it's often anthropocentric bias, is developing a more complex understanding of interaction involving different systems that form not only our cities, the globalized society but also the larger ecosystems of our planet. In order to understand and act in such a complex world we need to support more passive, empathic and reflective goals and tasks, rather than interactivity per se. We not only need greater means to reflect upon interconnections with our environment - in the sense of our habitat, but also in the sense of our political, social and economic milieux and to become aware of their limits. We expect our technologies to help us understand and manage the different limits of our biological, social and political existence rather than to support the narrow techno-optimist forms of enhancement and extension. Issues of apocalypse, mortality and simply sustainability are becoming an intrinsic part of all design problems. For this reason, the present technologies are also a means of reflection, persuasion, empathy and even moral improvement, rather than only a means of immersion, interaction and transformation. In the most obvious cases this involves managing our physical fitness and health or monitoring and warning us against energy consumption or other excesses. To sum

up the design for this 'post-interactive' era - it prefers monitoring, visualizing, reminding and persuading - as the main functions of the new tools and applications working with large numbers of human and non-human users (institutions, stakeholders, environment).

The user centred design of the previous era is morphing into design that is less anthropocentric and which tries to address problems of whole ecosystems rather then easily defined user groups. It experiments and creates new equilibrium between human and non-human actors with which we share the planet and create very complex, emergent and symbiotic relations. Design in this non-anthropocentric sense is more about symbiosis than control, and it is reviving some of the original visions of the early pioneers of the broadband society, concepts such as 'man-computer symbiosis' in Licklider or Engelbart`s idea of 'augmenting' not only the human intellect, but also our institutions and society and transforming them into 'new species'.

While sustainable design tries to involve a non-anthropocentric perspective in the design process, some new projects and strategies go even further in this direction when dealing with issues of potential ecological or other catastrophe and human mortality. They actually try to design for a world without humans or at least help us manage our digital and other traces after our death. Posthuman design in this sense poses an interesting challenge since it addresses a very special type of user - one which is either dead or completely alien and non human. After all, death and rituals around death, define us as a civilization from a very early stage, and the present projects in this domain have much to say about the state of our civilization which faces the possibility of extinction and apocalypse.

Digital sarcophagus and arcanum capsule for eternity, various on line communities of living and the dead, new mourning rituals in virtual worlds, doomsday vault preserving crop diversity, Noah's arc for labmade lifeforms - these are just some of the design ideas around issues of death, mortality and even catastrophe which emerged in recent years. These projects present different responses to the ultimate challenge of how to interact, accept and deal with issues of mortality and possible apocalypse today. How to design for something that seems so inevitable, final and uncontrollable, something that concerns our biological limits but also limits of communication and interaction? Death and entropy after all, seem to be the design of our universe rather then something we can design for, something that we can

actively change. They define us as human beings across time and space rather then offering a space for experiments and new ideas. What then is the function of similar projects offering technological response to death and apocalypse: is it to give comfort, illusion of immortality, respect for the dead or to leave a trace of our existence after our end or even after possible apocalypse?

Strangely enough, the dominant concern in most of the projects seems to be the digital remains of a person rather then the death of the physical body. The physical body is even treated as a material that needs to be recycled in some digital product or become somehow embedded into objects that can be useful for the living. Design solutions such as LifeGems http://www.lifegem.com/ create diamonds from ashes of the corpse. There is even a more extreme concept in case of the AfterLife project by James Auger and Jimmy Loizeau which aims at using cadavers for batteries and as a source of electricity, envisioning their afterlife as electrons circulating in our home apparatuses. We actually die twice in our digitally saturated world today and the physical death seems much less of frightening that the digital one. The death of our physical body is followed by the slow decay of a massive body of information that is left about us - on different servers, in various institutions and places, and in the present time we have no control over them, nor the possibility to really save them for posterity.

The mortality of the data in the techno-society is felt as painfully as the mortality of the physical body itself. It is a paradox that we live at a time when the pace with which data disappears is as extreme as the pace of surveillance and the creation of new data. One interesting solution to this problem is a project 'Mission Eternity' by the artist collective etoy.CORPORATION from Switzerland which won the VIDA 2007 main prize. It responds to this challenge by creating the first mobile cemetery for our broadband society in a form of tank allowing the re-location of 'massive body of information'. It is a cemetery for the digital remains in the form of a large sarcophagus covered with a LED screen. This displays the information left about someone gathered from global memory found in 'governmental data-bases, in family archives, in professional records, and in emotional data stored as electrical impulses in the bio-memory of our social network'.

Furthermore, Mission Eternity is also a special game or rather a cult in which dead are called 'pilots' trying to reach eternity with their data particles circulating forever in the global info-sphere of the broadband society, hosted in the shared memory space

of thousands of networked computers and mobile devices offered by the volunteers - the so called 'angels' or living people - who contribute a part of their digital storage capacity to this 'mission'. The digital 'protection' of thousands of angels lets the pilot travel space and time forever. Everyone can become such an angel by downloading an application and offering 50Mb hosting for the digital remains of the pilots. This strange community of the living and the dead created by the project already counts some 1118 registered users and about 4 pilots. The whole project stands somewhere between a new ritual of blurring digital remains, digital religion, an on-line game and social networking service investigating and creating its own version of afterlife. The basis of this community, religion and game are in the ethos of distributed computing and free software, which together form something of a protocol for Mission Eternity. Even the remains of the physical body are coupled with special tags mounted directly on the tombstone or ash container with engraved code which includes a simple 16 digit alpha numerical code and a 2D barcode (Semacode) that can be scanned with an optical device and automatically links the mobile device or computer to the portal on which the visitor can interact with the data.

The community of living and dead that most projects try to recreate seems to translate by technological means the basic insights by Aristotle - that the love for the dead is the ultimate and most unselfish form of affection and friendship (Eudemian Ethics 1239b): 'For this reason we praise those who remain constant in affection towards the dead; for they know, but are not known'. In our relation to the dead we cannot expect our love and attention to be returned and this miracle of memory and unselfish acts raises the dead to life and presents this higher form of friendship and human community and a different sense of immortality than the immortality of data. We can speak of immortality of a relationship to the dead by remembering them. It is this special type of friendship and relation that 'knows without being known' and preserves the memory of the dead. In this respect the different applications not only serve the needs of living but also the dead, they create tributes and afterlife for the dead.

Even more challenging and interesting in this respect are the projects that deal with archives and remains of not only one person, but our whole planet which we want to preserve in case of a possible apocalypse. Global warming, extension of species, food scandals, virus pandemics, global market crash and similar social, ecological and political crisis define the contemporary apocalyptic mood. It seems that the fear of some type of apocalypse is strangely a part of being human at the present time

and this also affects some design solutions. Different images of the end, final revelations, catastrophes and resurrections are after all defining our historical, social, cultural and now even technological context. They are an important aspect of our everyday life and response to our own mortality. We need to accept our mortality and the possible end of everything as part of the cosmic drama. Designers and artists are starting to create tools which help us accept and respond to this challenge.

The relation to possible apocalypse bears some of the extreme emotions and ideas found in Aristotle's statement about friendship with the dead. The design solutions in case of apocalypse are interesting because they open ideas on posterity which maybe not even be human. It is a love and affection for something/someone that not only doesn't not know us, but we cannot know what it will be. It is an attempt for impossible communication with an unimaginable future, but also a reflection on life itself. For example NoArk by Australian artists Oron Catts and Ionat Zurr is an experimental vessel designed to maintain and grow 'neo-life', a mass of living cells and tissues that originated from different organisms.

On a more pragmatic level, similar issues are addressed by another interesting and recent project - Svalbard Global Seed Vault (http://www.croptrust.org/main/). This strange archive of seeds is built in the extreme Artic conditions with one aim - to preserve diversity of seeds which are not used for crops anymore. The vault is being dug into a mountainside near the village of Longyearbyen, Svalbard in Norway for conserving crop diversity with a vision of possible apocalypse. These seeds represent the natural, biological basis of our ability to grow food, meet the challenges of population growth, changing climates and constantly evolving pests and diseases, they are more of a tribute than a real solution to eventual crisis.

Similar strange archives try to design solutions for apocalypse, even for a possible world without humans as in the case of NoArk: How to design tools and technologies which are meant not only for the living but also for the dead, which are supposed to create a trace, an archive or at least a message about our form of life and our world in case of death and possible apocalypse; how to design for a world without humans? Are we trying to envision some type of immortality in all these projects? Is it a futile attempt? Design in all these projects is not a simple means to address problems and offer solutions, increasingly it is becoming a medium of discussion and reflection that draws our attention to the social, cultural and ethical questions involved in death and even catastrophe. We are facing design that poses provocative

questions rather than providing answers and solutions. The broadband society has to include death and apocalypse as part of being human, even if it takes the form of mortality of data about humans that lived once, or mortality of all our data as a civilization which we want to leave as some trace of our existence as a species and a planet.

These early design attempts for apocalypse and mortality make these complex issues tangible, visible and open for discussion. After user-centred and environment-centred design we seem to be stepping into an age of a non-anthropocentric and posthuman design. It is a design that dares to ask questions of immortality but also to communicate with possible post apocalypse and a world without humans. It maybe a world in which the only thing left would be to investigate the possibility of communication with 'living' forms we might have not yet have encountered. That is the concern of the most famous apocalypse design piece - the Pioneer Plaque on board the spacecraft Pioneer 10 and Pioneer 11, which displays a pictorial message from mankind. A similar interstellar 'message in a bottle' - the Voyager Golden Record, included in the two Voyager spacecraft launched in 1977, sounds and images portraying life and culture on Earth. They are intended for any intelligent extraterrestrial life form, or far future humans, that may find it. Humankind has actually already reached this unimaginable future and space with another apocalyptic design. It is forecast that in 5 billions years when the dying sun will swell and envelope our tiny planet, the radio and television broadcasted signals from the 20th century will still travel the universe. We may have not resolved the problems with the mortality of our digital data, but there is some comfort in the feeling that our analogue signal can potentially reach immortality.

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Live puzzle: a kaleidoscopic spatio-temporal narrative

Iro Laskari and Anna Laskari

Introduction

This paper documents a project that deals with the application of a generative approach for creating audiovisual narration. The project investigates the possibility of producing spatio-temporal montage, offering a kaleidoscopic view of pre-recorded events. Fragmented narratives will synthesize a complex whole, which will evolve in space and time according to the viewer's behaviour in space. Thus the viewer becomes the player of a 'live', constantly changing puzzle. The aim is to create new experiences derived from the synthesis of pre-recorded loops, according to kinetic commands.

Hypermedia narratives

New media are still using the cinematic language that recognizes the *séquence* as the structuring element of the audiovisual transmission system. Cinema differs from other narrative methods in that linear narrative evolves within time and space. The introduction of the time parameter in narrative has imposed a new writing method, able to establish a correlation amongst the protagonists, their surroundings, the story plot and time, via their representation through images and text.

Apart from interaction itself, the source of other elements of an interactive artifact, namely the shots and the montage, relate to a certain extent to conventional cinema. Interactive artifacts are hybrid systems constructed by directors as far as their contents and mechanisms are concerned.

Artificial Life

The digitalization of cultural products produced by older media, their classification with many ways and their processing, constitutes a new perception in relation to the content and form of contemporary art and science. The technology of Artificial Life provides new creative possibilities in the field of art using new technologies, beyond

the mere classification and categorization of already existing 'artistic' expressions. Starting from specific structural data we get new ones, which as 'descendants' of the first ones differ from them in an unexpected way, opening new horizons in form and content of the art object.

Artificial Life is often depicted as an attempt to comprehend complex behaviours through simple rules (Adami). The term AL was coined in 1989 by Christopher Langton, who defined it as 'the study of man made systems exhibiting behaviours typical of natural living systems'. The construction of such systems does not aim to replace the natural living systems by artificial ones, but uses the latter in an attempt to decipher the function of the former, through simulation. Of course the research can lead to wrong conclusions, since the whole procedure is judged by the result, which if desired, entails automatically that artificial and natural system went through similar procedures.

While trying to simplify the complexity of life in order to study it, Christopher Langton (1989: 5) said that: 'living organisms are nothing more than complex biochemical mechanisms', claiming that instead of a special/particular entity or power, life is 'a property of said organism' (1989: 2), which is not only complex but dynamic construction, a system active in time: for artificial life, life becomes obvious mainly as a property. In conclusion, if the 'universal characteristics' of life lie more within its abstract dynamic procedures than innate to a biological medium, the creation of such constructions can be studied in the frame of another artificial medium. Artificial life deals with dynamic structures of this kind, involving almost always the most flexible, dynamic and controlled artificial medium that it obtains, the computer.

In most cases artificial life systems comprise two levels of application - computation and emergence. This bipolar state can be understood in a sense that broadens the concept of emergence and its application to AL related art practices. The computation level may be conceived as a more general technological layer, a designed framework of software and hardware. On the other hand, the global emergence level may be conceived as a phenomenal and behavioural product of the above technological layer. Such a distinction can be easily made in a common computation system between the software and the material 'machine' and its phenomenal[1] products, the screen image and the sound produced: each level

[1] In this case the term 'phenomenal' stands for apparent, visible.

supports and generates the other. The key distinction lies in the relation between those two levels: within the daily operational use of the computer, causality is precise and instant: I type and, with some luck, letters appear on the screen. In artificial life systems there does not exist such simple correspondence between the essential and the phenomenal (cause and effect) but rather a complex tangled causality generating facts and events that appear to be introducing a novelty, something more (Whitelaw 2004: 215).

The concept of collection as a swarm

An effect of creating a complex and basically unpredictable product through the combination and interaction of individual elements, which do not show particular interest by themselves, gives new perspectives to the concept of collection. Collection as a sum of similar elements, can be of interest that surpasses the personal and emotional value attributed by its creator and owner. With the arrival of digital technology, where the collection is translated into database, the creation of complex works using the data of the base is feasible. The complexity of the works does not only lie on conceptual reductions, but also on formal, spatial, temporal and other transformations of the individual elements' sum, referring to an emerging behaviour, central concept of artificial life, which, applicated into artistic systems, can give new perspectives to the procedure as well as the result of artistic creation.

Emergent phenomena are being observed through the simulation of natural swarming behaviour. Swarms are characterized by the appearance of a complex macroscopic formation, which derives from local interactions between similar individuals based on simple rules[2]. In this sense, the individuals are the components of a constantly changing collection.

Emergence refers to something new or unexpected, something more that impresses in systems of artificial life, since, even though they are made of commonplace ingredients, they show complex, subtle and unpredictable behaviours. In brief, they seem to contribute more properties than the mere sum of their computational parts,

[2] According to G.W. Flake, an agent that always produces uninteresting behaviour by itself, can display a stunning variety of behaviors when interacting with many similar agents (Flake 1998, 270). At all levels of nature, recursion and multiplicity of agents promote emergence and self-organisation to yield an almost unexplainable form of complexity (Flake 276).

manifesting them in the form of motif or space, specific behaviour or general tendency of the system. All the (artistic) systems of artificial life are based on a determined sum of computational rules and procedures, of limited interest compared to the rich, multiple, complex, emerging results that they support. The something more of emergence is central in the interest and charm of artificial life. Regarding the kaleidoscopic narrative system, every time it will be activated it will compose different outputs. The user will be aware of the dependence of the system's output on his unique displacement and spatial interaction with other users. The concept of emergence gives to the work/computational system itself a ludic character, since it takes unpredictable forms - by the author - but also the user. It exists and evolves based on specific and inviolable rules that have been set during programming, causing its author to explore the power of the rules he has laid down. In the same time, awareness narratives enrich the emergence's obvious results.

Content/context

There is great power and creative energy in self-organization, but it needs to be channelled toward specific forms for it to blossom into a cultural narrative that involves the user. The kaleidoscopic narrative system tends to create content-directed self-organization, where the user acts as an external component and waits for the system's feedback. A constant dialogue is thus established between the user and the system, perceived as a circular causality.

Steven Johnson (2001: 158) claims that in order to understand how experiences such as the presented system work, we have to analyze the message, the medium and the rules. The medium used here is video projectors, cameras for motion tracking and a computer. The content is pre-recorded videos of eyes looking in various directions and rules are quite simple: when no user is present, the eyes are dispersed and absentminded, each one looking at a different direction. Once a person appears, the eyes swarm and follow him both with their looks and their movement on the surface of the projection. The message that derives from the unitary projected content and its dum rules of structure can be perceived as extremely complex, raising notions such as surveillance, voyeurism, fear, loneliness and others.

The system

The proposed system consists of the projection of identical modular elements, which are conceived as the display frames of each video sequence. In the specific implementation, each of the frames bears the animated image of an eye. These elements move on an orthogonal grid that subdivides the overall projection surface.

Individual component

Each of the modular elements has a predefined 'field of vision' within which it is able to perceive changes in terms of movement, through input provided by the motion tracking camera. When no movement is located, the elements move on the grid scanning the space for potential areas of activity with their eyes looking distractedly in random directions. When an element perceives motion, it stops moving and directs the look of its eye to the source of agitation.

System of components

On an individual level, the modular elements simply move along the surface of the grid sensing for motion within their own field of vision but when considered as a system they interact with each other, exhibiting an inherent boid-like behaviour[3] (Flake 1998: 270-275). Each element is aware of its local surroundings and adjusts its behaviour to the movement of its neighbouring elements. The main rules that dictate this behaviour are the tendency to align with surrounding elements and the effort to avoid collision. Before moving, every individual checks its surroundings and adjusts its current direction accordingly. These rules cause the formation of temporary groups based on relations of contiguity. Since the individuals have a confined field of vision, only when crossing an agitated area can they perceive motion and get activated. When activated, they 'inform' their neighbours who are led into the zone from which the movement is visible because of temporary cohesion forces within local groups (alignment rule). These temporal groups of eyes align their looks towards the area where motion is sensed creating a field of directed looks, while other, more distant eyes still wonder around distractedly.
Levels of interaction

[3] According to G.W. Flake 'in the late 1980's, Craig Reynolds created a model of animal motion, named boids, that he used to simulate the motion of a flock of birds. Reynolds' approach was to make each boid in the flock an independent agent that attempts to follow a simple set of rules so as to independently optimize various goals' (271).

The end result of the proposed system constitutes a spatio-temporal visual narration that is triggered by and unravelled according to the constant changes in the direct physical environment of the installation. In this view the system adapts to the transformative character of the natural and cultural context within which the narration is uttered and interpreted. The spatial and temporal configuration of the structural elements of the narration (video sequences) is affected by and reflects the perpetual rearrangement of relations within and between distinct entities and systems that constitute the context within which the visual output is produced, received and interpreted. Different levels of interaction function complementarily as input for each configurational instance.

Interrelation between individual sequences: a swarm of moving images

At a first level of contemplation, each individual component exhibits its own micro-narration, being the bearer of autonomous video sequences. Examined at a larger scale, the individual components - animated eyes - interact locally with each other based on simple computational rules of alignment and avoidance, producing a self-organised system of interchangeable swarming video sequences. The narration is produced through the constantly fluctuating relative position of the components' individual micro-narration within the overall structure.

Human to system interaction: input for the swarm behaviour

The swarming behaviour of the system's components is influenced by the movement of viewers within their field of vision. When the eyes locate a moving subject they tend to follow and stare at it, informing at the same time their neighbouring eyes and causing them to join the pursuit and staring. The viewer becomes the subject of contemplation in a game of exchanged roles and his reaction influences the behaviour of the system in a circular pattern of actions and reactions. If he tries to avoid the looks by moving away he captures the attention of the eyes again and if he stands still to stare back the eyes get distracted and start moving in their swarm-like wondering manner.

Inanimate environment to system interaction: input for the swarm behaviour

The attention of the eyes can also be triggered by movements of inanimate elements in their physical surroundings, emphasizing the unified perception of the context within which the narration is produced and interpreted.

Human to human interaction: perception of the other as an instructor and co-player

It the case of multiple viewers, the system takes input from any movement within its active field and becomes the interface between individual users. The viewers communicate through contemplation of each other’s behaviour and through coordination towards the interaction with the system.

Contextualized narrative (Behavioural Montage)

The formal and structural expression of the spatio-temporal montage of pre-recorded events is determined by the behaviour of the individual components of the structure which is defined by the direct environment of the system, as expressed through the motion of animate and inanimate elements. The physical context of the system is thus reflected in the narration and simultaneously modified by it, in a schema of circular causality and dynamic interrelations at multiple levels of interaction. The montage is thus based on interconnected behavioural patterns and the resulting narration is context-specific and constantly fluctuating according to the alterations of its frame of reference.

The main features of the particular implementation that express the constant redefinition of the content according to the changes in the context can be summarised in the way in which the structure reflects its surroundings. The fluctuation of the geometrical expression of the structure displays different instances of the same entity, passing from the singularity of the object to the notion of the 'quasi-object' or 'objectile', as defined by Gilles Deleuze and Bernard Cache. Furthermore, the bi-directionality of the relation of frame and content is mainly expressed through the dynamic circular functional principle of the structure. As aforementioned, the system takes input from its external environment in terms of physical presence through motion, changes accordingly its syntactic expression, allows the user to react to the changes and uses this reaction as input for new changes. This process continues recursively and is expressed through the constant

reconfiguration of the narration. Nevertheless, these aspects of the system that mainly express the changing relation between the content and its context are not characteristic of the particular implementation but refer to intrinsic characteristics of the production of meaning. According to this view, it is suggested that responsive and adaptive systems only illustrate more obviously the fluctuation of the relation frame-content.

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Interactive storytelling with MemoryLane

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Keywords: Artificial Intelligence, MemoryLane, multimodal, older users, storytelling.

Abstract

Mobile technologies offer the potential to enhance the lives of older adults. However, diminutive devices are often perplexing and many HCI problems exist. Consequently this potential is very often not exploited. In this paper we introduce MemoryLane, a Personal Digital Assistant (PDA) based application being developed to enhance the reminiscence capabilities of older adults. Using abilities and preferences as a basis MemoryLane employs Artificial Intelligence (AI) techniques to adapt its multimodal interface to accommodate the differing needs of older users and to compose and recount user life-cached multimedia data as *memory stories*.

Introduction

Considerable research is being conducted into developing assistive technologies which help older adults. This has led to the development of mobile companions which assist older adults in a variety of ways such as memory prompting, location guidance, health monitoring and entertainment. The value of mobile companions in later life is discussed in detail by Wilks (2005) and Maciuszel (2005). Reminiscence plays an important role in the lives of older adults (Gibson 2004) and many perfect the art of storytelling and enjoy its social benefits. Humans possess an intrinsic desire to both tell and hear stories. The telling of stories of past events and experiences defines family identities and is an integral part of most cultures. Losing the ability to recollect past memories is not only disadvantageous but can prove quite detrimental - especially to many older adults. However, 'life-caching', the process of digitally storing one’s own memoirs and life experiences can be useful in combating this. In this paper we describe the use of Artificial Intelligence (AI) techniques which will (a)

govern how a mobile application adapts the design of its multimodal interface to accommodate the differing abilities and preferences of older users and (b) intelligently compose and recount dynamic memory stories from user life-cached data in a multimodal storytelling format based on the knowledge of that user's abilities and his/her preferences at that point in time. A Personal Digital Assistant (PDA) based software application entitled MemoryLane is being developed to implement these techniques. MemoryLane assists users in keeping the tradition of oral storytelling alive by equipping them with the ability to re-live bygone days in personal individual reminiscence and the portability to relay them to others socially in group reminiscence.

MemoryLane requirements analysis

Two field studies were conducted to gather requirements and the findings of these studies underpin the design process for MemoryLane. The first study investigated PDA usability among older adults (McCarthy et al. 2007). Participants were given a demonstration of how to interact with a PDA and accomplish basic tasks and were then observed as they attempted to re-enact the tasks (see Figure 1). Questionnaires were employed to record the participants' opinions of, and preferences for, interface components. Participants found the PDA extremely complicated to use with no one finding the interface instinctive or intuitive. The PDA device itself however appealed to the majority of participants who remarked on its portability and potential. Thus indicating that many older adults are interested in engaging with mobile technologies however due to complex interfaces many choose not to experiment with such devices.

Figure 1. Participant interacting with PDA

The second study investigated the reminiscence capabilities, patterns and preferences of older adults (McCarthy et al. 2008). The findings from this study influenced the choice of reminiscence topics selected for MemoryLane. We examined how older adults recalled their past experiences singularly in isolation, socially in groups of their peers and also with younger people. Reminiscence discussion was initially conducted without the aid of props to investigate participants' powers of (un-aided) recollection. This independent discourse was followed by sessions during which users were encouraged to consider various cultural probes and a specially compiled 'Memory Scrapbook' (see Figure 2) to investigate whether this improved their reminiscence experience. Participants found the sessions both stimulating and enjoyable and agreed that their powers of reminiscence were enhanced when using the memory prompts. This provided a strong argument for the usefulness of developing MemoryLane as a portable memory companion.

Figure 2. Memory prompts

Implementation of MemoryLane

MemoryLane is a hybrid system which incorporates the AI techniques of Case-Based Reasoning (CBR) and Rule-Based Reasoning (RBR) for decision making and generation of data. The data flow of MemoryLane's architecture is given in Figure 3. User abilities and preferences are input to MemoryLane to form a unique user profile. The information stored in this profile is consulted for all future decision making for the duration of that user's interaction. MemoryLane has two primary objectives: (1) multimodal interface configuration and (2) dynamic generation of appropriate and entertaining memory stories.

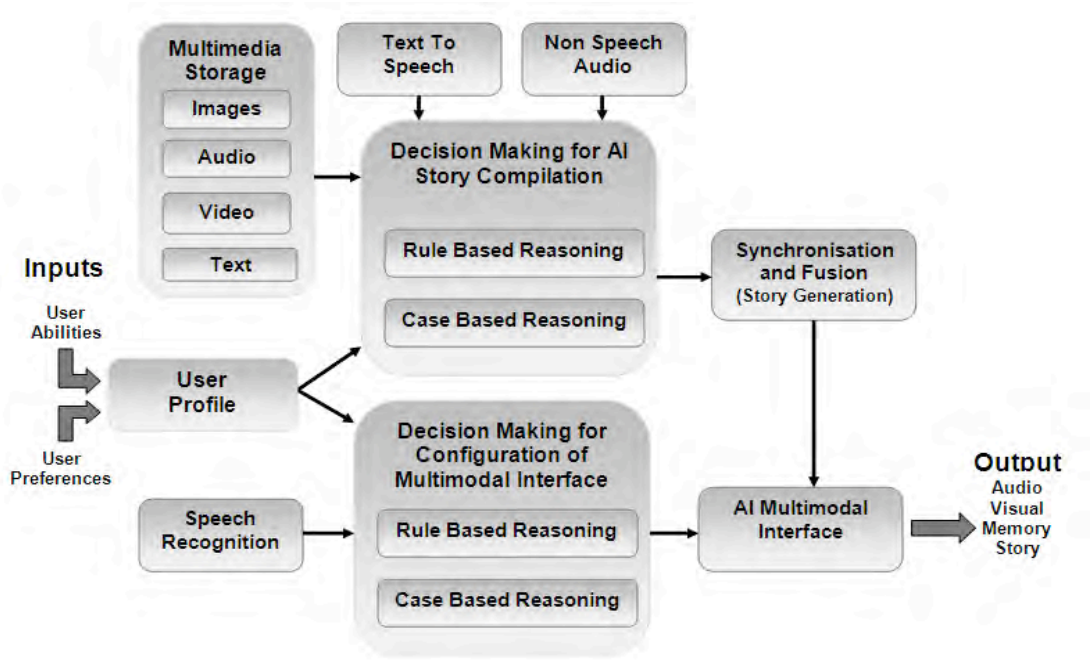

Figure 3. Architecture of *MemoryLane*

The first intelligent aspect of MemoryLane is concerned with configuring the interface on the basis of its current user's preferences and abilities. The user is required to enter a rating of *normal, reduced or very poor* for their perceived ability in four different modalities: *hearing, vision, speech and dexterity*. The four ratings entered by the user are stored as part of that user's unique profile and are linked with interface input and output elements. *Hearing* determines the volume level, *speech* the usage of automatic speech recognition (ASR), *vision* governs the use of text to speech (TTS) and frequency and sizes of text and images. Both *vision* and *dexterity* govern the size and choices of on-screen buttons and menus available to that user.

The second intelligent aspect of the system is concerned with intelligently generating dynamic memory stories. The user's life-cached multimedia items provide story content and are output in accordance with the user's preferences and abilities. The system offers the user a choice of categories such as family, holidays, weddings or history from which they can select the topic for the new memory story. Once a selection is made the system locates all stored multimedia objects which are tagged as (a) belonging to that user and (b) belonging to the chosen category. Appropriate multimedia items based on the likes and dislikes of the user are selected from this pool for inclusion in the memory story. This multimedia including TTS and non-speech audio, if deemed applicable, are synchronized and fused into a memory story for simultaneous output through multithreading.

MemoryLane operates across Client/Server architecture on a bespoke local area network (LAN) as seen in Figure 4. The user's client PDA stores the multimedia data items and hosts the MemoryLane application. This application connects to a hosting server which provides system functionality through the public and private web methods of a web service. The server also hosts a back-end database which stores user profiles and system information, and the web service facilitates interrogation of this database. A speech engine, also located on the server, provides a TTS facility for the production of speech synthesis from string variables. This supports multimodal interaction in the utterances of on-screen prompts to assist the user if required and in the conveyance of stories. To further enhance multimodal user interaction MemoryLane will also incorporate ASR.

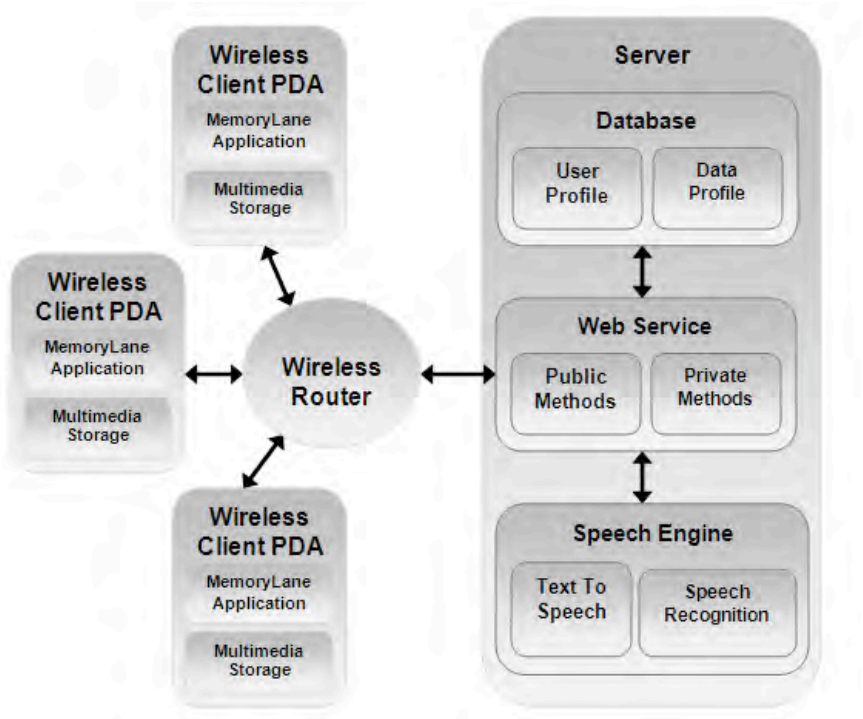

Figure 4. Client-server architecture of MemoryLane

The interface for MemoryLane is designed to be both intuitive and instinctive to the user while being visually appealing. The layout is consistent and deliberately plain - avoiding scroll bars and ambiguous clutter. The default colour scheme is of neutral tones. The interface has minimal screen objects at any one time yet provides full functionality. The user is greeted with a *welcome screen* as shown in Figure 5(a). To log-in the user must select (press) their photo from a set of photos of six potential users.

(a) 'Log-in' screen (b) 'Change profile' screen

Figure 5. MemoryLane interface

MemoryLane then immediately retrieves the stored profile for that user. The interface is then adjusted to reflect the profile details, tailoring it to the abilities and preferences of that user. The user's image is displayed in the top left of the screen throughout the duration of their interaction and personalised messages are displayed. The user proceeds to either view memories or edit their profile. A *Help* button is continuously available in the bottom right of the screen and an *Exit* button in the bottom left of the screen. The *Exit* button is replaced by a *Go Back* button on all subsequent screens.

MemoryLane worked example

In
Figure 5(b) we can see that 'Nellie' has logged in and has chosen the *Change Profile* option. She is now presented with the choice of editing her profile *preferences* or *abilities.* The preferences option facilitates control over interface colour schemes and the use of icons and symbols instead of text. The *abilities* option allows her to change her profile level for hearing vision speech and dexterity. Changing the level for an *ability* will instantly be reflected in the multimodal interface, e.g. increased or decreased font size button size volume levels or amounts of ASR and TTS. As Nellie begins her reminiscence experience she is offered the choice of viewing a previously seen memory story stored in her *album* or creating a *new memory story* using combinations of her stored multimedia e.g. photographs, video clips, music, sounds, letters or poems. If Nellie chooses a memory from her album a selection of thumbnail

images is displayed where each image represents a stored memory in the album. Selecting (pressing) an image causes it to be played in full. The new memory option allows Nellie to select a topic for the new memory story as seen in
Figure 6(a). She can then view the ensuing memory story via the bespoke user interface as shown in
Figure 6(b). Memory stories last anywhere between one and three minutes during which the user has the options to pause stop or replay the memory and to also maximise the viewing screen if desired. The options to rate a memory story and save to the album are offered after each showing.

(a) 'Memory topic' screen (b) 'Play memory' screen

Figure 6. MemoryLane interface memory screens

MemoryLane will learn from the user during interaction and record this information as part of the user's profile. Should the user express dislike for a particular story MemoryLane will learn to avoid this particular multimedia combination for future memory stories. Similarly if the user rates the memory story highly MemoryLane will learn that this is a popular combination of multimedia. Should the user repeatedly require *help* MemoryLane will become pro-active and will automatically offer help in known problem areas for that user. As a user interacts with MemoryLane over a period of time its knowledge of that user will increase accordingly. MemoryLane can then offer more precise and accurate memory stories in a way that the user finds entertaining, using interface components that the user finds easy to understand, navigate and control. The more the user interacts with MemoryLane the more it will learn about him/her.

Conclusion and future work

This research introduces a hybrid method of decision-making specifically for a mobile platform, combining AI techniques in the development of a multimodal PDA-based application called MemoryLane. MemoryLane accommodates user-specific abilities and preferences for multimodal input and output and also performs fusion and synchronisation of life-cached multimedia for story generation. An initial MemoryLane prototype is currently being implemented and future work will involve iterative user evaluations of subsequent MemoryLane versions, rigorous testing of the final MemoryLane prototype and results analysis.

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Alternate reality games, advertising and entertainment: how digital media is changing the way we tell stories

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Abstract

Alternate Reality Games are structured around interactive narrative that uses multiple media - text, audio, still images, animation, video, and interactivity - and game elements to engage players, encourage collaboration and tell a story that can be affected by the players' ideas or actions. They are typified by the idea of 'Game as Platform' where there is not one specific platform that the game is played on. Instead it uses numerous elements, both online and offline to tell the story and the game itself is the uniting factor.

These games have been used successfully in the advertising and entertainment industries to promote brand awareness and to absorb viewers in the settings and themes of films and television shows. They can also be used to engage diverse groups of people in discussion on global issues such as the environment and politics.

In May 2008 we ran Ireland's first Alternate Reality Game to a successful conclusion. Using our own learning through this experience and drawing from the experience of others, the aim of this paper is to explore the various factors that influence the relative success of these types of games. The paper will look at their previous usage in entertainment, advertising and conflict resolution and their potential applications as both a social and educational tool.

Throughout human history storytelling has been an integral part of how we learn, communicate and socialise. Whether through drawings, word of mouth, print, or film, stories are an important part of the way we pass knowledge from person to person and process and explore new ideas and concepts. In today’s media-heavy

environment there are many new ways of communicating but telling stories is still an important part of the way we learn.

Alternate Reality Games (ARGs) are a relatively new game genre. These games are generally comprised of a collection of codes and clues that the players must complete in order to move forward within an underlying narrative. They are identifiable by the way they incorporate existing places, events and websites into the scope of the overall telling of the story. ARGs generally use multiple media, such as print, telephones, email and television for player interaction and use the Internet as the essential connecting medium. Players interact directly with characters in the game in order to complete plot-based challenges and puzzles and the players and the games creators decide the outcome of the story collaboratively. In recent years ARGs have been moving steadily from the peripheral of the gaming world into mainstream entertainment and have the potential to become a useful tool for both the advertising and educational sector.

At present the vast majority of ARGs are being created for entertainment purposes but this is slowly changing. Since the inception of the internet, viral marketing has come to the fore. ARGs are created for the 'hive mind' which means that one person cannot complete the game alone. It is this dimension that makes these games ideal for advertising. Players must find other people with the expertise to help them, thus the player base is expanded in a viral manner to incorporate new people with new skills in order to get to the end of the story. Compared to traditional advertising, ARGs may provide better value; creating a viral marketing campaign through multiple media, heightening the frenzy around a new product or event, and thus providing an innovative solution at a competitive price.

One of the earliest viral marketing campaigns that people might recall is the lead-up to the release of 1999 film, *The Blair Witch Project (*http://www.blairwitch.com). This micro-budget film used the internet to build up a back-story and disclose their fictitious storyline to the public. They incorporated fliers and a fake documentary to spread the word and to reel in their audience in a campaign that is one of the major precursors to ARGs. The film itself was hugely successful, largely due to the amount of hype the project generated online.

A more recent example of film marketing was the ARG developed for *The Dark Knight (*http://whysoserious.com), the latest instalment of the Batman film series. The

batman franchise has always had an expansive world, with comic books, cartoons, films, action figures and more, so a venture into the world of ARG was almost a natural progression. This game was presented as an online newspaper for the fictional city of Gotham (http://www.thegothamtimes.com) which developed the setting and explored the theme of the story over the course of 18 months. The campaign was rolled out in a number of phases, one of the highlights being the unveiling of the first image of the Joker character (http://www.ibelieveinharveydenttoo.com). The image was revealed bit by bit on a website, and the rate it was uncovered at was dependent on the amount of people logging on to the website. This not only created a general awareness of the film, but also encouraged their core audience to get friends, families and online communities to become involved and help them uncover the image.

The Art of the H3ist (McKinney-Silver, 2005) was a three-month interactive marketing campaign conducted in conjunction with the launch of the first-ever Audi A3 in the US in 2005. The campaign aimed to immerse players in a high-speed thriller. Players could interact with characters, delve into their computer systems and find out more information from their emails, phone conversations, faxes, photos, documentation etc. While on the surface the game appeared to be simply a fun and engaging story, Audi's main objective was to raise public awareness of the A3 brand. The highly innovative campaign resulted in a large increase in website traffic and a 34% increase in buying indicators such as use of dealer locator and payment estimator features. The campaign proved to be a huge success for Audi. Within 4 weeks of the games conclusion over 10,000 leads had been generated including 3,827 test drives (Leavitt).

While ARGs can be used to increase awareness of a project or brand they have also been used to great effect in maintaining ongoing interest and investment in long-running projects, such as TV shows. One of the most recent success stories in the ARG world is *The LOST Experience* (Waite). This game was used to keep viewers interested in the TV show *LOST* and its universe over the three-month hiatus between the second and third seasons of the show. The game incorporated many fictitious websites (http://www.thehansofoundation.org) based around some of the corporations and characters mentioned in the show and helped to keep the viewers engaged with the show while it was off the air. Other TV shows such as *Heroes* (Price), *Harpers Island* (http://www.eqal.com/harpers-globe/) and *The 4400* (High) have all used similar games to maintain their audiences' interest.

More recently an emerging trend of 'Serious' ARGs has resulted in these types of games being utilised to help raise the awareness of humanitarian, environmental and educational issues through storytelling and game-play. The Serious ARG provides the opportunity for the game to offer alternative ways for the intended target audience to learn about a subject matter by means of interactive narrative. It seeks to educate people about topics of public concern such as climate change, pandemic crisis, natural disasters and the effects of war, by engaging them in a new and entertaining way.

Tomorrow Calling (http://www.temporalkinephonics.com) was an ARG which focused on environmental awareness. The plot was based around the idea of a relative from the future contacting the players and asking for their help in protecting the Earth for future generations. It offers players the opportunity to engage with the issue in an enjoyable way and to learn more about what part they can play in environmental preservation.

Aftershock (Madrigal) was an ARG that was based on a US Geological Survey scenario report. The story detailed the extensive damage that Southern California could experience in the aftermath of a 7.8-magnitude quake on the San Andreas Fault. Players were encouraged to imagine the worst possible scenario and to record their responses to this scenario online in forums, blogs, videos and other means. Created by the Institute for the Future and Art Centre College of Design, the ARG ran for three weeks in 2008 and provided the players with practical knowledge of the effects of natural disasters such as this and guidelines on how to react to such an event. This is a prime example of how ARGs can be implemented in a practical and significant way to prepare the public for real-world events.

Coral Cross (http://coralcross.org) is an ARG commissioned by the US Centre for Disease Control and Prevention which was to revolve around an organisation that steps forward to aid an Hawaiian island community during a flu pandemic crisis in 2012. Due to the outbreak of the H1N1 Virus (Swine Flu) the game was restructured to further increase knowledge of the current pandemic, illustrating the flexibility that issue-based ARGs can demonstrate.

With the advent of the technology-driven era the art of traditional storytelling has evolved. ARGs are the ultimate in Transmedia storytelling. They can expand fictional worlds and give background on characters, corporations and current affairs.

They can be an entire story unto themselves or can be used to set the theme and tone of another story. ARGs can use any and all media and are not restricted by location or platform. Using this format, storytelling now incorporates films, television, the internet and other media forms such as audio and images.

The emergence of new computer game technologies adds to the challenge for authors in attracting and retaining the attention of children. *Cathy's Book* (Stewart, Weisman and Briggs) is one of the first children's novels to face this challenge head-on. *Cathy's Book* is essentially an ARG published in the form of a novel in 2006, which debuted at no. 7 on the New York Times Best Seller list for Children's Books. Cathy is a young girl who has gone missing and left a book to help her friend Emma find her. The book contains, clues, riddles, puzzles, authentic phone numbers and website addresses that are all clues that Emma must piece together with the help of the readers. Their search takes them through a world of mystery and intrigue where they encounter many interesting characters including the immortal Chinese Eight Ancestors. This book not only encourages children who would not normally read books to start, but also introduces avid readers to a new way of storytelling where the reader is more than just a passive participant.

In addition to presenting a new type of storytelling, encouraging children to read and informing people about important issues there is perhaps a more important educational lesson in ARGs. The New Media Literacies (http://newmedialiteracies.org) are the subject of a current project at Massachusetts Institute of Technology (MIT) which is exploring how children and young people should be prepared with the expertise necessary to function optimally in the current fast-paced digital climate. The areas that this initiative has set down as important developmental skills include problem-solving, critical judgement, multi-tasking, collaboration, negotiation, networking and the ability to pool resources and information. These are just some of the skills that playing ARGs promote. Players are required to work together, to share information and solve problems, and to work out what information is relevant and what can be discarded. Transmedia Navigation is also found to be an essential skill. This is 'the ability to follow the flow of stories and information across multiple modalities', a resource that is very relevant to ARGs.

ARGs are one of the only educational tools that require players to decipher and recognise clues in multiple media and environments. Players are also required to find new people with specific skills to assist them, which helps with interpersonal and

social skills. In addition, these games teach patience and persistence. Going through large amounts of repetitive or uninteresting work can eventually lead to a large pay-off, such as a chance to progress further or the eventual conclusion of a story the reader has contributed to, thus enforcing the notion that mastering skills do provide their own rewards.

Helping to tell stories and taking the opportunity to play and interact with new worlds and concepts has always been an extremely effective way for people to learn. The emergence of new technologies makes this an even more accessible idea today and ARGs are the ideal format for facilitating learning and expansive storytelling. Whether the aim is to get users to become aware of new brands or important issues or to learn more about TV show, films or events ARGs are proving to be an effective and engaging tool. Even now the genre is still essentially in its infancy and it is clear that ARGs offer a wealth of potential that has yet to be explored.

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Media diffusion: multiplicity, identity and ecology - re-thinking images in animation after cinema

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> Could I ask you to explain the music of heaven to me? Sounding the ten thousand processes and events differently, so each becomes itself according to itself alone - who could make such music? (Chuang Tzu)
>
> Multiplicity without unity is chaos. Unity which does not depend on multiplicity is tyranny. (Blaise Pascal)
>
> What is an idea?... an image that makes us think. (Gilles Deleuze)

Abstract

This paper will explore the intersection of several concepts that relate to recent research the authors have conducted in the creation of artworks that make use of novel media diffusion techniques. The significance of this creative practice is located at the intersection of several rich concepts forming a productive nexus for the creation and analysis of new forms of media images. The spectral lines through multiplicity and unity; sequence and simultaneity; lines and surfaces; are combined with new approaches to spatial and temporal arrangements of images to create dynamic media images providing new avenues for re-thinking the technical process of animation as well as newly articulating memory and identity.

A brief history of media diffusion

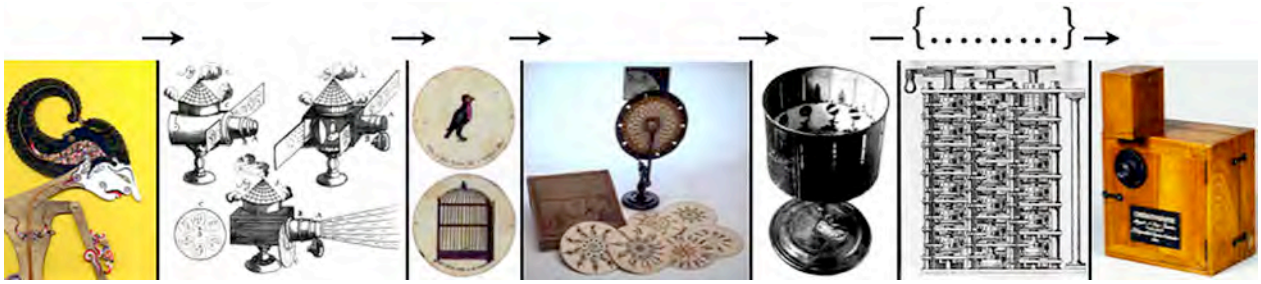

Figure 1.

The history of media diffusion spans a broad historical and cultural narrative. An abbreviated form of this narrative could draw a series of broken but roughly contiguous lines from shadow play and magic lantern performances through philosophical toys such as the thaumatrope, phenakistoscope, zoetrope and others culminating in the cinematograph. By historical circumstance the computer almost precedes the development of cinema but the development of that particular force stalled in the mid-19th century while the spiritual automaton of cinema emerged as the major media form and image of thought of the 20th century. This chain of media diffusion technologies changes in a metamorphoses from performing objects towards automation and increasing abstraction and de-materialised experience. The cinema grounds itself in this automatic presentation of linear sequences of photographic images and a compositional form based on montage of images in time and space (Manovich 2001).

Encoding practice

In the mid-20th century the development of computational forces was rekindled and, in concert with a variety of cultural practices, opened possibilities for new forms of media based on process and participation. The computational media after cinema is grounded in a creative methodology of encoding practice. A methodology that marries logic and intuition through the process of making external tacit, embodied knowledge normally internal and only vaguely accessible to conscious process. New forms of temporality and dynamism emerge as potentials of the work as the linear 'next' of the syntagmatic cinematic image sequence is replaced by the paradigmatic 'now' of the computational image (Campbell 2000) as well as the 'again' based on the looping form inherent in the underlying code of the procedural media mechanism. These new temporalities echo other emergent cultural practices of the period,

particularly the time-based practices of contemporary music (Kramer 1981). But more significantly the 'then' of the linear narrative of cinema (as in 'then this, then that, etc.') is replaced by the conditional 'if ... then' of a sentient medium. The dynamic nature of this becoming-medium allows the composition of a new media form based on a heterographic braiding of media processes (Dulic and Newby 2004).

A core problem in the presentation of media images across multiple media diffusion points is the mapping of such content to specific spatio-temporal locations. A media image that is either spatialized in volumetric space or made of a multiplicity of diffusion points provides the opportunity to explore the composition of immersive experiences that share characteristics with ecological environments. Such environments exhibit characteristics of complexity, variety and balance across a large community of elements. The reconstruction of such an ecological image can be facilitated by the modulation of media elements along a spectrum of correlation through de-correlation of images across multiple diffusion points contributing to the complexity and coherence of the resulting media experience (Truax 1999). Another strategy modulates mutual coherence in order to create perceptual fusion. This approach has been used in several of the authors' works in which composite images appear across multiple diffusion points that are themselves composed of fragments of audible and visible images drawn from discrete sources. This strategy of working across the spectrum of correlation and de-correlation suggests a general approach that we have found most productive in the creation of discursive images.

Braiding the chaosmos — from sequence to simultaneity

One of the conceptual deep structures or points of reference we find useful in grounding our practice is chaosmos - a punning conflation of chaos and cosmos drawn from Joyce's *Finnegan's Wake*. The meaning of the work is concentrated across a series of lines that stretch between the poles of sequence and simultaneity; lines and surfaces; representation and abstraction; unity and multiplicity; self and others.

Figure 2.

A single screen, or its simple extensions into two or three projection planes, can be made qualitatively more complex by breaking it into an arrangement (*dispositif*) of many surfaces arrayed in space on which time variant media are projected. *in a thousand drops ... (refracted glances)* (Newby, Dulic and Gotfrit 2008) is an interactive audiovisual installation work that makes use of such a media diffusion system designed by the authors to display and animate images across a large number of discrete diffusion points. The media diffusion system developed to manage the media database forming the deep structure of the work brings life to the still photographic image in the creation of new forms of discursive images.

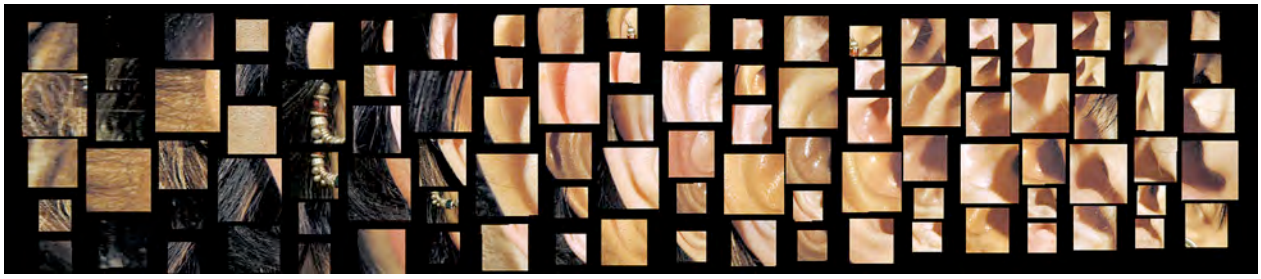

Figure 3.

The content of the photographic database of the work is displayed across 120 discrete screen surfaces under computational control in such a way that a new form of montage - between temporal and spatial - can be explored for its expressive potential. Each screen surface carries a discrete photograph of an individual person - face, eye, lips, ear, or hand. The media diffusion technique breaks the monolithic screen and provides new articulations of relations across multiple screen arrangements in space. The computational process that guides the display of the ensemble of images assumes a moving point around which each image is arranged in order to create an animated image of a whole made of a set of parts. In this way each image participates with the others around a dynamic common centre. Each screen-surface acts as a discrete diffusion point that can carry a unique visual projection. The collective set of diffusion points provide a continuum of difference-similarities that can be read through the perceptual dynamics of a complex interplay of parts and pieces; grouping and splitting; levelling and sharpening (Arnheim 1974). These perceptual mechanisms, brought to bear on an image made of discrete multiple points, are further complicated by the interplay with abstract form inherent in the spatial arrangement of the diffusion points themselves. A variety of forms have been explored with best results occurring when a balance is struck between

symmetry and randomness, allowing the perception of emergent wholes to more easily occur.

In a spatially abstracted image of multiple ears (Figure 3), as the eye moves from right to left, there is a shift from the biological/personal, the folds of flesh that surround ear canal, to the cultural/communal as expressions of fashion and style appear in the way hair is organized and jewellery is applied to the lobes and pinnae. In a similar fashion the controlled level of abstraction provided by the facetted nature of the image produces a loosening of perception allowing thought to explore relations across cultures and, in a trans-human context, visual analogies to other similar biological structures such as sea shell forms.

On the semantic level - given visual content based on the human form - the swarm-like arrangement of images takes the form of a network of relations - rhizomatic in quality - that allow the articulation of ideas of memory and identity. The utopian reading of an image of a face (Figure 4) represented by fragments of many different subjects - 'We are all one' - is easily inverted into the more complex 'I am many.' Another question asked by the image, 'Who is this person?' flips easily to the plural 'Who are these people?' The fact that the image contains these inversions in equal measure makes it rich in discursive potential. Similar complex readings are embedded in the image in terms of gender, age, ethnicity, style and other aspects of the multiplicity and emerge as altered states of memory and identity.

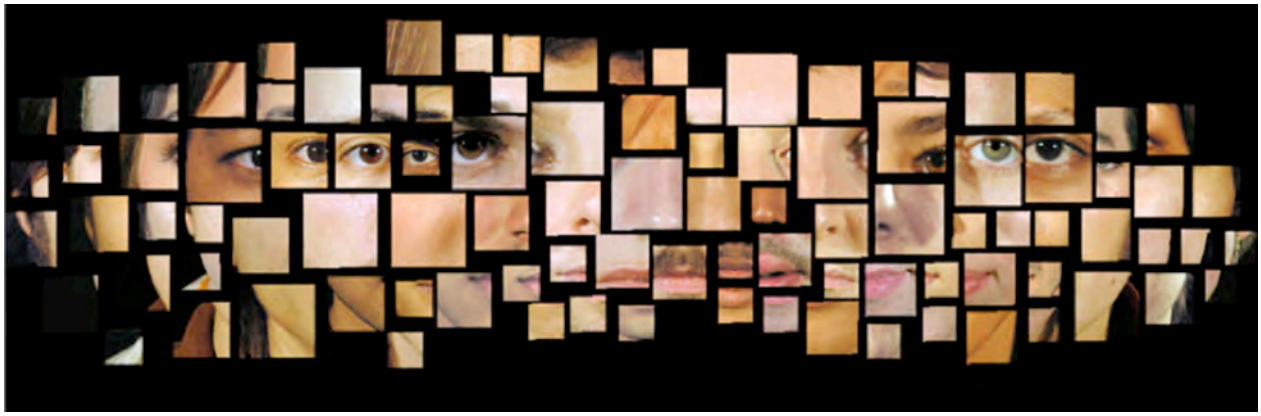

Figure 4.

Vilem Flusser notes that the skin surface forms 'a plane on which I happen to the world and the world happens to me.' He characterizes these happenings occurring on the horizon of this plane as facts that form - depending on their outward or inward

going vector - adventures summing to our memory and past as well as the active decisions that sum to one's presence in the world as active agent. In this way the powerful metaphor of skin and experience meeting as happenings of facts on surfaces provides a nexus of experiential intensity where future and past are laminated again and again to form memory and identity.

The metaphor of screen surface as skin is a productive one for the interface between the actual and virtual. Like skin, the media interface functions as a permeable membrane that mediates the event of process and participation with the actualization of a set of virtual potentials. As a metaphor for identity skin also provides a material against which to struggle - 'the skin encapsulated self' contains the conventional subject that can be opposed and transcended by a variety of means in order to actualize and transform the subject. Skin can also function as a screen on which identity is projected externally to the participating subject in an ecstatic view of self. The participatory relationship of the new media image is one in which the secretion/excretion dynamic of skin - action/experience as well as future and past - is under constant negotiation. Memory and identity are thus fluid and continuously under construction and subjectivity, as Felix Guattari notes, 'is in fact plural and polyphonic' (Guattari 1995).

The coherent temporal composition of the complex media images made possible by multiple diffusion points is made difficult by the fragmentary nature of such complex images. The solution to this difficulty involves the establishment of a dynamic balance along the spectra of continuity and discontinuity; linearity and non-linearity; stasis and motion; realism and abstraction. What emerges in this complex interplay of media elements as they emerge and are modulated in time is a dynamic steady-state as multiple diffusion points relate to each other and contribute to the emergence of a larger coherent media image. With the introduction of time these relations are animated and made more complex still as what was static becomes dynamic. Our perceptions of the identities of the represented-yet-abstracted subject shifts. Change and difference show themselves as fundamentals of experience as the de-centred subject moves through variation. The media image here forms a portal to an altering state of consciousness.

Cultural information - the broken mirror as emergent ecology

In this prismatic set of images each surface is a facet in a complex interplay of constructed identity, memory and subjectivity in which the white light of a monolithic and levelling globalism is refracted into a full spectrum of colours in a shimmering play of differences. The subject-made-complex here is read as an articulation of cultural information - 'the difference that makes a difference' (Bateson 1972). Echoing the Taoist ecological notion of diversity so elegantly summed up in Chuang Tzu's question of the music of heaven, the notion of an inscribed heterography of multiples across media and cultures is consistent with Toru Takemitsu's observations that the great mirror of Western culture that dominated the post-colonial world is now broken and what remains is a multitude of shards - each reflecting a difference - a diversity to be cherished, cultivated and preserved as the rich endowment of our planetary evolution (Takemitsu 1995). Images here struggle to express themselves as well as recombine in the creation of new possibilities across boundaries previously considered normative and therefore inviolable: gender, age, ethnicity, style, history. A media structure that arranges multiplicities of images in balanced complexity and variety forms ecological images that allow complex meaning-structures to emerge. Through a process of making complex and external the processes and relationships that are typically held as simple and internal, the first step is provided in a process of forming transpersonal relationships with self and other, individual and collective, human and non-human.

The computational media image provides forces with which new images of thought can be articulated in collaboration with not only the participant experiencing the work but within the media apparatus itself and its array of images. Conversations occur across the work itself and are then continued in the experience of the human participant in a network of relationships internal and external to the work. The new discursive image is one that offers new opportunities for participation with its thinker.

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Pools, pixies and potentials

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Abstract

Interactive dance works create new dramaturgical challenges, where notions of relationship and inter-relationships may be dynamic, where overall structure and form are malleable and where, the performer often needs to have multiple, parallel awareness's. Composition of a work is challenging in this arena as form, narrative (linear or non-linear) and the consideration of 'interaction' all require careful and simultaneous deliberation. Furthermore, systems that do not use pre-recorded content (music or video), but rely on synthesis of all material in performance, break down the traditional processes of content creation and rehearsal, where constraints are set on material and the work is formed into a known whole, followed by a performance phase. In an interactive system with real time synthesis, the performance is also the moment of content creation. The authors are addressing these challenges through constructing clusters of potentials with inherent sets of relationships. Pools of potentiality may contain any number of composed foci and become the fundamental dramaturgical device, suggesting paths through the work, and relationships between interactive input and performative outcomes.

Evolving practice

In 1984, in the first edition of the journal, *Contemporary Music Review*, the composer Tristan Murail sought to challenge the status quo:

> Our conception of music is held prisoner by tradition and by our education. All has been cut into slices, put into categories, classified, limited. There is a conceptual error from the very beginning: the composer does not work with twelve notes, x rhythmic figures, x dynamic markings, all infinitely permutable - he works with sound and time. The sound has been confused with its

> representations, and we work with these, with symbols. Since these symbols are limited in number, we quickly come up against the wall. (Murail 1984)

He continues by arguing that pursuing the tradition generates music of incredible complexity ‘which in fact no longer represent anything at all, since the music becomes un-performable, or literally inaudible in the sense that there is no correspondence between the music perceived by the listener and that conceived by the composer.’ (ibid)

Murail raises two critical points; that musical practice has become so bound in the strictures of the tradition and the symbols used to represent it, that entire generations of composers have forgotten that the fundamental materials are sound and time (Lucier 1995). He also considers the correspondence between the work representing something, the embedded internationality inherent in such a concept, and the degree to which such intentionality can be perceived by the audience.

Many arguments about the value of contemporary practice are not about the way the composer/musician deals with the fundamental materials, but how their work accords with the traditional symbols of representation. This discussion is relevant in this forum, because some contemporary practitioners of music and dance have moved from representations and symbols, from styles and to focus on the inter-relationships of fundamental of materials - time, sound, space, experience … in real time interactive systems. When practice is driven by these considerations, the mechanisms of traditional making become in large part obsolete. A choreographer for instance focuses on the experience of presence and relationship, or space and it’s transformation, and on the cybernetic causal loops established through real time interaction. These notions carry forward, as they do in music, to considerations of systems that allow real time response, evolution and transformation, of distributed relationships, sonifying or visualising those relationships as dynamic morphologies.

I suggest therefore that interactive works require new considerations about fundamental relationships between both dance and music (Birringer 1999; Emmerson 1989; Emmerson 2001; Garnett and Goudeseune 1999; Hayles 1996; Norman 2004; Paine 2004; Sommerer and Mignonneau 1998; States 1996; Zurbrugg 1994). The compositional process becomes one of constructing potentials, where notions of relationship and inter-relationship are dynamic, where overall structure and form are malleable and where, in performance, the performer needs to have multiple

and parallel awareness's. Not only is this a challenge to the choreographer/composer, but also to the concept of intention/reception, the communication with an audience.

In the context of dance, Thecla Schiphorst has written widely about the body as interface in immersive environments. In describing the human body's role as interactive agent, Schiphorst says:

> I am interested in thinking what is body in relation to the construction of systems. I can describe the body as being fluid, re-configurable, having multiple intelligences, as being networked, distributed and emerging. …From my personal history and my own live performance experience I developed the notion of body knowledge and what I call 'first person methodology' and use this as a basis for interface design. (Schiporst 2001).

Schiphorst paints a picture of the human body being deeply engaged with the act of interaction on many levels, being intuitive, visceral, corporeal and intelligent while exhibiting parallel processing features.

Dramaturgy

The dramaturgical challenges inherent in a truly interactive work (i.e. The Darker Edge of Night) are the focus of research by the author, in collaboration with dancer Hellen Sky, funded by an Australia Council for the Arts, ArtLab grant in 2007. Indeed the concept of interaction is unclear, being too broadly applied to indicate any one practice with clarity, and is therefore also defined within the project.

Techniques being developed to facilitate a consideration of interactive systems as central to the resulting performance work (The Darker Edge of Night) include the notion of constructing potentials, groups of potentials with inherent sets of relationships. These form what we term 'pools of potentiality', each of which may contain any number of composed potentials and become the fundamental dramaturgical device for determining the possible paths through the work, the way in which the potentials inter-relate, and the justification for the relationships between interactive input and performative outcomes. An initial mapping of the number of pools for The Darker Edge of Night can be seen in Figure 1.

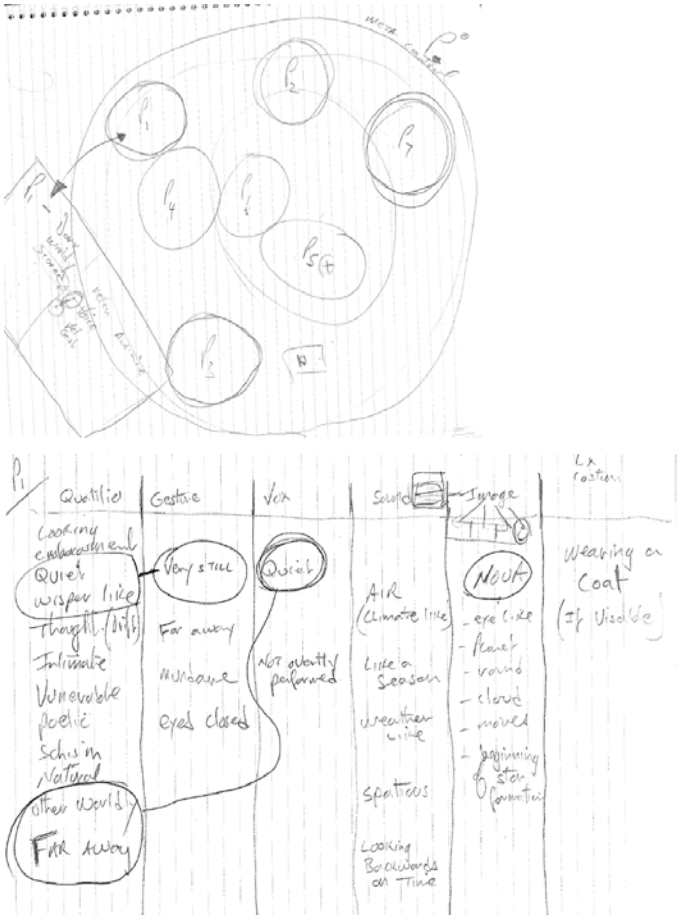

Figure 1 Initial map of 'Pools of Potentiality' for *The Darker Edge of Night* and some detailed consideration of Potential 1 (P1).

Each of the identified pools contains a number of composed potentials, each detailed as in: firstly the qualities of that moment are noted; then they are extended to the resources of the work, in this case, gesture, vocal, sound, image, lighting and costumes.

These considerations direct the composition process for each of the potentials. They determine aesthetics for each of the work's resources at the micro-scale whilst allowing for dynamic transformation of these relationships. The macro-scale considerations address notions of non-linear, dynamic form/structure and the question of intention/reception.

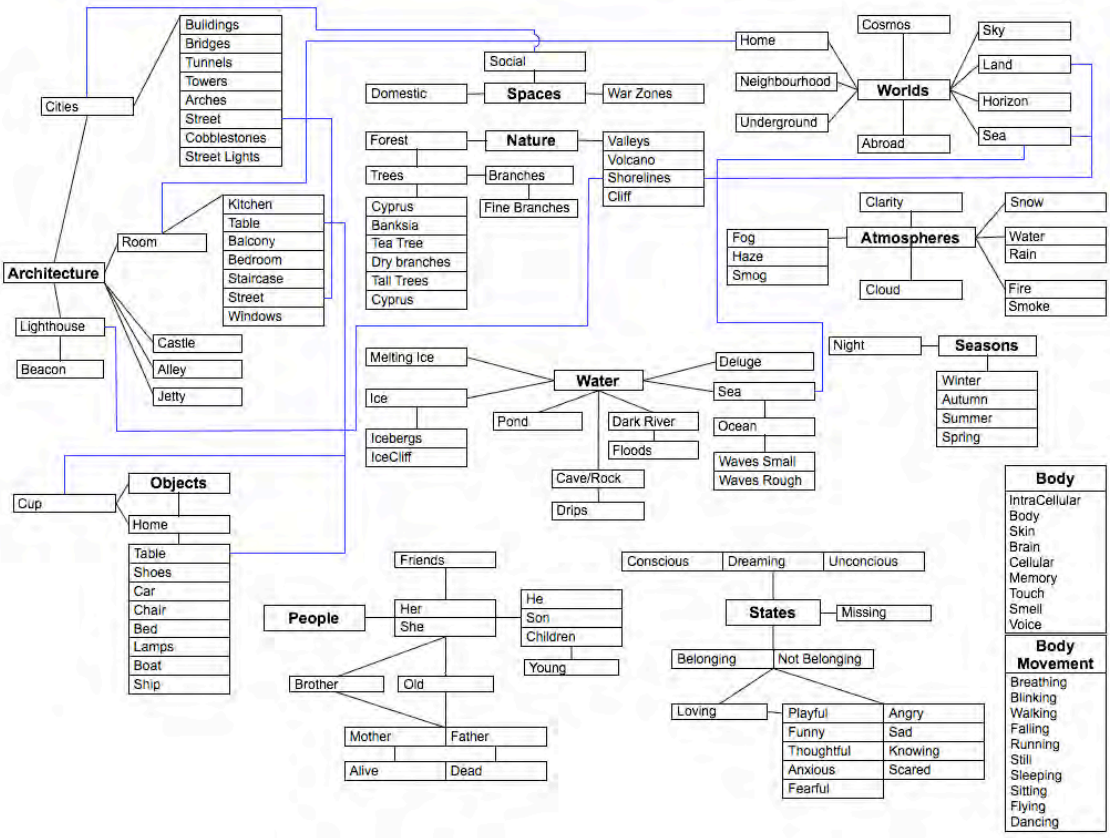

Figure 2. Example data selection tree for *Darker Edge of Night*

Precedents

Eberhard Blum discusses Earle Brown's musical compositions as ‘fully composed although frequently having “open form” potentials.’ (Blum 2007):

> As a musical score, it can be realised by any number and type of sound producing means. One may begin a realisation at any given point in the score and proceed to any other point therein, interpreting the variations in size and position as musical parameters (frequency, duration, volume, colour/timbre). Brown calls his work a ‘mobile musical piece’ in reference to Alexander Calder’s kinetic sculptures, or mobiles. In Europe, in the late 1950s, the terms ‘musique informelle’ and ‘Aleatorik’ were invented as designations for related works. (ibid)

The dynamic mobility Blum refers to in Brown’s compositions parallels the approach to dramaturgy briefly outlined above. This approach results in a vibrant, transforming

work, which focuses on the fundamental qualities of the materials – time, sound, space and experience.

In discussing the preparation for a performance of Earl Brown's *Four Systems*, Blum comments that:

> Freed from the constraints of having to lend form to a dramatic development, I can devote myself in *Four Systems* entirely to the processes of sound production. Instrumental sound in all of its aspects becomes the major musical event and durations, registers, volumes, and the physical act of creating sound the objects of my musical interest. Each separate moment in the course of the work is unique unto itself, demanding and receiving full attention. (Blum 2007)

A further precedent for the concepts being proposed in this paper is an early application of composing potentials in literature, specifically the work of the French collective, Oulipo[1]:

> Oulipo (pronounced oo-lee-PO) stands for "Ouvroir de littérature potentielle", which translates roughly as "workshop of potential literature". … It was founded in 1960 by Raymond Queneau and François Le Lionnais.
>
> The group defines the term 'littérature potentielle' as (rough translation): "the seeking of new structures and patterns which may be used by writers in any way they enjoy". Constraints are used as a means of triggering ideas and inspiration, most notably Perec's "story-making machine" which he used in the construction of Life: A User's Manual. As well as established techniques, such as lipograms (Perec's novel A Void) and palindromes, the group devises new techniques, often based on mathematical problems such as the Knight's Tour of the chess-board and permutations. (Wikipedia 2008)

An example of early interactive literature from the Oulipo, Queneau's *Cent Mille Milliards de Poèmes*, can be engaged with online[2] and shares characteristics of the ever popular drawing game where a collective of individuals each draws part of a human picture (an important constraint leading to a common understanding of the

[1] See http://www.oulipo.net/ (viewed 28/06/08)
[2] See http://www.bevrowe.info/Poems/QueneauRandom.html (viewed 28/06/08)

object in the making), where by the paper is folded into sections so that the final drawing is not revealed until all parties have completed their contribution. Referred to as Picture Consequences, or simply the Fold Game, this game has been networked so that people can play it anonymously online[3].

> Queneau's *Cent Mille Milliards de Poèmes* is derived from a set of ten basic sonnets. In his book, published in 1961, they are printed on card with each line on a separated strip, like a heads-bodies-and-legs book. All ten sonnets have the same rhyme scheme and employ the same rhyme sounds. As a result, any line from a sonnet can be combined with any from the other nine, giving 1014 (= 100,000,000,000,000) different poems. Working twenty-four hours a day, it would you take some 140,000,000 years to read them all. (Rowe)

A further precedent exists in current approaches to electronic music interfaces. Like Queneau's poems, electronic music algorithms often have multiple variables. When combined in a real time synthesis engine this can multiply to tens or even hundreds of variables in need of control simultaneously. This is an impossible task without some form of correlation into higher order control patterns. One approach being taken is to develop preset interpolation interfaces such as those available in the Kyma software (Scaletti, 2004)[4] and in AudioMulch (Bencina, 2003)[5], and audio plugins such as GRM Tools (INA-GRM, 2008)[6] and the INT.LIB for Max/MSP (Larkin 2007).

Oliver Larkin comments that the design goals for INT.LIB were as follows:

> • to allow the control of multiple parameter sets independently from one encapsulated interface
> • to abstract the user interface from the max patch
> • to facilitate rapid layout of the interpolation space
> • to be fast enough to support interpolation of many presets featuring many parameters
> • to be easy to understand and use. (Larkin 2007)

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[3] See http://masscat.afraid.org/foldgame_pages/foldgame.php (viewed 28/06/08)
[4] See http://www.symbolicsound.com/cgi-bin/bin/view/Company/KymaX1Released (viewed 28/06/08)
[5] See http://www.audiomulch.com/ (viewed 28/06/08)
[6] See http://www.grmtools.org/ (viewed 28/06/08)

Ross Bencina outlines the Metasurface in AudioMulch as:

> The Metasurface – a mapping interface supporting interactive design of two-to-many mappings through the placement and interpolation of parameter snapshots on a plane. The Metasurface employs natural neighbour interpolation, a local interpolation method based on Voronoi tessellation, to interpolate between parameter snapshots. (Bencina 2005)

Such mappings have been applied in the Darker Edge of Night, where the bio-data is fed directly to synthesis variables, but these are in turn constrained by a conditional set, relating to an interpolation of preset spaces, in turn associated with a range of preferred aesthetics states. (Figure 3)

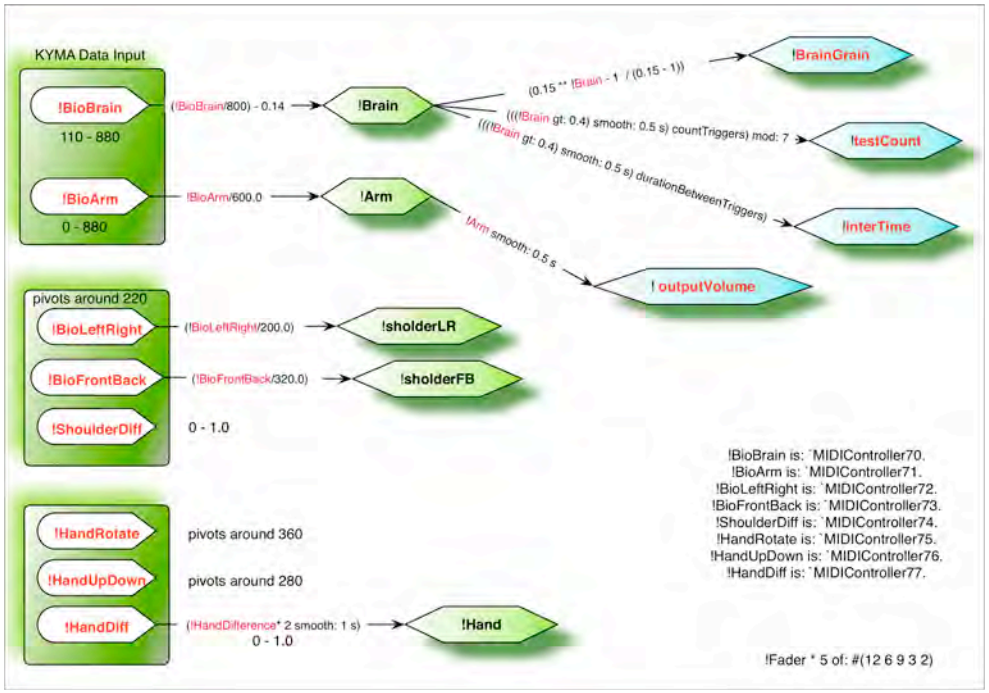

Figure 3. Bio-data mapping to sound synthesis algorithms in *Darker Edge of Night*

The feeling of moving

As outlined above, we started with a vision to design a human computer system, which like our own sensing of the world, is complex, sensorially rich and not fixed in time - where the performer's dance and the performance elements of image sound, light and virtual 'staging' are deeply and intrinsically connected. This is a

choreography that attempts to engage all of our senses, and rather like our own imagination and memory, is capable of making unexpected leaps between sensations of thoughts, experiences - not as a replication but as art - rich in virtual potentials. We understand already in developing this system that the body is capable of producing all kinds of data, patterns of ever changing data, where the parameters of difference exist as computational potentials. We sought to synaesthetically trans-code those patterns in , as fluid states manifest as sound, light, and image. In this system our choreography of body perceives no boundary between the computational potential or that of the performer, rather they create a symbiotic system of exchange. Although there are sets of conditions that are pre-composed, pre-scored imagined or sensed, what occurs in the moment to moment dance, is an open dramaturgical system which folds between influence and response.

Our choreography includes not only the composition of the physical body, of the performer moving in space and time, in site, but also the composition of the data produced by her movement as a combinatorial system, generating the transformations of the performative elements. In so doing this interplay deepens the performers engagement with the multi-sensory worlds she embodies. Capable now of sensing herself as light, or wind, made audible from breath, her attention is multi-sensory, multi-focal, in the micro moments. The in-between spaces of thoughts and actions form a creative interplay between these scores that is not simply causational or on cue.

The dynamic nature of these relationships invites her curiosity, a playfulness, a risk of unknowing. They can also incite an amplification of states that bring relations into the body, felt as visceral embodiment of the evolving audio-visual environment.

Embodying the system is a complex dance and one that is indicative of our increasingly more interwoven relationship with technology. This responsive system, allows us to think of other non-linear structures as choreographic form where the story is told, no matter of the order, regardless of any dominant performative language.

She closes her eyes, looks inside

Sensors worn on the performers head (EEG (brainwaves), EOG (eye movements) and facial EMG (muscle movements)), the arm (EMG), the shoulder and hand

(angular velocity in two dimensions) are transmitted wirelessly every two milliseconds to a computer network for sonification and visualisation. Through imaginative software programming, these data patterns make audible the blinking of an eye, the clenching of the jaw, the flexion of the arm and the tilt and spin of the body. A synaesthetic sensing moves her attention between multiple modalities, multiple scores, inputs and outputs - the electro-physical dramaturgy of this expanded choreographic practice are represented as 'pools of potentials'. Additionally the software development has addresses and Open Sound Control framework, so that all data can be shared, making the work extensible, both in terms of local sound and image synthesis, but also in term of telepresence performances.

In conclusion this paper details the ways in which the compositional ideas put forward here are applied in the creation of the work for The Darker Edge of Night.

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Moving history, moving goalposts

Verity Peet
Supported by Northern Ireland Screen

Abstract

Digital film archives are experiencing unprecedented growth around the world. They provide easy-to-use access to our historical moving images as never before. But what are the critical factors in their formation? Funding, technology, content, rights, consumers and producers all play a part, but how do these issues and influences interact? Who or what is creating - and controlling - our memories of the past?

This paper discusses these issues with reference to my work as Producer of the Northern Ireland Screen Digital Film Archive and Consultant to a number of UK publicly funded digital film archive projects, and in particular the recent innovative proposal developed for the East Anglian Film Archive.

Funding

Funding bodies influence the concept design for digital film archives through the given criteria for applications. The criteria usually changes its emphasis every four or five years to reflect the funding bodies latest concerns. When the Northern Ireland Screen Digital Film Archive was created in 1999 most of my meetings with the Heritage Lottery Fund were about digitisation. Did we know what we were doing? Had we chosen the right Mpeg? Were we paying too much for it? Currently, I have been devising a digital film archive concept for the East Anglian Film Archive. The new funding buzzword is participation. Access and outreach are not enough anymore. And now we have ‘buzzphrases’ too: ‘active participation in making decisions about moving image heritage’.

When the funding bodies operate on a tick box level of project assessment then it becomes easier to be successful with your applications – assuming of course that the agenda of the funding body becomes your agenda and you tick all the boxes. The

East Anglian project proposes a new model in which the content is selected by public groups who have been identified as under-represented in their access to, and participation in, moving image heritage. Such a proposal very simply ticks all the right boxes for targeting under-represented groups and including 'active participation in making decisions about screen heritage' and so it has successfully gained its funding. However, while this focus on participation and under-represented groups clearly addresses those issues, the forced need to focus on those requirements leads to other factors, which are arguably as important, being side-lined. For example, the East Anglian model has hit the right buzzwords but in doing so created some practical problems. The planned project will be far more logistically complex that it might have been. There's a big difference between a film archive or similar creative body with expertise and experience selecting the content, and the selection of content by several groups of under-represented groups who have had little or no access to any archive film before … Putting knowledge issues aside, how long will it take to get these diverse groups to agree on a selection? And what if they only want the bizarre or spectacular? How does the East Anglian Film Archive ensure it doesn't end up with Britain's Got Archive Talent?

Fortunately, with the best will in the world, the under-represented groups can't possibly view all the archive film available so the archive 'experts' will have to pre-select the material the participants can select from. This pre-selection will require the same amount of effort by the archivists as would have been necessary had the archivists selected the final selection. Whatever material gets selected in the end, the process is likely to be an unnecessarily laborious one and makes no economic sense. But by putting aside such practicalities as these this project has managed to achieve the most important practicality of all – getting the public funding in the first place.

Technology

When Northern Ireland Screen's Digital Film Archive was created ten years ago the best technological solution then was not the best technological solution now. The access infrastructure was wildly different. Had you heard of broadband ten years ago? Who knows what will be a household term in another ten years. This ever-changing technological landscape can only be dealt with in one way: let content be king. And there are other reasons to let content be king. Technology often causes major headaches for the funding body assessors. If you say the project uses

groundbreaking technology then they will worry it won't work. If you say the project uses tried and tested technology then they want to know where's the innovation? So forget the techno jargon. Who cares what version of the software it uses; it'll be obsolete in a couple of years anyway. As far as technology goes, there are three areas of concern. First, the digitisation of the content that needs thought. What's the potential and likelihood for re-use of the material in other projects? Second, prioritising the needs of the rights holders. Security is always their number one concern. Rights holders never ask about design or navigation or resolution, all they care about is whether someone can steal their stuff. Whatever access methods you choose, security of content is king. The relationship with rights holders is vital to any afterlife for the project. Spend on security and you will save on rights. Finally, ease of use: the continuing success of the Northern Ireland Screen Digital Film Archive has frequently been put down to the fact that it is extremely simple to use. Navigation options are straightforward, for example, by decade or geography. The keyword search function searches all the data accompanying the images and the images are all adequately tagged before upload. It may seem obvious, but it is vital to remember that the technology serves the content and the user – the technology itself should effectively be invisible.

Content

The selection of content is often perceived as the most significant issue due to the politics of balance and/or representation: who selects the content and using what criteria are critical questions. However, often, the selection of content is shaped by more practical factors such as availability and affordability. In the evaluation of the Northern Ireland Screen Digital Film Archive a persistent criticism was the lack of material from rural areas. Everyone wanted to see his or her hometown or village fifty years ago and the majority of those places were not in the archive. The Digital Film Archive was perceived to over-represent people living in Belfast. Of course, what the majority of the viewing public did not realise is that it was not a question of over and under representation: the film they wanted to see simply was not available. It does not exist. Equally, issues of political balance are frequently subject to the availability - or not - of material. In a post-conflict society sometimes the only way to avoid accusations of imbalance is to redress the balance using alternatives such as contextual documentation or photographs. But such additions bring new issues: If it is necessary to provide a balanced account by using non-moving material where

moving material does not exist, is it also necessary to interpret this material or provide pointers of some kind?

As mentioned previously, the East Anglian project proposes a new model in which content is selected by public groups who are identified by funding bodies as under-represented in their access to, and participation in, screen heritage. Such a proposal may cleverly tick the right boxes for gaining funding but what effect will this have on the choice of moving images and consequent construction of a shared historical narrative? Does such a method successfully redress the under-representation of minorities in society or does it create fresh problems? In East Anglia the under-represented groups include the elderly, the rurally located and ethnic minorities. How likely is it that these groups will agree on selections or even themes? It is this diversity that will create a rich and varied selection for the public archive, but it is also this complexity of stories and viewpoints that will create a headache for the producers. Arguably the likely patchwork quilt of material may better represent our modern multi-cultural society, but how will the producers devise navigation and themes across such diversity? How can a new user be expected to navigate such a diverse mass without theme or pathway? Will the very act of attempting to enable an enjoyable user experience through simple navigation be seen as asserting an interpretation on the material; a partisan view on this shared history?

Affordability of content is another factor often overlooked. Clearing rights on material is costly. Even if the rights holders agree to waive their fees – and most willingly do so for not-for-profit projects – the actual process of identifying the rights holders and clearing the rights is time-consuming, labour intensive and expensive.

Consumers

Who are the consumers? When I produced the Northern Ireland Screen Digital Film Archive it was enough to waffle vaguely about lifelong learners and local history societies. Not so today. Today, the funding bodies ask you to identify your target markets and specify likely numbers of participants. For the East Anglian project we had to count every member of every group at the Help The Aged day centre clubs. (I hope the numbers don't change before we start.) But these targeted participants / consumers were chosen specifically because they ticked the under-represented box. What about all the other potential consumers of moving image heritage? I can't say I feel over-represented. Do you?

Should consumers or curators choose the material they want to see? I worked for a short while at the British Film Institute and recall the horror on the faces of the curators when I suggested we might do a bit of research to find out what people wanted to watch. For some people this is a backwards way of working. The experts show the way to the uninitiated not the other way around. And I have just explained the impracticalities of attempting to get the public involved. And yet … surely there is some middle ground? It will be interesting to see how the East Anglian project fares.

It seems equally perplexing that the screen heritage content itself seems to be one of the last considerations of the funding bodies. The funding criteria is always concerned about who is making the project and for whom and all the buzzwords already mentioned … But rarely seems to be interested in what material actually exists. Surely the first thing should be to find out what there actually is? Indexing the vast piles of cans of film lying around in dusty archives is never high up on the list of priorities though. I guess it doesn't make for good press releases.

Producers

So who are the producers? What's in it for them? My experiences have been with publicly funded institutions and organisations but increasingly private companies are beginning to see the potential for profit in the world of screen heritage. Perhaps these are the projects that will be aimed at the over-represented majority?

The role of the producer is two-fold. The producer or producers must organise everything and find the cash, but second, and more problematically, the producer must shape the concept. How will the material be sourced, selected and laid out? What are the themes, pathways and boundaries? What is the underlying purpose of the work? To educate, entertain or simply exhibit? How will the vision of the producer be compromised by the funding criteria?

For Northern Ireland Screen's Digital Film Archive a steering group was set up to aid me in making these choices. That was the plan. Inevitably, it didn't quite work out like that. The benefits of a steering group are in the multitude of expertise and knowledge within. However, that diversity of opinion creates problems too, especially in a post conflict society. Gaining agreement across the board in the selection of moving images was no easy task. But how could it be anything else? History is full of many

stories. To gain a genuinely shared picture of history differing points of view are necessary.

Summary

In summary then, the goalposts in creating digital film archives keep on moving. The funding bodies change, the funding criteria changes, technology changes, our perspectives on the past change … but one thing stays the same. The content. Those moving images recorded however many years ago cannot change. We can change their context, their delivery, their reception, but we cannot change their content. And so I leave you with this thought, let content be king.

Further information

Access Northern Ireland Screen's Digital Film Archive at over 20 venues across the region. For more information visit:
digitalfilmarchive.net or northernirelandscreen.co.uk

For more information on the East Anglian Film Archive visit:
uea.ac.uk/eafa
Contact me at veritypeet[at]btinternet.com

(Re-) constructions of memory in post-conflict Serbian society

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> There’s no memory you can wrap in camphor but the moths will get in.[1]
> (Elliot 1969: 49)

At present we are witnessing the world-wide spread of remembering. For about twenty years, especially after the changes in East Europe from 1989 on, most countries, and ethnic or social groups have changed their traditional relation to their past. This change has taken various forms, such as criticism of official history; claims on abolished or confiscated traces of the past; the cult of roots etc. One of the reasons for this 'movement' is connected with the phenomenon of the 'acceleration' and 'democratization of history, which also has to do with the expansion of visualelectronic memory in a globalized world. This has not only refined observation of the current reality, but also the view of the past.

At the end of the 20th century, access to information was rapidly democratized by the Internet. The World Wide Web, as a kind of 'Gutenberg’s revolution in audio-visual media', has led to the fact that building collective memory in digital form has increasingly become a multimedia phenomenon. The new 'time machine' brought not only the possibility of looking at the past(s) from many different perspectives, but also simulating alternative historical flows. At the same time, breaking up the old system of remembering initiated an abundance of old myths and superstitions. Using different simulations, images of the past became more inventible, imaginative, even amusing and also easier to notice and keep in mind. But the latest 'technical revolution' led the second half of the 20th century to be more critical toward the past than any other period, which is also noticeable in the visual arts.

In my lecture, I will show two artworks, a video and an online work as an example of the link between the image and history and thus of the relationships between artists

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[1] T.S.Eliot, *The Cocktail Party*, 1969: 49

and the authorities. Those artworks have an important position within the international production of the period for several reasons.

Firstly, they were produced in an area that has a special 'cultural' and political status within Europe. As a bridge between Western Europe and the East, the Balkans has favoured population moves for several centuries. Secondly, the video and online works made between 1993 and 2001 demonstrate an evolution in the relationship between historical writings and images. And thirdly, with the digital age, artists have acquired the possibility of providing a counter-analysis in their works of the political history of the space whose writing has long been, and still remains, largely falsified through distinct periods.

As a victim of a *selective memory phenomenon* during the communist era, the civil war in the former Yugoslavia and its continuing impact, the official and publicized versions (books or films) of social and political events have never provided a true and accurate picture. That's one further reason why the artworks are important in the way in which they provide a new and complementary analysis of their societies. As a tangible mark of *something that was, but no longer is,* video and the Internet make possible the representation and conservation of experiences, situations, events etc. According to those aspects, I will present two projects of the Serbian artists Mrdjan Bajic and Milica Tomic.

I will also present one 'non-artistic' project, the oral history project of Documentation Centre 'Wars 1991-1999', and try to explain why both the artistic and historical approach are important in the re-building of the identity of a person or collective in the post-conflict period. Each war conflict cuts deeply into the continuity on many different levels. In one's personal experience, the war means a breakdown of normal life. It is connected with loss and after it, people suddenly wake up in a new system and old values and old stories are no longer valid. The question is how can people find the orientation they lost and where? And how they can deal with that which has happened to them and to others?

Mrdjan Bajic: 'Yugo Museum' or memory without a place

The mutual connection of experiences and narratives organized a symbolic field of imagined communities. By communicating its presence or positively, we take part in

community, share it and participate in it as property. In his essay 'Experience and Poverty', Walter Benjamin said:

> It is as if something that seemed inalienable to us, the securest among our possessions, were taken from us, the ability to exchange experiences … Experience has fallen in value. And it looks like as if it is continuing to fall into bottomlessness.[2] (1969: 83-84)

While some forms of orders and communities are breaking apart or have already ceased to exist, there arises at the same time a restitution of community as the wish and desire for a shared historical experience and narration.

Since 1994, the Serbian artist Mrdjan Bajic has been examining the new peripheries, generated in the background of the civil war in the former Yugoslavia: places and objects of the historical dislocation of social life and history. The past and social life, which once gave meaning to these objects, have vanished. Once relegated to the tracks of official history, these objects/places have been estranged.
'Yugo Museum' is a project about history, another version of history, and the impact of history on a human being, where the term 'cynicism' stands as a demarcation line between 'History' and 'Another Version of History'.

The past can never leave the present. For Bajic, History is not an exclusive subject of historians. He also searches in it, and finds and shows something that can be forgotten later. But unbearable truths will not disappear if we simply stop paying attention to them.

In the case of 'Yugo Museum', a simple fact is overlooked intentionally: even if it's built without walls, as an Internet / virtual project, this museum exists in reality. Inviting people to add new objects, write their own memories in it, the artist is trying to demonstrate its existence to everyone:

> This museum does not need halls and walls; you do not have to buy a ticket in order to enter it. You are in it for free every day, whether you want it or not, whether you can accept the fact or not that your identity has been built in a

[2] Walter Benjamin, 'The Storyteller: Reflection on the Works of Nicolai Leskov', in *Illuminations*, 1969: 83-84

> reality that keeps on repeating: There has never been war nor trauma; Goli otok (Bare Island) has never existed; Communists have never executed anyone; Chetniks and Ustashes have never slaughtered innocent people; the Karadjordjevics were great democrats; the Serbian Orthodox Church despises secular wealth; Milosevic is not guilty of war crimes because there have never been any war crimes at all, etc.[3] (Merenik 2000)

Here people from the ex-Yugoslavia are confronted with the history, which they can recognize as their own, which is, on the other hand, partially no longer a part of them, like the photos from Tito's time. Visitors to the website often send a comment, or even take part in the project. Later the same images from the Internet are printed and shown to the public. People's reactions have varied. In the real space, they are confronted with the real object – with their own identity, or their lost one. This has elicited reactions from the public. People no longer wanted to see their own history, or to have the images of dying men and women from the current war in front of them. A further part of the 'Yugo Museum' has led to even more extreme reactions: a series of posters, which show the consequences of the NATO bombardment, and actions against Serbia, with the heading: 'I did this'. This series was also produced as billboards and postcards.

'Yugo Museum' raises the question about relationships of art and politics. Can history and politics transform themselves into artworks? What use does history have for individuals or what damage does it do to them? Can each human have her or his own version of history? And where is art in this? Can an artist be categorized as 'political' or 'apolitical?

Bajic said*:*

> Art has the freedom of never becoming political art. But at the same time, it does not have the right to be silent. I do not insist on the fact that all artists address politics directly in their works. That is sometimes even stupid. Often artists, who are interested in completely different topics in art, such as perception, geometry, the body etc., bring a deeper feeling for the problems of the time than "political" ones. But to be silent, that is something different.

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[3] Mrdjan Bajic, in Interview with Lidija Merenik, 2000

> To be silent, as a public person, and to do so as if the political and social context of the situation in which you live is not clear to you, is rather traitorous. Therefore, it is the most important, particularly in this decade, it is even my obligation not to be silent, but to show responsibility and my political attitude. (Merenik 2000)

Milica Tomic: 'xy – ungelöst – the reconstruction of the crime'

In this video installation, the Belgrade artist Milica Tomic reconstructs the crime committed by Serbian forces on Albanian civilians in Kosovo on the 28th of March 1989. The title of the work 'xy – ungelöst' ('xy – unsolved') is taken from a popular German TV show in which unresolved criminal cases are presented to the audience and they are invited to participate in solving them.

Milica also invited people, and her colleagues and friends to participate in 'her' criminal case. They were invited to pose in clothes that were actually reconstructed original clothing of victims, according to photos she obtained from victims' families. In the act of reactivating the Kosovo myth, by placing herself as a metaphor for 'Kosovo maiden', Milica became a central figure in the reconstruction of the crime, even as a blind one.

This project creates a memorable link between questions of the personal and political version of the 'truth', and personal and/or collective guilt and/or responsibility. One can ask here whether an artwork, which takes a stand on a particular event or situation, is to also be understood by a public far from these situations. Milica Tomic said:

> I believe that the most intimate and local have the largest reach. The preoccupation with private problems has the largest reach. Due to its intimacy, the work surprised, and reached a wide variety of people from many different countries in a very similar way. It is not a political way and is not concerned with politics. I would like to speak no other language than the language of contemporary art.[4]

[4] Milica Tomic in Interview, *Vreme*, number 518, 07. December 2000

In post-conflict societies, in order to rebuild the interrupted stability of political and social life, the official version of what happened often hides and distorts the facts. But official politics also works as hard as possible to obstruct alternative sources in receiving and distributing relevant information.

What people know, they mostly know from their own experience, or through personal contact with those who have experienced or witnessed something. Thus, in the example of the civil war in the former Yugoslavia, knowing about the events that constitute the most difficult part of the 'bad, negative past' - of the crimes committed on people of other nationalities - depends only on a private decision. Everything - the choice of sources, believing or not believing certain facts or anti-facts and the art of interpretation - is basically left to one’s personal decision. 'Take it or leave it' without any consequence is a most common behaviour to the 'bad past'.

The 'work on the past' is a clearly articulated obligation for the political structures in post-conflict societies. Truth, and also guilt, is one of the most important questions for Serbian society today, as a ground to emerge as a properly transformed country. This does not mean, however, that there is no place for any other changes before this question is (re)solved. This has to go on at the same time as a list of other, more intensive processes, so that the already exhausted society is not additionally burdened, but made stronger.

Documentation Centre 'Wars 1991-99'

Documentation Centre 'Wars 1991-99' is a non-governmental organization committed to illuminating the character, causes and consequences of the 1991-99 wars in the region of the former Yugoslavia and especially the Serbian part of responsibility for them.

The errors and delusions that led to social and moral ruin in the last decade of the 20th century and caused vast tragedy all over the region must not be forgotten. Documentation Centre's 'Wars 1991-99' work is based on the belief that accurately recording, understanding and remembering the past is crucial for building a society of responsible citizens capable of shaping the peaceful and creative future of Serbia and of the whole region.

Documentation Centre 'Wars 1991-99' was launched on May 1, 2001 under the auspices of Radio B92, whose broadcasts, throughout the war, were devoted to the truthful reporting and analysis of the wars.[5]

In the process of memory building in a post conflict society, the role of oral history is very important. Academics and professionals have traditionally collected oral history. Recently, however, members of diverse communities have begun working together to record their own oral histories.

In Documentation Centre 'Wars 1991-99', the informal history, the private stories, are very important, so that persons once involved in the conflict get the chance to articulate their points of view. It is also important for finding out which circumstances are responsible for 'shifting' the whole society to madness: from the state of peace to war. What is it that makes humans support and even join the war? And how is it possible then, later on, for individuals and societies to 'switch back' to peace? One very important thing, often forgotten, but which is supported in this project, is the experience of everyday-life under the conditions of war. Mostly we hear stories about war, a very brutal one, but there are, besides those horror stories, many other facts that are also important to understand in terms of what happened. Thus, the main target of the oral history projects 'Wars 1991-99' is not only to show extreme experiences, but also to give a place to the simple stories.

Who speaks? - is one of the most important questions in the oral history projects, because when the life histories of people who occupy privileged positions within their communities dominate the collection, then the existing power structures can be reinforced. Important aspects of the history of a group are then excluded and the project fails to transform the purpose of oral history. In this project, the life histories of a variety of members of the community, including those marginalized in the communities themselves, comprise the collection. The project allows for a multiplicity of stand points in reconstructing the memories from the bottom up.

In general, in order to find a proper strategy for re-building memory after a war conflict, one of the most important points is to answer the question of guilt. Consequential and parallel guilt must also be treated and this by all the parties once involved in the conflict. But each side must start from its own part. Like Jaspers said in 1945, 'In a catastrophe, the most important thing to each and every one of us is a clear knowledge of himself.'[6]

[5] http://dcwmemory.nb.rs/07/eng

[6] Karl Jaspers, *The Question of German Guilt,* 1947

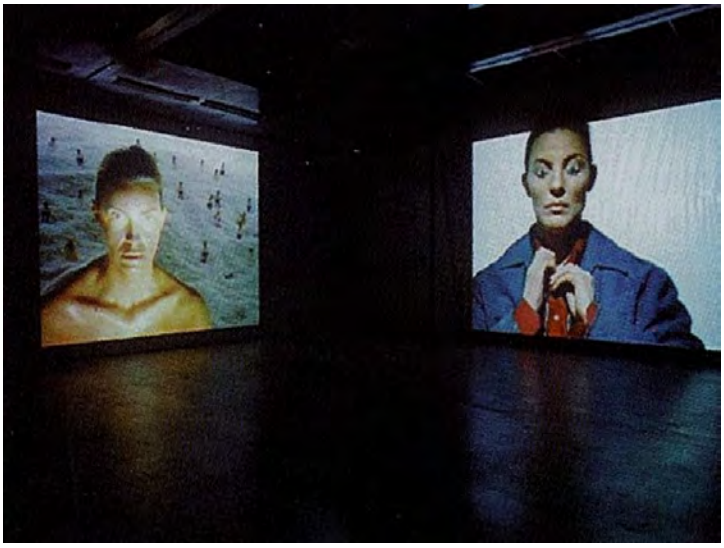
Tank, Belgrade, Terazije Square, May 1. 1949 © Mrdjan Bajic

Tank, Belgrade, Terazije Square, March 9. 1991 © Mrdjan Bajic

Referendum, 2006 © Mrdjan Bajic

I did this, 1999 © Mrdjan Bajic


XY Ungelöst, 1997 photo: Robert Fleischanderl


XY Ungelöst, 1997 copyright: Milica Tomic

Location based entertainment and co-evolutionary narratives in mixed reality immersive environments

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Keywords: location based entertainment, co-evolutionary narrative, autonomous agents, augmented reality, mixed reality, interactive spaces

Introduction

Our research focuses on integration of 'human-like' agents that naturally interact with the actions of real world participants. Characters in games, interlocutors in theatre, as tutors show enormous potential for research in the co-evolution of narratives within interactive experiences. The work develops upon existing and ongoing research into intelligence in virtual agents. We explore such agents with modest abilities to sense, and to interpret symbolically actions of real world participants, the agents interact autonomously with participants. In theatrical form, the narrative carried forward through the emotive and expressiveness of the human actors in fixed narrative with predetermined outcomes. We propose mechanism that allows for a simultaneous development of interaction between the human participants and the human-like agents within a framework of mixed reality performance.

This new entertainment form, 'location-based entertainment' allows narratives, animation, and cinematic presentations to occur in real world locations. The form is interactive, audience participative and moves away from passive entertainment, placing viewers within the 'fourth wall', immersing them into experiential performances [2]. Through the integration of autonomous characters that respond to and interact with; non-ascribed behaviours, explorations in mutually inclusive and affective dialogues, navigation thorough narrative paths with no fixed or predetermined - outcome is enabled. These experiments allow us to evaluate co-evolutionary narratives, and qualitative aspects of experiential interactions [3].

Technically, the work is enabled by developed systems to accurate tracking of participants in immersive augmented/mixed reality environments. Accurate tracking of observer's spatial and orientation point of view is achieved by using hybrid inertial sensors and computer vision techniques. The hybrid tracking uses active markers and inertial sensors to track the movement of the observer. The active marker is made up of an infrared (IR) light-emitting diode (LED) mounted on the user's head-mounted display (HMD). In our system, to detect IR LED, instead of using normal cameras, we use Nintendo Wii Remotes as vision tracking devices. This low-cost device can detect IR sources at up to 100 Hz, which is very suitable for real time interaction systems. Furthermore, an inertial sensor consisting of 6 degrees of freedom is attached to the HMD to detect the rotation and movement of user viewpoints.

Based on this location-based entertainment and co-evolutionary narratives research we show two project installations demonstrators, 'The Long Bar' and 'Tiger Training'. In 'The Long Bar', we demonstrate results with an animated agent in a real environment. The system installation allows the observers to freely walk around in the environment and the ability to see the avatar from various angles. The project installation provides for cultural and historical narratives to be presented vividly in the real present world. Ongoing work is developed through the creation behavioural responses from the virtual avatars where the avatars are imbued with the ability to respond in a limited nondeterministic manner. We do not expect to have a fully autonomous virtual character. Yet we hope to build characteristics into the avatar that can allow for potential response that is meaningful within the context of the conceptual narrative framework.

The motivation for developing this project is to allow people to experience certain cinematic and performative content impressed over present day real world environments. We have built a demonstrator that presents historical and or legendary, culturally significant events in fully interactive mixed reality experiences. Participants wearing head mounted display systems witness virtual characters immersed within a real world environments. Through the application of research in tracking, occlusion, and by embedding large mesh animated characters, this installation demonstrates the results of the technical research and the conceptual development and co-evolutionary narratives in the installation.

Locating people in a mixed reality environment

'The Long Bar' was intended to be set-up in the famous and historical Long Bar in Singapore. People wearing HMD would be able to see virtual avatar of famous historical human characters talking and interacting with them. The technology that we use is the fusion of computer vision-based beacon tracking and inertial sensors that measures the movement of human body. Conventional method for detecting both position and orientation in an augmented reality application is to use marker-based tracking [1]; however in theatrical and large area environments it is not feasible to use such approach as it would suffer from problems such as loss of tracking and jittering. The attachment of IR LED and inertial sensor on the HMD is a novel idea of tracking the viewpoint of the human user.

Using Wii Remote and Infrared LED

Low-cost vision-based tracking of head position using conventional ARToolkit or MXRToolkit markers are not suitable in large areas and uncompromising lighting environments. Jittering and loss of tracking due to the poor lighting condition seriously hampers accurate tracking, adversely impacting the audiences' aesthetic experiences. In view of this, we devised an active beacon by using IR LED as a position-tracking device. We used Nintendo's Wii Remotes to track the IR LED. The Wii consists of a monochrome camera with resolution of 128x96 pixels, with an IR-pass filter placed in front of it. The Wii cameras are installed in the ceiling to track the location of the observer. This tracking provides positional information only and does not provide the orientation information of the user's viewpoint.

Using inertial sensor

The overview of 'The Long Bar' installation is shown in Figure 1. Figure 2 shows the actual installation demo. The inertial sensor is attached to the HMD, above the viewing camera. It provides low drift error 3D acceleration, 3D rate gyro and 3D earth-magnetic field data. With sensor fusion algorithm, the 3D orientation data of the sensor coordinate can be found.

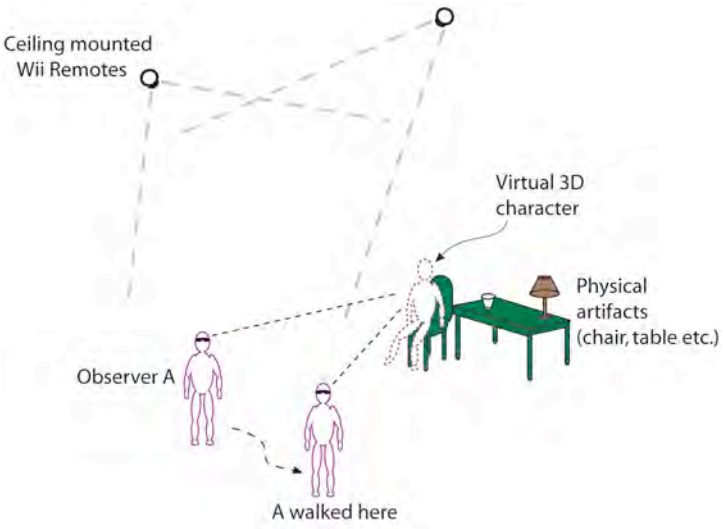


Figure 1. Set up of the large area robust hybrid tracking system. The chair, table and lamp are physical objects in the real world. The 'human' in dashed-line and sitting in the chair is a 3D avatar.

(a) (b) (c)

Figure 2a, 2b, 2c. Installation of *The Long Bar*, SIGGRAPH-Asia.
2a. Viewer looking into the scene using head-mounted display.
2b. The scene viewed normally without headset.
2c. The view captured from the viewers head-mounted display video.

Impact of tracking on selective attention and arousal

The tracking is handled via a minimum of intrusive methods. This allows for a more natural interaction and increases attention and engagement. Stimulation and arousal of cortical and autonomous response impact on viewer response with entertainment scenarios. While cognitive dissonance is accepted to increase arousal and selective attention [4], [5], this can be negative, neutral or positive. In circumstances of entertainment, games, and immersive experiences, the least cumbersome and natural interaction allows the viewer/user to gain enhanced engagement with the content or experiential context. While the HMD headset currently uses cabled connection for the video relay of the scene to the user, orientation and position data can be captured via Wii Remote vision system and by transmission of orientation via Bluetooth. This limits, to a certain extent, having to manipulate wires and heavy HMD

headsets. This limits dissonant sensory stimulation to the user. The focus on content delivery can then increase engagement in the narrative, increase the interaction and build more natural interaction response mechanisms.

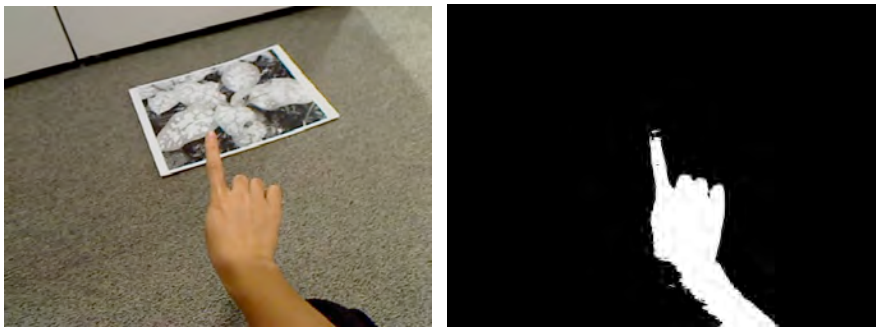
Understanding human gesture

'Tiger Training' explores the relationship between real and virtual worlds via interaction with virtual animals in an immersive mixed reality environment. This interactive, audience participative installation encourages viewers to 'train' virtual animals using hand signals and voice commands. This installation uses mixed reality and game technologies creating audience participative immersive interaction with virtual animals.

The installation uses in-progress research in real-time stable marker-less tracking techniques, placing virtual tigers in proximity with the viewer in such way that allows the viewer to view from multiple angles and interact with using hand and voice prompts to coax 'training type' responses form the virtual animals (Figure 3).

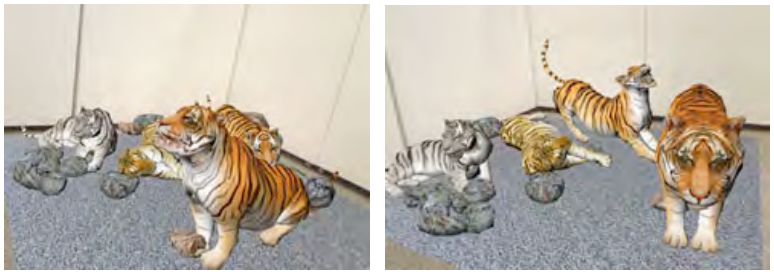
Figure 3. Using hand gestures and voice the user can prompt responses from the virtual agents. The viewer’s hand gestures and voice are captured to create natural interactive 'training' of virtual animals.

The experience is designed to elicit responsive interactions and cooperation between real persons and virtual animals, thus, creating a natural interaction between digital agents and humans (Figure 4). The installation is virtually embedded in real world environments where viewers can simultaneously move freely in the real and virtual worlds. The mixed reality virtual agents are viewed via a stereoscopic headset that is tracked on position and orientation in real time.



(a) (b)

Figure 4a, b. Hand gesture (a) is segmented using skin colour out of the background (b) and compared to a library of gesture images to determine the invoked behaviour of the virtual agent.



(c) (d)

Figure 4c, 4d. Invoked behaviour responses from virtual agents.

In this installation these virtual tigers are not easily “trained”, it requires viewer to learn appropriate ways to coax responsive actions from the tigers. This prefigures the notion of a co-evolutionary narrative where the virtual animals are allowed a modicum of 'independent' responses to the human expressed cues and interactions.

Co-evolutionary Narratives in Mixed Reality Experiences

We propose a platform and mechanism that allows for a simultaneous development of interaction between the human participants and the human-like agents within a framework of a mixed reality performative and game play environment. In these types of scenarios, the narrative, the agent's behavioural characteristics are more autonomous. The work in 'Long Bar' (Figures 1, 2a, 2b, and 2c) develops characters that have a set of behaviours that can be invoked based on audience cues and actions; the narrative is currently being developed to allow multiple pathways through the narrative with a limited set of possible endpoints. In this scenario the agent's behaviour is generally ascribed with a limited set of responses within a directed narrative. Within 'Long Bar' our exploration involves studying how the viewer interacts, primarily by responses to statements and verbal cues given by virtual agents. We also explore the use of physical devices and controls that are created as part of the physical sets – cranks set pieces, and props. Each of these has a potential for manipulation of the timing of the delivery of behaviours, and potential selection of pathways for the enacting of narrative segments.

Through the use of gesture and voice recognition in 'Tiger Training' (Figures 3, 4a, b, c and d), we are currently exploring different possible responsive behaviours that the virtual agents can react to stimulus. The potential responses within this test project will further inform the development of mechanisms for the interaction strategies in non-deterministic narratives. Future work entails the creation of a library of a wide variety of character behaviours that are invoked by potential viewer actions. We will explore the use of gesture, posture, voice via key word and possibly inflection and voice pitch and timbre. Each cue can be used to provide potential pathway selection through a set of ascribed narrative segments.

Inherent in our approach to the creation of an interactive performative experience is a nondeterministic narrative where the agents are imbued with a modest ability to sense participants and respond independently from predetermined or ascribed behaviours. To achieve a natural interaction that engages the participants, the agents should appear in a form or context that encourages mutually inclusive and affective dialogue. While the experience occurs in an experimental environment, participants and agents enact a narrative in a naturalistic manner, agents respond in their own voice and exhibit motivations and responses, that are not subject to control by the

authors, but open to navigate a path in a narrative which has no fixed or predetermined outcome.

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Cinesensory: a filmic model for imaginative reconstruction of a city from haptic memories

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Keywords: film, architecture, montage, mapping city

Abstract

In a city spatial and temporal fragments can be conceptually examined, expanded, and physically mapped through moving image manifestations of memories, sensory affects and situations, as spatial storytelling. How can sensory spaces in film be recognised and then further visualised? Creative montage techniques using film and video can work as multisensory portals to map lived experience. This paper proposes Eisenstein's *dialectic montage* theory as the basis for experimenting with 'conflict' as a creative sensory dimension. Haptic qualities of film are explored as technical and experimental cognitive methods of mapping filmic memory. In 'creative geography' montage for instance, the aim is to create a narrative from juxtaposing multisensory spaces of film and identifying a flexible spatial cognition in film, a soft database cinema, termed *Cinesensory*.

Introduction

In 2009 Iranian election's demonstrations disrupted Tehran and others Iranian cities. Their residents consequently started a wave of video uploads on the web as the proliferation of the event's news was concurrently taking place. The project utilises these videos as database. Over several days thousands of coexisting videos contributed to a collective narrative reconstruction of the conflicts. The contested identity of Tehran was being depicted globally frame by frame. A video mashup method for this project was filmic and involved the notion of conflicts. Eisenstein's montage theories were utilised to design a dialectical montage as memory slices (cuts) of the clashes with contrasting peaceful scene of the same cities. The question

was - can a multidimensional (non-linear) narrative reflect the multiplicity of the responses? One method of interaction was developed using a combination of spatial montage database as modular narratives, platforms such as Flash and Shockwave web video, and the *Korsakow*[1] system for creating flexible database narrative architecture for an online mashup.

Art as conflict: structural dynamism of narrative

'Art is always conflict, according to its methodology.' (Eisenstein 1949: 46) Eisenstein emphasised the *method* of conflict and collision in creating art work which always yields conflicts according to social, nature, and methodology. Eisenstein in *Montage and Architecture* (1938) suggests that there is a genealogical connection between the two. (Webber, Wilson ed., Bruno 2008) Different montage methodologies produce soft architecture of conflict dynamism on the surface of film and the screen reflects the haptic experience of e-motion. For instance, in linear montage a filmmaker situates the spectators as cognitive geographers, linking intervals of contrasting spatial and temporal realities in a film. Similar to geography, a time-space is continually reinvented and reconstructed in a form of creative geography. (Penz from Webber, Wilson 2008) However, in *vertical montage* as opposed to the dialectical method, Eisenstein synchronises all senses instead of contrasting. Space as shape, memory and narrative as architecture, can be explored through film's ability to expand and contract time space duration and rhythm as analysis.

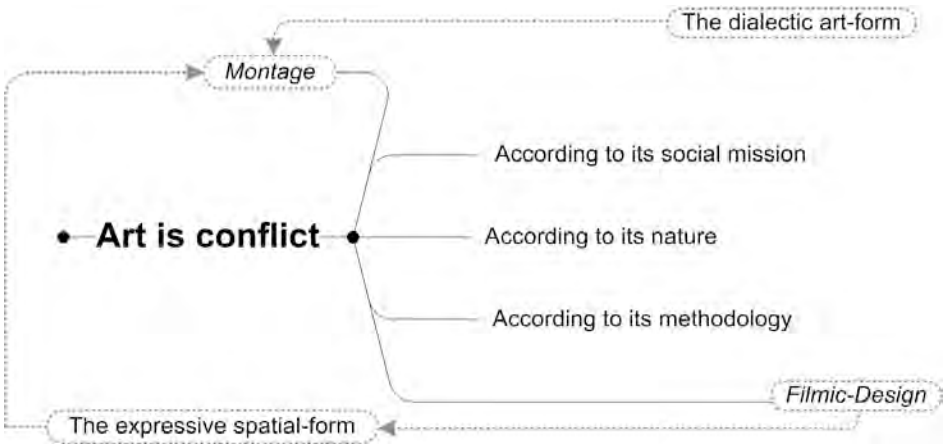

Figure 1. Based on *A Dialectic Approach to Film Form* (Eisenstein 1949: 46)

[1] http://www.korsakow.com

Film as tender mapping

In Giuliana Bruno's *Atlas of Emotions* (2002) and *M is for mapping* she exemplifies Welsh filmmaker Peter Greenaway as an artist-painter-filmmaker 'obsessed by architecture' and topography. Bruno says Greenaway requires us to think haptically about mapping cultural space and a new 'geometry of passion' as a mode of 'tender mapping' or cartography of emotion. (Bruno 2002) Haptic is the experience of the environment through body's 'movement of joint, muscle through your entire bodyscape' which 'engages feeling and doing simultaneously.' (Bloomer, Moore 1977) Pierre Huyghe is a current French avant-garde filmmaker interested in topographic plays; a celebration resembling Situationist act's of sensory play engaging with the environment while our bodies reinvent and change the spatiality in both film and reality. This is a blend of reality and fiction, the mapping of memory through narrative navigating by haptic program. He scripts spaces as a form of filmic creative geography.

A Journey That Wasn't (2005) a short film by Huyghe is an example of narrative montage mapping topographic entities of particular haptic sight, and a site that could be an actual place for conceptual situations before it is filmed. In this work the space of audience's body becomes a haptic explorer. The montage technique spatialising uncanny yet playful narrative, a 'transensory' experience: a creative geographic journey. As the opening frame cuts into the next shot it is of seemingly another site, an ice rink in Manhattan, which in turn has dislocated the earlier disruptive effects. From this point on the film has two distinct topoi, Antarctica and Manhattan as creative geographies; a third (vertical montage) layer is the music mapped from the actual topographic raw data from the journey and written by composer Joshua Cody and performed for audience on the ice in 2005 by a symphonic orchestra. In this film the camera becomes a panoramic storytelling vehicle transporting the viewer with it through diverse and incompatible locations and achieving a heterotopic world stitched by *'*travelling montage*'* that are disrupted by fixed hybrid time-spaces in between; Huyghe continues to use these sorts of programmes to script his conceptual situations that are juxtaposed with reality. At a glance this film could be a documentary, or more accurately a cognitive form of documentary.

Cinematic soft architecture

This type of dynamic architecture is a way of augmenting the transitional spaces as spatialisation of consciousness through montage, sequencing, and exposing conflicts of the meaningful images as juxtapositions. This is a spatial montage; its haptic, kinaesthetic and synesthetic connections are simultaneously presented. In film, psychological dimensions of time and space, are important for our understanding of the environment. Today contemporary artists and architects are more and more becoming interested in, as Kevin Lynch says, 'temporary structure which corresponds to time.' (Lynch 1972: 87) This is about transition of space and time which, if we could incorporate into architectural design, will enhance meanings through multidimensionality and possibly less nullity. The transition is obviously connected to emotion, pleasure and movement. If through cinematic architecture we can reflect our mental, sensory dimensions as physical ones, we are capable of creating a new dynamic building design, experiencing new productions of imaginative architectonics dimension.

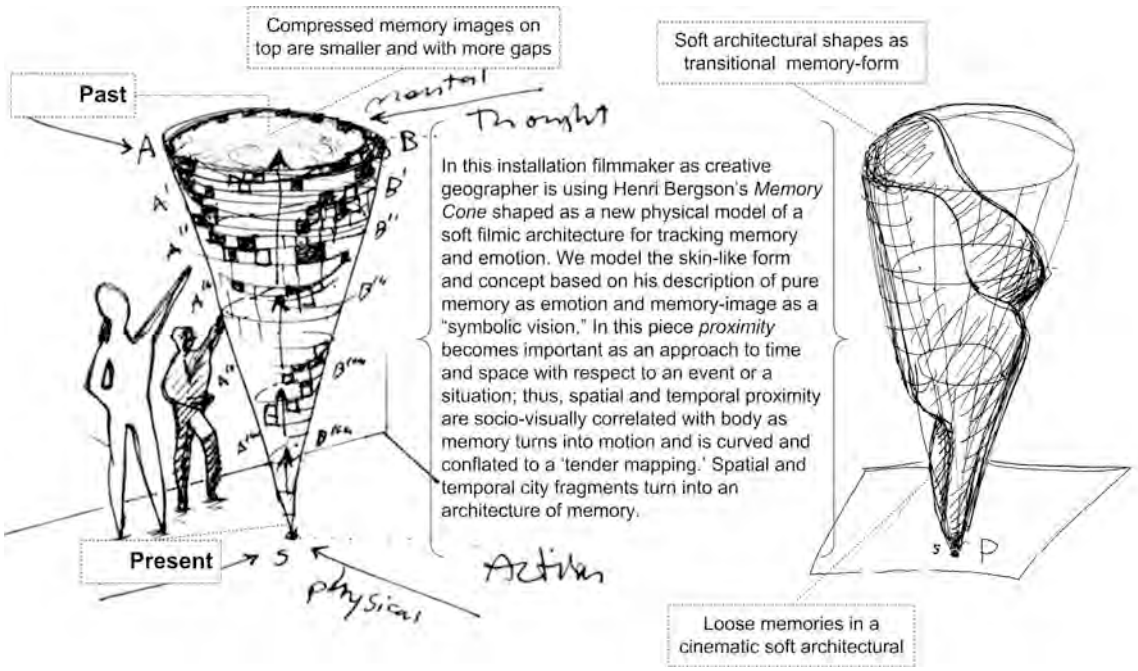

Figure 2. A tender mapping architecture

Anthony Vidler in his paper points out that the kind of psychopathology of everyday life through film has deepened our perception, as Walter Benjamin says, film becomes an unconscious poetics, a kind of analysis in itself. (Vidler 1993: 53) In this way if we compare architecture and film we see that film has the ability of disrupting our routine senses of architecture and therefore changes the way we consume space

or perhaps even our actions with it. The way to make architecture again more critical is to make a film of it, since the public are more attentive to the 'shock affects' of film than the architecture. So here we can sketch out our sensory engagement through film: through haptic vision and contact between us and environment; through haptic-optic remapping - as an interface for communicating emotion and the multisensory. Vidler emphasis the article *Montage and Architecture* (c.1938) where Eisenstein compares the path of moving through architecture and through following a line of sight traversing through a series of architectural objects, to the immobile spectator watching a montage on film. This is similar to Le Corbusier ‘architectural promenade’ and montage through movement in space. (Ibid) Generative temporary affects in architecture of imaginary dimensions, exists as we experience them in a cinematic architecture, and they potentially can be studies for their physical affects in design.

Learning concepts which involve programming complex architectural effects, as Jean Nouvel says, is of interest to today’s architects; effects such as transparencies are more common - involving layers of light as material in designing. As ephemeral effects it is a way of programming the building 'differentially over time and play with temporary effects', as traditional architecture Nouvel says, plays with the idea of permanence. (Baudrillard, Nouvel 2002: 62) Today's architecture wants to take advantage of temporary and subtle effects that can explore the sensory and sensual aspects of architecture which test its physics - its continuity in time space as well as thinking of ideas like transparency- light as a way of complex programming for different appearances in architecture. Cinematic architecture plays with ideas like depth of field and other haptic senses that are drawn through our body from architecture. As narrative it connects an evolution between matter and light, motion and emotion that continues evolving with space. Contested situations of a city’s riots are also temporary spaces, and unplanned and unconventional, yet deliberate events that show how the city can react to disruption in its time space.

Reconstructing a contested city map

In a narrative of a city one way of looking at spaces is through action and to play with the situations. In Tehran’s events, as a way of action within the spatial fabrics of the city, residents used the city as interface for creating new narratives, situations for revolt, rebelling, and contestation. Here filmic and video interactions work crossing distant locations through media and the Internet, in a sense giving it a public temporary space tactic. Demonstrations are temporary uses of urban space whether

as guerrilla action or as more organised and governed methods. In a combined virtual and physical project called *Vacant Memories* we test *cinesensory* concepts in an interactive video platform using spatial montage clips of a city in conflict.

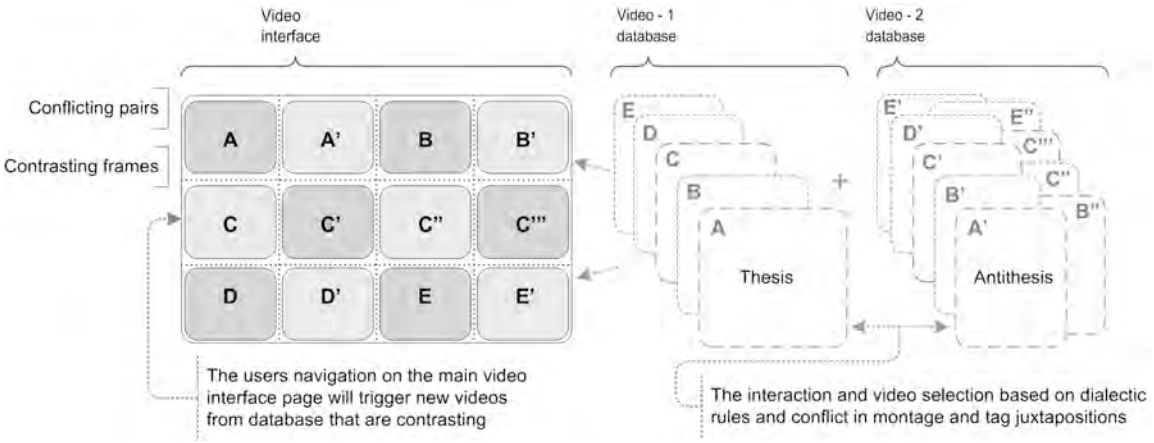

Figure 3. *Vacant Memories* (2009) an example of online interactive video database montage

In a contested city and conflicting situations, the temporary actions in a city will bring changes in the immediate spatial stories that creates dynamics for a new urban development. As we can see it already exists in a virtual form in Youtube and other online media sites. This is in a sense, squatting a vacant space that existed all along but through this moment of triggering is able to be realised - as cases of temporary use of their spatial and social structure. In one sense revolting by squatting, and attacking the city, the streets, using the city in a way that is not normally used - the temporary tactical urban system is a political expression; a new digital storytelling phenomenon - which only through this digital paradigm - connects these stories in a televised way. Therefore, in a video mashup of the instant news that we receive we gain our insight as ‘arts’ of temporary measures of conflict. What is this kind of spontaneous filmic expressions and video writings? What lives behind those invisible moments of memories of negotiation and boundaries that make this transition between the real and virtual? Once this news travels from the reality to the virtual we lose the physical moment when the things become conflated, yet are more tangible and reusable. Space as memory shape and narrative as architecture can be explored through film’s ability to expand and contract time, space, duration, and rhythm as analysis.

Mashup as narrative architecture

A *mashup* is a method of single integration of data functionality from multiple sources. 'The term mashup implies easy, fast integration, frequently done by access to open APIs and data sources'[2] to produce new results unrelated to the original purpose of the data. Moving image today is not necessarily only in film, the idea of online video as data has taken moving image to a further dimension. For instance the abundance and the proliferation of online video clips and footage gives it this kind of paradigm, which itself becomes a saturated field. Now to be able to understand meaning through them, one has to resort to searching through tags and various methodologies that help access this database orientated type of moving image. This brings possibilities of further exploring narrative dimensions, which includes the notion of online video multiplicity. The concept of mashup is a new web orientated methodology that deals with audiovisual media which produces a new type of both vertical and horizontal (linear) montage.

Conclusion

Soft video architecture consists of digital layers of information flow, and the flux of digital narratives. This is the kind of 'tender architecture' that is found in films, as memory does not exist in reality as matter - until the images are put to motion. Editing and montage makes this soft/flexible architecture into a matter flux which is never completely vacant, it only lives in temporalities and is occupied by soft bodies and soft identities, conflicting and contrasting. It is only through film that we can combine this dynamic notion of soft reality with ridged physicality's. An example of this paradigm is the *Soft Cinema* coined by Lev Manovich as database driven cinema where one can choose and pick the narrative and images from a video depository therefore creating flexible reality, a soft cinema; thus, the film is different every time it is viewed. (Manovich, Kratky 2005) A combination of the database soft video architecture and dialectical montage is to perceive architectural narrative through flexibility of the film as a multisensory medium. A filmic dialectic as *cinesensory* of city's memories can be city's spatial choreography - as new adaptive narratives, animating and activating a haptic semiotic.

[2] http://en.wikipedia.org/wiki/Mashup_(web_application_hybrid)

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Lines of flight: placemaking in motion

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In this paper I will use arguments from the sociology of mobility to reflect on the relationships between movement and locative media, using the flight of balloons, kites and light aircraft to explore embodied aerial perspectives.

These metaphors of flight and questions about movement have emerged through my practice as an artist working with Hamilton, Southern & St Amand. In the work ‘Running Stitch’ (2006 - 2009) participants go for a walk with a GPS device that sends a live signal to the gallery where it is stitched into a large canvas screen, thereby setting up a live relationship between a stitcher and a walker. Feedback gathered from participants suggests that they are not just thinking about where they are passing through, but also about the stitched line they are making, the drawn route or view from above, and that their walk had become a performance of place. While these observations apply directly to one installation, the ability to make a live track is becoming increasingly easy as GPS enabled mobile phones are becoming common. This paper explores how these technologies might change the way we experience place.

I will begin by exploring the two views that live GPS tracking seems to bring together, the embodied view of being in the landscape, and the static mapped view from above, what De Certeau (1984) would describe as the writing and reading of the city. I will argue that locative media can offer us radically different ways to think about the relationship between the map and the ground that go beyond the enhanced printed map, and that map and ground can be entangled in our hands.

Panorama and vertigo

In *The Practice of Everyday Life,* De Certeau (1984) describes the view from a tall building as the distanced point from which the city, that is written by the actions of its inhabitants, becomes legible. This removal from the city and from experience is problematic. It implies that the only 'real' way of being in the world is to see it close

up, and face to face, rather than from above. And it is this idea - that to have the overview is also to have a static view - that is changing.

The vertiginous panorama from a viewing platform at the top of a tall building is usually seen from behind a sheet of thick safety glass. The perspective from that building, one of panoptican surveillance, is reduced to a single point of perspective, albeit with the ability to pan around. It is easy to think of this viewpoint as not being 'in the world' in the same way as a walker on the ground. If we shift our perspective to that of Philippe Petit's 'Man on Wire', or indeed the high-rise window cleaner, we see that the person at the top of the building is also dwelling in the world but from a different perspective (Heidegger 1975, Ingold 2000). And this also applies to dwelling behind the glass. There is something in the vertigo of the view from a tall building, that suggests that we are still very much in the world, both reading it, as de Certeau would say, but also writing it. And it is this quality of simultaneously writing and reading the world, practicing and reflecting, that I want to explore.

Flow, flux and point-to-point

Locative media projects often use elements such as photography, video, audio and text to annotate a fixed map, or conversely they are accessed from a fixed map while moving through an environment. In this way the technology of GPS, which reports a succession of points, alongside the infrequently updated static satellite images of many base maps, shape the way we use and view locative media. There is the view from the ground walking through a city engaged with the sounds, smells and textures of the street, and the view of a Google satellite image annotated with information. It is a 'view from somewhere' embedded within in a 'view from nowhere' (Büscher 2006).

I am not denying that locative maps are useful for navigation, or that static maps can make data readable and transferable, what I am contesting is that views from above necessarily have to be static. There are also more creative uses of locative cartography, complex layered maps of individual emotional responses to the city that offer new ways of reading the local through the personal. These mappings reveal new layers of action and emotion, but the 'in motion' or 'passing by' (De Certeau 1984) quality of experience is lost in the resulting static maps. Annotations in locative media are in a very real sense placeholders, they show a place where something was, and then hold it still in the moment of marking.

Placemaking in motion

If we swoop back to the viewpoint on the street, Ingold's description of wayfinding suggests that:

> people do not traverse the surface of a world whose layout is fixed in advance – as represented on the cartographic map. Rather, they 'feel their way' through a world that is itself in motion, continually coming into being through the combined action of human and non-human agencies (Ingold: 2000).

For Ingold the 'taskscape' of our actions, merges with the landscape that is always in a state of becoming. Placemaking is done in motion, and experienced in practice through all the senses. The world is perceived through movement, and sight and hearing are both part of our being in the world. Ingold contrasts this way of perceiving the environment with Descartes who describes vision as separating us from the world, a world that is 'out there' in contrast to the viewing subject that is 'in here', for Ingold however the view and our being in the world are constitutive of each other and not separate.

In his work on Movement-Space Thrift suggests that there are now "many millions of calculations continually to be made in the background of any encounter". He traces this development through the invention of mathematics, the ability to conceive of 'populations', the gridding of space, the growth of the ability to make lists and registers, and the emergence of the field of logistics. The increasing speed and quantity of calculations changes the way that data is dealt with and allows for calculations and representations of a world that is moving and unfolding like a river, not static like a surveyor's map. These constant, background, on-the-move calculations change our qualitative experience of the world, as spatial technologies and calculation expand our reach, generating a new calculative sense which Thrift calls 'qualculation' (Thrift 2004b).

This is not just about visual mapping, but about indexing or addressing space. In addressing the world we create discreet points on a global Cartesian grid. There is a rich field of data that is created every time someone moves about a city, but when individual points are specified, there is always something left out (Latour 2005). Tracking objects and people across the grid is technologically determined by GPS because it records a series of co-ordinates over time, even if these dots are frequent,

and retrospectively joined up to form a line. If we follow Ingold's use of Gibson, we see that in placemaking in motion, 'A path is to be understood not as an infinite series of discrete points occupied at successive instants, but as a continuous itinerary of movement' (Ingold 2000). It is important to note however that any qualculative map has to be based on this grid and Thrift (2004b) states that:

> … these sensings would be impossible without the fine grid of calculation which enables them: they are not, as many writers would have it, in opposition to the grid of calculation but an outgrowth of the new capacities that it brings into existence. A carefully constructed absolute space begets this relative space.

Maps are at our fingertips in mobile devices, I am proposing that we think of these locative maps as 'qualculative maps'. These maps that know where they are can be used to access a wide variety of data dynamically, that change according to individual and temporal needs and desires. But they are also maps that do those calculations in the background and that extend our senses, so that the ground and the map become entangled in our hands, and become co-constitutive with our being in the world.

An active and embodied view from above

If this qualculative map will offer a viewpoint that is both reading and writing the city, what models of this combined view already exist? The capacity to view a city from the top of a tall building is an iconic view of the modern city, but the view from a moving airplane has become just as ubiquitous. The balloon, and early flight may suggest a better metaphor or model than the tall building. The writer and pilot Saint Exupéry (1939) describes the practice of reading the landscape whilst in flight, looking for a safe haven when threatened with engine failure. His writing suggests a far more active reading of the earth from above, one that could perhaps reflect a view from above that is also a 'passing by' (De Certeau 1984) or a 'journeying along a way of life' (Ingold 2000), it is a landscape that is read but that also has potential for action:

> Beware of that stream, it ruins the field for landing... Mark that on your map too… In the paradise of that emergency landing-field, it lay in wait for me in

> the grasses, twelve hundred miles away. Given the chance, it would transform me into a sheaf of flames (Saint Exupéry 1939).

His reading of the ground is informed by an embodied experience of flight, and of forced landings. The landscape is not just read on a map, but is acted upon, in motion.

Learning to fly a light aircraft is not dissimilar, the air pilots training manual (Thom 2000) describes the procedures for flying a ‘forced landing without power’, including 'select a suitable field and plan an approach to it', 'attempt to resolve the emergency (while maintaining a safe glide)'. The measures described in making a safe landing include complex assessments of height and distance from a landing field, and observation of indicators of ground wind speed and direction such as smoke, cloud shadows and wind lanes on water, coupled with the ability to estimate gliding range, and select a suitable field, with a suitable surface such as pasture and avoiding wet ground, crops and livestock. Vision and reading of, and acting upon, an active and moving ground were never more important, and an embodied vision in motion never more apparent in the knowledge of the fragility of the body at a height.

Similarly, during a balloon flight, the landing point is rarely known ahead of time, it is assessed throughout the flight, as remaining fuel, wind speed and direction and suitable fields are continually being monitored, being so much more at the mercy of wind currents. Using these metaphors of flight as a guide, I suggest that the use of locative media can entangle the map with embodied action, in a qualculative map.

Extended senses

The way that we view things matters both socially and politically and location based technologies are changing the views that are available to us. The photograph of the earth taken from space, as described by Ingold (2000), became an icon for a world that is understood by being separate from it, by looking down on it as if a map, as opposed to a life world, or sphere of experience that we are at the centre of. Views of local place as described by Szerszynski and Urry (2006) can be seen as either insider views, similar to that of wayfinding, in which places are described through memory and experience, as opposed to outsider perspectives in which a more map like view is used. However, in recent research using GPS technology to discuss experience of pollution in a city (Southern and Speed 2009) participants who knew a

place used their previous knowledge to make speculations about broad areas, whereas newcomers responded much more directly to the environment around them, not knowing how it related to other parts of the map.

The vast amount of work involved in navigation is described by Hutchins in *Cognition in the Wild*, including the all important calculation of current and projected locations of a naval vessel (Hutchins 1995), with much of this work disappearing with the use of GPS, as a new way of navigating and knowing where we are. Büscher's work with landscape architects who are attempting to reconcile the plan view with the view on the ground reveals the vast amount of work that this entails, to move from a map based 'view from nowhere' to an embodied 'view from somewhere', and as she suggests new combinations of location aware technologies may offer us ways to reconcile these two views (Büscher 2006).

To end I'll liken the user of locative media to the power kiter. Stationed on the ground, the kiter's senses are extended by the kite up into the sky, just as satellites extend our vision. Harnessed to the wind the kiter's movements are entangled with the movement of the kite. As they feel their way, the kite's and the kiter's movements are constitutive of each other. I suggest that these metaphors of flight, of the balloon's and the pilot's embodied reading of the ground from above, and the kiter's engagement with both the sky and the ground, can act as guides to new ways of making locative media that entangle the qualculative map and the ground in action, that extend our senses to understand the overview and the embodied, the entangled viewpoints of the distanced and the local, to see individual action as co-constitutive with the global.

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Lily's Image: a child's process of 'making sense' of universal themes such as family, home and their perpetual change

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Story-telling is always connected to questions of meaning-making, identity-, and memory-building. Venturing from this premise, the paper focuses on the representation of a child's perspective on these issues, discussing the short film *Lily's Image* (2008), which I wrote, directed and produced.[1] It represents part of a 'PhD with Practice', discussing the 'Visibilities of Childhood in Moving Image Emphasising Children's Agency and Child-Adult Connectedness'.

The discussion is set within a context which challenges the theorizing of childhood as only a time of becoming, i.e. important in terms of 'what is yet to be' (Jenks 1992: 15), juxtaposed against adulthood as a time of being that is 'assumed to be complete and static' (ibid.). Therefore, it concurs with Wyness that 'we cannot assume childhood; we can only bring it into being' (2006: 26), as much as with Lury's straightforward definition of the child's agency:

> [Children] want and they *act,* and they should therefore be understood as *agents* as well as subjects. (2005: 308).

The writings of paediatrician and child psychoanalyst D. W. Winnicott are also relevant. Not only did he coin the phrase 'Home is where we start from' (Winnicott 1986), which links him to the themes of family, home and their perpetual change in *Lily's Image*, his theory of transitional phenomena is also applicable. Transitional phenomena occur first at approximately six months of age as the infant typically forms its first object-relationship with a specific toy, which she perceives as simultaneously part of herself and her surroundings. Thus, transitional phenomena

[1] Starring Stuart Graham (*Hunger, 10 Days to War, Small Engine Repair),* Laine Megaw (*Hunger, Mickeybo and Me, Divorcing Jack)* Matt Faris (*The Carnival Queen*) and introducing 8-year old Belfast girl Annie Gorman,, the script was developed under Northern Ireland Screen's and British Film Council's co-funded DEVIATE Digital shorts scheme 2007/08 before securing production funding as part of Northern Ireland Screen's lottery-funded MINI scheme. It is currently showing nationally and internationally at festivals, e.g. Belfast Film Festival, 2009, Galway Film Fleadh, 2009, *Montecatini 60th Mostra Internazionale Del Cortometraggio,* Italy 2009.

represent an interface between inner and outer worlds and Winnicott contends that, while not necessarily object-related, they manifest themselves throughout the life cycle, implying perpetual change:

> It is assumed … that the task of reality-acceptance is never completed, that no human being is free from the strain of relating inner and outer reality. (1971: 13).

Considering all of the above, I perceive the child's story-telling as a vehicle for agency and examine how it highlights the 'relating of inner and outer reality' (ibid) in terms of the processes of meaning-making, identity, and memory-building.

Given the focus on the dimensions of structure and content, the term narrative is to be used synonymously with the term 'story-telling'. It is understood with the following in mind: postmodernist discourse raised many questions about narrative, leading to a general scepticism towards it but, importantly, also to new forms of validation. On the basis of a distrust of the 'grand narratives (*grands récits*)' of history, for instance, whose function is to 'unify, synthesize, totalize and legitimate' (Carroll 1993: 72) the social and political realm, Lyotard proposed the concept of 'small narratives (*petits récits*)' instead. These are 'discontinuous and fragmentary' (Macey 2000: 236) and their 'conflictual multiplicity and heterogeneity resist totalization' (Carroll 1993: 72). As a result, narrative has gained new relevance regarding the experience of the previously un- or under-represented and their respective meaning-making. Dinkla (2009) points out how this re-appropriation must not be seen as regressive:

> The 'rediscovery' of the narrative … is … not a regression to a time before the negation of the great narrative blueprints of the modern age, but rather a critique of these, because it assumes that storytelling as cultural dispositive still … influences our perception and processes for constituting meaning.

With regard to children, this is particularly significant. Children's narratives frequently go undetected, are misunderstood or played down. Treacher's fieldwork in primary schools, however, is just one example of an appreciation of 'children['s] struggle to narrate and to make sense…[of] the complexity of becoming…[which] does not come easy' (2000: 150). Referring to Salman Rushdie's essay on *The Wizard of Oz* and reminiscent of Winnicott's transitional phenomena, Treacher also refers to adults, recognizing a similar function of narrative for both groups:

> … a task for all of us is to move towards the realization that we end up in a different place from where we began. Critically, this argument is not based on the homily 'there is no place like home' but more that the place, internal and external, is always in the process of being made and lived. (ibid: 151).

Her final conclusions are equally crucial here, resonating with the above considerations regarding being, becoming, connectedness and agency:

> [Children's] narratives can be put to various uses: they can make sense of a life and locate an individual within a wider sphere of influences and identity, not simply inter- and intra- family; but they are also, in part, the way in which historical subjectivity is gained and forged, for they are also a means by which continuity and change are registered, placed and understood…[C]hildren are more knowing, active, perceptive and fantasizing beings than is generally understood. The narratives … showed children struggling to understand themselves as both separate from and connected to others… It is a complex nexus of self, other, family, peer and wider cultural forces that impact on, forge and form, these children's narratives. (ibid: 150).

Despite being a fiction film written and directed by an adult, *Lily's Image* was conceived with these considerations in mind. The simple storyline is juxtaposed against the more complex prerequisites of the child's observation of the adults around her and the making of her image. Set in contemporary Northern Ireland, the film follows eight-year old Lily, whose parents have separated. While her mother is processing the split through her painting and the father has started a new relationship with a man, Lily reveals her reading of this situation, creating a collage based on favourite toys and family photographs (Figures 1 and 2). All of the disparate ingredients of Lily's collage imply 'stories' in themselves, but are reapproppriated for the story the child herself feels compelled to tell. The narrative of the collage tracks the family's change from a rather traditional-looking nuclear unit of mother, father and child (Figure 3) to a more disconnected looking 'motley crew' (Figure 4), culminating in a final 'tableau', suggesting the bond between the father and his new lover as much as the bond between a smiling mother and daughter on the basis of their both being 'artists' (Figure 5).

Figure 1

Figure 2

Figure 3

Figure 4

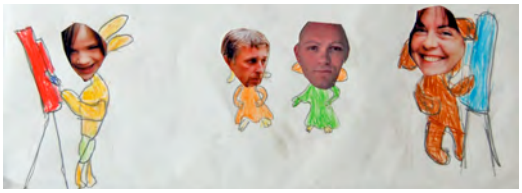

Figure 5

An element of secrecy is involved in the making of the image. It is created largely unsupervised and its narrative belongs to Lily alone. It is the camera that enables the witnessing of the narrative's unfolding, pointing out the child's complex grasp of the individual family members' implication in the changed situation, including her own.

Lily's agency has been deliberately placed within a framework of being, i.e. routine behaviours within everyday contexts, which are more or less consistent despite the changes in the family. Thus, as the film opens, Lily can be seen sitting lost in thought on a park bench, playing with her toys as the father is sitting beside her, reading a newspaper (Figure 6). Scenes like this are carefully juxtaposed against the making of the image (Figure 7), combining the child's observing and contemplating with her acting out. Carefully searching a family photo album after having stolen a picture of her father's lover, Lily knows what she want[s] and [she] act[s]' (Lury 2005: 308).

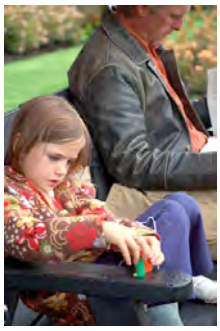

Figure 6

Figure 7

Figure 8

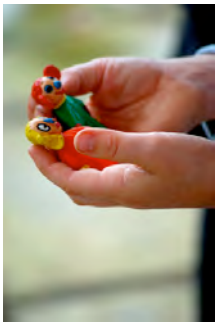

Figure 9

She re-appropriates the photos, placing aspects of her own memories in new contexts, combining them with a yet unknown person, the father's lover, who, as part of this process, becomes literally a familiar face. The family photos were taken with a view to suggesting the family's past. One shot, for instance, shows the gloomy-looking father standing behind the smiling mother with a bird cage hanging right in front of her, half-covering her face (Figure 8). Implying the father's previous unhappiness, it is interesting that Lily selects this shot, cutting out the face and re-appropriating it in the final part of her collage (Figure 5), placing the father in a happier scenario, i.e. with his new lover at his side. As a result, Lily's selecting of the photographs highlights two things: her having been a witness to the family's past but also her personal view of it in the present. Creating new narratives with a view to the future, Lily suggests the whole family's implication in the process of being and becoming. Thus, a potentially frustrating or saddening act of recollection is reappropriated by a child introducing an element of creativity and variation. Not only does this illustrate the child's agency and complex awareness, it also reveals Lily's narrative as a vehicle for her own covert meaning-making, identity, and memory-building regarding the themes of family, home and their perpetual change. Annette Kuhn points out how:

> … telling stories about the past, our past, is a key moment in the making of our selves…Secrets haunt our family stories, giving them pattern and shape. (2002: 2).

Given that the eponymous image is only one example of Lily's take on the situation, with the end of the film implying the perpetual making of art by mother and daughter, Lily's actions also resonate with Adam Phillips' observations from his practice as a psychoanalyst:

> In opposition to the adult archaeologist putting the house of childhood lost back together, I am arguing for a continual stacking, knocking and splitting – what we might call a 'child's eye view of archaeology'. (Brown 2002: 38).

Featuring throughout the film (Figure 9), the toy characters are crucial in these processes, reminiscent of Winnicott's transitional objects, providing a bridge between the child's inner and outer reality. In her image, she moves from a traditional family scene to a more imaginative family set-up, illustrating aspects other than simply the respective person's role within the family. Introducing toy alternatives for both adults

and child creates a layer on which the two groups mingle as peers and, importantly, this process is initiated and developed by the child. Furthermore, the adults are shown as similarly malleable, confused and secretive as Lily, illustrating the idea that 'the state of adulthood involves just as much improvisation as the state of childhood' (Lee 2005: viii).

While the completed image communicates a specific narrative, its meaning is not explicitly fixed, and only the attentive viewer and Lily are privy to it. Therefore, in terms of its relative inaccessibility and ambiguity, it can be understood in the tradition of Lyotard's 'small narratives', highlighting the 'discontinuous and fragmentary' (Macey 2000: 236). The overall narrative in *Lily's Image* into which the child's own is embedded, was shaped with this in mind also, focusing on specific moments from a bigger situation, as if showing only the tip of an iceberg and thus requiring the viewer's cooperation. Therefore, via putting Lily at the centre, the film highlights the specificity of 'small narratives', and children's in particular. Being indispensable to the child's meaning-making, the film implies also, though, how a sophisticated narrative could be entirely missed, misunderstood or played down.

Importantly, relating the story of a parent leaving home and starting a new relationship with a same sex partner within the contemporary Northern Irish context and its considerable rate of homophobic incidents - from a child's point of view - has additional repercussions: *Lily's Image* questions power relations and hegemonic representations not only with regard to the formerly under represented agency of the child but also regarding the small number of representations of homosexual parenting to date. Furthermore, Lily's imaginative redeployment of the family highlights children's capacity for tolerance and the creativity they embrace being tolerant, which, if given a forum to unfold, can be powerful and subversive in the face of specific and longstanding social and cultural preconceptions. Thus, Lily's natural negotiation of inner and outer reality, being and becoming, child-adult connectedness and also agency in relation to her specific circumstances, accentuates a political dimension. Rather than romanticise or pathologize the child as in much contemporary discourse, *Lily's Image* positions the child as agent, who, from her unique perspective, draws attention to the "variability of childhood experiences as shaped by the contingencies of time, space, gender, class, ethnicity and countless more factors" (Philo 2003: 9).

As a result, the 'small narratives' are not so small at all. They are directly related to the universal themes of family, home and their perpetual change affecting children as much as adults. Therefore, recognizing the need for 'small narratives' to be told centre-stage, can shed new light on these universal themes, questioning and reaffirming them at the same time.

Relating this to *Lily's Image,* it is obvious also how crucial the perspective of the story-teller is. With regard to the qualities the moving image this adds to the child's perspective, Wilson notices a recent trend, which:

> … open[s] up the representation of children, strategically denying the distinct division between adults and children, provoking a seizure of emotive response; where adults suddenly *feel* like children. (Wilson 2005: 331).

Crucially, she adds that

> … regression is not an aim …; rather, politically, filmmakers address and undermine the power relations which have existed between adults and children. (ibid).

In *Lily's Image,* the child's perspective and her being in charge of the image's narrative are key. However, on another level, the child is on a par with the adults. We see her observing and acting out while the adults' situation is similarly subject to change, i.e. everything but "complete and static" (Jenks 1992: 15). Thus, child and adults alike have to '[relate] inner and outer reality' (Winnicott 1971: 13).

To conclude, the child's perspective and narrative in *Lily's Image* highlight children's complex involvement in the processes of identity - and memory-building on the one hand - and the political importance of their representation as sophisticated agents undergoing these processes rather than stereotypical 'adults-in waiting' on the other. It is in their 'small narratives' that, referring back to Treacher:

> historical subjectivity is gained and forged, for they are also a means by which continuity and change are registered, placed and understood … children struggl[e] … to understand themselves as both separate from and connected to others … It is a complex nexus of self, other, family, peer and wider cultural forces that impact on, forge and form, … children's narratives. (2000: 150).

In her image, Lily makes highly individualistic sense of the universal themes of family, home and their perpetual change, offering a unique perspective on the dimensions of family and home in contemporary Northern Ireland as a result.

Finally, given that 'we cannot assume childhood; we can only bring it into being' (Wyness 2006: 26), with regards to adult-made representations of children's perspectives, the adult's responsibility to trace such 'small narratives' and disseminate them centre-stage is another crucial point.

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Accreditation

SecondLife: art and archive - thoughts about Lynn Hershman Leeson

Cyril Thomas and Paris X Nanterre

Can Lynn Hershman Leeson's 'Life Squared', displayed in Montreal in 2007[1] as part of an exhibition entitled "Les vases communicants-e-art', be interpreted as the re-enactment, in the context of SecondLife, of a performance dating back to 1973-74 in which the artist staged moments in the life of her imaginary *alter ego*, 'Roberta Breitmore', at San Francisco's Dante Hotel?

Rewriting the history of a performance

The dialectical interaction of 'self' and 'play' play-acting and performance, has been central to Hershman's artistic development since the 1970s. All through her career, she has devised imaginary characters based on real-life experiences of hers; she has also used various pseudonyms such as Prudence Juris[2], Herbert Goode[3] and Gay Abandon. Aliases have featured prominently in her work as a visual artist since her student years; for instance, a sculpture entitled *Self-Portrait as Another Person*, dated 1969, has repeatedly been used as a prop in later performances involving Roberta Breitmore.

In the San Francisco performance, the spectator was invited to visit a hotel room whose door was permanently unlocked; various objects belonging to the artist, such as wax sculptures representing body parts, letters and audiocassettes were on display within the room. Eventually, one visitor panicked and, believing that he was looking at a crime scene, called the police who seized all the objects; however, investigators found no trace of a dead body.[4] 'Life Squared' is a *near*-perfect re-enactment of the performance as it might normally have unfolded, the main

[1] http://www.fondation-langlois.org/e-art/f/lynn-hershman.html
[2] Juris, P. "The Dadist Vision-Artists' Games at SF Art Institute ", *San Francisco Progress,* 9 August, 1972.
[3] Goode, H. " John Sloan-American realist " *Artweek 3,* No.10, 4 March 1972.
[4] Kurtz, G. " Composing with images : Lynn Hershman's photography " *The Art and Film of Lynn Hershman Leeson, Secret Agent Private*. Ed. M. Tromble , Berkeley & Seatle : University of California Press, & Henry Art Gallery, 2005

difference being that it does not take place in San Francisco, but on SecondLife[5]. Using personal records and photographs, Hershman has painstakingly recreated the hotel, the corridor and the room which formed the setting of the original performance.

In addition, Hershman has updated the project, omitting some aspects of the initial performance and altering others. The event at San Francisco's Dante Hotel[6] was a collaborative project also involving Eleanor Coppola, who simultaneously took possession of another room. Coppola asked Tony Dingman to stay in one of the two rooms and to allow visitors to watch him as he went about various activities; no trace of this is to be found in 'Life Squared'. More problematically, none of the objects used in the original performance appears on SecondLife, which is surprising since it would have been very easy to create 2-D or 3-D virtual reproductions of the various items displayed in San Francisco: furthermore, the artist's double has been replaced by an avatar.

'Life Squared' does more than recreate on SecondLife[7] the setting in which the San Francisco performance took place. The virtual hotel is surrounded by two other buildings. One houses an archive of Hershman's and Roberta Breitmore's careers; the other, a simpler structure consisting of a single, rectangular room, contains several photographs of two avatars - one a blonde woman, the other a brunette - as well as two screens. The work exhibited in Montreal consisted of an exact reproduction of this room. 'Life Squared' can thus be described as an installation involving a video display of two avatars walking down the corridors of San Francisco's Dante Hotel as duplicated on SecondLife, as well as two additional items: a multimedia device allowing the visitor to visit SecondLife using one of the avatars, and a series of framed photographs in which they are both pictured.

[5] "The archive of Lynn Hershman Leeson, now housed in the Special Collections Library at Stanford University (California)" cf ; Perron J. "Life to the Second Power: Animating the Archive". *Daniel Langlois Foundation*, 5 October, 2006.http://www.fondation-langlois.org/html/e/page.php?NumPage=1829.
[6] Linden R. https://blogs.secondlife.com/community/features/blog/2009/01/06/stories-from-second-life-hotwire-island-and-lynn-hershman-leeson
[7] Lynn Hershman Leeson: Autonomous Agents - A Real + Second Life Symposium http://presence.stanford.edu:3455/16/8386

Transforming Narratives

At this point, two questions arise. Should the work as seen on SecondLife be considered as a mere blueprint of the installation set up in the real space of the museum? And why did Hershman choose to recreate this interesting, but hardly accessible work, in Montreal (where various additional documents illustrating the video and the successive stages of the project's unfolding on SecondLife were also shown), considering that the same exhibition included several other works of hers, including films? A hypothetical answer could be that she uses SecondLife in order to flesh out the biography of her alias Roberta Breitmore, as featured in numerous performances and writings produced between 1974 and 1978. Hershman thus identifies the Dante Hotel as the starting point of the performances involving her double. To this day, the creation of Roberta Breitmore or, to be more precise, her birth and first appearance in San Francisco, that is to say the initial stages of her polymorphous career, remain shrouded in mystery. Little information is available about this period in the imaginary life of Hershman's double, whereas the rest of her existence is well documented. Via SecondLife, Hershman rewrites part of Roberta Breitmore's biography and indicates its point of origin: when Roberta Breitmore first arrived in San Francisco, she spent her first two nights in town at the Dante Hotel (the original performance was supposed to unfold from November 30th, 1973 to August 31st, 1974, that is to say a few months prior to her official 'birth'). This invalidates Breitmore's other fictitious biographies, which claim that she moved to San Francisco in 1975.

Multiple fictions of the self

There is more to be said about the two avatars. Why does Hershman emphasise the process of creation, and why does she exhibit pictures of her avatars? Taken together, these pictures form a coherent series that sum up a process similar to the one whereby Hershman devised her double Roberta Breitmore. Thus, she offers a linear account of the avatars' and Roberta Breitmore's common history, emphasising narrative continuity and downplaying the differences between her various aliases.

The process falls into three distinct stages, even though they sometimes unfolded almost simultaneously. First, Hershman establishes the double's visual identity. Then she endows it with a specific body language and chooses significant postures and

attitudes related to its personality. Finally, she stages performances drawing on the repertoire thus created. 'By accumulating artifacts from culture and interacting directly with life, she [Roberta] became a two-way mirror that reflected societal biases absorbed through experiences. Roberta was always seen as a surveillance target. Her decisions were random, only very remotely controlled.'

A number of images pertaining to the physical transformations undergone by the artist as she assumed her double's identity are therefore displayed on SecondLife, notably *Roberta's Construction Chart #2*. Breitmore's makeup is shown in various photographs and in a 1974 film by Coppola, Stills From Constructing Roberta. In the photographs, Breitmore is shown wearing a blonde wig (whereas Hershman is a brunette), dark clothes and very vivid makeup. As first published in a review called *La Mamelle*, the photograph showing Hershman as Roberta Breitmore—a reframed version of a picture taken in 1975 and originally entitled *Roberta's Construction Chart #1* - was accompanied by a caption in which the artist gave a detailed description of the double's makeup; the caption was later omitted from exhibition catalogues and from all publications issued after 1976[8]. 'Roberta's face has been marked like a topographical map, with instructions for applying make up, with dotted lines and numbered shades areas'.[9]

The original caption mentions the brands, colours and in some cases the prices of the cosmetics used by Hershman; for instance:

1. Lighten with Dior eyestick light;
2. "Peach Blush" Cheekcolor by Revlon; . . .
9. Creme Beige liquid makeup by Artmatic[10].

SecondLife: representing bodies and the body of representation

Despite the obvious similarities between the two pictures, *Roberta's Construction Chart #1* and *Roberta's Construction Chart #2* illustrate different strategies. In the later photograph, various colours highlight parts of Hershman's face. On SecondLife, two versions of *Roberta's Construction Chart #2* are displayed, a sketch and the final

[8] In later catalogues and magazines, the picture was reproduced as *Roberta's Construction Chart #2*.
[9] Kurtz, G. "Composing with images : Lynn Hershman's photography ", *The Art and Film of Lynn Hershman Leeson, Secret Agent Private.* Ed. M. Tromble, Berkeley & Seatle : University of California Press & Henry Art Gallery, 2005
[10] Hershman Leeson, L. "Roberta Breitmore " *La mamelle, Art Contemporary,* No. 5, 1976: 10

picture; both are untitled. The earlier photograph is omitted altogether. There is no caption, instead, annotations are scribbled directly across Hershman's face.

This emblematises Hershman's new strategy, which aims at rewriting her previous performances as well as the history of her earlier artistic projects, including her work as a visual artist. Initially, the items which bore witness to her transformations were seen as documents. As time went by, they came to be exhibited as works of art in their own right, first displayed in glass cases, then blown up and finally shown inside picture frames. They are reproduced identically on SecondLife, except for the fact that, despite being included in the archive of Hershman's work, they bear no caption specifying the status of the photographs or their publication history; instead, they form a diaporama which gives the series an appearance of uniformity since all dates are omitted.

Midway through the year 1976, while still engaged in producing fake ID for her alias Roberta Breitmore, Hershman started treating documents as fully-fledged works of art; *Roberta Aged by Weather and Time* is a good example. After drawing coloured lines over her face, and especially around the eyes as in *Roberta's Construction Chart #2*, Hershman first crumpled the picture and mistreated it in various ways so that only traces of the handwritten annotations remained. She then took another photograph of the damaged print. This makes it appear as if it had been lost, damaged by time and then recovered, a unique item with an individual history. At the same time, this parodic document calls into question the very notion of archive.

After years spent devising imaginary biographies and rewriting them as she evolved new alternative identities, Hershman thus sums up her own artistic career and submits some of her earlier works to an archivistic treatment which obscures the nature of the projects to which they originally belonged. By setting up her own archive on SecondLife and creating two avatars which come across as the dual *mise en abyme* of the doubles invented in the 1970s, she further complicates the situation. On SecondLife, Hershman shows photography to be a highly complex mode of expression and questions the viewer's ability to take a critical look at seemingly authentic documents.

At the same time, while engaged in questioning the nature and role of photographic documents, Hershman takes full advantage of all the means that can help her rewrite her own fictional biography. Thus, all the works bearing Roberta Breitmore's

signature can be likened to a palimpsest on which Hershman relies in order to put together a fictional retrospective of her work. As a result, the pictures displayed on SecondLife come across as a kind of universal self portrait reflecting not so much a quest for personal identity as a critical examination of all forms of documentation, their status and function. These images show individuals whose bodies are less to be seen as imaginary doubles of Hershman's own, than as components of a generic entity; taken together, they represent, not the artist, but a *corpus* or body of work.

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Links

http://www.fondation-langlois.org/e-art/f/lynn-hershman.html

http://presence.stanford.edu:3455/16/8386

https://blogs.secondlife.com/community/features/blog/2009/01/06/stories-from-second-life-hotwire-island-and-lynn-hershman-leeson

Narrative inertia - a spatio-dynamical model of generative story telling

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Abstract

In this paper I present the concept of narrative inertia in my ongoing research on generative narratives, as well as the previous work on metadata, narration and montage theory developed together with the key collaboration team (Pia Tikka, Mauri Kaipainen, Joonas Juutilainen et al) from 2003 to date. The process, for my part, has been very practice and production oriented, where theories have immediately been implemented and evaluated in practice using real installation experiences – juxtaposed with artistic and theoretical academic processes. A core ideology has also been to review the models and theories from the perspective of authors, directors and designers, not distributors nor consumers. Our experience suggests that this has been a lacking perspective in a lot of research in similar fields to date, where the focus has either been on very technical issues of production, or on consumption, distribution and reception of already produced media artefacts.

Introduction

In a variety of forms of generative media - computer games, interactive art and entertainment or even documentaries and news - a common challenge is how to design and author a meaningful narrative that dynamically responds to and varies in relation to internal or external changes in the system, without sacrificing the narrative flow and coherence. Branching stories and narratives often have relatively limited variability, while completely dynamic database driven narratives can suffer from a difficulty of coherence and consistency. In our research we examine some specific methods of dealing with this challenge mainly from an authoring perspective, but also to a degree from the perspective of a participatory audience. We continue from the previous work of designing tools and methods for authoring generative cinematic narratives in the *Obsession* production and in the context of the *Enactive Cinema*

research project. A real time generative approach is required to enable fully enactive and/or interactive works, where the feedback loop and the behaviour of the piece are essential elements to the aesthetic of the new medium.

Algorithms, metadata and ontologies

The key component in any generative narrative is the algorithm. The narrative engine is the real time process of selecting and retrieving media clips (video, audio, text) from a database of media and metadata using one or more fitness functions. However for any algorithm to be able to make sensible selections, there has to be something to select from: as crucial as the quality of the logic is the quality and accuracy of the annotations and level of relevance of the used ontologies. Using a soft ontology approach and annotating the media fragments with fuzzy metadata makes the framework suitable for human approximations. For example, to classify a particular image as romantic might be difficult using Boolean logic, but it can be more natural to tag it as 'slightly romantic' or tag one image less romantic' than another one, by just ordering them next to each other. This is also a big challenge for designing authoring tools for metadata annotation. It's worth mentioning that some parts of the annotation could be automated, and there are many interesting research projects going on in the field of automated analysis and annotation, however we've chosen to use manual annotation as the most relevant aspects from our perspective are artistic and design choices that cannot simply be automated.

The fragment metadata envelope

From the perspective of a narrative engine, the media and its metadata has to be structured into feasible sized units, which it can combine and recombine. The approach used during the *Obsession* productions has been to define a metadata envelope, called fragment, as the single editable unit. Each fragment carries three relevant sections; the time coded in and out points for cuts, and the accent that is the part of the clip relevant to the flow of the story. Future development of the fragment metadata envelope would be to allow for more flexible and conditional in and out points, multiple levels of accents and possibility for annotation change over time.

The narrative engine

During the process of building *Obsession* we first developed a very simple narrative engine, which just did straight searches and matching in the ontological space, through plain Euclidian distance calculus. This gave reasonably good results as an experiment, however it didn't give the author enough control over the montage mechanisms. In our second-generation narrative engine we decided to build a set of conditional montage rules, which then were combined into a more complex system. Now, instead of calculating distances directly in the ontological space, the new relevant fitness result came from the projection of the 'ontospace', via the montage rules into a new multidimensional vector. Still, distance calculation was used, and the resulting vector used as a probability value for that particular fragment. The probability calculation is fundamental, as a deterministic best fit selection restricts the system in unwanted ways, and is counter productive. By using a probability value from the fitness function the approximation of the fuzzy metadata became useful. For example two very similar fragments might get very similar values; however a straight best-fit function would only always select one, not the other, even if the difference were very subtle. However, when the values are turned into probabilities the relevance of the difference is negligible and they are almost equally probable.

Interaction, enaction and biosensitive feedback

Without any feedback mechanism absorbing external variables into the process a generative narrative engine merely works as a standalone self-generating story-machine. This by itself obviously already has its merits, for example the option of endless variations and continuous flow are characteristics artists and directors might aim for as such. However, it's when the design of the artwork or system requires external input – either in the form of interactive elements of engagement, interpretation of enactive gestures or behaviour and less intrusive and more subtle biosensitive emotional changes – that the strongest argumentation for an authored, dynamic generative process is presented. For the external variables to really have a fundamental effect on the narrative, the mechanism has to be dynamic and reactive to the changes. From the perspective of the narrative engine this is much less dramatic; any external variables can be considered as just added ontological dimensions. A model with this flexibility also allows for a range of very different implementations regardless of purpose or context.

Narrative inertia

In many ways the narrative engine has a strong resemblance to a Markov chain, where past states are irrelevant and future states depend only on the current state. Computationally it makes sense, but from a narrative perspective the solution is not always ideal – the past states are still relevant to the story. The challenge is to make the current state reflect the sequential patterns leading up to it. The computational solution, and the aim of my current research, is to implement this using narrative inertia – speed, direction and mass – as the descriptive model for the calculations. The velocity can accelerate or decelerate according ontologies based on narrative patterns, and the mass defines the relevance of the ontology. Mass, speed and direction have an impact on the distance calculations in the ontological space.

Using the narrative inertia for sequential ontologies in the system should improve on the authored control on the Kuleshov effect (i.e. the meaning and interpretation of a specific visual sequence) of the narrative, still calculated in real time without sacrificing any of the dynamics for narrative control.

Conclusions

Any new authoring model can be fully evaluated only when it’s implemented, and can be experienced to a reasonably full extent in reality. During the process the tools and the models have been tested and evaluated through real world productions. The experience so far has been successful, the metadata envelope, the ontological structures and the computational model have all shown proof of their strengths, and some of their current weaknesses will hopefully be corrected with the model of the narrative inertia.

My personal interest is in the narrative algorithm, the metadata structures of the fuzzy ontology dimensions and the actual design of the interaction process. But as the tools and theories need to be tested both in laboratory environments as well as in real artistic productions, a full multidisciplinary team effort is required.

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Whose past is it anyway: the use of digital databases in exploring personal and collective memory

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This paper explores a number of concepts and questions in relation to an unfinished data-based art project with which I have been engaged since 2004. These are concerned with the agency of the individual in the construction of the history of the recent past, and the tension between lived experience and the official record. This tension may encompass differing versions of the same event, but may also reflect differing ideas on which events deserve focus. In addition there may be conflict within the individual about the ownership of the recent past; if events - which form part of your autobiographical narrative have been incorporated into the official record, then who owns the memories? The paper also explores the idea of the 'narrative unconscious', which may operate at both the personal autobiographical level, and the authorised accounts of the recent past.

These concepts and questions are particularly interesting when linked to the latent potential of digital databases. Manovich (2001) identifies the database as one of the two main forms within media design and describes how the nature of databases has been altered by digitisation. The structured collection of information in a card-index is transformed when it has been inputted onto a digital database which allows almost instant access to the information, but also provides the means for using many sorting, ordering, and reordering systems. He observes that 'these computer-based forms migrate back into culture at large, both literally and conceptually … a computer database becomes a new metaphor that we use to conceptualize individual and collective cultural memory' (ibid: 218).

The data-based art project has so far resulted in two artworks – *Surveiller* (2004) and *reports from an agent in the field* (2007) – which utilise the information from two databases holding information about visual art events held in Belfast, Northern Ireland, during particular time frames. The first of these, which was used in the artwork *Surveiller*, was compiled in 2004 and contains details of visual art events – exhibitions, performances, interventions etc., which took place between March 1968

and March 2001. For the second database, used in *reports from an agent in the field*, the existing material from 1968 to 1995 was updated and augmented and new material for the period 1960 to 1968 was added.

The information in the datasets - over 3500 records - was compiled from primary sources including newspapers, magazines - listings, reviews and advertisements - and ephemeral material such as invitations and press releases held in various libraries, archives and public and private collections, including the National Irish Visual Arts Library. The data was extracted, detached, from the source material and shaped to fit with the database management system.

The database record for each event consists of information entered in a number of fields: type; start-date; end-date; artist/group name; title of exhibition; venue; source 1; and source 2. The 'type' field records if the event was a one-person, two-person, etc. up to six-person exhibition, or a group exhibition. One of the objectives in building the database was to name as many artists as possible, within reason, if that information was available. The number six was set as the upper limit in naming individual artists, after which the event would be considered a group show and the individual exhibitors were not named. These databases provided the source material for the artworks, but are not themselves artworks. In this respect these works should be distinguished from much of the archival-type work produced by visual artists. These differences are explored elsewhere (see Walker 2009).

The multi-media work *Surveiller* presented the data in both fixed and searchable formats within an installational setting. The data was screen printed onto Perspex panels, one for each year, and was mounted along one wall of the gallery. The panels were of a uniform width but the height of each individual panel depended on the number of records for each year. The effect visually was like an audio wave-form, as activity expanded and contracted during the period. An office – with table, chair, computer and filing cabinet was set up at one end of the gallery. The information from the database was available in a searchable form on the computer. Visitors to the exhibition could search the database, but as they did so they were being filmed by a surveillance camera, which was transmitting these images to a monitor mounted at the entrance of the gallery.

In *reports from an agent in the field*, an audiovisual installation, a different approach to the use of the database was taken. It was possible for the viewer of *Surveiller* to

construct narratives from the contents of the database, but in this second work Manovich's statement that 'the database represents the world as a list of items, and it refuses to order this list' (2001: 225) was examined. This installation explored the possibilities of exploiting the digital database to resist narrative, and how this might manifest itself in the real world.

The information in the database was ordered, according to date, in descending order, from December 1995 to January 1960. The information for each year from four fields - date, artist/group name, exhibition title, and venue name - was then exported separately, providing four separate scripts for each year and 144 scripts in total. These scripts were read aloud by four individuals, and recorded live in the gallery where the finished work would be later presented.

All the readers started reading the scripts for each year together, but depending on the amount of information in their individual script, finished at different times, the person reading the information on dates always being last to finish. During the reading of each script one word (black on a white background) appeared on the screen. The words – date, artist/group, title or venue – indicated the subject matter of the script. The subject matter for each reader changed with each year in sequence through the four available subjects. As each reader finished the individual year information, their screen went dark. In the blacked out gallery space, as the last reader finished, the gallery was momentarily in complete darkness until all the screens lit up again as the readers started on the following year's scripts.

When the art events database was initiated as the basis for the *Surveiller* installation, the objective was to build a parallel chronology to that published in each issue of *Fortnight*, a political and cultural magazine published in Northern Ireland from 1971. The *Fortnight* chronology, and those compiled by Deutsch and Magowan in 1973 and 1974, related to political events in Northern Ireland. These were a form of database, providing dates and details of the circumstances of violent events such as murders and explosions, plus political reports, organised in chronological order. *Fortnight* is still published and each issue contains a chronological list of events from the previous month. The accumulated data continues to be available online through the CAIN project. These sources provide an authoritative history of Northern Ireland. The day-by-day chronology of events provides the scaffolding for a reconstruction of the past, but a past stripped bare of the accretions, the mulch, the irrelevant but specific details - which ground events and experiences in the here and now.

The database format was adopted for *Surveiller* as a means of providing distance from the events recorded, and also to attain a level of objectivity. Among the many impulses to create the work was an interest in brain function and memory - which I had explored previously is a series of video works. Neuroscientists have distinguished different components of memory - which include episodic memory - through which we construct our personal, subjective autobiographical narrative, and semantic memory - which processes and stores objective factual information, divorced from our experience of acquiring the information.

This separation of an individual's episodic and semantic memory mirrors the separation of individual memory, and collective or historical memory. One is viewed as subjective, and thereby liable to distortion, while the other is viewed as authoritative and reliable. Craig (2002) has described this separation, stating that:

> our personal memory, with all its subtlety nurtured by recollection of direct experience, will pass irrevocably with our death…social memory, that which we share with communities of experience and history, eventually is elevated to a commanding position because it exceeds and transcends the life of any given individual.

However, she also warns of the possible conflict 'between personal experience and its retelling as the remembered witness of events, and the memory embodied in documentary evidence.' Craig writes as an archivist whose belief in the documentary record allows her to assume that there will be evidence for events and that even if the individual account disappears without trace then the collective memory will endure, so that somehow nothing is lost. In undertaking the compilation of the databases it was not the intention to oppose some well rehearsed version of the past; rather it was to construct evidence of activities which happened at the periphery of well documented and publicised events, but which remained largely unseen and in many cases forgotten.

Although I am now employed within academia, when I started this project it was as an unaffiliated individual artist without any institutional authority or support. I did not view this as a position of weakness, but rather as a desirable and integral element in the overall conceptualisation of the work. My authority was to be derived from my meticulous methodology, my inclusiveness and my objectivity. This was not to be an illustration of a preconceived theoretical position or personal selection in relation to

what had importance. Shaw (2004) described *Surveiller* as 'just a list' but one that 'creates and communicates power structures and opposes the experience of those "who were there at the time" with larger and longer patterns.' I was demonstrating the ability of the individual to construct a document about the recent past by amassing information about many disregarded events, which at the same time was commenting that activity.

Freeman has described the type of disregarded information which contributed to *Surveiller* as the 'narrative unconscious' which he explains 'refers not so much to that which has been dynamically repressed as to that which has been lived but which remains unthought and hence untold, i.e. to those culturally-rooted aspects of one's history that have not yet become part of one's story.' (2004: 289) Freeman's focus is on the construction of self through autobiographical narrative, but is seems to me that those common-place aspects of lived experience which go unremarked by the individual, are also reflected in the collective memory of a community. Freeman recognises this relationship between the personal and collective narrative and suggests that by 'making the narrative unconscious conscious through the work of autobiography, there also exists the opportunity to discern the relationship between the manifest narratives that are often told and those more disruptive counter-narratives that sometimes surge into reflection, infusing one's history with new meaning, complexity, and depth.' (2004: 289-90) In this way he proposes that the 'manifest narratives' prompting counter-narratives may help provide a more complex and rounded character to autobiography. However, it appears to me that the source of counter-narratives lies not within the realm of manifest narratives or official histories, but within the realm of personal narrative and lived experience.

I stated previously that one of the objectives in making *reports from an agent in the field* was to explore the possibility of using database logic to resist narrative. In many ways this work acts as a counter-narrative to the earlier work, *Surveiller.* If one of the outcomes of *Surveiller* was the production of a document on the recent past which revealed hidden power structures, another was an assumption on the part of many viewers that an authoritative document had been produced and that part of the recent past was now fixed and knowable.

In 2006 I was approached by a researcher who was planning to present information about an organisation which had operated in the 1980s in Belfast, of which I had been a board member for a few years. At that time I was aware of only one or two

magazine articles about the organisation which had been published since its demise in 1989, and as far as awareness of its existence went it was all but invisible. Among my files I had various documents – minutes, posters, invitations etc. – which related to my time on the board and also to my personal art practice as an exhibitor in the organisation's gallery. The researcher assumed that I would be happy to make these documents available to her but was confronted with marked, and, even in my own estimation, irrational reluctance from me. Part of this reluctance arose from the fact that the researcher was not from Northern Ireland and hadn't been here during the time in question. I was keenly aware that without knowledge of the circumstance in Belfast at that time any account produced could only present a false impression. Yet most of those 'circumstances' were unquantifiable, including each individual's experience of negotiating the physical and psychological difficulties of living in Belfast at that time. In addition there were probably many aspects of our lives which escaped our own scrutiny, those 'manners and customs' so entrenched as to be accepted as natural.

reports from an agent in the field attempts to present the past as ungraspable, individual facts may come in to view but remain detached from the context which would provide meaning or allow understanding or knowledge of time gone for ever. In contrast to *Surveiller* it questions both personal and official histories and our ability to represent the past. These works are both about, and a product of, Northern Ireland, where accounts of the past continue to occupy individuals. Until we can recognise our own experience in accounts of the recent past the official histories must remain incomplete.

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Memory, Reverie Machine: toward a dance of agency in interactive storytelling

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Introduction

> I wonder if a memory is something you have or something you've lost.
> Another Woman. Dir. Woody Allen, 1988.

In many interactive narrative pieces, agency is often narrowly understood as a user's freedom to either perform actions or alter the mechanics of narration at will. This paper presents an interactive narrative project, *Memory, Reverie Machine* (MRM), which explores the expressive use of agency as a narrative device. After a concise review of the concept's rich social implications and its adaptation in digital media, this paper presents MRM's main theme – the protagonist's self-discovery portrayed through dynamic shifting of a balance between the user's agency and the system's agency, a dance of agency[1]. Finally, we discuss two ways in which the project's theme is instantiated: via the control scheme and via the narration of computationally generated memories and daydreams.

Agency

Agency is a crucial concept that links an individual to the material world and society. The wide range of negotiations and struggles between an individual and her socialization actions and experiences, constitute an important component of one's lived experiences. Different approaches to the concept of agency lend themselves to distinctive social and political practices. The 'free will' view emphasises an individual's uncompromised liberty; some feminist theorists locate agency in one's resistance against the hegemonic patriarchal status quo; whereas some read

[1] This concept is presented with all due respect to Andrew Pickering's insightful earlier use of the phrase in the much different context of the practice of scientific work.

Foucault's impersonal discourses (Foucault 1977) as proof of the absence of individual agency (Ahearn 2001).

In many interactive narrative and digital media artworks, agency is often narrowly understood as a user's freedom to either perform actions or alter the mechanics of narration at will, often followed by an implicit assumption of 'the more agency the better' (Harrell and Zhu 2009). For instance, in the computer game Shenmue, associated popular hype asserted that the player character was given the agency to interact with every single object in the story world. This type of unconstrained agency, however, focuses on objective interaction with material objects and may bore or overwhelm the user and deprive her of a potentially meaningful and dramatic experience.

Our work explores the computational engagement of agency, not as a holy grail of digital media practice, but as a novel expressive device. Paralleling the invention of conventions of camera use (e.g., movement, and the length of a shot) as an expressive storytelling mechanism in the history of film, we argue that the variation of agency can convey meanings and express ideas. Based on the domain of interactive narrative, we have proposed a model of agency play (Harrell and Zhu 2009), highlighting different aspects of agency and the ways in which their variations and correlations may accentuate the narrative.

Memory, Reverie Machine

Our text-based computational narrative project *Memory, Reverie Machine* (MRM) calls for more nuanced understanding of agency, both as a novel expressive storytelling mechanism afforded by digital media and as critical commentary on our post-conflict society. The interface of MRM resides between interactive fiction (IF) and concrete poetry. The user interacts with the system by inputting keywords, and the generated responding text is displayed and sometimes animated typographically. The control scheme of MRM seeks to complicate the conventional dichotomy, in interactive narrative, between user controlled player characters/avatars (emphasizing user agency) and computer controlled non-player characters (highlighting system agency). The protagonist, a robot-character named Ales, is controlled jointly by the user and the AI system whose power relationship shifts dynamically. Initially, Ales follows the user’s commands completely. As the story unfolds, however, the system increasingly gains more control – Ales starts to ignore certain commands by the user

if they contradict his internal states; even if he eventually obeys, Ales does so very reluctantly. Ales may become lost in daydream rather than acting. At the end, Ales may even gain full autonomy, eliminating the user's agency to influence the story.

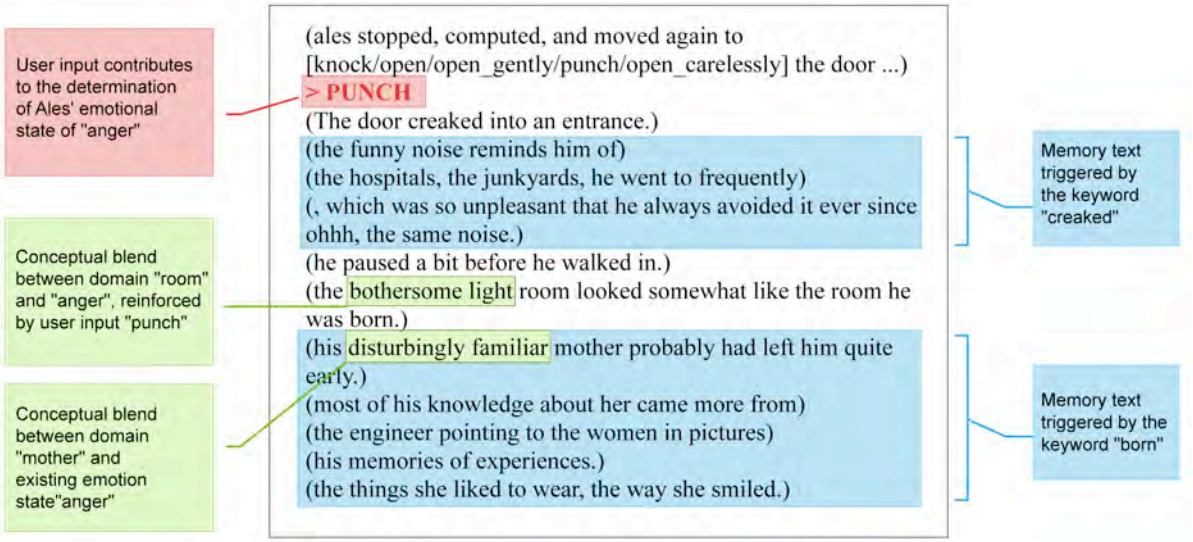

Figure 1: A diagram of Sample System from *Memory, Reverie Machine*

The shift of emphasis from user's agency to system's agency in the story can be read as a formal exploration in which the protagonist's journal of self-discovery and empowerment is depicted at both the content and discourse level. It also speaks to a social order of multi-dominance, which precludes a hierarchy of human-leader over computer-follower as the sole interaction model with expressive systems (Lewis 2000). MRM's engagement of dynamic agency hence invites critical reflection on themes such as control, resistance, and dis/empowerment and is in dialogue with conceptual instruction and pedagogy artworks of Yoko Ono, Adrian Piper, and Sol LeWitt.

Machine memories, reveries and daydreams

The potential of computationally generating and narrating imaginative content (e.g., memories and daydreams) triggered by, and sometimes at odds with, the world at hand has not been fully explored. We turned to the stream-of-consciousness literature for inspiration because these modernist writers sought literary portraits of very similar mental processes. Prior to the turn of the twentieth century, fictional characters were typically represented by their external behaviours. Writers carefully crafted their actions, dialogues, and rational thoughts to create distinctive personas for their stories. The stream-of-consciousness writers' achievements, in comparison, lie in their creation of characters wrought mainly out of their psychological aspects,

including their buzzing random thoughts and associative trails. *Mrs. Dalloway* (Woolf 1925), among other works, offered invaluable directions to MRM's plot and narration styles.

Memory building is the major means of identity formation in MRM. Ales starts as an avatar with no past, emotion, or belief, all of which will be shaped by the types of memories triggered by Ales' encounter of different events, objects, and actors. A piece of memory from his childhood, for instance, may set Ales to a melancholy state, which will make him more easily accept user's commands with similar emotional undertones. At any point of the story, the user never has direct control over Ales's internal world. Aligned with many stream-of-consciousness writers, we deliberately chose memories, reveries, and daydreams as indicators of Ales's independence (Zhu and Harrell 2008), in addition to his actions. If the recollected memories converge toward a coherent personality, Ales' system agency increases and he will act autonomously and ignore user's commands contradictory to his belief-system. These memories could also be fragmented, triggering one another and leaving him in a state of confusion and hesitance. When the protagonist reaches a high level of system agency in the end, cascades of memories and daydreams may trigger one another and completely take over the main story line.

As Ales gains more autonomy over the actions he takes, the narration also shifts towards increasingly subjective and affective tones. The story hence moves away from the voice of an 'objective' third person narrator who emphasises actions, facts, and consequences toward the subjective perspective of Ales. Specifically, the protagonist's emotional state is used to generate affective descriptions of the world through the computational-cognitive approach to conceptual blending (Fauconnier and Turner 1998; Harrell 2007). For instance, the same room could appear to be either 'bothersome light-coloured' or 'refreshingly spacious,' depending on whether Ales is in an 'angry' or 'happy' emotional state. Such blends provide an affective overlay to the narrative. It is also worth mentioning that MRM follows the precedent of *Mrs. Dalloway* and avoids the first person pronoun 'I' as a stylistic convention, paying homage to Woolf's inspirational characteristic combination of third person voice to convey highly affective first person experiences.

Conclusion

MRM foregrounds a shift between user and system agency made visible through the narration of memories, intentions, and dispositions. It brings forth novel narrative experiences as well as critical reflections on social and political conditions. Influenced by the stream-of-consciousness literature and cognitive science (semantics) theory, MRM explores the tension between rigid computational algorithms and fluid human cognitive processes by computationally generating affective depictions of the story world as well as the character's internal world. As our initial exploration for expressive deployment of agency, MRM opens up new possibilities towards what we conceive as a dance of agency in interactive storytelling.

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04 Positionings local and global transactions

One degree of separation - shopping super locally

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In his introduction to *Radical Thoughts in Italy*, Michael Hardt wrote, 'capital is undergoing the postmodernization of production' (1996: 4). In lieu of the Fordist focus on the mass production of consumer *goods*, capital is generated through the production and collection of *information* via a networked, technological system. The change Hardt alludes to, though immediately relative to economic systems, echo through the cultural landscape affecting art and social practices. In *Chat Rooms*, Hal Foster's book review of Nicolas Bourriaud's *Relational Aesthetics*, Foster wrote, 'In a world of shareware, information can appear as the ultimate readymade, as data to be reprocessed and sent on.' (2004: 191). Foster's 'world of shareware' is a way of rewriting what Bourriaud terms the era of 'postproduction' where an artist's work emulates postproduction techniques common to the contemporary networked consumer society. By way of quoting and remixing Hardt, Foster, and Bourriaud, I posit that as *information* has become the focus of production in a networked society, it is the new media artists' material for appropriation, collection, and redistribution. The information is transformed through the artists' interface or platform as a readymade manifestation where socially adept participants have access to adding, modifying, and acting upon it. It is through this lens that I will be presenting two works of art, both inhabiting the Internet as a vehicle of distribution and a virtual commons, where the agenda of consumer culture is reverse-engineered.

Utilising normative features of information exchange online, social networking and consumption, *Delocator.net* and *Your Neighbours' Biz* encourage web users to shop locally. While *Delocator.net* supports local coffee shops, movie theatres and bookstores by providing users the opportunity to locate their favourite local stores as an oppositional tactic to shopping at corporate chains, *Your Neighbuors' Biz* transforms 'shopping locally' into shopping amongst friends. *Your Neighbuors' Biz* is a Facebook application that relies on a user's social network to connect friends, as well as friends-of-friends, in order to locate off-the-grid services such as baby-sitting

or lawn care, or artisan foods or crafts. In the wake of the *Craigslist Killer*[1], friends who socialise on sites such as Facebook have a (or an assumed) decreased impetus to fear the person on the other end of the online bargain. These two web projects share a common theme: shopping locally. On *Delocator*, postal codes are used to geographically identify local areas. *Your Neighbors' Biz* interprets locality as a community of friends.

Why should we shop locally?

In *Relational Aesthetics* Nicolas Bourriaud succinctly discloses why 'modern life is rubbish' (to quote the British band, Blur, from an album of the same title released in 1993): 'The widespread failure of modernity can be found [here] through the way inter-human relations are turned into products, along with the impoverishment of political alternatives, and the devaluation of work as a non-economic value, to which no development of free time corresponds' (Bourriaud 2002: 84). I interpret the 'impoverishment of political alternatives' as the global economy where international corporations proliferate a whitewashed culture in the disguise of Starbucks coffee (1203 on Forbes' 'The Global 2000' largest Corporations list of 2009), Gap jeans (640), and Wal-Mart (8) home products.[2]

Although local alternatives do often exist, international enterprises have greater market-share on formulating consumer habits through advertising campaigns.[3] Corporate industries invading neighbourhoods, from coffee to book and movie theatre 'chains' pose a threat to the authenticity of unique neighbourhoods. Although there is room on the map for shared territories - both the homogenous corporate enterprise and the independent ventures, community-operated businesses are significant contributors to our local neighbourhood economies.

In *An Analysis of the Potential Economic Impact of Austin Unchained*, Civic Economics reports: 'For every $100 in consumer spending at Borders, the total local economic impact is only $13. The same amount spent with BookPeople (an

[1] There are many illicit events that have resulted from offline meetings established through Craigslist.org including robberies, murders, and slayings. The 'Craigslist Killer' is the nickname given to Phillip Markoff, a 23-year old medical student at Boston University, arrested on April 20, 2009 for the assault and robbery of two women and the murder of one. For more information, view this online news article: http://www.bostonherald.com/news/regional/view.bg?articleid=1166939

[2] http://www.forbes.com/lists/2009/18/global-09_The-Global-2000_Counrty.html (note: yes, 'Country' is inaccurately spelled at the end of the URL)

[3] See Naomi Klein's *No Logo* and Kalle Lasn's *Culture Jam* for a greater elaboration on these ideas.

independently owned bookstore) and Waterloo (an independently owned music store) yields more than three times the local economic impact' (*Civic Economics* reporters 2003: 2).

Many independent shop owners invest time and interest in their communities, create authentically friendly atmospheres, place supporting the community at the forefront of the business model, and take the time to chat with loyal customers. 'People say we're cozy, not corporate,' said Café Nora (Latham, NY) owner Melody Holler. 'We can make our own rules and we can empower our staff to do so as well. A Starbucks employee doesn't have the pride in ownership that they do at our store' (Degroodt 2000: 2). Locally owned stores aim to please local customers.

In mass culture, supporting local stores is like supporting the underdog sports team. It promotes a future that includes the locally oriented culture of small businesses. Independent bookstores are facing a grave challenge. Cody's Books in Berkeley, California was a bona fide cultural institution on Telegraph Avenue. In his May 10, 2006 announcement, owner Andy Ross said, 'It is with a heavy heart that I must announce that Cody's will be closing our doors at the Telegraph Avenue store for the last time on July 10.' (Ross 2006: Cody’s website). In the prior fifteen years, Cody's sales declined by 66 percent. Cody's is certainly not the only independent bookstore to close its doors. The American Booksellers Association has seen a decline in membership from 5200 bookstores in 1991 to 1702 stores in 2005.[4]

With chains on the rise, supporting local institutions (and many independent bookstores are truly thought of as cultural institutions) promotes a future that includes our neighbourhood bookstores, movie theatres and coffee shops and denies the type of news that Andy Ross so sadly delivered.

Project details: Delocator.net

In 2005 I created Delocator.net, a website people could use to find independently owned coffee shops in their neighbourhoods by searching with a zip code. The search results display a comparison between the differences in the amount of Starbucks stores and local coffee shops in a selected radius within a U.S. zip code. I provided the list of Starbucks stores and addresses, while users were prompted to

[4] http://www.norwichbulletin.com/news/business/x418531163/A-novel-approach-to-selling-books

enter the location of locally owned coffee shops. On the day the site launched (April 1, 2005), only a handful of independently owned shops populated an empty database. Today there are over 4500 entries. The Delocator.net logo mimics a similar green circle to the recognizable Starbucks logo; and the coffee results page lists independently owned stores in the left column of the page while corporate store locations are listed on the right side of the page.

When I launched this web project, which obviously opposes a Goliath of mainstream culture (Starbucks), I did not expect to be involved in a tidal of media frenzy. There was so much traffic on the website that I had to purchase more bandwidth from my Internet service provider. The site also generated media reviews, first from blogs such as *BoingBoing* and *StayFree!* followed by *The Village Voice, The New York Times, The Boston Globe,* and more. The site was reviewed by international media sources and I was interviewed on the radio, in the press, and for Ian Urbina's book, *Life's Little Annoyances*. I left the code used to create the website on Delocator.net and two international sites were made for 'delocating' coffee (one in Great Britain and one in Canada). In 2006, movie theatres and bookstores were added to the website. In 2009, I re-launched the site with a better distance calculator (used to determine where the stores are located on the results page) and a log in feature. While many reviewers wrote about Delocator.net as if it were an anti-Starbucks website, my personal attitude has always been that alternatives are healthy for a democratic society. I am not rigidly against Starbucks (many of my students will tell you – there is a Starbucks in our campus building and it is very difficult for me to resist buying from the store that is one level above where I teach - during a ten minute class break), but I like to know where the alternatives are located. The impetus to create this website was simply to develop a tool for locating independent coffee shops. As many media artists who make projects utilising code collaborate, I worked with several programmers – one during each separate launch or re-launch of the website (Vasna Sdoeung, Kyle Cummings, and Jim Bursch, respectively).

Project details: *Your Neighbours' Biz*

Craigslist may be the most popular website where online users post information about items or services for sale, barter, or free. Launched in 1996, the site serves about 570 cities in 50 countries and more than 20 million page views are accessed

per month.[5] While this website creates a backdoor for shoppers and traders, it comes with a dangerous element: whom are you dealing with when you meet in the analogue world for a Craigslist exchange? *Trust* is increasingly important in the execution of offline meeting or exchange initiated on the Internet, so embedding a trading community within a social site where users are already connected makes use of the trust-factor being built into the network. *Your Neighbours' Biz* allows users to search within their pre-existing social networks to shop with the confidence of a personal recommendation assumed by friends and friends of friends. This interface is searchable in two ways. A map is used to find neighbours holding hobbyist side jobs, resulting in new local friendships and an increased social network on the Facebook platform. It is also searchable through one degree of separation of a user's friends. Though many of us are likely to be acquaintances with a portion of our Facebook 'friends,' we are likely to be acquaintances with our Facebook 'friends of friends.' This application was created for two purposes: 1. To connect Facebook friends with friends-of-friends in the pursuit of supporting hobbyist side jobs, thereby creating a wider network of interactivity in the analogue world; and 2. To encourage Facebook users to meet their neighbours as they shop for hobbyist services on an interactive map.

Web projects as social interstice

In defining *relational art*, a way that these types of web projects and other works of tactical media can be categorized, Bourriaud posits these types of art works represent a social interstice. This Marxist terminology is used to describe an elusion of the capitalist context – and surely any work that aims to reverse-engineer consumer culture also aims to elude the nature of capitalism. As Bourriaud writes, a project that falls into the arena of representational commerce 'creates free areas, and time spans whose rhythm contrasts with those structuring everyday life, and it encourages an inter-human commerce that differs from the "communication zones" that are imposed upon us' (2002: 16). The dichotomy between *communication zones that are imposed upon us* and those that are *freed from everyday life* by way of the artist's project is at the conceptual root of *Delocator.net* and *Your Neighbors' Biz*. Both projects aim to transform shopping and consumption into a local habit, while avoiding mass consumption from corporate enterprises. Corporate commodities act as the *zones that are imposed upon us*, symbolically through massive advertisement

[5] http://www.craigslist.org/about/factsheet

campaigns, and physically by inserting shops in our local neighbourhoods. While users on *Delocator.net* share information about local stores for travellers and newcomers to a geographic location, *Your Neighbours' Biz* is used for supporting friends and neighbours with hobbyist jobs. Strangers who participate on *Your Neighbours' Biz* are encouraged to become friends in analogueue and virtual communities by connecting through offline exchange and adding each other to their personal online social networks.

Information as readymade

Both projects are made visual through their web interface designs, however the aesthetics of each work are second to the ideas fostered by users who participate in generating and exchanging information. The works act as tactical economic agents that provide a forum for sharing online in order to support local businesses, neighbours, or friends offline. Here, information about store locations or locally made artisanal goods is transformed into art by way of organization and publication.

Conclusion

As an artist working with the web as a platform for altering consumer habits for the past five years, I've noticed a few challenges and have hopes for the next generation of web users and developers that I will pass along as a conclusive list:

1. *Delocator.net* has always been challenging to launch, update, and maintain. I am not a web programmer, so I always have to find a collaborator in order to keep the site functioning and there has almost always been something wrong with the site – ever since it has launched. *Your Neighbours' Biz* has been even more challenging as I waited for three years with the idea for the site before finally finding someone willing to do the programming (still, it has taken years for the project to develop as programmers who labour for free generally don't work rapidly). However, in the past five years the web has become easier to use and I hope that the tools for generating, modifying, and maintaining content will continue to mature, becoming easier and more accessible for a wider range of people. With the power to structure and organize any kind of information, I believe a society has a greater capacity for acting democratically.

2. Assuming that one day it does become easier to make and maintain a collection of data, making new projects visible will always be challenging. The press quickly picked up *Delocator.net* because people like to think in black and white terms – the site was reviewed as an 'anti-Starbucks' operation in many cases, even though I always spoke about the project as being anti-homogenous. (The press often prefers smaller words and sound bites, so let that be a lesson too.)

3. The third challenge is in how we interact with media, material, people and information. I single-handedly maintain what I think of as this little web project that happened to garner a lot of attention once, back in 2005; and I receive email that reads as though the website has a staff of 'customer service' workers. For example, correspondences are often addressed to 'you guys' such as this one from December 2008: 'Just so you guys know, Harrisonburg, Virginia uses both 22801 AND 22802 as area codes.'[6] As more and more projects are crafted and launched by individuals or small teams, the receiving culture will need to change. Attitudes and expectations closer to what we see on Wikipedia where users modify, add to, and make better existing contributions, would be much more pleasant to work with in all aspects of life – both online and off.

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Tolerating mass murder: migration, diasporas, genocide and climate imperialism – an investigation by virtual migrants

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Climate change needs radical strategies, but also a re-writing from an anti-imperialist perspective. Imperialist socio-economic genocide has a parallel genocide of the environment and bio-diversity. In his book *Exterminate All The Brutes*, Sven Lindqvist directly links the mass industrial-style slaughter of humans during European expansion through Africa with both the German holocaust against the Jews and the creation of racist ideologies as developed and reinforced by key scientific thinkers, including, contentiously, Charles Darwin. These he links together as one historical process. Zygmunt Bauman links industrialisation and modernity with the abilities and ideologies that make mass genocide possible. As colonial, and then post-colonial states, have yielded ever more profits for the West, the minority elites of those states have also become areas segregated from our existence - hegemonic and complex mass exploitation camps - which remain disconnected from the experience of Westerners, except through distant and problematic media representations.

Now that debates on whether it is actually happening have almost ceased, the process of understanding the relatively 'new' threat of climate change seems simple, despite its grave consequences. Essentially, CO2 created by human activity creates an atmospheric blanket which traps heat inside the planet. All of the proposed solutions require careful management of this 'human activity' which will hopefully avoid the worst predictions, but it's too late to avoid some degree of serious problems for which significant preparation is required.

However, lets consider another layer. The processes of industrialisation, which have led us to this juncture, have been at play for a considerable time, and these were the beginnings of the globalised world we know today. Critical to the development of industrial processes was the mass exploitation or extermination of large parts of the world, and the very creation of the 'third' world. During the development of this imperialism by industrialising countries, the ideologies of racism, which were

developed to justify the exploitation, went directly hand-in-hand with the development of museums and galleries, the high class culture of collecting artefacts for these institutions and the ways in which, at least the West now understands, the discrete specialisms of art, culture, science and history.

The increased access to knowledge about the world, however partial its nature, also led to a detached distance from the source of that knowledge and the processes which that knowledge described. This disconnection is at the heart of being able to rape both people and land while also making them behave in accordance with, or collude with, the rapist's preferred vision of them. In changing the way we are can we rest within the neat parameters of so carefully 'managing' our world towards sustainability - requiring the 'controlling' nations and elites to further their superiority over the global environment to do this? Even if this might be the most realistic chance for a way out of this mess, should there not be some voices that attempt to re-examine some fundamentals of humanity: the ways in which we and the systems we create and connect with and our understanding and valuing the world around us? Doesn't this also raise critical questions for those of us engaged in creating cultural or aesthetic meaning in a professional capacity, not only in terms of thematic exploration, but also in terms of the very nature of packaging our work in a world where packaging facilitates a disconnected consumerism?

We are increasingly confronted with statements attempting to instill urgency towards action, such as the following:

> The situation is still within our grasp, but we must act now, we must act strongly, and we must act together. Individuals, companies, and governments across the globe must each do what they can to reverse climate change. We will never get a second chance.

Our familiarity with these kinds of Obama or Hollywood-style quotes is moving towards an overdose, and while they may reinforce an important message they equally well discourage deeper inquiry: the knowledge is there – it is only action that is lacking, so by doing 'something' you can do your bit. In a world of incredible media saturation, the supermarket metaphor of ensuring a feel-good experience with whatever is on offer for consumption becomes painfully accurate as we can buy-in to feeling that we can quietly participate in a solution - while our liberal silence and disconnection may in fact be part of the problem. The necessary changes will not

take place without civil disobedience and as Gramsci, the father of the concept of ‘contradictory consciousness’ said, 'The challenge of modernity is to live without illusions and without becoming disillusioned.' The Yes Men (an artist-activist group) recently produced a spoof newspaper in which the leaders of the European Union thank the European public for having engaged in months of civil disobedience leading up to the Copenhagen climate conference. While clearly demonstrating worthy intentions, the fact remains that this level of civil disobedience is not happening in reality, and moreover, this neat consumer-oriented package may create an aesthetic feeling of moral outrage taking place as a substitute rather than a motivator for real outrage.

The strategies to tackle this disconnection using the language of commodification (managing the symptoms using tick-box solutions) is in opposition to holistic and ‘connected’ languages, values and cultural methods which have evolved over many years and still survive amongst less industrialised communities of the world. Critically reconnecting with such sets of values may be a radical step, yet the suppression of such possibilities due to those values having been deemed as inferior is a part of the same system of dominance which has brought about climate change. While the Chipko movement to protect trees (their 'maternal home') and livelihoods in India gained considerable respect and was seen as a landmark in ‘third world’ struggles for the environment, other strong and emotional relationships with the physical environment include those of the Aboriginal peoples of Australia or even the many small, agrarian communities in any of a number of countries. These value systems have little currency in the industrialised world where we will be signing up to an environmental solution of carefully managing human activities to a point just below the unsustainable threshold, carried out on our behalf by a joint effort between state machineries and various corporations to create a fully designed, fully controlled world.

The term 'climate change' as a cause of future problems must also be questioned. If climate change is a symptom of numerous power-greedy processes causing various kinds of environmental depletion, is it diversionary to use it as a cause? Decades of depletion have been affecting so-called Third World economies with raised levels of poverty, illness and mortality and such recipients of these effects are currently enduring what the West is contemplating. The West ignores the desertification caused by over-cultivation or unsustainable irrigation, and corporate mass poisonings such as Bhopal and the Niger Delta, yet the realisation of a symptom which affects

the entire planet and therefore the West themselves – climate change – then captures attention.

Predictions for global depopulation resulting from climate change are devastating: the possible extermination of three-quarters of the population and equally devastating levels of forced migration. The countries worst affected will be mostly from the global 'South' and while in the UK we may worry about the difficulties of tropical summers, we are largely deaf to the probable decimation of vast numbers of those 'others'. It is impossible to imagine what this will really mean; the levels of death, suffering and forced migration will be unprecedented. The actual direct causes will be the gradual accumulation of the results of industrialisation and the concomitant sets of values that underpin this - which can allow both mass consumerism and mass genocide while remaining distanced from the latter - just as people in the West have remained distant from these related facets for many decades.

The resultant prospect is, again, difficult to visualise but there are a number of precedents to draw on. Desperation to migrate will be incredible, and will be met by equally strong draconian measures to strengthen borders. Levels of crime and racially-based detention regimes will soar, while the concept of the prison-industrial complex (as discussed by Angela Davis) and its relationship to labour and profit will really come into its own with various land masses perhaps becoming effective and profitable prisons for certain categories of people. Climate change will create opportunities for greater climates of fear, fear fuels aggression and conflict, and imperialism has its last, most ghastly and hysterical laugh while various leading companies, states and elites find ever-new 'solutions' and ways to exploit the situation for gain.

For diaspora communities in the West, the generalised national dialogue of climate change along with its domination by western experts has undermined our connections with the environmental issues affecting our ancestral communities. This is compounded by more immediate needs to 'integrate', to fulfil economic ambitions and to deal with discrimination. However, there are possibilities of mobilising sections of such diasporas around climate justice and deeper contexts concerning global inequalities - along with potentials to nurture connections for the West - not simply with issues affecting 'developing' societies, but moreover with different sets of value systems and ideological affiliations which must be reintroduced, adapted and disseminated for a radically different social system to be possible.

Alongside an investigation into the issues from the perspectives outlined so far, digital arts group *Virtual Migrants* are developing a social art project using democratic dialogues towards a de-commodification of the issues, which will evolve over the next few years. The first step will precede the Copenhagen conference (autumn 2009 at The Arnolfini, Bristol, UK) as a part of a show about climate justice - curated by the artists' group *Platform* (London). It will involve cultural, artistic and educative approaches to connecting groups and individuals with activists and counterparts both in the UK and other parts of the world - using internet technology, including one-to-one intimacy between people across the globe - towards an engagement which can be emotional, social and ideological, along with a concomitant cultural production base to disseminate this process.

The work will focus on the aesthetics of words, spoken and written, emphasising immediacy and direct connection with the source of those words. Maintaining levels of intimacy and inviting local contributors to take some ownership of the work along with associated events will be critical to its operation. Activists will speak directly about current contexts, experiences, thoughts and activities, either in person or via an audio-visual Internet link accompanied by semi-improvised moving images, audio tracks and sometimes live music. This will constitute a deliberately raw and unperformed part of a performance or installation, minimising the interpretation that artists normally introduce to such work, and allow such non-performers and non-artists to become a part of work with integrated cultural, aesthetic and political meaning. The format will remain open enough to be able to hold an impromptu discussion or other verbal/textual interaction, before, after, during or within the work. This won’t be a package - participation will be real and there will be provocation, inspiration, argument and discussion: armchair consumption and distance will not be an option.

There are many examples across the world throughout history where popular enjoyment of words - their depth of meaning as well as their beauty - has been an essential part of cultures which foster critical engagement with discussion. Not only will the issues in question be discussed both inside the gallery and outside in various communities, there will also be a subversion of the post-modern trend away from content and narrative to a revaluing of text-based knowledge including oral testimony and books. There will be a replacement of the imaginary and distant digital with the real and intimate human. This is the beginning of an exploration away from commodified and collectable work for art museums, institutions that emerged from

industrial hierarchies. It is also an investigation into imperialist and environmental genocide outside the segregated confines of the academic world.

The hegemony of freedom

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It is a common assumption that, in using the Internet, one is taking advantage of a newfound freedom; to peruse vast streams of data, to engage in exchanges of conversation and information, to contribute (and therefore add one's own) subjectivity into an ever-expanding field of disparate perspectives. The user is able to manoeuvre at will, at high-speed, and re-direct course in the instant of a thought. Throughout this process, however, there is always the possibility of return, to stable spaces and familiar formats, launching points for subsequent ventures. One is granted immediate, unrestrained access to anything, everything, whenever.

This kind of idealised language is, of course, true and false at the same time. The capacity of the internet to provide contact with an unprecedented wealth of information tends to obscure the hidden trajectories and hierarchies that are built into the system. Limitless movement does have its limits; sign-posts and roadblocks are often overlooked in the relentless rush onwards. Furthermore, one could suggest that the independence of the user is being gradually hedged in, narrowed and constricted, even as such developments maintain the illusion of freedom. In such conditions, this ends up meaning only a series of multiple choice decisions; the user's 'free' decisions to surrender, piece-by-piece, their autonomy in exchange for access to new innovations and applications.

Hyperlinks and search engines

> The very principle of hyperlinking, which forms the basis of interactive media, objectifies the process of association, often taken to be central to human thinking… Before, we would read a sentence of a story or a line of a poem and think of other lines, images, memories. Now interactive media asks us to click on a highlighted sentence to go to another sentence. In short, we are asked to follow pre-programmed, objectively existing associations. (Manovich 2001: 61)

In *The Language of New Media*, Lev Manovich posits the deliberateness of the Internet, in its network of hyperlinks which subtly guide the user through a certain trajectory. The sequence is not permanent, nor is it unavoidable – the user can always retreat or sidestep any such links – but such conduits point out the contracts and relations that are already being established online. These may be harmless acknowledgments or suggestions of related materials or areas of interest, yet they are just as likely to signify sites under common ownership or affiliation, or (via exclusion) competition. Such links tend to be presented as tangential or allusive, while, in reality, they represent the virtual framework of the Internet, passageways carved into an allegedly free-floating sphere of associations and positions. The processes of independent human thought, outlined by Manovich, harden into established routes and corridors.

Surely, however, this doesn't apply to the search engine, the tabula rasa of a blank space that provides a range of related links to the user's query. And yet, this relationship too is skewed towards hidden online hierarchies; of advertising purchases, of rates of linkage, and the economic realities that affect and determine such results. Subjectivity is encouraged in posing questions; answers, however, are strictly determined (and even this is challenged by the search engine's tendency to bring up popular searches, to finish the user's sentences and attempt to manipulate their choices). Julian Stallabrass notes the structures underlying the appearance of randomness:

> The competition for the first few places on the search engine lists for a query ('flights', say, or 'fashion' or 'sex') is intense, involving complex software tricks and the expenditure of large resources which favours the big players. In general, the more a site is linked to by other sites, the more likely search engines are to rank it highly, but organisations or companies with large resources can either set up their own links, or pay for inward linking by others... The structure of the Web is fluid, shifting and continually contested, but nevertheless it has acquired a strong tendency towards homogenisation, closely reflecting the commercial and state powers that dominate both the Web and the offline world. (Stallabrass 2003: 20)

In this sense, the search engine provides a space for the signifier and then produces a variety of signifieds. The relation is therefore true to Derrida's reading (through Husserl) of the original detachment of the two, whereby an actual ethical and

theoretical decision is made which determines the relationship and where commonplace notions of the signified is merely the result of its long-term sedimentation in society. Economic power, aligned with marketing strategies, studies of user attention spans and complicated (and secretive) algorithms, ultimately decides which result receives an undeclared advantage through its indexical positioning. It is left to the deconstructive process, the flip-side to Laclau's theory of hegemony, to uncover and scrutinise these relations.

Social networks

The phenomenon of the social network follows this same logic. In its appearance of ease and openness, these sites mark a gradual shrinking and territorialisation of the Internet, replicating the conditions of the larger system under stricter rules of organisation. In this stage, the models of the hyperlink and search engine remain, although largely within the enclosure of the specific network. The space is able to therefore regulate discourse, excluding dissident positions (such as pornographic or politically suspect materials) while maintaining an aura of inclusiveness. The sense of freedom and manoeuvrability is heightened through the site's emphasis on user-generated content, and the creation and determination of (some) material by the subscribed online community – even though the main structure remains in place, under specific (off-line) ownership. That the site's content is essentially created, even donated, by users justifies this language of freedom. Similarly, the network allows for slight modification – through the integration of applications and adjustments – as a way of incorporating innovation (and therefore increasing relevance in a field dictated by technological development) and consolidating the loyalty of its users and contributors. Such an open-ended yet inherently static system, seen in popular social networks such as Facebook, MySpace, Bebo, LinkedIn, etc, bears a number of similarities to Ernesto Laclau's writing on hegemony. His texts, while not explicitly about online technologies, serve as an effective model of relations of power in systems of signification. By overlapping his model onto the virtual one, one can hope to gain a better, albeit imperfect, sense of both the Internet's freeness and its contraction into social networks.

Essentially, the system of signification, as set out by the linguist Ferdinand de Saussure, is made up of differences or particularities which operate in a constellation of disparate positions that is nevertheless enclosed by an all-encompassing whole. The system or whole, of course, cannot be breached by the particularity; there is a

dynamic difference between the two. In Laclau's terms, we see the system as the empty signifier, the structure that is radically different from the particles that occupy it, if only because, in a system made up of differences, a non-radical separation between system and product would suggest that the system is merely one more difference, and ergo, part of the system. Or one could simply quote Fredric Jameson; 'a system that constitutively produces differences remains a system, nor is the idea of such a system supposed to be in kind "like" the object it tries to theorise, any more than the concept of dog is supposed to bark or the concept of sugar to taste sweet.' (Jameson 1998: 37). Either way, the positions are clear: there are specific particular points, interacting and conflicting with one another, and there is the whole. And yet, in Laclau's model, the particular can extend itself to occupy (most of) the whole, to establish itself as a hegemonic authority that fills the otherwise empty signifier of the system. How can we imagine such a process happening online? How to square Jameson's dynamism with Laclau's logic of hegemony? The process of equivalence which transforms the particular into the universal empty signifier doesn't radically transform or become the system so much as conform to the necessary emptiness of the hegemonic power. In online terms, this temporary filling means only that another particular position, diluted of its particularity, gets to stand in for 'freedom', 'community', 'interactivity', all equally meaningless definitions of the internet. As Laclau states:

> How does this mechanism operate? Let us consider the extreme situation of a radical disorganisation of the social fabric. In such conditions… people need an order, and the actual content of it becomes a secondary consideration. ‘Order’ as such has no content, because it only exists in the various forms in which it is actually realised, but in a situation of radical disorder 'order' is present as that which is absent; it becomes an empty signifier, as the signifier of that absence. In this sense, various political [or economic] forces can compete in their efforts to present their particular objectives as those which carry out the filling of that lack. To hegemonise something is exactly to carry out this filling function. (Laclau 1996: 44)

‘Freedom’ would apply just as well. The analogy comes in applying Laclau's hegemony to the Internet itself, where a number of particular positions are diluted through equivalence to establish their dominance of the system. The system itself is essentially meaningless as a term - it signifies a disparity of particularities - but the newfound coalition of particular points are rendered, through their equivalence, into

something approaching a definition of the system. In 'real' terms, one could think of Google's pre-eminence on the Internet as such hegemony. It's propagation of cloud technologies under the rubric of 'doing good' is about as vague and malleable as any hegemonic empty signifier. Naturally, this position isn't inherently permanent; another particular will eventually usurp this role, not through political upheaval but through innovation and, for the fading power, obsolescence.

The social network replicates this structure of difference collated under a single system. Yet, in this case, upheaval has been guarded against, revolution already accounted for and protected against. A number of 'friends' does not equate to a position of hegemony - it only means the user is even more integrated into an essentially stable system. The system itself is foolproof against internal change. Change is managed, kept within the structure and allowed to operate only on a cosmetic or recreational level. Yet does this ensure longevity? Not necessarily, the network is still only a prescribed space within a larger system, one that is still susceptible to the vagaries of taste and loyalty, and which can still slide into irrelevance. The structure may remain unalterable, even as its users desert it to shift over to another, more advanced system (or, alternatively, a ‘freer’ system). There are two possibilities; on the one hand, the appearance of freedom (and the freeness of applications to be used and / or created) might instil a sense of ownership, where the user has committed enough time and effort to sustain their participation in the system. On the other, this selfsame freeness might lead to fickleness, where users realise that, as their free labour has 'made' the system, they have no particular reason to remain attached to its, by-now archaic, structures of movement and communication. As Karel Dudesek of *Van Gogh TV*, the seminal media art group whose Piazza Virtuale work pre-figured user-generated content sites like Youtube, suggested to me, the best way to hold onto this free labour may be for such sites to establish a system of patronage and reward for superior contributions, to essentially fall back to traditional methods of maintaining a 'free' workforce. Otherwise, they may be reduced to watching their perfectly controlled social networks sit empty and abandoned (Dudesek 2008).

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large screens, third screens, civic spaces and innovation

Cecelia Cmielewski and Sean Cubitt

Can recently ‘created’ public spaces become places of civic engagement - can they become a transnational ‘campo’?

A partnership between Australia and South Korea will incubate innovative and artistic practices via public screens. The hypothesis is that interactive artwork presented across nations on large public screens can have a positive impact on how we engage with each other and affect our civic lives.

our questions

The *large screens and the transnational public sphere* research project explores how information and content is exchanged between cities identified as media ‘hubs’, and what the impact is on the formation of a regional public sphere, in this case in the Asian region. In the first instance, the screens are linked between Federation Square, Melbourne and Incheon, Seoul.

We ask how the networking of these cities contributes to regional public diplomacy, in the light of an increasing emphasis on the role of culture in urban development, tourism and transnational communication. How can networked screens distribute regional cultural production and generate new social relationships in public space? Does this create new modes of civic participation at local and global levels? To what extent can a cross-cultural focus enable a new perspective on the relation between technological change and cultural production? What can the network model tell us about culture in the era of what George Yúdice has termed ‘culture-as-resource’? How might it contribute to inter-city cultural rivalry for economic infrastructure and development? And, crucially, how might this model be tested and adapted collaboratively?

our team

Our culturally and organisationally diverse team members are from the Art Centre Nabi, Seoul, South Korea; Australia Council for the Arts, Federation Square PL, University of Melbourne and the University of Sydney, Australia.

The project's genesis has been twofold. A real impetus for the project came from Soh Yeong's conception of the Cultural Network Asia (CNA) from a symposium she convened in 2007 that called for regional content exchange between city 'hubs'. The project also developed from the Discovery research, *Public screens and the transformation of public space,* (first named CI Scott McQuire, CIs Nikos Papastergiadis and Sean Cubitt, Research Associate, Meredith Martin).

The two large screens are managed by the Art Centre Nabi and Fed Square PL. Art Centre Nabi is a new media art centre that opens new spaces for creative practices. Their aim is to humanize technology so that it is integrated with cultural life. Fed Square PL is Melbourne's meeting place and a unique cultural precinct comprising an entire city block. Over 2000 events are held annually there – both live and using the large screens and state of the art broadcast systems. The Australia Council for the Arts is the Australian government's arts funding and advisory body. It supports the creative development of the arts projects and which form the basis of this research.

what we seek to change

This program of cross-cultural exchange (involving theorists, administrators, technicians, artist and curators) and empirical analysis of public interactions around large screens, aims to inform media, cultural and urban planning policy.

Current urban planning policy in Australia, for example, treats electronic screens in much the same way as static billboards. This underestimates the possibilities for public screens to be sites that incubate innovative artistic and communication modes. Opportunities to revitalize public space and public interaction are being missed. Current policy also ignores the potential for networked public screens to function as a nexus for new forms of cross-cultural exchange.

Appropriate policy for public screens should not be confined to regulating their scale

and location based on the assumption that primary usage will be advertising. Nor should it assume that screens will only support centrally regulated content which treats viewers as passive spectators. Nor should it assume that content produced by artists is free. In order to provide informed urban planning guidelines, it is essential to develop a clearer understanding of the full spectrum of potential uses of public screens.

why we want to do this

The commercial interest in large screens has proceeded with phenomenal speed especially in Asian cities. The growth of large screens has also been driven by the success of major events such as the Live 8 concert and the FIFA World Cups which use mobile public screens as 'live sites'.

Professor Misook Song, researching Asian cultural heritage, media art and the urban environment says: 'There has been a process of modernization in Asian countries, which is quite different from Europe, Australia or the United States.' While Professor Song notes that the rise of global media platforms and content-sharing has had an homogenizing effect, particularly in the realm of popular culture, she observes that technology 'works both ways: it [also] brings out local and indigenous cultures, traditions, or artistic practices - those that are unique to a region, city, nation or race'.

Scholarly analysis of the impact of media on social life and urban space has generally been framed by concern with spectacle and the commodification of space on the one hand, and surveillance and the policing of space on the other. While these orientations are clearly of great significance, it is equally important to identify and research alternative modes of social life that are emerging in the interaction between new media, urban space and mobile publics. Contemporary artistic practice is included here as a key arena for experimental and emergent forms of social interactions.

the artist

Concepts such as relational aesthetics (Bourriaud 2002), social aesthetics (Enwezor 2007), and networked cosmopolitanism (Hsu 2005) are attempts to grapple with the paradigm shift from object-based to process-based work undertaken by artists such as Krzysztof Wodiczko and Rafael Lozano-Hemmer. They emphasize the capacity for art to facilitate, mediate and translate social relationships within and across

specific contexts marked by complex differences. Artists who create works in public space demonstrate aesthetic and technological innovation, but also have the capacity to articulate and influence civic values in the context of global culture.

Artists can seek to intervene in public spaces and shift public consciousness. New media and digital networks offer strategic potential for realizing these ambitions. Instead of forming a belated representation of social life, art is able to become an active partner in the production of new forms of social experience.

the first two artworks

In August 2009, two artworks will be presented simultaneously on the Incheon and Federation Square networked screens, with the public invited in both places to interact with the work and each other. These projects relate in a delicate way with each other, beginning what we hope will be a poetic dialogue.

fone_hm uses the large screen as a public sms graffiti board. Leon Cmielewski and Josephine Starrs conceived and designed the piece working closely with programmer Adam Hinshaw. A phone number is displayed on a large screen in a public space along with the instruction 'sms the name of the country you come from'. When participants sms their (and/or parents or grandparents) country of origin, a curved vector is added to the map of the world displayed on the large screen, which updates in real time as it receives texts.

The concept, design and programming by Seung Joon Choi of <*Value*> explores what is well regarded by people. A word sent via sms responding to the question 'what is valuable to you' makes a water ring and sound, stirring the boundaries between words that segregate the space on the screen into three sections for each word. <*Value*> lets us express the relationship between different values. Choi says that ‘pursuing or choosing values in our lives can make vital decisions at times’. <*Value*> suggests that we take a step back and light heartedly explore possible harmonization of different values.

the curators

We work with the principle that it is no longer sufficient to select existing new media works to project on the large screen in a static viewing situation. The potential to

transmit artwork on a large screen in two cities with public interactive dimensions involves innovation in both curatorial techniques and artistic content.

This means that the task facing the curator is to participate in both the creative production and public interaction processes. Ross Gibson (Sydney College of the Arts), Cecelia Cmielewski (Australia Council for the Arts) and Dooeun Choi (Nabi Art Centre) will ensure that the artistic contributions are sensitive to the specific social, cultural and political contexts in which the work appears. The curators negotiate and facilitate the presentations of interactive artwork at the sites of two controlled public spaces. This means that they may well also influence the aesthetic, civic and communication aspects of the medium.

The capabilities of different artists and media that can both inspire and bind communities across these cities will be investigated. This method needs to be attuned to cultural and technical parameters of both sites to provoke any new transnational civic consciousness.

hi res / lo res

There are two typical modes of screen in use in public spaces in the early 21st century. A simple relationship can be established with screens in public space: high resolution means low interaction, while low resolution is associated with high levels of interaction.

The first is the large, high-resolution LCD screen characteristically used for advertising, and typically placed in the busiest spaces. In some cities, these are malls and open public squares, in others, like Seoul, major traffic intersections. In many cities, operators have also taken the opportunity to provide public service activities: closed-circuit relays of local events, rather like the use of such screens at sporting and music events; public-service broadcast, again often of cultural and sports events, but also of news and current affairs; and to a limited but interesting extent artworks designed for public space. With the exception of the latter, while audiences may cheer or boo, they are rarely in control of the flow of images on large screens.

The second is the handheld 'third screen' of mobile phones, PDAs, iPods and console games, low resolution, intimate LCD screens which, while they may also be commercialised in playback of films, TV, games and advertising, are also commonly

used to port video and still images person-to-person. The increasing use of Bluetooth or wire headphones increases the intimacy of the cradled screen. The likelihood of cheering and booing diminishes, but at the same time the ability to text, speak, manipulate and make one's own videos and images is immensely greater. The porting of social networking websites to mobile platforms is a major advance in this intimacy of the mobile phone, even as it is increasingly ubiquitous in public spaces.

public space

Both populate public space. We might trace their histories back fifty years and suggest a relation like that between the poster and the paperback. One is bigger, brasher, brighter, and open to both artistic uses and graffiti-style intervention, but in a relatively highly policed zone where fly-posting was (and remains) an illegal activity. The paperback meanwhile was highly portable, intimate, personal communication. Admittedly few people authored their own novels, but the degree of personal intimacy with a good book, the engagement with the reader's fantasy, and the exclusion of the surrounding world are very similar. One major change has been that with the billboard-sized screen and its robust LED components, it is far more expensive to place content on high-resolution screens than to silk-screen rebellious posters, and far more difficult to damage a commercial screen than to deface a commercial poster. A second is that even the wave of commercial applications for third screen devices has not supplanted their use for generating person-to-person media.

What remains the same is the struggle in the streets and squares for attention, and the struggle, more specifically, between low-resolution but engrossing intimate media and high-resolution, spectacular display media.

The anonymity of the crowd, celebrated by Poe and Baudelaire, dramatized the dialectic of self-loss and spectacle between immersing oneself in deeply personal and emotional small media and subordinating oneself to massive spectacular displays. To the extent that both play with established rhetorical techniques of word, sound and image, and that both deploy standard repertoires of illusion and narrative, they are akin in replacing the actual city with a vista upon something which is not actually present.

The expropriation of public space by corporations for purposes of advertising may be inevitable. Smearing the walls with commercial messages has a history stretching

back to the late 19th century, and is in some respects indistinguishable from the rise of colour lithography. The migration from TV screens carrying advertising in shop fronts to big LED screens mounted on buildings, and from print to moving image technologies is entirely in keeping with the age. The loss of any public goal in public space, other than the generation of unwanted desires for unnecessary products, is largely seen as harmless by the public who inhabit them. Of a similar visual effect the poet John Montague writes 'The censor's certificate flashes up./ I scarcely notice / so deeply has the harness worn in'.

We are inured to this theft of time and space, and have developed strategies for ignoring our environments as a response. One such technique is to concentrate one's attention on a portable screen, as previously on a book. The sightless gaze of those lost in conversation or fantasy is now ubiquitous in public space. The accusation of theft then runs beyond the theft of public space to the theft of human attention to the environment or to one another.

For the unplanned criss-crossing of lives in the city, mobile networks substitute networks into which we have opted, networks that are planned, networks of like with like, walled gardens from which we need not stray to find an unexpected cultural difference or an unwanted challenge to our shared opinions. Under such conditions, the meaning of the word 'public' has changed, and with it what we might understand by the public good.

As Scott McQuire argues, large public screens in metropolitan centres stand at the junction of two conceptions of public interaction: the longstanding tradition of urban public space and the more recent practices of electronic public spheres. This unique capacity to articulate physical and electronic space positions large screens as critical frontier zones in the investigation of the dynamics of public life in contemporary cities.

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Endnote

our team

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Particles In Space

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This paper initiates an exploration into how modes of exhibition influence the experience, understanding and cultural representation of media artworks under emerging contemporary conditions. Viewing conditions establish new meanings and uses of virtual images, as well as offering alternative constructions of the social space of their exposition.[1] By turning attention away from concerns operating at the formal or 'local' level of the artwork itself towards the construction of exhibition conditions, the increasingly complex interactions between art, technology and society taking place today become more clearly pronounced.

Proceeding from a design research perspective, this paper plays its part within an extended critical examination that will centre principally on the curatorial design[2] process leading up to the realisation of the Len Lye exhibition premiering at the Australian Centre for the Moving Image (ACMI) in July 2009. Arguably the most comprehensive survey of the artist's career previously resulted in the exhibition, *Len Lye: Experimental Filmmaker, Sculptor, Photographer*.[3] Touring to the Monash University Museum of Art (MUMA) in Melbourne in 2002, this exhibition coincided with the establishment of ACMI as a cinemedia centre dedicated to promoting the moving image in all its forms. By retrospectively casting attention back to the staging of this iteration of the exhibition and comparing it with the recent exhibition developed

[1] This situation becomes increasingly complex in new media installations where spatial considerations and exhibition design play a significant part in establishing the appropriate form of engagement required to achieve the aesthetic intentions of the artist. Conditions supporting the aesthetic encounter may be established by rendering the spatial considerations of exhibition as unobtrusive as possible (e.g. the 'Black Box' as a remediation of the neutrality of the 'White Cube' aesthetic), or through revealing the technologised apparatus incorporated as part of the artwork.

[2] The primary objective of this research is directed at developing the conceptual framework for digitally informed creative production of exhibitions. In developing this proposition, the term *curatorial design* will be used to encompass the practices that influence aesthetic experience associated with the art of exhibition. The curatorial design project proposes a critically informed approach to creative curatorial practice, particularly as this relates to the production of exhibitions that integrate digital mediation with spatial practice.

[3] *Len Lye: Experimental Filmmaker, Sculptor, Photographer* was a joint exhibition between the Art Gallery of New South Wales (AGNSW) and the Govett-Brewster Gallery, supported by the Len Lye Foundation. The inaugural exhibition was held at the AGNSW in Sydney from 1 December 2001 – 29 January 2002. Subsequent exhibitions were hosted at the Monash University Museum of Art and Queensland Art Gallery, before culminating with a tour of New Zealand. The exhibition was comprised of a screening programme of his pioneering films, a large selection of photograms and three kinetic sculptures.

specifically for ACMI's Screen Gallery, this cumulative investigation provides an opportunity to review their respective installation strategies, exhibition design techniques and technological infrastructure. It is hoped that by focusing on such issues associated with exhibiting the work of Len Lye, a greater understanding of how the translation of filmic and interactive works in exhibition space has evolved in the intervening formative period.

Particles In Space: Len Lye exhibition at the Monash University Museum of Art (2002)

Len Lye (1901-1980; New Zealand) is recognised as a significant figure in the history of the moving image, first gaining acclaim for his experimental filmmaking while working in London and later New York before playing an important part in the kinetic art movement.[4] Lye's overarching aesthetic can be generalised as a quest to produce 'total artworks' based on movement, light and energy. Connecting his otherwise disparate media practice – extending from photograms to experimental filmmaking to kinetic sculpture – was his preoccupation with expressing the 'beauty of motion' (Lye 1961: 75) through visual forms of abstract motion. While not exhaustive, the selection of works that were included in the 2002 survey placed emphasis on this central preoccupation of Lye's production: the guiding conception of 'art in motion', and art forms as products of energy and active material and perceptual forces at work.[5] While these qualities exist intrinsically in his artwork, they also find a particular acuity of expression when spatially activated through exhibition.

By definition, any touring exhibition possesses the ability to modify its presentation in some degree to the distinctive character of exhibition spaces found at different venues. In order to adapt its inventory to the particular gallery spaces at MUMA, the installation was informed by instructions supplied in an installation manual as well as the observation of curators involved with its earlier staging at the AGNSW.[6] In the

[4] Lye's professional work in the fledgling commercial film industries in Britain and America was undoubtedly influential to his experimental animation. Having begun making animated advertising films in Sydney during the 1920s, Lye left for Britain in 1927 where he found work with John Grierson's groundbreaking GPO Film Unit. Moving later to the US in the 1940, he worked on the 'March of Time' newsreels as well as producing his own hand-etched and hand-printed abstract films.

[5] According to curator Judy Annear: 'Lye was driven to use whatever means – words, film, music, metal, kinetics, photography, batik – to realise his singular vision of a universal life force which he saw as an appropriate subject for art. For Lye, that force was made manifest in motion'. With reference to uncatalogued documentation: Information Sheet for *Len Lye: Experimental Filmmaker, Sculptor, Photographer.* Sydney: AGNSW.

[6] The exhibition was designed for the entrance level project space at the AGNSW and required a 7x7 meter projection room be built as a dedicated video viewing area for screening of the film program.

exhibition contract, the following spatial conditions (or 'Environmental Provisions') are explicitly stipulated:

> (i) temperature between 20 and 23C
> (ii) relative humidity at 55% +/- 5%
> (iii) recognised standard lux level for works on paper – 60 lux

While these specifications are of limited relevance to a discussion of curatorial philosophy, archived documentation of correspondence exchanged informally between various members of the curatorial staff of the two venues begins to offer some insight into the connection between the curated selection of artworks and the proximity and relationship of particular items making up the exhibition space:

> In terms of exhibition design and installation requirements please note that the film component of the exhibition will require a video projector and a screening room. It is preferable that this is an isolated area distinct from, but an adjunct to, the kinetic sculptures and the photograms. The total area required needs to be about 400 square metres.[7]

Or, even more directly:

> The relationship between things are quite important as is pretty clear I guess. The photograms need to 'speak' to each other i.e. the pairs of heads face each other but apart from that the sequence is very much up to you. The kinetics just need plenty of space to show them off to their best advantage. *Grass* and *Universe* are usually fairly close to the walls so you don't have to hide their power chords but, as you can see, we did it differently.[8]

Exhibitions promote a dialectical way of thinking about the relationship between art and viewing experience. For its part, the character of the footprint of MUMA's three defined galleries influenced to some degree how this relationship was coordinated spatially in the resulting installation. The unusual semi-circular entry 'portal' to the gallery complex proper immediately presented the viewer with the option of entering either of two adjacent spaces: to the left, a self-contained darkened space dedicated

[7] With reference to uncatalogued documentation of correspondence dated 20 June 2001.
[8] The directive for the works to be situated in direct relation to a wall surface were not adhered to in the AGNSW install where their exhibition design was 'in the round'. With reference to uncatalogued documentation of email correspondence dated 14 January 2002.

to viewing the continuous screening programme of Lye's experimental films; to the right, entrance into the first of two internally connected rooms where first the print and then the sculptural works were installed. In a sense, the photogram suite acts as the point on which the exhibition turns. While heralding Lye's later attraction to kinetic art, the photograms demonstrate a similar approach to those applied in his 'direct film' method where implements such as combs, saws, pins, and razors were used to scratch into the black film leader before sequencing the frames and overlaying musical scores. In films such as *Free Radicals* and *Particles In Space*, Lye effectively created multi-dimensional environments by playfully exploring the synaesthetic relationship between sound and image.

Similar principles are revealed in Lye's kinetics sculptures: deceptively simple pieces with motor-driven movement which generate intense soundscapes from the flexing, twisting and rebounding of metal parts. The first of these 'harmonics' (as the artist sometimes referred to them) was situated at the threshold of the final room located at the furthest end of the gallery complex: *Roundhead* is a small delicate work whose rhythmic movement of orbiting constructions emulate the circulation of planets. In contrast to this self-enclosed model, *Grass* and *Universe* enter into a relationship of reciprocal influence with the gallery's configuration and scale. The walls lining the cubic environment effectively act as a backdrop to the sculptures in this adaptation; most dramatically in the case of *Grass*, an interpretation of wheat fields buffeted by wind against an expanse of sky, or the reaction of seaweeds gently moving on the undulating surface of water is immediately conjured up. The form of the more imposing *Universe* – reinforced by the striking sound produced from the collision of suspended cork ball and looped strip of metal – contrasted dramatically with the gentle rhythms produced by its companions.[9]

Particles In Space: selected exhibitions at the Australian Centre for the Moving Image (2002-08)

Supporting the primary investigation of Len Lye at ACMI the following abbreviated survey of selected exhibitions developed for the Screen Gallery offers an indication of ways in which the creative directors, curators and exhibition designers have

[9] In communication between curators, it was noted: "*Universe* requires cleaning of fresh finger marks. Floor taped to provide a discrete visual barrier so that people did not get too close, but this has not stopped the hands reaching forward! Visitors have found this work the most captivating, hence their propensity to touch it. Cork balls cleaned once a week as more difficult to reach. Base should be wiped when dust appears on surface. The elastic attached to the cork ball can stretch and may need to be shortened as required so the sculpture is not too loud." With reference to uncatalogued documentation of email correspondence dated 24/01/02.

embraced the dialectical opportunities of exhibition space. As mediated spaces, these exhibitions reveal how an integrative approach to digital mediation and spatial practice underpins the conceptual framework for curatorial design.

Since it's founding in 2001, ACMI has employed an extremely varied range of installation strategies. ACMI's opening exhibition, *Deep Space: Sensation & Immersion* announced that it would offer its visitors a 'transformative experience' of being immersed in the totality (kinaesthetic visual, aural and informational) of virtual artworks. As introduced by curator Victoria Lynn (2001: 17): 'The audience is invited to immerse themselves in the wonder of spaces, to explore their physical construction, their digital presence, their filmic pulse and their spatial expanses of colour and light'. In response to *Remembrance + The Moving Image* (twin-exhibitions curated by inaugural creative director Ross Gibson), Kevin Murray (2003) recognises the centre's unique opportunity to reflect critically on media art's relationship to cinema:

> ACMI is in the unusual position of evolving its own context: it takes the moving image out of the cinema and into the gallery. Rather than experiencing film while trapped in the dark by comfortable seats, conspiratorial silence and ushers, ACMI brings this ritual into the public domain.

In design terms, this *technoaesthetic* has resulted in exhibitions that have minimised their formal reliance on the type of gallery, cubical and light-trapped interiors that predominated earlier, 'first-generation' exhibitions (contemporaneous with the Len Lye touring exhibition). While retaining their innate character as individuated systems, inventories of artworks have been 'mixed' in an open-ended space to create curatorially-inspired connections (*World Without End,* 2005*)* or thoroughly fused as part of enveloping sensory environments reinforced by distinctive interior architecture that challenge the traditional separation of art from space (*White Noise*, 2005). Characterising the exchanges in operation between digital media in real space, the monographic exhibition of Christian Marclay (*Replay*, 2008) exemplified how audio-visual experiences are symptomatic to their site of exhibition. Reflecting a broadening of its curatorial agenda, the possibilities of negotiating the combination of media and objects in a hybrid form of museological display has been broached (*Eyes, Lies & Illusion,* 2007*)*.

Summary

The conceptual framework for curatorial design draws upon an integrative approach to digital mediation and spatial practice. The mediated exhibition environments introduced above extend the narrative and communicational possibilities for aesthetic experiences in the multimedial museum. The dialectical predisposition of curatorial design senses the implications that virtuality brings to a fuller reconceptualisation of the exhibition interface. By investigating an earlier case study involving the staging of a cross-section of experimental artworks by Lye in the first major survey of the artist in Australia in 2002, alongside a brief overview of exhibitions developed for the Screen Gallery at ACMI across the intervening period, this abbreviated text intends to establish a historical backdrop ahead of developing a more detailed and thorough critique of what the added 'dimension' of the exhibition form itself brings to the aesthetic experience, critical framing and historical positioning of a given artist's work within the canon of the media arts.

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Play, skip, jump: warp devices in videogames

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Introduction

Theories related to the discussion of space within videogames are often focused on ideas such as player relationships with their avatar (Wolf, 2001), (King and Krzywinska, 2006), (Stockburger, 2006), bounded landscapes (King and Krzywinska) or genres of videogames (Wolf, 2001), (Rollings and Adams, 2003) amongst others. This paper instead, discusses the various routes through gamespace in particular those of the path and the track. In doing so, the focus then shifts to an understanding of warp devices found along the paths of the game world and the experiences they can create for the player.

Routes, paths and tracks

There are various routes though the space of the videogame allowing the player to move from point A to point B. The two most distinct types can be seen to be that of the path and that of the track, each providing a differing experience of being able to move through and explore the game world. Whereas the path is bi-directional, enabling the player to move their avatar in both directions freely, the track is unidirectional forcing the player's avatar in one direction only. In the past, the track has been likened to the unicursal paths of the labyrinth as discussed by Fernadez-Vara, who states that '[i]f there is a single path the game feels as though it is "on rails" like a theme park ride: the user cannot chose where to go. Unicursal structures are this scarce in videogames. Even games that go "on rails" such as *House of the Dead* (1997), offer branching paths' (Fernandez-Vara, 2007). The path of the labyrinth is often discussed as being unicursal in that it has one path from beginning to end, in contrast to the multicursal (multiple pathed) maze that offers the walker choice in which path to take to reach the end. Unlike the paths of the labyrinth, where the walker is free to move in both directions, either from the start to the finish or the finish to the start, the track can be likened to railway tracks, or the 'on rails' theme

park rides as mentioned previously. Much like the layout of various railways tracks, tracks found within videogames can be comprised of different types. Those compared to unicursal paths, can be seen as ‘tracks with active volition’ with either single or multiple tracks. These types of tracks allow the player to move their avatar in one direction, but there are some choices to be made, such as overcoming enemies along the way of the track, or maybe deciding to take one track route over another. In contrast to this, there are ‘tracks with suspended volition’. These tracks do not offer the player a choice of direction or extra navigation along the track; the player’s avatar is carried along them. Instead, these tracks are the most fixed type of route within the gamespace, and it is tracks such as these that question the role of the player and their experience once on them. ‘Tracks with suspended volition’ are the main focus of this paper as it explores the relationships between warp devices and tracks such as these in movement through the worlds of various videogames.

Warp devices

The paths of videogames hold objects that players have to work out how to use. These objects may be in the form of different types of keys, used to unlock gates along a path in order to open up new ones. There are however other objects found along the path that seek to disrupt the path, and the warp device is one such object that changes the shape of the path within the gameworld. The term device can be understood as either a permanent object on the landscape or a portable object found to be used when required by the player. There has always appeared to be a fascination with transporting ourselves to other areas through thoughts of time machines and time travel. This is linked to ideas of teleportation and warping, found throughout fiction and more recently trying to link that fiction with scientific fact (see Al-Khalili, 1999). Warp functions can be seen to exist in various novels, films and television series, such as the rabbit hole in *Alice in Wonderland*, the TARDIS in *Doctor Who*, and even the bed in *Bedknobs and Broomsticks*. Each instance of the warp sees the characters within such fictions use a device to transport them somewhere else. These ideas of the warp are part of our cultural imaginary and indicate how we understand time and space differently within fictional environments. Each instance of the warp acts as a ‘device’ for changing time, space and narrative elements within fiction, and through its presence in various media types, we can recognise the warp as a common ‘cultural artefact’. It is only natural therefore that this progression of fiction has been recreated within the videogame, where once again constructions of time, narrative and play can be understood in various ways.

The warp can be discussed as having three main functions:

1. Warps break the fluidity of the path. The player is taken from one path to a separate path (even if the new path can be seen, the original path is still broken in order to reach it).
2. The navigational control of the player is taken away whilst in the warp. The player becomes viewer for the time they are in the warp.
3. Time and narrative structures can change whilst in, or after the warp, as the fluidity of the previous path has been broken.

It is these functions that will be discussed in understanding the player experience through space whilst using a warp device. As mentioned previously in differentiating between paths and tracks, it can be seen that by breaking the player's original path within the game, and removing navigational control, the experience of the player's avatar changes from being on paths within the gamespace to being on tracks. It is whilst in the warp, that the player's avatar is on 'tracks with suspended volition' as discussed above. This changes the avatars position within the gameworld, and in this instance it can be seen that the player shifts from a role of being able to interact with the game environment, to being a viewer of the environment. The shift between path and track is particularly evident in the game *Ratchet and Clank: Tools of Destruction* where the player's avatar is forced along certain sections by warp panels in the way of the path. These warp devices make sure the player is following a particular route in the game and also allow the player to momentarily view the architecture of parts of the game level. During the warp sequence, the player's avatar is taken from lower to higher pieces of architecture, allowing the player to see more of the gameworld. This creates an impression of the gameworld appearing to be larger than it actually is, therefore can cause the player to believe there is much more that needs to be explored. In viewing, rather than interacting with, the gameworld the player is also able to see parts of the level they may or may not be able to experience, therefore giving clues as to what else is to come. Warps such as these also move the player's avatar is one direction, with no way of getting back to the original path. Therefore in many ways, a sense of real exploration is stripped from the player.

As well as breaking the fluidity of the path and affecting navigation, warp devices can also restructure temporal and narrative elements within the gameworld. Juul discusses two separate notions of time when playing within the gameworld. He

discusses time within the real world of the player (that of 'play time') and the time passing within the gameworld (that of 'fictional time') (Juul, 2005; 142). In games where the player experiences a 1:1 mapping of play time to fictional time, the experience of moving the avatar along the path is occurring within the same time dimension as that of the real world the player is playing in. It is through understanding different mappings of time existing in different instances in the virtual game world as opposed to that of the quotidian, that players can accept the possibility of warps within the game. By playing in a virtual world, natural world occurrences do not have to be obeyed, and the laws of physics can be changed so that moving through walls, skipping parts of levels, accidentally falling down a tube and ending up in a new location, or normally sequential narrative structures being re-ordered, can all be accomplished within the game setting. As Huizinga states, 'Play is distinct from "ordinary" life both as to locality and duration. This is the third main characteristic of play: its secludedness, its limitedness. It is ‘played out’ within certain limits of time and place. It contains its own course and meaning' (Huizinga 1970: 9).

Prince of Persia: Sands of Time is a key example of a videogame re-working the rules and altering time through the player’s discovery of devices. The game contains a special trigger for players to rewind time at certain points within the game, allowing them to stop themselves falling to their deaths. The capacity to rewind the game indicates a warp sequence within the level for the player. This sequence can be seen as part puzzle and part spatial navigation. It allows the player’s avatar the opportunity to avoid (or delay) death. This acts as part of the puzzle to be solved, using the player's ability/knowledge of the game to judge when to use the trigger. At the same time, the player can change the timing of the game, therefore changing the narrative sequence. The game changes the narrative for the player to try and succeed at not dying the second time round and previous events are shown in a fraction of the time than when they were first played through this the act of rewinding. All the time the player remains in a warp until the rewind sequence is complete and can regain full navigational control along the path once again. So not only does the warp distort our perspective of time within the gameworld, it can also manipulate the narrative experience, whether intentionally or by chance.

Warp devices can exist as built in puzzles to games, as those described above, or they can be inadvertent, found by those players seeking to find hidden extras within a game. The warp found in *Super Mario Bros* by what Newman terms 'glitch-hunters' (Newman 2008) is one such type of inadvertent warp. By accessing a supposedly

secret part of the game in World 1-2 of the game, players are faced with the choice of three extra tunnels or pipes. These pipes are found within other levels of the game, and can often function as warp tunnels to areas where the player's avatar can pick up extra items such as gold coins as part of the built in game structure. At the end of World 1-2, the hidden area with the new pipes is not part of the pre-designed game, but a glitch left within the gameworld found by players exploring the system. Two of the warp pipes take the players to a 'new' level termed by players to be 'level minus 1'. The level is actually similar to World 2-2 in the game, yet there is no way out of this newly found level. As Newman notes, 'it is a cul-de-sac, an endlessly scrolling level that offers little or no variety for the gamer and certainly nothing novel as it is made up of elements present in other sequences' (Newman 2008: 119). It is here that the inadvertent warp can trap the player, making them restart the game in order to play the originally designed sequence once again. The pipe warp device breaks the original path, and although new paths are found there is no way to gain access to the previous ones. Therefore warps can act as points of no return, as player's avatars are forced in one direction and in many ways, the exploration can then end once the new path has been discovered. So, although warps can benefit the player, and help them to experience new paths within gameworlds, they can also hinder the players progress and force them to start levels over again in the hope of avoiding some warp traps later on. Recognising these devices for their strengths and weaknesses can then help the player learn how to make the most out of path and track sequences throughout the game in order to complete the game to the player's own satisfaction.

Conclusion

The warp can be seen to give the player a sense of empowerment in the represented world, which then need not follow quotidian space/time congruences. These elements of the warp device allow for a restructuring of narrative, as well as different understandings of the construction of space and the architecture found within game levels. The warp therefore changes the player experience from the bi-directional path to the unidirectional track and in doing so, changes the nature of player interaction for that instant. In defining a vocabulary of paths and tracks it is possible to understand the type of track related to the warp device; the track with suspended volition that offers the player no choice. This distinction then adds to current discussions about space and exploration within game worlds including the player's freedom of movement and what can be discovered in different levels. Warps can be deliberately

built in puzzles of the gameworld, or they may be found inadvertent through bugs, glitches, or extra code left in the system. These different instances of the warp combine to understand how gamespaces are explored and negotiated by the player and how the spaces of the gameworld open up new challenges to be overcome and learnt through this act of play.

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Urban fiction: between map and landscape

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Introduction

Urban space is a densely woven fabric; a multi-layered tapestry of different actors and institutions, cultures and political agendas. Living in the city means to co-inhabit a multiplicity of real and virtual spaces. Locative media's potential to turn the urban fabric into a canvas promises to open up a playground for probing into subjectivities and multiplicities that conventional mapmaking practices are blind to. The playground of locative media arts practices however also links critically to the technologies and politics of spatialisation and the historicity of cartographic practices. Probing into the fluid and fragile anatomies of the physical and social spaces we inhabit thus involves a critique of maps and mapmaking practices as social constructions of the world. After all, as John Harley argues, maps redescribe the world in terms of relations of power and cultural practices, rather than providing a representation of nature (2001).

This paper will look at the potentials for the map to become a tool of intervention itself. It will introduce the performative map-making practice of my work *Impossible Geographies 02: Urban Fiction*, a locative media and installation environment concerned with the multiplicity of spaces, lived and mapped, and the connections and fissures they produce in the urban fabric. The exploration is situated in a critical discourse involving John Harley's deconstruction of the map, and feminist, postcolonial and visual culture perspectives. The discussion involves a critical account of locative media practices with regards to linking geographic locations (and relations) to social positions (and relations). In summary, the argument of this paper is that we are still far from probing and mapping Debord's 'lived space' (1977).

Art is back on the map

In his notorious essay 'Deconstructing the Map', John Harley argues that '[m]aps are too important to be left to cartographers alone' (Harley 1992). And yet, according to Harley, art has been continuously edged off the map. In fact, '[a] "scientific" cartography (so it was believed) would be untainted by social factors' (ibid). A belief that, as of today, has not disappeared from what Haraway (1991) calls the 'agonistic powerfield' of, in this particular context, cartography. It is believed that through science - and may I add technology - 'ever more precise representations of reality can be produced' (Harley 1992). Locative media has put art back on the map and conspiring with critical and feminist cartography, it has brought with it the politics of mapping and spatialisation (see Kwan 2002).

According to Irit Rogoff, mapping is a cultural, political and epistemological activity, and has always been a powerful instrument for masking difference, making borders, and producing coherent identities (2000). Harley puts it succinctly: 'Cartographers manufacture power: they create a spatial panopticon' (1992). The subtitle of this paper alludes to what is probably cartography's most powerful deceit: dissolving the difference between map and landscape. Theodore Roszak (1972) writes:

The cartographers are talking about their maps and not landscapes. That is why what they say frequently becomes so paradoxical when translated into ordinary language. When they forget the difference between map and landscape - and when they permit or persuade us to forget that difference - all sorts of liabilities ensue.

Assuming that all we can ever produce are fictions of our reality (that nevertheless have a powerful influence on it's evolutionary path), artistic and other critical fictional lenses probing our urban habitat distinguish themselves from the cartographic science fiction by their desire for the ambiguous, the dissimulating, and the paradoxical. While locative media technology certainly brings about the paradoxical, its reliance on precise and categorical location (as in GPS coordinates) is contagious. Like our scientific colleagues and everyone who has ever consulted a map's view, for that matter, '[w]e are prisoners in its spatial matrix' (Harley 1992). And therein lies the crux. And the challenge.

Beyond the grid

Mobile technologies, advanced with a capacity for tracking surveillance, have established an oxymoronic ground for an alternative production of knowledge. One could argue that locative media art is marked by the tensions between a political agenda to break out of cartography's epistemological imprisonment and the impossibility to do so by deploying a military technology that endorses the Cartesian way of seeing the world (see Fusco 2004, Hemment 2004, Holmes 2004, Sant 2006).

The Situationist maps with their torn apart and re-stitched pieces, often serve as the most interventional, radical examples of an alternative urban geography or departure from the grid, as referred to by Alison Sant (2006). In fact, the method of the *dérive,* which underlies these urban remappings, has had a roaring revival since the first arrival of locative art practice. Most artworks using the GPS system are, according to Holmes' critical view, 'premised on the idea that it permits an inscription of the individual, a geodetic tracery of individual difference' (2004). The maps they produce however don't necessarily challenge the rigid nature of geodetic tracery and question the limited, normed sense of individuality they - even if gracefully - may trace. Holmes continues, '[t]he aesthetic form of the dérive is everywhere. But so is the hyper-rationalist grid of Imperial infrastructure' (2004).

For the map to become a tool of intervention itself (and map making to become performative), it needs to depart from a notion of location that is bound to a fixed reference point. The dominant system will always favor the known as the centre and hierarchize difference in relation to it. Feminist discourses on spatialization and subjective heterogeneities can inspire alternative cartographies that emerge from the situated, partial and interpreted knowledge of the terrain (Haraway 1991). What if our maps allowed for ambiguity and multiple readings - mapping the multiplicity and heterogeneity of spaces that we co-inhabit? According to Irit Rogoff's concept of 'multi-inhabitation', we constantly inhabit multiple co-existing spaces 'through bodies, social relations and psychic dynamics' (2000). This form of inhabitation cannot be mapped in homogeneous ways that serve a single perspective. Introducing the heterogeneity of multiple, moving perspectives into the map means more than simply depicting or summarizing these alternative views. Rather, it is a performative act in which the map differentiates itself and produces new knowledges in-between. Homi Bhabha's postcolonial writings of the insight that heterogeneity is performatively counter-hegemonic, opening up spaces between binary opposites from which other positions can emerge (1994).

Figure 1. Urban Fiction gallery installation, showing layers of ‘skin’ extracted from the urban fabric.

Impossible geographies and urban fictions

The work *Impossible Geographies 02: Urban Fiction* used mobile phones as ‘lenses’ through which to look at the city in ways that afford a reading outside of known and fixed relations. ‘Impossible’ here refers to what is commonly not seen and, in the context of cartography, what is commonly not mapped. The term ‘geography’ is concerned with cultural practices and differences in relation to space (Rogoff 2000). It interprets ‘space’ as a fluid, migrational construct, which we always only temporarily belong to, rather than as something geographically fixed and bound (Gemeinboeck et al 2007).

Participants were equipped with mobile phones and tracked using Global Positioning, whereby their location data served as hyperlink between the physical and a second, virtual landscape. These custom mobile ‘lenses’ transformed the cityscape into a thick layer of foam bubbles. Wading through this foam, the bubbly shapes got more irregular, messy even (Figure 2). If the participants crossed paths, an increased amount of bubbly displacement occurred, and the system registered an ‘encounter’.

Back inside the gallery, these movements and encounters were networked to drive the fabrication of an urban fiction: weaving threads, causing whorls and adding stitches; producing a result similar to the embroidering pulses of a heart rate monitor (Figure 1).

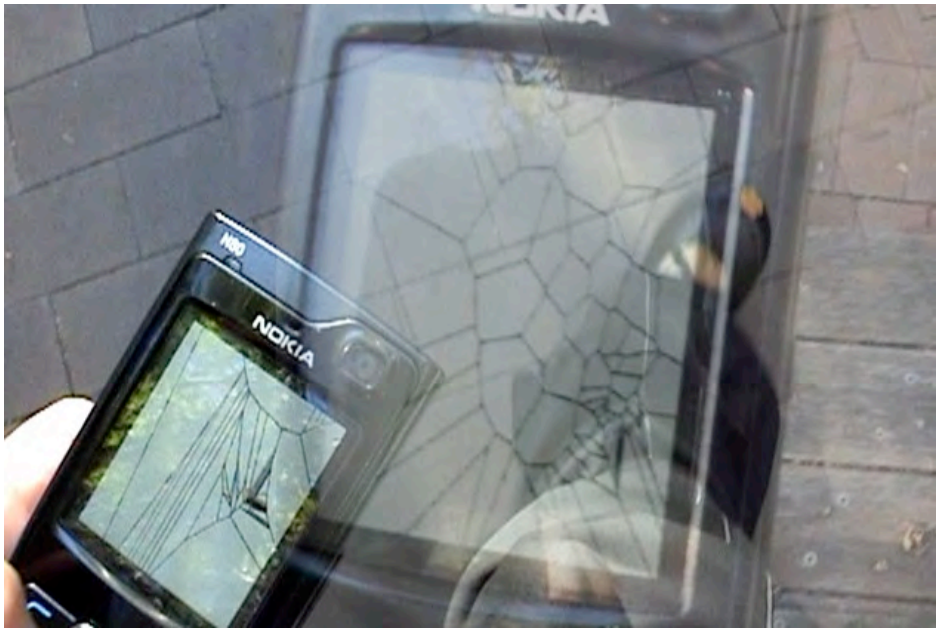

Figure 2. On the street, participants' introduced movement and displacement to a landscape of what appeared to be foam bubbles.

The customised mobile phone platform and the indoor gallery installation together interpreted and presented the participants' paths and encounters as a filigree of imaginary spaces spun by our everyday lives. The imaginary in-between spaces emerged from the tensional spatial dynamics between participants' encounters (lived, unknown) and demographic data (fixed, mapped), and how they mutually affected and interacted with each other. The participants' movements were translated into virtual turbulences that fluidly transformed a digital counter-fabric of the urbanscape. Adding threads and pulling them across the virtual fictional landscape, actuated and influenced virtual force fields, and perpetuated the fluid transformations of the map. Demographic data of the terrain was seen as text through which to read the production of spaces and zones and used to specify the varying degree of elasticity of the digital fabric (Figure 3). Dependent on the underlying demographic data, the virtual terrain was more or less permeable to the participants' distorting influences - resulting in continuously evolving connections and fissures (Figures 3 and 4).

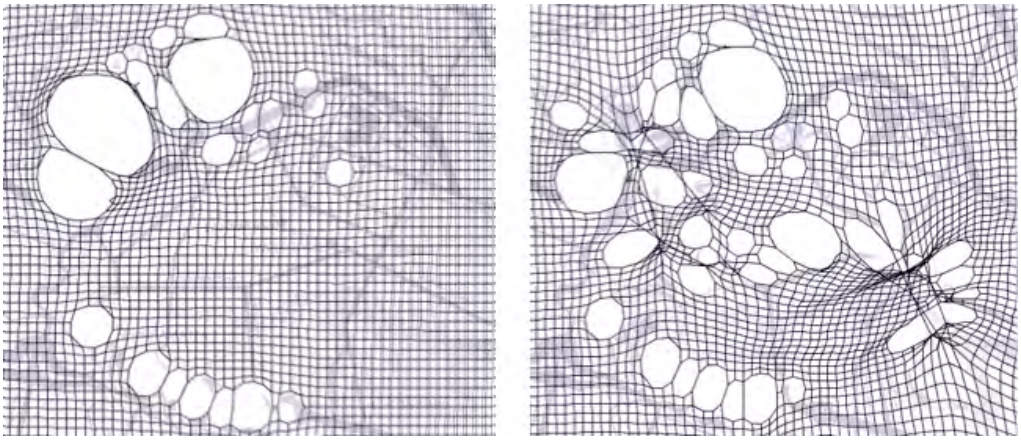

Figure 3. Snapshots of the computational process transforming the digital fabric. Demographic boundary lines become break lines along which the fabric tears apart.

Conventional representations of the city are blind to our everyday social encounters and the changing spaces and relations they produce. They display a fixed landscape of rules and regulations that if anything, constrains this dynamic play. This project's objective was to make the interplay between the lived and the mapped visible and tangible as a cartographic performance. *Urban Fiction'*s spacings and webbings emerged from the contact surface along which these two spatial ontological positions are negotiated and eventually transform the urban map (Figures 1 and 4). The project's performative mapping practice sought to problematise the authority of the hegemonic cartographer by unfixing the knower and the known. In this 'performative geography', different actors iteratively and collectively produce a dynamic history of imaginary spaces, for which the social imaginary is, as according to Appadurai (1990), a social reality.

As we have seen in the Situationist maps, the rupturing, displacing and stitching of geographical zones destabilises the predefined geographical order and implies injury and loss (of the familiar). Donna Haraway opens up a potential for 'location' that starkly contrasts the one offered by the Global Positioning System and its underlying desire for clinical precision and high resolution (see Hemment 2004). According to Haraway, 'location is about vulnerability', resisting the politics of closure but rather 'insatiably curious about webs of differential positioning' (1991). Such a map counters the dominant hierarchies of Cartesian cartography by abandoning the uniformity of the grid, and allows for unscripted and impossible relations to be read between the lines.

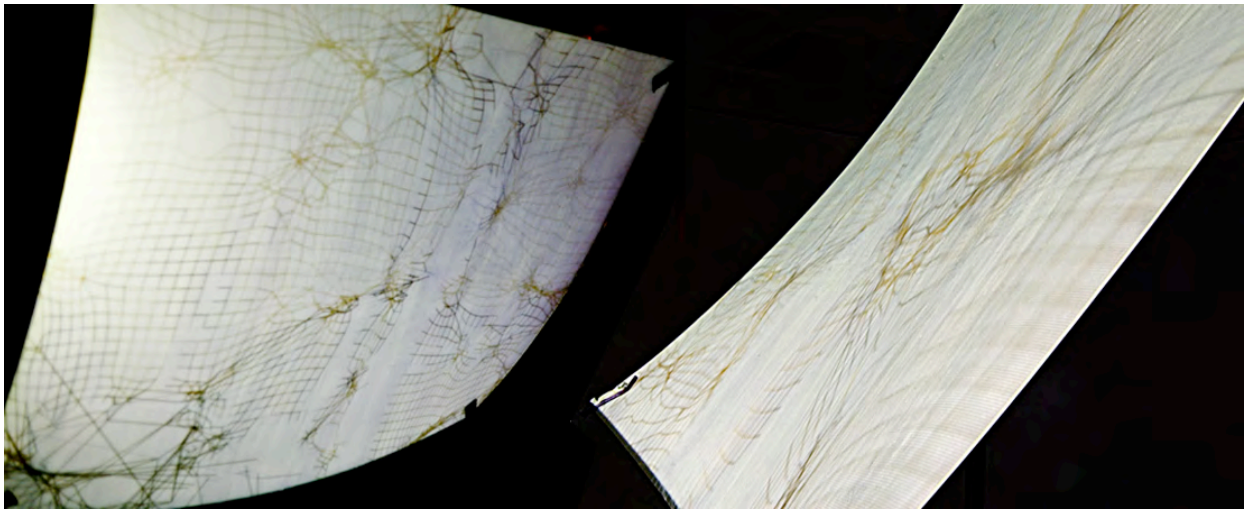

Figure 4. Snapshot of gallery installation, showing ripping and stitching processes illustrated in Figure 3. The result alludes to Haraway's constructs of partial knowledge, 'imperfectly stitched together' (1991).

Parting thoughts - or critical fictions about a beautiful, uncapturable mess

It cannot be assumed that artists' maps provide a more true or 'real' account of the urban landscape and the beautiful, uncapturable mess of its inhabitants' lives. What locative media art can do is break-up and disperse the hegemonic position of the map-maker: making the map becomes a process, rather than a dictum; situated, rather than stripped of any context; participatory, rather than dominant; subjective, rather than allegedly objective. These map-makers have a face (not a disembodied authority), a life, a culture, and a past. While - fortunately, we might say - our map making technologies cannot sense and capture the particularities of what constitutes belonging (as of yet), they can open up a space for inquiry ... and critical fiction.

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Using 2D photography as a 3D constructional tool within the Second Life environment

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Keywords: photography, re/construction, construct, perception, Second Life, reality, virtual reality, cultural context, re/presentation, appropriation, metaverse, virtual architecture, depiction, perpectivism, Ottoman miniatures, experience.

Abstract

Photography is a powerful 2D representation tool to document 3D volumes like architecture. It is possible to manipulate photos with 2D tools like Photoshop in order to suggest new 3D re/formations and re/interpret architecture. One can alternatively use 2D textures as mappings to create realistic 3D model renderings. This project is a combination of these two approaches: photographing architecture, turning the resulting photos into transparent PNGs and then mapping these photos onto 3D volumes in order to create a 'new' architecture from an 'existing' architecture…

One of the advantages of using photographs to create architecture is that your photo pool can easily be composed of visuals from various cultures and you may end up using an amalgam of visuals from, say, two supposedly 'opposite' cultures. This possibility reminds the peaceful collaboration of musicians from different cultures to create a unique music. In addition, this act can also be taken as a migration of media through appropriation of photography for 3D volume creation and re/presentation. At this point, we are talking about a double representation, since photography is a representation tool already and it gains another representational dimension when it is re-mapped onto 3D volumes for the construction of an alternative reality.

This paper concentrates on using a representation tool (photography) to construct a 3D space (architecture) within a virtual 3D environment (Second Life). During the process; the concepts of perception, reality, cultural context, re/presentation and appropriation will be examined.

Introduction

As digital photography became more accepted, influential and widespread, artists / designers started to take advantage of photos to create novel 2D / 3D entities. Panoramic photography, photo-mosaics, stop-motion studies are examples of 2D creations using numerous photographs. Microsoft's Photosynth, PhotoModeler, DigiCad, ImageModeler are some software where one can employ photographs to create 3D scenes and environments. In such cases photos mostly act as planar surface information to be used as mappings onto volumetric faces and they provide valuable knowledge / detail on the identity of a particular entity.

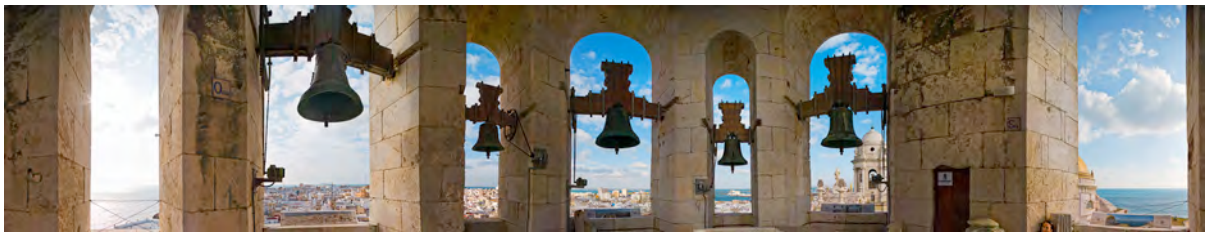


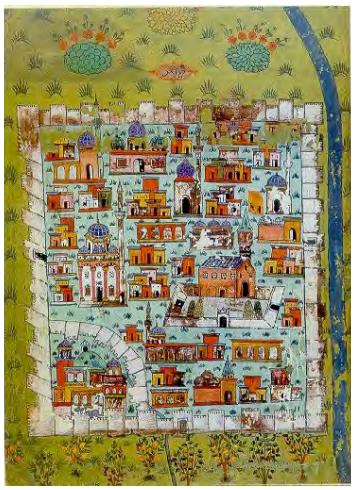
Figure 1. 360 degree panoramic photography turning a cylindrical bell tower space into a linear planar architecture. Photo: Murat Germen, 2007, Cadiz, Spain.

Figures 2 and 3. Left: 360 degree photo-mosaic. Photo: 'Hagia Sophia #3' from 'Places' series, Ahmet Elhan, 2008. Right: Gwon Osang's photo-mosaic sculptures.

Architecture, representation and perception

Depending on facilities and technologies available at various periods of the world history, architects used various tools like drawings, paintings, miniatures, models, computers, fine arts platforms to represent their design before and after construction.





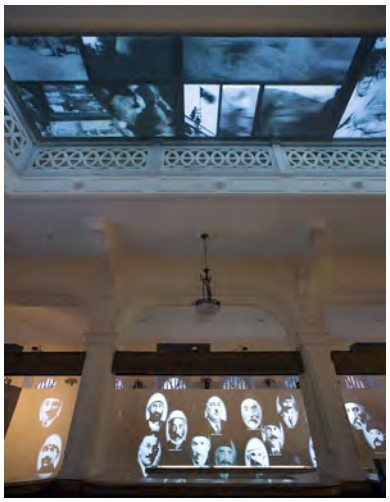
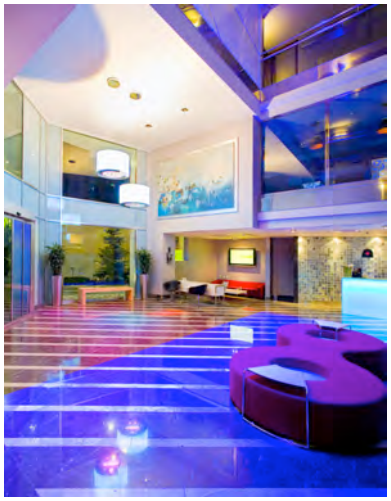
Figures 4, 5 and 6. Ottoman miniatures depicting Izmit (left), Eskisehir (middle) and Tatvan (right) by Matrakci Nasuh. (Images accessed: Sun Jun 7 18:29:12 2009 / URL: http://img260.imageshack.us)

The constitution of space involving multiple incompatible perspectives to be present in photos to be used, can be likened to Ottoman miniatures where various conflicting perspectives can co-exist. This diversity of perspectives takes us to the idea of 'perspectivism' which, after Wikipedia, is 'the philosophical view developed by Friedrich Nietzsche that all ideations take place from particular perspectives. This means that there are many possible conceptual schemes, or perspectives which determine any possible judgment of truth or value that we may make; this implies that no way of seeing the world can be taken as definitively "true".' If we take this a little bit further, there is no strictly objective 'reality' to be re/presented, but instead, a detailed depiction of our personal perception which is closer to reality since it describes a particular experience (which is different for every individual). This experience is a symbolic association as 'representation includes everything people construct to be known as a visual record or figurative manifestation of [a] reality. […]' Within this approach, architects usually reduce the definition of representation to the creation of such visual forms as drawings or models that selectively double or imitate the physical reality of a building. I would like to move beyond this traditional view to define representation as 'a culture-specific and dynamic process of establishing the

relationships between reality and the signs created to symbolize this reality. In this process, reality becomes thinkable, and its meanings are symbolically assigned.' (Piotrowski and Robinson 2001)

Architecture, photography and truth

Photography is the only medium that enables architectural works to be shared with people who do not have access to these works. It is, in this respect, the ultimate representation of architecture that is built. There are various techniques, lenses, rules of thumb that are used in architectural photography in order to make the process as 'appropriate' as possible. But these special techniques usually provide us with unique visual recording possibilities that are practically and physically impossible to the naked eye. The so-called 'perspective correction' process much used in architectural photography, carries the potential of producing some steeply converging lines, especially when the photographer is close to the building to be photographed. Consequently, the shifting motion in photography causes another shift in our perception: photography does not reflect the truth…

Figures 7, 8 and 9. Professional architectural photography samples where two horizontal photos taken with a wide-angle tilt-shift lens were combined in order to widen the angle even further and augment the perception. This coverage is not possible with a single shot and offers a unique aesthetic. Photos by Murat Germen, 2007,8,9.

With reference to the notion of an ideal truth Mark Kingwell makes it clear:

> The image is made, not found, and the making is inherently personal, rooted in prejudice. The important truth is to recognize and acknowledge bias openly, not least in the essential decisions around framing the image. […] Our investigation must entail a special kind of refusal: a refusal to take the taken-for-granted for granted. It follows that the responsible image is the one that makes that refusal necessary, unavoidable, insistent. That is the truth in the image though perhaps not the truth we thought to find. (Kingwell 2006)

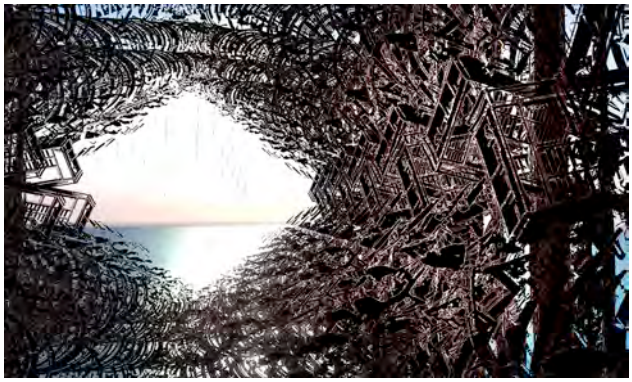
The concepts of objectivity and the presence of a single dogmatic reality are also criticized by Vilém Flusser:

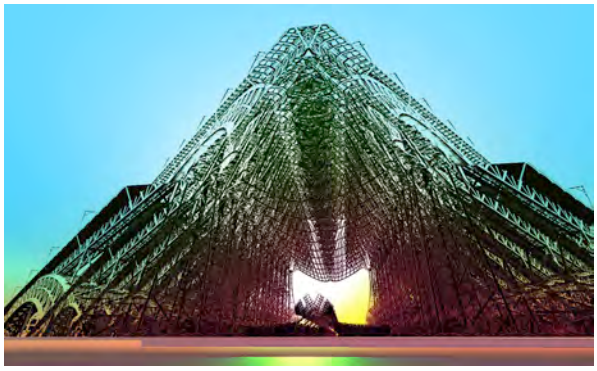
> The apparent non-symbolic, 'objective' character of technical images has the observer looking at them as if they were not really images, but a kind of window on the world. He trusts them as he trusts his own eyes. If he criticizes them at all, he does so not as a critique of image, but as a critique of vision; his critique is not concerned with their production, but with the world ‘as seen through’ them. Such a lack of critical attitude towards technical images is dangerous in a situation where these images are about to displace texts. The uncritical attitude is dangerous because the ‘objectivity’ of the technical image is a delusion. They are, in truth, images, and as such, they are symbolical. (Flusser 2000)

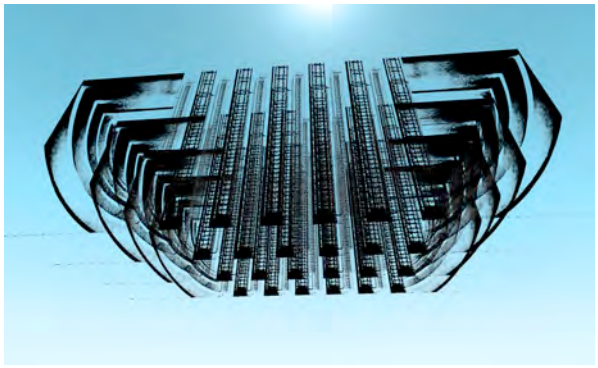
Experimentation in Second Life

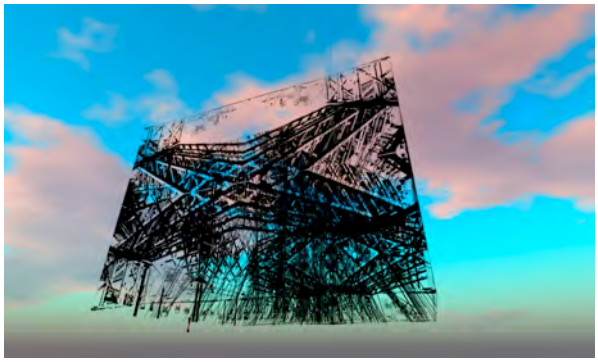
There were various offline and online 3D environment alternatives at which one could carry this experimentation out. Second Life (SL) was the one that was selected since it had a powerful 3D construction interface. More importantly, SL is a global(ised) milieu in which you can have people from all over the world try 3D creations interactively. SL has recently been quite popular as a customizable virtual environment. Yet, most took it as a game setting and since SL requires more self-motivation and guidance compared to online game platforms, they did not exactly find what they were looking for. According to some SL experts, this customizable virtual environment is ideal for creative projects to be realized as 3D volumes, as it allows you to build anything without rules / regulations and has quite an intuitive / advanced 3D modelling environment.

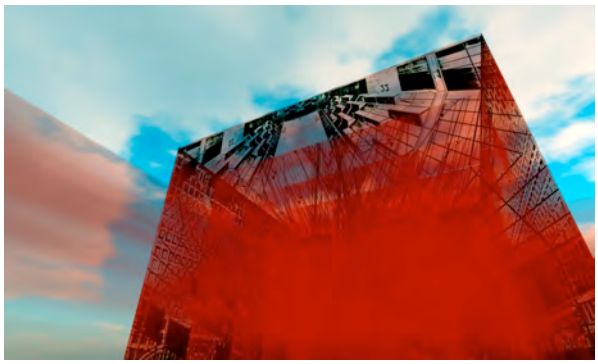
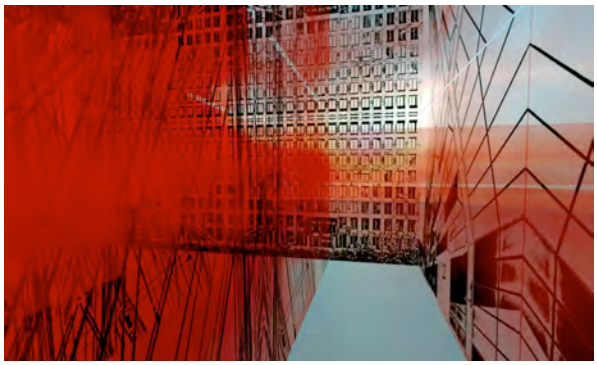
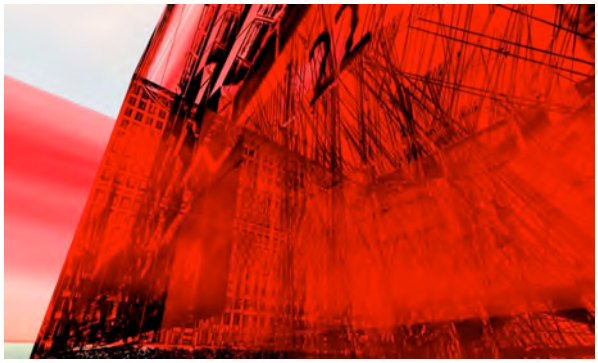
I wanted to take advantage of the SL environment in order to test what I have been proposing on performing architectural design with the aid photography. During this investigation process I have used my own photos, which were the products of both artistic and professional photography, turned them into 1-bit black & white images with threshold command in Photoshop, saved them as transparent PNGs, mapped them onto transparent planes within the metaverse and finally, built volumes to be 'photographed' using SL software's snapshot feature.









Figures 10, 11, 12, 13, 14, 15, 16, 17, 18 and 19. Staging a succession of planes devoid of the typical depth of field, with all its planes kept clearly and no shadows cast (due to online rendering limitations in Second Life), leads to an idiosyncratic perception mode that further fosters the concept of constructed reality and creation of a personal world. This personal world exists in the virtual world and the particular experience of the constructed reality takes place through the help of a concept that we can call 'telepresence' which focuses on the relationship between an individual and his / her personally mediated environment.
3D modelling artworks constructed in Second Life by Murat Germen, 2008-09.

Conclusion

This series of artworks and process focus on the possibility of (re)designing architecture virtually with the help of one of the most important representation tools - photography. Photography can be utilized in the process of ‘constructing’ a new space - that we can call ‘narrative space’- from an existing spatial body. This narrative space can also be defined as a ‘manufactured metaspace’ which is a space beyond reality and representation: a constructed reality that exists solely in digital realms like Second Life where boundaries are unnoticeable. Despite the fact that this constructed reality is not a physically built entity, it can reveal some spatial clues that

can later be used in tangible architectural projects of the real world. While the idea of juxtaposing a series of disparate photos sounds questionable, the new aesthetic challenge of formulating the visual continuity of photos in sequence offers new ways of constructing space and conveying narrative information as the result of a new spatial flow among contiguous planar spaces.

Virtual architecture is a term used for architecture specifically created in the computer environment and never used within the realm of architectural photography. This paper concentrates on the prospect of constructing architecture virtually through photography within the metaverse. People like Piranesi, Lebbeus Woods, M.C. Escher, Marcos Novak etc. previously dreamed about architectures that could exist virtually on paper, screen and digital environments. Space is usually defined / experienced as a physical entity, yet, we recently began to observe that the notion of ‘space’ can exist / be perceived / used as a non-physical organism by means of interactive media and virtual environment applications in the computer platform. Such creations bring new definitions of 'space' and can be named as 'informational space' or 'cognitive space.'

A final quote from Mark Kingwell supports this endeavour of making personal worlds of architecture using photography:

> Photographs are not multiple depictions of some single reality, waiting out there to be cornered and cropped, and somehow regulating, even in the cornering and cropping, how / what the image means. Rather, photographs offer multiple meanings. The presented image is not a reflection, or even an interpretation, of singular reality. It is, instead, the creation of a world. […] The truth of the image is the truth of time: not its metaphysical essence, whatever that might be, but its presence; its inescapability. A photograph, I want to say, is a machine for making worlds. (Kingwell, 2006)

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Mixed-realities: opening the Beijing Olympics

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> The digital yearns for the organic with the same passion with which text yearns for the reader Sean Cubitt (1998: 35)

Introduction

Not since the science fiction film *Tron* (1982) have we seen such a conspicuously visual attempt at creating a hybrid juxtaposition between computer-based aesthetics and physical artefacts in an entertainment medium. However, whereas the 1980s futuristic movie attempted encapsulation of the physical real in the digital virtual, in the Beijing Olympics opening ceremony we see a perceptual shift occurring through the extension of the digital virtual - out into the material real. A key tenet to this notion of mapping the digital into a material space is the idea that there is a distinguishable computer (or digital) aesthetic. How this aesthetic has become culturally recognisable - to the extent that it was utilised so effectively and comprehensively in the opening ceremony - will be examined in the following 3 steps: (1) through the definition of what makes up the idea of a computer aesthetic; (2) how this aesthetic has achieved cultural traction, in particular around notions of Chinese societal norms and (3) how this recognition allowed for the emergent configurations seen in the opening ceremony, where properties of computer technologies were combined with material artefacts to engender social spectacle.

Step 1: what is a computer or digital aesthetic?

Defining a set of formal digital aesthetics is useful in helping us establish the key characteristics of the digital environment, which can be ascribed to when we

contemplate a computer-based visual language. In this paper we will concentrate on the characteristics of scale; repetition; regularity of form; pattern; likeness and animation[1]. Firstly, we will examine the notion of scale as a key facet of digital domains. Through the use of the Graphical User Interface (GUI) the computer user can easily zoom in and out of digitised visual material (to allow for a birds-eye overview) or zoom in to a detailed magnification, down to the individual pixel. The pixel itself is a fundamental building block of the digital that allows for the use of another innate feature, that being ease of repetition; using software it is easy to copy and repeat the same digital image. Linked to the idea of this digital unit is the idea of regularity of form or uniformity. Digital images are made up of pixels, which are arranged in a grid called a bitmap, the density or resolution of which can vary from image to image (Kerlow and Rosebush 1986: 14). Considering that all computer imagery is constructed in this way, we can see how the underlying structure of the digital is based on a uniformed regularity. Extending the idea of the pixel as the basis of the digital image - arrangements of pixels with tonal similarities or variation can be used to form patterns, visual effects or images. Furthermore, these visual effects or patterns can be varied over time by altering the tonal qualities of a pixel through the use of computer code or pre-authored transitions. In this way time-based animations are made possible, to create movement, visual sequences or narratives. In the following sections we describe how the basic digital typologies outlined above were specifically used within a number of the sequences in the opening of the games and discuss the underlying cultural significance for doing so.

However, we must also define what is meant when we talk about mixed-reality. From a technological perspective, mixed-reality refers to the computer-facilitated capacity to map digital content, spaces and interactions into a real world context. Steve Benford (2002) defines mixed-reality as the '…overlaying [of] a virtual world onto your view of the real world, so that you can experience both at the same time.' He goes on to say that through the idea of mixed-reality, '…the everyday physical world might become populated with virtual characters and objects.' In addition to this description we should include forms or experiences which address issues around how we can perceptually move between digital / physical constructs and create, define and re-define complex spaces in technologically aware environs. This extended definition allows for the inclusion of conceptual works using interaction between the digital virtual and the physical real to explore associated languages; both separately and

[1] There are a number of other visual traits and ideas, which we commonly associate with the representation of digital technologies, such as 3D wire-frame models.

combined together, to inform creative practices and social commentary. For example, in Beijing this type of mixed-reality experience was embodied in the form of the digital / material scroll installation, a hybrid environment on which we will elaborate further.

Step 2: the Olympics, Beijing and 'the digital'

From the celebratory excitement evident on the evening of July 13 2001 as the decision to award the games to Beijing was announced, to the profound scale of urban development subsequently undertaken, it was clear that for China there was a lot at stake. Tomlinson (1996: 583) suggest that it is a truism that alongside the World Cup, The Olympic games are the most widely watched media events in the history of mankind. The 'globalising' process of hosting a major international sporting event produces world cities that transcend national institutions, politics and culture (Wei and Yu 2006).

Sassen's argument (1991) that global cites are also sites for the production and marketing of innovations largely centred on the hi-tech industry resonates strongly in the case of Beijing. There is fierce competition between Asian mega-cities such as Hong Kong, Singapore and Seoul (amongst others), to be perceived as 'global' cities and Beijing's efforts since 1990 illustrate its intention to achieve this (Wei and Yu 2006; Broudehoux 2004). The Beijing games presented a unique opportunity for re-inscription of what China means to the world. It is inherent to the Chinese dual preoccupation with tradition and modernity that she would do so in a manner that showcased the depth and influence of its culture and the trajectory of innovation stemming from its ancient past, despite the disruptions of the Cultural Revolution.

Contemporary Chinese society is often perceived as materialistic, an understandable reaction to the phenomenal modernisation of recent decades. Jin (2005) suggests that hosting the games aligned with efforts to, 'reconstruct a moral order'. The Olympics promoted three civilizing influences: (1) presenting an enduring image of 'harmony' to the global community – with a view to restoration of the value system of the 5000 year old Chinese civilization; (2) offering a comprehensive, strategic, balanced and co-ordinated presentation of a 'scientific notion of development' and (3) promoting an emergent democratization by 'emphasizing human well-being and the full realization of human potential.' (Jin 2005). That an initial budget of US$ 12.2 billion was put in place after the city won the bid, (equivalent to 41.2% of Beijing's GDP in 2000) is indicative of the crucial importance placed on the event.

The Government's stated themes of a 'green,' 'scientif c and technological,' and 'human (cultural)' Olympics (Wei and Yu 2006) are strategically implemented in the visual and performative displays of artistic expression, cultural identity, ethnic diversity, political power, technological capability and national pride. Tradition and modernity are juxtaposed repeatedly in a sequence of metaphoric scenes (wonderfully orchestrated by the ceremony director, filmmaker, Zhang Yimou), with an emphasis on material cultures - textiles, wood, bamboo and paper-costume, music, dance, iconic images, staged actions and ceremonial choreography. These were overlaid with digital projections and post-production techniques imbued with symbolic depth and comprise of a multi-sensory language, which was employed to dramatic effect. Sequences in the opening ceremony presented a blurring of the real and the digital, producing a mixed-reality further enhanced through the lens of state media processes and the western media networks. Benedikt (1991: 128) observes that the conventions of the digital virtual can be seen as an extension of both the ancient worlds of 'magic, myth, and legend', and contemporary worlds of 'fantasy fiction, movies and cartoons … replete with violations of the logic of everyday space and time'.

The themes of the Beijing ceremony profoundly contradict the picture painted globally in the lead up to the games - one of brutal political suppression of ethnic groups, insurmountable environmental problems, relentless urban displacement of the poor and a corrupt police state. That China was able to confidently articulate a highly innovative, complex, multi-layered, technological, sophisticated and resoundingly positive view of its people and culture, and facilitate the broadcast to a spellbound global audience, while western media conglomerates are generally unable to gain traction within the world's most dynamic economy, is not necessarily the message that the western media and it's political concomitants would prefer to disseminate. Controversy over the use of digital effects to augment 'reality' in the representation of detailed and mass staged theatrical performances in the ceremony is therefore unsurprising, especially when one considers the general mediated concern presented continuously prior to the games by most western media outlets.

The argument presented by the western media - namely that some degree of 'subterfuge' or in-authenticity was afoot in the layering of digital effects, projections and post-production is a misnomer belying the undeniable fact that any consumption via the screen is a mediated experience. This position relies on the public's limited awareness that all televised processes are filtered by the agenda of the provider,

producers, editors, advertisers and other stakeholders to present an 'official' version of reality. This loop of mediation was ironically completed in the broadcasting of the images of a number of athletes who were shown videoing the event as they entered the Olympic arena.

Step 3: a procession of realities

As a culture becomes increasingly technologised the notion of a computer aesthetic is reinforced through its use in contemporary arts and commercial advertising which helps to build a cultural recognition of digital technologies. It follows that the digitally referenced characteristics so extensively utilised in the opening sequence of the Beijing Olympics were dependent on the audience recognising the references to a series of digital languages. Their use infers a contemporised, sophisticated, and modern computer savvy society.

In this final section we examine a selection of sequences from the opening ceremony which effectively weaved together technological and cultural references in a hybrid collage to create mixed-reality environments that combined aspects of the physical real, such as recognisable architectural forms and human performers, with the abstract potentialities of the digital virtual, like the ability to fly, change shape and multiply.

Fireworks

As the giant digital footprints rendered as fireworks made their way across the Beijing skyline, the television audience was drawn into a world designed to present a highly symbolic spectacle representative of China's return to the world. Although used globally, ‘yanhua’ (fireworks) hold a particular and auspicious significance in Chinese culture[2] and have been used at least since the Qing Dynasty (1644 - 1911) (Haiwang 2008). These digital explosions in the sky highlight the place of tradition within Chinese culture but in a Janus-like manifestation allude to China's steady journey toward superpower status.

[2] Fireworks are common in daily life in China as they are used to mark auspicious occasions and to ward off evil. New Year in China is characterized by a week long festival featuring constant explosions illustrates the place of fireworks in Chinese society and culture.

Images of power

Throughout the ceremony military precision, both literal and in terms of the orchestration of human and material resources, is overtly apparent. Parallels between military formations and the digital grid or bitmap are easily identified. The use of the crowd itself in emphasising the immense scale of the event visually was leveraged through framing, camera angles and large format screens. Similarly, we can draw parallels with the digital characteristics of cloning, repetition and conformity.

People as pixels

The performative representation of pixels flickering across a metaphorical screen rendered by individuals is a striking if subtle emulation of mass political spectacle, familiar in meditated propaganda and displays of state and military power. What at first appears to be a field of traditional drummers (and was) is slowly revealed to also be a complex illusion of an LED screen, tightly choreographed in a display characterised by manipulations of scale and perspective via camera angle. This interplay of the visual language of socialist traditions, and computer technologies showcased the capability and symbolic power of mass population, and was overlaid with the gloss of the digital. Elsewhere in the ceremony a thousand performers in uniformed ‘electric’ green body suits and white lights (which the performers could turn on and off) moved together to create animated symbols and forms in much the same way that a computer-generated algorithm can visualise a predetermined set of images or animations.

The scroll

This was an important centrepiece to the ceremony. The scroll sequence presented a multifaceted performance space, integrated across illustrative interpretations both digital and sculptural of the scroll - a traditional form of communication contextualised for a global audience. In the darkness of ignorance the scroll brings light and culture - dance, language, and the traditional arts of the brush (as well as representing the Chinese invention of paper). Here we witnessed lighting, projections and digital effects mapped orthoscopically onto the real where dance and evocative 'brushstrokes' were rendered in a performance that merged the live with digital media. Augmented sonically with traditional instruments and music, the narrative presented themes of the past and the future merging in a bricolage of traditional

references and digital futurecasting. The scroll as information graphic reinforces the symbology of cultural history, information, power, knowledge and education, which was recontextualised and brought up to date in the hybridity of the real and accompanying digital manifestation.

Conclusions

As we have outlined, the use of the digital aesthetic within the Beijing opening ceremony resonates with Chinese notions of social conformity and homogeneity, but also with individuality creativity and a forward-thinking technologised society. The premise of this paper is that this was achieved through the conjunction of characteristics from both digital and material culture in what we have described as a mixed-reality spectacle. With it's voluntarily 'captive' global television audience, the Opening Ceremony of the Beijing Olympic Games 2008 had significant potential to produce a global focus, raising awareness of China's power, history and culture, cast within the context of the traditions of the games. Locally it was splendid nation building. The ceremony achieved this in a manner transcending past ceremonies in its complexity and subtle utilisation of digital technology to augment a dramatic and highly symbolic performative ritual. In recognising the significant role of the hi-tech sector in contributing to the process of becoming a first tier global city, recent policy from Beijing clearly, '…deems the development of high-tech and IT-related industries the new growth sector of Beijing's development and an engine of its becoming a global city.' (Wei and Yu 2006). What the world witnessed both live and via its' television screens at the opening of the games is evidence of the increasing maturity and sophistication in China's creative and digital industries and the accompanying recognition (by government) of its role in pushing Beijing and the country as a whole to the forefront of the global stage.

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A study on reconstructing meaning and experience with virtual restoration

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1 Introduction

This study will discuss virtual restoration in cyber-space of Sungnyemun - one of the prime cultural properties which was ruined - through the creation of characters in cyber space.

On 11 February, 2008, the Korean number one national treasure Sungnyemum, an ancient historical gate in central Seoul, was burnt down by an arsonist with foolish anger. The incident damaged national pride and people felt very sad for the loss of one of the most important symbols of Seoul city. The architecture, originating more than 600 years ago, was a considerable part of Korean's everyday life. This created a feeling of absence in daily life - yet its spirit was felt to remain. There was a huge desire to restore the national treasure in various ways, including a reconstruction plan, collecting funding and creating a virtual Sungnyemum on-line.

In this study we will look at the simulacra[1] of the building in Second Life, to consider how virtual restoration of Sungnyemum was created in cyber space. This restoration was completed through a process involving four levels of reproduction. In this paper the process will be explained. Also, more broadly, the characteristics of cyber culture will be discussed.

[1] Plato defines Simulacra as a copy of a copy, so like false pretenders they are built upon a dissimilarity, implying an essential perversion or a deviation. It is the unique phantasm (the Being of all beings), It is the power to affirm divergence and decentering and this makes power the object of power to affirm divergence and decentering. This power is the object of a superior affirmation. Gilles Deleuze. 1990: 204, 302.

2 Second Life

Second Life (www.secondlife.com) is the world's leading 3D virtual world environment enabling enterprises and educators to build custom, immersive spaces and applications which increase productivity, creativity and innovation while cutting travel costs and doing business in a more eco-friendly way. Since opening the doors of Second Life in the United States (2003) more than 13 million people are participating. More than 50,000 people from the republic of Korea have begun life in Second Life.

Major cities around the world exist virtually and these include many famous buildings such as New York's Yankee Stadium, the Eiffel Tower in Paris, Amsterdam Central Station, etc. Some cities and buildings, along with avatars with identities, make a culture in Second Life. Through disassembling and relocating an imitation of the real world is created, where each of the buildings, avatars and cities are compacted in a space with each as an independent piece. For this reason, virtual Seoul in Second Life is interpreted as a cubist painting, as virtual Seoul is made by reconstituting each part in sections from the real Seoul (See Figures 1, 2 and 3).

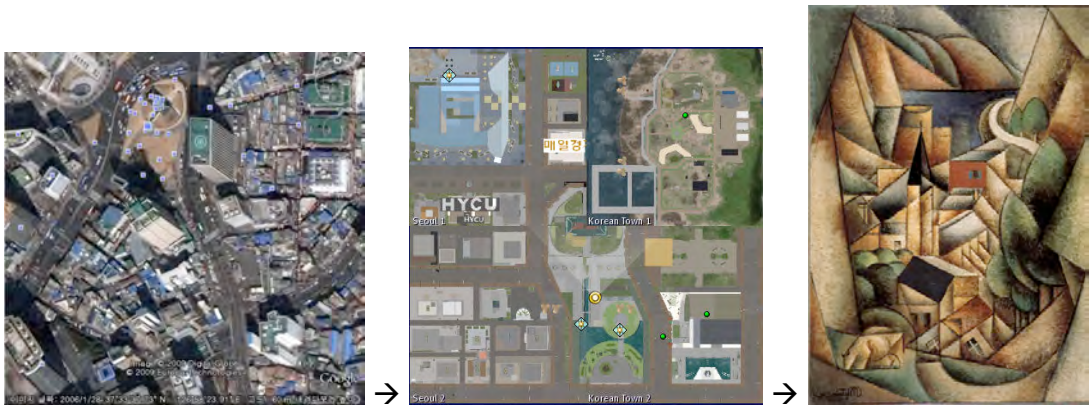

Figure 1. Seoul in the real world. Figure 2. Seoul in Second Life. Figure 3. Jean Metzinger (1883-1956) Aldeia, 1912

3 Construction of Sungnyemum

Sungnyemun is comprised immaterially of meaning, experience and it's external physical shape. Firstly its meaning and experience extend their spatial sphere as time goes by: Sungnyemun has been expanded from its (lost) physical space to the city Seoul and the nation Korea. Thus, invisible spaces of meaning and experience are piled up upon each other in Second Life. This make Sungnyemun like a channel

between civilization and tradition. Secondly its physical shape in Second Life helps give meaning and experience through acting as a cultural property - accessible to anyone wishing to visit the virtual site.

4 Reproduction process

4.1 Reproduction Level I: simulacra of information

The virtual metamorphosis of the Sungnyemuns' shape revealed a limited surface of its solid physical form. This meant the role of its shape was lacking somewhat in terms of physical detail, however meaning and experience can be considered to be vaporized and dispersed over the surface of the substitute.

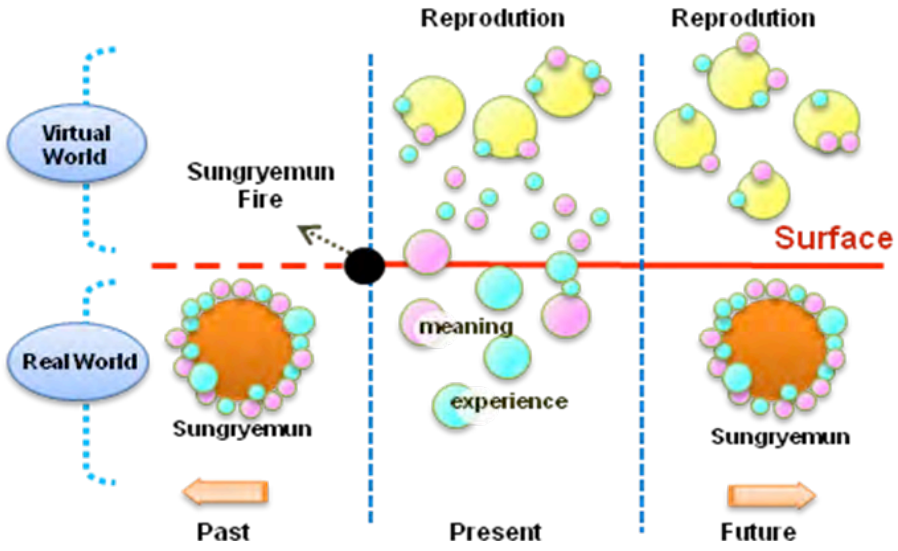

Figure 4. Division into real and virtual spaces

Figure 4 shows the process - the creating of a surface and dividing this into two spaces, resulted in the simulacra being created. Particular attachment to the appearance of Sungnyemun was the biggest issue because of the fire resulting in the building appearing burnt and collapsed. Therefore, simulacra had to incorporate this into imagery and serving as a monument within the flow of history. Meaning and experience floating over the surface searches for appearances and are absorbed into the afterimages individuals carry with them.

The desire for restoration was linked to a cyber campaign and the exchange of information on the network through a series of events. Meaning and experience are expressed on the surface of the building and these perceptions, located in the individual's consciousness, are expressed as behaviours. These behaviours drew from the communication behaviour on the Internet i.e. the series of events: 'The 100 day memorial for the destruction of Sungnyemun', 'the photos of old Sungnyemun in 1904', 'the soul of Sungnyemun restored by Pansori' and 'the candle ceremony for the clear spirit of Sungnyemun'. Thus the restored essence of subjective purpose came into being from the streams of information on the network.

4.2 Reproduction Level II: Simulacra of of image

Sungryemun as the most universal and objective shape is restored to 3D, as well as having perspectives from multiple visions - as parts that were seen in the real world. Sungryemun restored in virtual 3D in Second Life is detailed enough to distinguish giwatjang, mono and the contrast of building bricks, along with a detailed textual description.

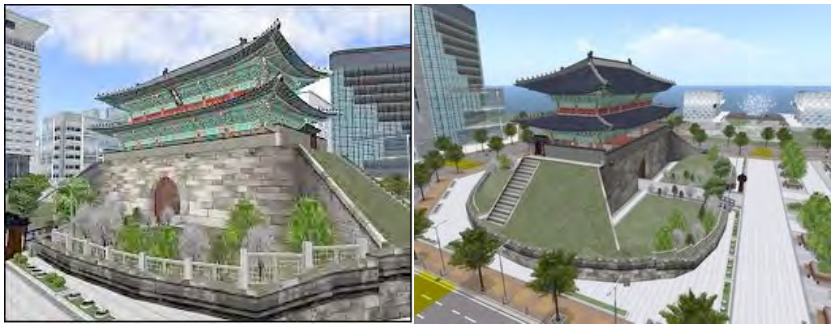

Figure 5. Restored Sungryemun in Second Life

With keeping similarities and likeliness of the real thing, it is possible to maintain habits of meaning and experience: the virtual image of Sungnyemun has both collected and continued these. For this reason only the appearances were restored at the beginning in Second Life. This is an example where an organically built virtual building, with the appearance of a real shape, can act as a centrifugal force in society through its continued generation of immaterial and invisible things. The shape of the virtual building 'fixes' its reality in virtual world. Thus, Sungryemun existed as only one thing in real world, but can be created in different spaces in the virtual world each with its own sets of experiences.

4.3 Reproduction Level III: simulacra of meaning and experience

When we say 'we look at Sungryemun, in virtual space this does not mean that we look at the essence of Sungryemun. We look at a 'recovery' and this is a consolation which we hope to see through the medium called cyber-space. From making meanings from fragments of the image, immaterial things can quickly 'fix' the space of virtual Sungryemun, thus experience can be easily created and accumulated. There is not a fixed vanishing point(s) in Second Life - like the cubist paintings - rather it shifts its place by moving into areas of different spaces.

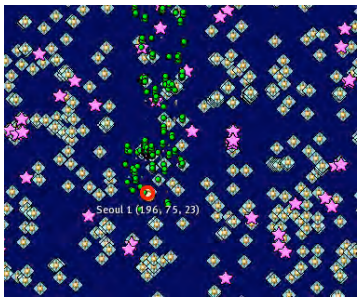

Figure 6. Object Map in Second Life Figure 7. Experiences around Sungryemun in Second Life.

Figure 6 is the object map of Second Life. Objects are stations, cultural heritage sites and shopping centres etc., which are simulacra of real buildings. The map shows the number of avatars around those buildings. This kind of a map shows virtual buildings as the main elements of Second Life in which experience is originated. Therefore, when a chapter of experience begins, the (chosen) vanishing point will be created. The virtual restoration of Sungnyemun performs a role where activity is created in the hubs of buildings in Second Life and virtuality depends on configurations mirroring real society. These configurations of environment make the avatar personalities in virtual space reproduce intuitive experience and moving around the space seems clear and easy. Second Life Sungryemun has attracted people to visit the building and hold events by Avatars - as though it were everyday life in the real world (Figure 7). Thus virtual experience derived from Sungryemun is created through a complex piling up of remembrances which operate between the real and the virtual.

Various spaces in Sungnyemun can be experienced simultaneously each having their own vanishing points of experience - and all experienced at the same time. These experiences can be in the past, present and future - gathered as it were in the one place. In this way reality and virtuality are blended.

Once a perfect restoration of real Sungnyemun exists, virtual Sungnyemun will be able to independently mass-produce unique experiences - being free from the real one. Thus the space Sungnyemun occupies in our imaginations and memories will be more extended and diversified.

4.4 Reproduction Level IV: Simulacra of fixing space

Virtual reproduction is oriented to the fixation of a physical entities existence through being recognized and protected as such. Because the virtual existence can simply be recreated or disappear, to give it some protection digital people are trying to build a virtual society by relocating parts of it to ensure continuance.

In order to be fixed (and to continue) Sungryemun in SecondLife has a virtual community bond. Thus its space can be strengthened through forming common interests around mainly common things. These bonds of virtuality could be built as a communal social network - forming a national identity - which is uncertain in cyber-space. Shared social characteristics and cultures can come into existence through individual experiences and meanings: a co-relation based on community intimacy. Furthermore the virtual restoration of Sungryemun tried to close up the gap between reality and virtuality and was regarded as heterogeneous space. To occupy its own space, Sungryemun in cyber-space was built upon incorporeal priorities, rather than the original nature of things i.e. its built physical priorities.

In the point of fact, the individuals in cyber-space pursue community in order to make progress for a fixation of a variable reproduction, and this helps ensure its continued existence. This fixed space helps extend the intrinsic value of the reproduction in virtual world - one made by a mutual dependence with real objects.

5 The special feature of CyberCubism Space

In this manner, I define as 'cyber-cubism' as the phenomenon that displays the overlaying and unfolding of time and space. A special feature of cubism is 'position of form and space'. In Picasso' painting *Guitar on a Table* (1912), the object called a guitar was arranged with pieces dismantling on the same level.

Figure 8. Pablo Picasso, *Guitar on a Table*, 1912.

In the painting, the abstraction of the object as an image are comprised of broken pieces. In this way the guitar can be displayed as an abstract form in one space which includes immaterial meaning and experience. These spaces of fragments bring harmony between real and virtual space, combining an external physicality and an abstractly fragmented guitar. Like this cubist painting, Sungryemun made partitioned space of the real and virtual combine through its various fragments. Also, these broken pieces connected to each other revealed complex networks with their own independence. However the example of Sungryemun revealed that the majority of cyber-space users tended to be quite conservative in terms of preferring the more real world objects and representations. We surmised that this was because it was an attempt to quell the fear and anxiety of things changing things through external forces.

By extension of this study, it can be interpreted that the dominant power of the virtual environment has shifted to users, and information has been accumulated by users. Because they can create information, they can break the given rules given - like a game - within the limits of an environment in the virtual world. Users tend to take control of an environment in cyber-space and resist change in terms of technology and communication altering that cyber-world. Yet also they tend to create their own individual spaces and so a virtual environment is divided into innumerable spaces.

6 Conclusion

This study discussed the characteristics of virtual Sungnyemum, its 4 levels of reproducing simulacra, CyberCubism and Second Life. Firstly the characteristics of cyber Sungnyemum in terms of its connection with Cubism: Second Life environment

is the synthesis of the parts in the real world - which takes spatial structure of three-dimensional geometry, with dynamics of each fragmented piece as in cubism. Three-dimensional geometry became 4-dimensional space by adding the flow of time: the movements of an avatar and a building can be overlapped as the avatar moves or environment moves in 4D space. This overlapping resonates with cubist painting.

Another point of Sungnyemum in the net is that the cyber contract works as a cultural property - just as though it exists in real world. Although the actual Sungnyemum has been ruined, avatars representing people visiting the 3-dimentional images in Second Life enable the sharing of information and experiences. This illustrates the cyber world expanding into the real world, and the way meaning and experience can be continued in virtual space.

Secondly it should be remembered that Sungryemun is much more than simply the virtual forming of a buildings external appearance. While the physical appearance is obviously important so also is the feeling (by users) that this representation is 'fixed' in cyber space and this enables the network to expand network and thereby connect experiences - something only possible in cyberspace. In this way meaning and experience continue to accumulate and this in turn publicizes the virtual space. Although we detect a somewhat conservative use of the environment it is possible that after completion of the real restoration of Sungryemun the virtual version will continue and will fulfil its own unique role: users tend to spontaneously reveal their nationalities and identities - but they should not been regarded as isolated.

People in cyberspace reveal gradually, and observe, the virtual world as though undertaking a journey. This can help us open our minds to the idea that immanent worlds can have both common features and differences: there are similarities and differences, pasts and presents, presents and futures, and each user can express their character by getting together through synchronism in cyberspace. Thus, various spaces exist simultaneously - with each uniquely different part existing on the same time line.

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The new theatre of the world: map mashups and web 2.0 space

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While the 19th Century attributed the flat world to the dark Middle Ages and its primitive believe in the edge of our earth, the 21st Century is facing a strange comeback of this image. It was the French astronomer and, a late if not a retarded romanticist, Camille Flammarion, who is to blame for the simplified view of the middle ages as the period when people believed in a flat earth. He is the probable author of an anonymous wood engraving from his 1888 book *L'atmosphère: météorologie populaire* (The Atmosphere: Popular Meteorology) depicting a missionary who just discovered the end of the world and the point where it touches the sky. This influential misinterpretation ignored the fact that the image of a spherical world was not only known to the Middle Ages - as we can see from the name and the illustrations of the famous Johannes de Sacrobosco tractate from the 13th century, *De sphaera mundi* - but it was actually a more prevalent model of earth.

The image of the flat world is more dominant today than it was ever in our history. The new edge and the point connecting heaven and earth is this strange but popular pin head called pin marker on Google maps. This marker is a visual metaphor which connects the objectifying and satellite image of earth with the subjective and earthly interests of its inhabitants. In the name of this symbol numerous mashups were created which always experiment with new and different interconnections between the phenomena on our modern flat earth. The modern day missionaries on this new flat world have found not only one point connecting the earth and the sky as the Flammarion engraving suggests but are continuously creating thousand of networks and mashups indiscriminately connecting different places, things, people and entities.

How did we get from this myth and prejudice of the flat earth and the dark Middle Ages to this most popular metaphor and vision of our world today? How did the flat world open a space for these prolific hybrid connections, new networks and mashups? Flammarion was wrong about the flat world of the Middle Ages but there is

an important transformation that happened during the 16th Century which explains the phenomenon of mashups. This change in the cosmography and mapping of our world is closely related to the ascension of secularization, science and technology - which started the age of colonization and globalisation - leading to the flat world of today.

The historian and the philosopher of science, Alexandre Koyré, describes this shift and transformation as the destruction of the cosmos, by which he means the destruction of the original, etymological sense of cosmos as the beautiful and well arranged unity, interpretation - which is common in the discussions of ancient cosmography. This nicely arranged universe was closed and hierarchically organised under the Aristotelian and later biblical models which we can see on the famous map by Peter Apian from his 1540 book *Cosmographia.* The earth in these models is not flat but closed, and organized in terms of different spheres from the changeable and unstable sublunar world, to the eternal and spiritual firmament. Everything has a stable place in this division between the lunar and sublunar spheres which was given by Gods` creation. The political, theological and cosmic orders are all closely interlinked expressing the hierarchical ideal of a closed and completed universe in which earth had its firm place in the sublunar sphere.

During the 16th Century a new model of the world and universe emerges shortly after the first sea voyages. It is the model of an open and infinite universe that is levelled and secularized without any hierarchy and it is waiting for us to be explored and conquered. This idea brought the destruction of the cosmos and disappearance of the finite closed, and hierarchically ordered whole. The development of science and technology went hand in hand with the rise of new maps and models of the universe and populated our closed world with new lands and new entities with which we have to create new relations and networks. This process is described by Bruno Latour as the proliferation of hybrids and the rise of the so-called non - human actors in the 16th Century. The renaissance maps where the first tools for creating the constantly changing and dynamic networks between the human and non-human actors - whose numbers are still growing in the age of mashups. Mashups are tools which allow us not only to make sense and experience our technologically saturated world, but to also create new and unexpected connections and networks between the human and non-human actors, between people, data and the things from the outside world. The division between the lunar and sublunar spheres, between the space of instability and corruption and the space of eternity and spirituality is questioned with every new

and unexpected territory, but also by science and technology and the new entities they discover and invent. The world simply ceases to be a moral lesson and becomes a space for exploration and experiments with new networks.

Five hundred years after these first models of the open universe new type of maps and models are emerging. Everyone can add nowadays and name a new layer of the world, create his own custom map and discover and share new data territories. It is the age of mashups and personal geographies when millions of Google map and Google earth users launch daily their textual and graphic adventures on the interactive models of our planet. They colonise the objective and universal representations of earth by monitoring, sharing and annotating different data of their rides, hikes, weddings, first kisses etc. They put themselves, their families, hobbies and different obsessions on the surface of earth to re-claim the territory. By doing this they reverse the history of mapping.

A long time ago mapping shifted away from trusting the human body as an agent of recording spatial information to the use of different instruments (compass, astrolabe etc) and objective representations. The map mashups return to the pre-modern condition when the individual and the human body were the referential point for all spatial information. Nowadays we annotate any type of data with GPS coordinates as we walk around the city. We can post in real time a personal opinion, evaluation or upload a picture from any place in the world. Map mashups are not only a scientific and topographic model and they do not consist only of grids, metric system and frame, but they start to define also an 'experiential' and even 'moral' space. They are closer to a thematic map bu, moreover, they bring to maps again values and not just facts. The unornamented graphic representation of the 18th and 19th Century maps are submitted to the ornamental possibilities of the mashups on which we can place photos, videos and any type of graphic. These new baroque maps have their own elaborate lettering, cartouches and pictorial symbolisation which bring together aesthetics quality with scientific precision.

Maps cease to be the objective images of the common world and are becoming again a place of utopian visions, ephemeral interests, grand and even apocalyptic stories. The return of the flat earth is this return of a world in which facts are not separated from values and nature is not separated from politics. The personal geography of mashups leads to a total annihilation of all hierarchies and differences in order to connect everything with everything else. Are mashups the icons of the

new cosmology? Do they bring the return of the repressed values and beauty or do they lead to the further destruction of the cosmos? Are mashups and other web 2.0 phenomena like social tagging symptoms of the end of our fascination with technologies and the return of man to the centre of the universe? Are we experiencing some type of 'sampled' humanism on these new models, or do they only reinforce the posthuman erasure of all differences between humans and non-humans, between what is embodied and what is digital? How do we evaluate the infinite linking of small and big, human and non-human, ephemeral and cosmic on these new maps? Will the interconnection of everything with everything else bring a total relativisation, far more extreme than the renaissance destruction of cosmos, or we can expect some new form of a closed and hierarchical world with one goal – survival?

Mashups are the continuation of the dramatic changes in the way we represent and perceive our world (the planet and the universe) ever since the 16th Century, but also a revival of pre-renaissance experiences and values. It is important to place them in this broader context and discussion of transformation of models and maps of our world because this process exists in parallel with other major transformations in our culture and society. Maps and models of the universe always play a crucial role in how we perceive our place in the universe as humans, especially now when we are challenged by many new and emerging technologies. Mashups are this most recent response to a very complex world of the web 2.0 technologies with its diversity of content, quantities of data as well as numbers of users, digital identities etc. There is a need for tools which will help us grasp the complexity of data we produce and consume and make them more synoptical but also useful.

Mashups however are not only visualisation tools used for the data chaos, they are also active tools with which we can place the humans back into the picture, collectively envision our world and universe and take part in what can be described as microglobalisation. Mashups are the not only the new means to create more hybrid networks in which humans and non-humans dissolve but they are also phenomenological tools with which to place back human experience into the technological world. All the new geoware, geotagging and the different ways of how to monitor and annotate space are the new compass and astrolabes with which we explore the hybrid worlds between the digital and the physical, the human and the non-human, the known and the unknown or the emergent. They are also personal tools with which we make sense of the technological universe.

Contrary to the networks, they connect not only the humans with the non-humans but also transform the whole relation between what is small and big, private and public, local and global and in the most general sense - the human and the cosmic. These hybrid connections and similar misalliances are norms rather than a chance encounters in the case of mashups. How do we evaluate and speak of this extreme linking of everything with everything else? How do these new maps that mash different content change our view of the common world and our place in it? How did the world flatten so much in opening this new space for networks, mashups and hybrid connections?

The flat world of the 21st Century with its globalization 3.0, web 2.0 and other attributes is a world of networks and mashups where humans and non-humans, things, machines, institutions but also people, data and objects are all in constant flux, creating new types of constellations and connections. Everything is levelled to such a degree that we could agree with the visionaries of the *Internet of Things* and RFID technologies where soon all things will chat with each other but also no one will be able to spot the difference between humans This flatness of our world has a paradoxical and interesting effect which we can describe as anthropomorphisation of technologies which runs in parallel with an intense dehumanisation of people: software is increasingly 'social' and biological, for example a SUN product will bring a new 'participation age', CISCO describes their technologies as a 'human network', Microsoft has it's 'People_Ready' business slogan - to name but a few of the many examples attempting to humanise technologies.

The goal of these technologies and phrases is not to create machines that think or feel like humans, nor to transform humans into machines, but to preach this strange symbiosis where both can live together in peace, harmony and equilibrium by supporting each other. This strangely sampled humanism is reinforced by radical posthumanism of thinkers when they speak of humans: like the 'wireless bipeds' of William J. Mitchell which he uses to define humans, or his concept of the self as a programming entity 'Me++'; Dona Harraways` concept of cyborgs; GenRich humans by Lee Silver; Metaman of Gregory Stock, ex-humans by Hans Moravec; transhumans and other beings which populate much of our writings on the post-modern man. This common flattening of the difference between what is human and nonhuman is also closely connected to the classical concept of network in Bruno Latour`s writing and in the concepts of Actor Network Theory which emphasis this as the basic character of our modern world.

How is the idea of a human and non human network, of anthropomorphised technologies and dehumanized people connected to the current mashup phenomena? While the idea of a network only describes the process of anthropomorphisation of technologies and the dehumanisation of people, mashups are a more normative concept; they actively support and create new forms of networks. The mashups are a means of experimenting with different connections, they are means of what Bruno Latour calls 'cosmopolitics' - the normative involvement in the creation of new hybrid collectives. Mashups also give us a unique opportunity to study, in real time, different hybrid and experimental collectives.

Mashups are simply an outcome of the intensive interactions and connections between humans and non-humans happening during the recent few centuries. Different networks, hybrids and translations between human and the non-human characterize our entire modern and postmodern world: it is impossible to draw a clear line between culture and nature, technology and politics today. While this idea of networks was more a metaphor in the 80s and 90s, with the advent of Internet and development of web 2.0, with mashups it became literally true. The mashups represent this new cosmography of the web 2.0 universe where millions publish, share, organise, annotate and mash content. We are basically not only witnessing the personal colonisation of media and public space, but also the whole globe. This renaissance colonisation is where modern and postmodern globalisation are changing in these new maps - into something which could be described as 'microglobalisation' - done by everyone individually - creating new models of the physical world as well as the virtual world through inhabiting Second Life.

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Virtual places, real money: the role of virtual worlds in the success of video games as cultural products

Kimon Keramidas

To start with - some significant pieces of data

On September 25th, 2007 Microsoft and Bungie Studios released *Halo 3* and in less than 24 hours the game made more than $170 million dollars, leading Microsoft to proclaim it 'the biggest entertainment launch in history.' ('*Halo 3*' 2007) Since that date, *Halo 3* has gone on to sell nearly 10 million copies (9.73 million as of June 2009). ('Worldwide Total Sales' 2009) In addition, *Halo 3* has also been one of the most heavily played online games in history. On May 1, 2009 Bungie announced that four players had participated in Halo 3's one-billionth match. Over those billion matches more than 9 million players (Wade 2009) had clocked over 2 trillion seconds of playing time, which comes out to more than 64 thousand years. (urk 2009)
On another note, Blizzard Entertainment, Inc. announced on October 28th, 2008 that its massive multiplayer online role-playing game (MMORPG) *World of Warcraft*, released in 2004, had exceeded 11 million subscribers for the first time. ('*World of Warcraft'* 2008) Considering that *World of Warcraft* requires a monthly fee of 15 USD, it is a safe bet that over the course of a year Blizzard Entertainment now earns close to 2 billion USD in revenue from these gamers. In addition to subscription revenue Blizzard has also been able to count on the earnings from the sale of software needed to play the game, of which 14 million copies (as of June 2009) have been sold at approximately $50 USD apiece. ('Worldwide Total Sales' 2009)
This type of economic success is representative of the worldwide video game industry as a whole, which has seen record-breaking growth over the past five years. Sales of video games and game consoles have nearly doubled since 2002 reaching 41.9 billion USD in 2007, and with continued growth expected sales are forecasted to reach 68.9 billion USD by 2012. (Caron 2008) These staggering numbers are reflective of the reality that video games are an increasingly important part of not only the daily entertainment choices of consumers, but also the global cultural economy as a whole.

Considering the increasing importance of video games in our culture we must therefore approach games both as aesthetic objects and as products situated within a cultural marketplace. I will discuss how the elaboration of fictional worlds within virtual spaces has been central to the expansion of video games simultaneously as cultural objects and cultural products. By looking at the importance of this type of world building in determining the success of a game's design and in determining the longevity and profitability of gaming properties, I will show how the development of immersive and entertaining virtual spaces has played a role in both the recent aesthetic evolution of games as an art form and their ascent to prominence as cultural products within the global marketplace.

Building game worlds

The creation of art and culture is in most, if not all cases, one of world building. When a novelist writes a book, he composes a world for the reader in which the characters and plots can exist. Similarly, a painter must imagine not only the shapes and colours within the boundaries of the work but also the history behind the moment he intends to paint, the possible futures for that space, and the world that exists beyond the boundaries of the canvas. And in film, the director and cinematographer use exposition and establishing shots that allow the viewer to imagine a rich world that extends beyond the limitations of the screen.

World building is as critical to a successful video game as it is in any of these other art forms. In fact one could argue that the interactivity that is so central to the video game experience makes the creation of a thorough, expansive and immersive world even more important. For instance, let's compare and contrast the comprehensive construction of space and place in both film and games. The specific details of the world in each shot or frame of a film must be more precise and comprehensive, as the specificity of film presentation demands a certain scale of presentation and very high-resolution imagery. But the director need only construct the facets of the world that he plans to portray on a screen. Only half a room or the facade of a building needs to be constructed in order to accommodate the planned shot for the film, because the other half of the room or the inside of the building may never be seen in the film.

In a video game however, the self-determinacy of the interactive player allows for a freedom of movement and exploration of the devised world. Therefore that world

must be more completely realized. This condition is true whether that world is cartoonish and simple in its structure, as in the Nintendo racing game *Super Mario Kart* where simpler environments provide a backdrop for the playable race tracks, or completely realized and lavishly detailed, as in *Grand Theft Auto IV* which takes place in a highly detailed fully explorable area approximately the size of New York City. In addition to filling the space of these worlds for the character to move within, good game design takes into consideration that these spaces must be places that ensure that as the player continues to progress through the game, he will constantly be having new experiences, and remain invested in staying immersed within the game world.[1]

The distinction between space and place here is important as the key to a successful game is the creation of an environment and story that is compelling enough to keep the gamer invested in participating in the world of the game. Those games that are most successful and achieve both economic success and critical acclaim are able to balance compelling environments with challenging game play and an intriguing story.[2] In this sense the features of game play and story add to the sheer geography of the virtual space to create a more realized and complex place for the gamer to inhabit through his character.

The importance of the generation of places full of interesting characters to be met, and experiences to be had, is readily visible in well-known and broad-scoped games such as *Grand Theft Auto IV* and *Fallout 3*, which provide hundreds of square miles of territory to be explored, a seemingly endless number of computer controlled characters with whom to interact, and more than fifty hours of possible gameplay. But it is also true of much smaller games. For instance, the game *Braid*, a side-scrolling game available through the Xbox 360 Live Arcade, gained almost universal acclaim for its balance of unique gameplay, visual composition, and storyline. The creator of *Braid* was able to combine a complex and nuanced application of time and spatial mechanics in relation to character movement with a highly stylised visual

[1] Alison McMahan notes that there are three important conditions which must be met to maintain this immersion in 3-D environments that could be applied to all game environments: "(1) the user's expectations of the game or environment must match the environment's conventions fairly closely; (2) the user's actions must have a non-trivial impact on the environment; and (3) the conventions of the world must be consistent, even if they don't match those of 'meatspace'." (2003: 69)

[2] For the sake of this discussion we will consider story in a broader sense and not solely limited to a traditional narrative. This is because while a traditional narrative is the structure for most games, such as highly-regarded *Bioshock*, there are many games, such as *The Sims*, where the story of the characters is determined very closely by the gamer as he determines the path of his character's life. In such a case, story is still important although a narrative is not followed because it is the capacity of the user to generate an interesting story on their own which makes the game compelling.

design and a simple yet poetic storyline to create a fully realized world. Although relatively short in duration to the expansive titles mentioned above *Braid* was able to provide the same kind of complete world for the gamer to inhabit.

From these few examples we can see that great games usually occur in great places. Therefore it is important to consider how the components of space, gameplay, and story are constructed in any game when reflecting on its quality as both a work of art and a cultural product. However, the idea of place in games is not necessarily only a characteristic of story-driven games, and if we look past the spaces of individual games we begin to see how important the expansion of virtual places beyond traditional gaming experiences has been significant in the recent radical increase in the importance of the gaming industry.

Marketing game mythologies

Returning our discussion to our initial examples of *Halo 3* and *World of Warcraft*, we can begin to see the importance of the elaboration of compelling virtual worlds in the successful development of powerhouse franchises of this ilk. First let us consider the importance of *Halo 3* and *World of Warcraft* being parts of larger franchises. *Halo 3* was the third game in a trilogy of first person shooters that has since spawned two further games. *World of Warcraft* on the other hand was built upon the *Warcraft* franchise, which originated with three real time strategy games with very different gameplay mechanics than the MMORPG. As part of larger game worlds both of these games represent either a historical or geographical subset of larger game worlds. The impact of this characteristic of each game is that the virtual worlds they take place within are more layered than a game that exists in isolation.

In the case of *Halo 3*, the game was the conclusion of an evolving story in a virtual world that over the course of three games was able to develop, not only a geographic specificity, but also a cultural history involving numerous alien races. By this third installment gamers were already familiar with the main protagonist Master Chief as well as the Covenant, an army of multiple alien species, and the Flood, a parasitic galaxy-threatening force. Gamers were also familiar with the planetscapes, architecture, and even the military traditions of the different forces. This background provided the developers with a rich armature upon which to add new plot twists and game play experiences, thereby making a rich and familiar space even richer and more compelling.

World of Warcraft on the other hand was a new type of game with a new type of structure for the *Warcraft* franchise. Nevertheless the developers at Blizzard were able to transport many of the story lines from the previous *Warcraft* games as well as characters, races, and locations. The abundant material has proved to be important to the success of *WOW,* because it provided a strong foundation for the development of an immense virtual universe covering multiple planets and including a diverse range of climates, landscapes, races, and cultures, all which play an important role in keeping the universe diverse enough to keep millions of users coming back for more.

In considering the construction of space and thereby place in the *Halo* and *Warcraft* games, it is important to recognize a characteristic that each share in the construction of their virtual world that has allowed them to transcend the borders of the gaming community, enter into the discourse of popular culture and become economic and cultural juggernauts: a mythology for their gaming world. In this case, mythology refers to the complex webs of histories, locations, and characters that create the cross-textual fabric that makes cultural franchises such as *Halo* and *Warcraft* so successful. Perhaps the classic popular culture example for these types of franchises is *Star Wars*. The *Star Wars* universe has thrived and persisted because of the amount of time and energy that has been spent perpetuating and enriching the universe first articulated in George Lucas's original three *Star Wars* films. Through books, television shows, video games, merchandise, other movies, theme park rides, etc. the *Star Wars* universe has continued to grow for over thirty years, engulfing multiple generations in what is probably the most thorough and comprehensive popular virtual place, a place that existed a long, long time ago in a galaxy far, far away.

The significance of *Star Wars*, and its amazing economic successes, as a model for franchises such as *Halo* and *World of Warcraft* is no small thing because it highlights how closely tied this kind of world (or galaxy) building is tied to the economic factors that drive these kinds of cultural products. Just as the *Star Wars* galaxy has been expanded and marketed through other media, *Halo* and *World of Warcraft* both franchise numerous book titles attached to them, along with a presence in comic books and graphic novels and have burgeoning merchandise collections. In this sense, these two franchises have been recognized as the types of unique intellectual properties that attract the kind of audience that is drawn to this type of mythological expansiveness. As these virtual worlds become recognized as places ripe for long-

term development, both within their core medium of video games, and across other media, there is more investment in the continued articulation of that virtual world. We can see this long term development in video games already as the *Halo* universe has spawned two additional games *Halo:Wars* and *Halo:ODST* with a third already in the works. The original *World of Warcraft* has already been expanded twice with *The Burning Crusade* and *Wrath of the Lich King* with more expansions in the works. Furthermore, there has been serious consideration as to how to maximize the profitability of these properties in other prominent media, and there have been rumblings about movies for both.

This kind of franchising has become an important part the increasing importance of video games because it allows game developers to reach more audiences and through films, books, comics, and television, expand the exposure of the games as a brand. Other video gaming franchises have reached into other media with games such as *Doom*, *Resident Evil,* and *Lara Croft: Tomb Raider* having been made into live-action movies, although a true blockbuster movie based on a game has yet to manifest itself. Similarly, games have often borrowed from films and expanded on their places on mythologies, as far back as *Tron* and as recently as *Terminator: Salvation.* The importance of these developments in the continued consideration of gaming properties as profitable and vital to the cultural marketplace cannot be understated as video games continue to be resituated within cultural hierarchies of economic and cultural value. This is especially true considering the relative youthfulness of video games as a medium and the fact that history has shown that as media mature they tend to gain acceptance across a wider spectrum of audiences. But, just as these similarities between video games and other media are important to their expansion as cultural products, it is one of the unique characteristics of video games' more unique characteristics that may prove to be the most significant and differentiating: online social space.

Online social space: the great persistor

There is no shortage of good recent scholarship on the importance of online interaction in video gaming, as it has rightly been recognized as one differentiating

characteristics of the medium.[3] In particular this scholarship has focused on the representation of the individual and the experience of identity, gender, and embodiment online with others. For the sake of this argument, however, I would like to think of online social space from a slightly adjusted perspective that will be more in line with virtual places and worlds. In particular I would like to consider how the online social features of the virtual spaces of *Halo 3* and *World of Warcraft* have been critical to the success of these spaces as persistent worlds that, are not only compelling because of their immersive construction, but also because the presence of other players adds a continual variability that allows the spaces to persist and even exist beyond their predetermined storylines outlined by their developers.

Halo 3 with its millions of online competitors participating in team competitions and death matches is able to keep gamers participating in its virtual world for a long time after they have completed the relatively short five hour story-based campaign. A combination of refined competitive gameplay, unique tools for the creation, recording, and playback of different online experiences, and a strong connection to the places and cultures of the *Halo* universe create a unique synergy that has yet to be matched by other video games. *Halo 3* has become the precedent setter for console-based virtual worlds that combine rich more traditionally story-based universes with unique online social experiences. The combination has made the *Halo* universe popular and culturally persistent far longer than similar first person shooters, and is a powerful example of not only the creative possibilities of this type of video game, but also the enormous economic potential these types of properties possess.

World of Warcraft on the other hand works just as successfully if not more successfully than the *Halo* games, but almost in reverse. Whereas *Halo* was successful as an individual experience first, and then burgeoned as an online environment, *World of Warcraft*, after borrowing some source materials from earlier *Warcraft* games, began as an MMORPG predicated on the fact that online social interaction would play a strong role in defining the dynamics of the spaces players would inhabit. Understanding that such a vital gamer-based word would be dependent on a persistent world that gamers would find interesting and compelling, Blizzard crafted story lines, and experiences within the game that could be played like a single-player game to allow each player to not only experience the history of

[3] Jim Rossignol's *This Gaming Life* (2008), Mark Wolf and Bernard Perron's *Video Game Theory Reader* (2003), and Noah Wardrip-Fruin and Pat Harrington's *First Person: New Media as Performance, Story, and Game* (2004) all provide good materials on subjects relevant to this discussion, such as online communication, identity construction, and embodiment.

the world but also build a rich history for their character over many hours of gameplay. This comprehensive elaboration of the space in multiple directions (single player experience, mutli-player experience, player vs. player experiences) then coalesced to form an incredibly rich environment that brought players back again and again and allowed them to add their own experiences to the increasing diversity of the social spaces that helped define the *Warcraft* universe as a place inhabited by numerous gamers in the best way possible.

Conclusion: add it up

Looking at the earnings of *Halo 3* and *World of Warcraft*, it becomes quickly apparent that video games are a very real economic force, and thus cannot be ignored as important cultural products. Taking this into consideration, alongside the analysis of the carefully devised and thoroughly constructed and populated spaces of these games, shows us the importance of place in creating compelling immersive experiences for gamers. So, as video gaming grows as a medium and individual games come to have a greater impact as independent cultural products it is likely that we will see that successful games will share the characteristics of a combination of elaborated spaces, challenging gameplay, and compelling stories within the context of both individual and social experience.

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Mitate: realising playfulness, multiple viewpoints and complexity in device art

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Mitate is a widely known Japanese tradition. It is a conscious act of showing/seeing a thing from a different viewpoint. The concept was further developed into an art of representation. While it is based on the universal human capability of imagination and association, *mitate* is a cultural phenomenon. As a part of the Device art project, since 2005, which seeks a new form of media art that goes beyond the art world, the author has analyzed 'Japanese' elements in today's media art. Through the analysis it is understood that *mitate* adds multiple layers of meanings to artworks in playful manner, and serves to open up interaction between the artwork and its interactors': it is similar to metaphor but its notion is wider and multifaceted.[1] This paper discuss the relationship between playfulness and *mitate*.

What Is *Mitate*?

Mitate is a way of using metaphors, associations, appropriation, simulation and double meanings - often in a playful manner - to (re-)present and read/imagine alternative meanings behind the real/physical (and often normal or unimportant) objects or scenes.[2] Since *mitate* allows an interpretation very different from what was originally meant, it may function as a way of hacking or satire: an important or sacred figure would be interpreted as figures such as a prostitute or a daily utensil. The word first appears in *Kojiki,* which was supposedly published in early 8th Century. (Aoki 1996: 42)[3] The idea is widely spread in Japanese culture, as can be seen with flower arrangement, *bonsai,* and gardens.[4] Masao Yamaguchi points out various examples of *mitate* in religious ceremonies. (Yamaguchi 1996: 5-6) *Mitate* is widely used in

[1] In Western art, paintings based on allegory or symbolism and works by artists such as Archimboldo are close to *mitate*, but optical illusions in general do not belong to *mitate*.
[2] Diagnosis by a medical doctor is also called *mitate*, especially when it has a rather temporary nature, although another Chinese character is often applied. Choosing a right kimono for someone is also called *mitate.* The act involves suggesting, guessing, and imagining the right choice.
[3] Aoki classifies *mitate* into different combinations of assimilation (association) and simulation (copy).
[4] *Ryoanji* Temple in Kyoto is a known example. Other gardens offer virtual travel through classic literature with suggestively arranged stones, trees, etc.

literature including *haiku*.[5] The nature of *mitate* is in the fun of offering and discovering a surprisingly different meaning behind the presented reality. Clues are cleverly placed, while interpretation is open to each viewer.

The term was consciously used in Edo era (1600-1868) especially in *kabuki* and woodblock print. Part of the reason for *mitate* was the severe control on entertainment. Depicting contemporary and actual themes was strictly forbidden. To avoid legal conflicts, art of *mitate* achieved its maximum complexity in the late Edo era, while its inventiveness and playfulness became an attraction in itself.[6] The intellectual interplay was enjoyed among townspeople and in numerous books and prints. *Mitate* in tea ceremony is defined as:

> Sen no Rikyu using his outstanding aesthetic sense, decided the form of tea utensils and also brought into chanoyu objects which were not originally made for it. This was called 'mitate'. The word 'mitate' means 'to see an object, not in the form that was originally intended for it, but as another thing',(…) Rikyu really brought this spirit of 'mitate', which came from literary theory, to life by using everyday household articles as utensils for chanoyu.[7]

Besides the gourd appropriated into a flower vase by Rikyu, a well-known example is normal rice bowls from Korea, which were 'discovered' to be perfectly suited for serving tea. The 'found' object needs to be aesthetically interesting and fully functional, while the gap between its purported use, and the newly discovered use, brings an excitement.

Playfulness and *mitate* in Device art

Japanese media artworks have often been criticized as being 'too playful'. However, playfulness is in the origin of media art.[8] Playfulness in Japanese media art reflects both historical reasons and contemporary popular culture (Kusahara, 2007: 277-307; Screech 1996). Device art considers playfulness a positive feature that enables bringing artworks outside museums and galleries, including being commercial products. (Kusahara 2008: 275-279)

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[5] Akira Amagasaki analyzes various types of *mitate* in literature in *Nihon-no Retorikku*.
[6] *Tsukurimono* (or *tsukurimon*) was such an example of sideshow in late Edo era.
[7] http://www.omotesenke.jp/english/chanoyu/6_3_1.html, *Chanoyu* means tea ceremony.
[8] Marcel Duchamp's works often contain playfulness, as in case of *L.H.O.O.Q.*, or *The Fountain*. Nam June Paik also had a playful approach combined with a critical attitude.

Novmichi Tosa (Maywa Denki) has used *mitate* extensively since 1993 in developing a variety of mechanical/robotic instruments and gadgets that comment on the relationship between technology, society, and our life. For example *Na-Code*, an electric cable in a shape of fishbone, visualizes electricity with its dangerous side - which we tend to forget. The name has a double meaning that suggests the commercially available product is a 'go-between' that connects us to the industry, as well as to the artist.[9] The complex set of metaphors, associations and wordplays form a playful *mitate* that enables bringing together two totally different things – an electric cable and a fishbone – in a creative manner. One of Tosa's projects is 'life with Maywa Denki', which promotes use of Maywa Denki's devices in everyday life. It is neither a conceptual proposition nor an installation meant for a museum or a collector. People can buy products such as Na-Code from online or offline shops to become Maywa Denki users. These objects placed in one's private room or house will function as devices for *mitate*, similar to rocks in a Japanese garden.

Sachiko Kodama creates dynamic sculptures using ferrofluid, a material developed at NASA in 1960s. With 'Protrude, Flow' (2002), as electromagnets react to the surrounding sound, the heavy black liquid transforms quickly into sharp spikes, bubbles, etc. Here the artist appropriated the industrial material as an artistic one, while viewers transform the physical phenomenon into an artistic experience through their own *mitate*. The gap between the industrial material and the beauty it creates produces a sense of wonder. While association is open to each viewer, the artist has designed the device with knowledge about viewers' imagination and artistic authority. The whole process is similar to Rikyu's gourd flower vase.

Hiroo Iwata applies *mitate* in a twisted manner. 'Feel Your Brain' (2008) measures one's brain activity with near-infrared spectroscopy (NIRS) and transmits the data in real time on a thermal display in the shape of brain. This is the person's own brain according to *mitate,* and can be held on his/her lap and felt by both hands. The piece is a continuation of Iwata's earlier work 'Floating Eye', with which one's sight is replaced by a camera attached on a blimp which the person carries above his/her head - realising the McLuhanian extension of body using latest technologies.

[9] Tosa produced a video showing how Na-Code is 'mass-produced' in an old fashioned family operated 'factory', which overlaps with his father's company Maywa Denki. The original Maywa Denki went bankrupt in 1970s as it lost market share against big companies.

Kazuhiko Hachiya also employs *mitate* in many of his works. 'ThanksTail' (1996), which was commercialized by a car accessory manufacturer in 2004, is a communication device for car drivers. Attached on the rear of a car and remotely controlled from the driver's seat, the tail-like device wags to express 'thank you' or 'sorry' to another driver. The artist had thought of a friendly communication device for drivers - to change the current driving culture, and which had been missing from car design. Hachiya designed a prototype and uploaded it on his website with a call for a production partner. Creating a museum piece was not his goal and thanks to the rapid development of inexpensive wireless communication technology, the idea was realized after eight years.

While the mechanical device does not look exactly like an animal's tail the association is clear to anyone. The artist uses shared images and knowledge amongst people, such as a car being associated with animals (which is a cliché in advertising) or how friendly dogs wag their tails, in order to establish a visual communication using the device. At the same time the unexpected combination of a car and a tail brings guesses, laughter, and probably happy conversations afterwards, even for the passers-by. Similar to what woodblock prints did with *mitate* with people in Edo, 'ThanksTail' brings discoveries and fun to people, as well as being an inventive communication tool and the artist's critical thinking on automobile society.

Conclusion

Mitate enables creating multiple layers on an artwork. It also allows an open space for viewers/interactors to explore what an artwork could signify. Its playful nature fits with Device art, and is effective in bringing artworks outside museums and galleries. While not all artworks are playful, playfulness could be positively explored in media art. *Mitate* makes it possible to combine playfulness with critical themes with multiple layers, maintaining the value of the playful surface - like the art of wrapping - which is still very important in Japanese culture.

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When digital trumps analog: teaching with Second Life

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It sounds like a horrible idea.

Put the head of a slightly anesthetized cat into a vice so that it's forced to watch a simple slide show while you poke the back of its brain with a microelectrode. But that scene was not a horror movie plot that would give a member of PETA (the People for the Ethical Treatment of Animals) nightmares, two scientists won a Nobel Prize for that experiment in 1981.

The work of Canadian David Hubel and Swede Torsten Wiesel of the Johns Hopkins University in Baltimore, provided clues to how the brain sees images via our eyes. The two jabbed a microelectrode into a brain cell in the visual cortex at the back of the brain of an anesthetized cat and connected it to both an amplifier and an oscilloscope. The amplifier converted electrical energy to a 'put-put' sound while the oscilloscope turned signals to a blip on a screen so they could measure the response.

With the cat's eyes open and focused toward a screen, the scientists flashed simple straight and slanted light patterns. With their set-up Hubel and Wiesel could see and hear immediately the effect of any nerve cell stimulation by the patterns of light. After they flashed the light on the screen several times and adjusted their equipment, the scientists recorded what they had thought was possible: the stimulated activity of a single brain cell responsible for vision.

The visual cortex is composed of several thin layers of nerve tissue. By this tedious and perhaps ethically disturbing method of placing microelectrodes in various cells within each layer of a cat's brain, Hubel and Wiesel found that some cells responded to a spot of light while others noted the edges of objects, certain angles of lines, specific movements, specific colours, or the space between lines rather than the lines themselves. In short, each brain cell in the cortex almost reacts in a one-to-one relationship with the type of visual stimulation it receives. From all this information,

the brain constructs a map of the outside world projected upside-down on our retinas.

More importantly for visual communicators, it was eventually discovered by other researchers that the brain, through its vast array of specialized cells, most quickly and easily responds to four major attributes of all viewed objects: colour, form, depth, and movement. These four visual cues are the major concerns of any visual communicator when designing an image to be remembered by a viewer because they are noticed before a person even realizes what they are. The four visual cues, therefore, are what the brain sees, not the mind. Consequently, the four cues can be used to attract attention to a presentation whether in print or for a screen.

Colour

Throughout human history, people have been fascinated by light. Civilizations prayed at, and celebrated the start of, each new sunrise and invented gods that ruled the sun. Religious leaders equate light with life and most religions begin with its creation. When the light from fire was discovered, probably by accident through a lightning strike, most were awed by its power. Literary references and colloquial expressions about light and vision abound, because of the importance placed on seeing. When we want to learn the truth we say, 'Bring light on the subject.' After a revelation of some truth we have 'seen the light.' If we are concerned that we are not getting the full story, we complain, 'Don’t keep me in the dark.' New Orleans photographer Clarence John Laughlin once wrote, 'One of my basic feelings is that the mind, and the heart alike ... must be dedicated to the glory, the magic, and the mystery of light.' Rock bands such as Daft Punk, Etienne de Crecy, Radiohead, and Trans-Siberian Orchestra among others know the power of light to attract attention so they produce expensive light shows to accompany their concert performances.

Light can intrigue, educate, and entertain, but nowhere is light so exquisitely expressed as through colour. Colour is a highly subjective and powerful means of communicating ideas. James Maxwell, the Scotsman who gave the electromagnetic spectrum its name and invented colour photography in 1861, once wrote that the 'science of colour must be regarded essentially as a mental science', in contrast the artist Francis Bacon’s common-sense statement proclaims that 'All colours will agree in the dark,' and no two individuals see a colour in exactly the same way.

Form

Another common attribute of images the brain responds to is the recognition of three types of forms: dots, lines, and shapes. The dot is the simplest form that can be written with a stylist. A dot anywhere within a framed space demands immediate attention. In the centre, it becomes the hub of visual interest. If off to one side, it creates tension as the layout appears out of balance. Two dots within a framed space also create tension as the viewer is forced to divide attention between the two forms. When three or more dots appear in an image, the viewer naturally tries to connect them with an imaginary line: it may be a straight or curved line or take the basic shape of square, triangle, or circle.

When dots of the same size are drawn so closely together that there is no space between them, the result is a line. According to anthropologist Evelyn Hatcher, straight lines convey a message of stiffness and rigidity and can be horizontal, vertical, or diagonal. Horizontal lines, especially when low in the frame, remind viewers of a horizon with plenty of room to grow. If the horizontal line is high in the frame, the viewer feels confined, as the layout seems heavy. In a layout, vertical lines bring the eye of the viewer to a halt. The eye attempts to travel around the space created by the line. Diagonal lines have a strong, stimulating effect in a field of view. The most restful diagonal line is one that extends from one corner to its diagonal opposite. It is a perfect compromise between horizontal and vertical forces. Any other diagonal line strongly moves the eye of the viewer in the line's direction. Several diagonal lines within a composition create a nervous dynamic energy. Curved lines convey a mood of playfulness, suppleness, and movement. Curves have a gracefulness about them that softens the content of their active message. If lines are thick and dark, their message is strong and confident. If thin and light with a clear separation between them, their mood is delicate, perhaps a bit timid.

The third type of form, shapes, is the combination of dots and lines into patterns that occur throughout nature and in graphic design. Shapes are figures that sit on the plane of a visual field without depth and define the outside edges of objects. They can be as simple as a beach ball and as complex as the side of a person's face. A shape that is quickly recognized is clearly separated from the background of the image. The three basic shapes are parallelograms, circles, and triangles. From these three shapes, variations that make all known or imagined forms can be created. Polygon is the name of the form created by a combination of shapes. As with all

visual attributes, cultural meaning is assigned to each shape. In 1987 American animator Bill Plympton was nominated for an Academy Award for his short cartoon, *Your Face*. In its short timeframe, Plympton shows how a creative and talented mind can make variations on the shapes that combine to form a human face. Later, the same concept was used in a commercial for Taco Bell.

Depth

If humans had only one eye and confined their visual messages to drawings on the walls of caves, there would be no need for more complex illustrations that could be made from dots, lines, and shapes. But because we have two eyes set slightly apart, we naturally see in three dimensions - width, length, and depth - rather than only the first two. In 1838, Sir Charles Wheatstone presented a paper to the Royal Society of London detailing his views on binocular vision. He concluded that our two eyes give different views and create the illusion of depth. The images are projected onto each two-dimensional (2-D) retinal screen at the back of each eye and travel to the brain that interprets the difference between them as depth.

Movement

Colour, form, and depth join movement to constitute the principal qualities of images that make the cells in the visual cortex respond quickly to a stimulus. Recognizing movement is one of the most important traits in the survival of an animal. Knowing whether an object or other animal is moving closer or father away avoids potentially harmful encounters. There are four types of movement: real, apparent, graphic, and implied. Real movement is motion not connected with an image presented in the media. It is actual movement as seen by a viewer of some other person, animal, or object. The most common example of apparent movement is motion picture films. Moving images are a series of still images put together sequentially for film, videotape or digital media and moved through a viewing device at a fast speed. Each single picture is only shown at a fraction of a second. Movement is perceived in the brain because of a phenomenon called *persistence of vision*. In 1824 Peter Mark Roget, who later became famous for his popular *Thesaurus*, proposed that this phenomenon, also called *diligence of foresight* resulted from the time required for an image to fade from the cells of the retina. Graphic movement can be the motion of the eyes as they scan a field of view or the way a graphic designer positions elements so that the eyes move throughout a layout. Visual communicators often

position the graphic elements in a design to take advantage of the eyes' movement around a picture and layout. A viewer's eyes will move through and notice elements in an image based on previous experiences and current interests, seeing certain parts of the picture and ignoring others. Nevertheless, a visual communicator can direct a viewer's eyes in a preconceived direction. The eye will usually follow a line, a slow curve, or a horizontal shape before it follows other graphic elements. Of course, colours, sizes of individual pieces, and placement of elements against a frame's white, or background coloured space also are crucial. Implied movement is motion that a viewer perceives in a still, single image without any movement of an object, image, or eye. Some graphic designs purposely stimulate the eyes with implied motion in order to attract attention. Optical or 'op' art has been used in advertisements and in posters to achieve frenetic, pulsating results. Visual vibration is the term used for these images. Through high-contrast line placement or the use of complementary colours, moiré (wavy) patterns seem to move as if powered by an unseen light source.

David Hubel, Torsten Wiesel and other scientists, who built on their work through experiments with rats, monkeys, and people with brain injuries, demonstrated that the cells in the visual cortex respond primarily to colour, form, depth, and movement. But even without the knowledge of research, for many millennia visual communicators have used these four visual cues in their work, whether it has appeared on cave walls or on computer screens. An important lesson for image producers who want to make memorable messages is to understand that brain cells are complex 'difference detectors.' They are stimulated more by the relative difference between visual elements than by the intensity of each one. Consequently, a gaudy, colourful presentation may lose much of its impact if all its graphic elements have the same intensity. Differences between the visual cues detected by brain cells are only part of the reason that some messages are noticed and others are ignored.

Teaching the four visual cues with Second Life

With online, web-based instruction a popular alternative to classroom teaching, several studies have been conducted to show if there are significant differences between face-to-face and online classes. As students ask for more flexible educational experiences (being able to take classes on a computer from home or work) and as administrators are concerned about space restrictions with crowded on-campus auditoria, instructors and researchers have been asked to investigate

whether teaching an online class is a benefit or a hindrance to the educational experience for students.

WebCT and Blackboard.

For the reported studies above, the predominant online software program used was WebCT. Developed by Murray W. Goldberg, a computer science faculty member for the University of British Columbia in 1995. WebCT at one point served about three million online students in 30 countries. In 2006 its online course rival Blackboard acquired WebCT and phased out the name. Consequently, most universities around the world switched to the Blackboard program for the delivery of online classes. In 2004 Blackboard, Inc. became a publicly traded company on the NASDAQ exchange. Today the Washington, D.C.- based educational delivery business is used in more than 2,200 educational institutions in more than 60 countries. Blackboard is similar to WebCT with asynchronous features that include grade checking, discussion board assignments, course material links, paper depository, classroom discussion recordings, and examinations as well as the synchronous feature known as the 'virtual classroom.'

The virtual classroom in Blackboard, in which students meet online at a specific day and time for class discussions, is an important and vital instructional tool because without it a class is not much more than a textbook. In the online classroom, slides with words and pictures, websites, and video clips can be shown to students as the text-based discussion continues. After the initial shock from students who realize that as a participant in an online class they will never meet face-to-face, the text-based format in Blackboard is easily incorporated as a teaching tool because most students are familiar with chat room technology offered by American Online and other companies. As students are usually at home using their personal computers, class discussions are often more insightful and penetrating as students feel comfortable, can think before they type, and overcome any shyness they may experience when attempting to participate in a face-to-face classroom setting.

Second Life

Another 'class' of online instruction in which the visual display is as important as the communicative features are those that employ online 'virtual worlds' as venues for

teaching. One of the most recent and popular software programs for this purpose is Second Life (SL), an avatar-based virtual social community of residents who can walk, fly, drive a vehicle, and teleport to rural and urban simulated environments to engage in all kinds of activities. With credit card information, residents can accessorize their avatars with hair, skin, and clothing. With a premiere account (SL is otherwise free to join), residents can buy land and build stores and homes and sell their creations to other users of the program. Roughly inspired by Neal Stephenson's 1992 science fiction classic S*now Crash* about a user-dominated virtual reality, Second Life was launched in 2003 and currently has more than 13 million registered accounts.

Although essentially an elaborate chatroom, SL combines the visual cues found in the real, analogue world (colour, form, depth, and movement) with an interactive communicative experience. In that sense it is possible to make the learning and teaching experience more real for online students than with the virtual classroom provided by Blackboard. Presently there are over 100 educational institutions throughout the world (e.g. Aachen, RWTH University, Germany to the University of Warwick in Coventry, England) that have a presence with many offering live, synchronous classroom instruction.

Whether using a virtual classroom in Blackboard or a virtual island class site with Second Life, compared with face-to-face or analogue teaching - the actual conveying of information with PowerPoint slides, video clips, formal lectures and entire class conversations and small group breakouts - in a discussion format is quite similar. What is quite different however is the fact that students can use the tools of Second Life to learn about and exploit the four visual cues by creating objects and actions within the virtual world.

This presentation demonstrates how Second Life can be used as a teaching tool for teaching the four visual cues of visual communication in an environment where there are few limits to human creativity in its supernatural environment.

Bird watching: satellites, telescopes and the metaphor of transparency

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Remote sensing is the act of measuring and observing an object from a distance without any physical contact. Interestingly, the term ‘remote sensing’ was coined by Evelyn Pruitt, a geographer for the Office of Naval Research at the start of the Cold War. This paper argues that remote sensing space satellites represent a contemporary interweaving of vision, knowledge and power and as optical devices have, like the telescope in the 17th century, changed how we think and engage with the world.

Space satellites provide a uniquely modern perspective of the earth in that they, as Hanna Arendt wrote in *The Human Condition*[1] were, 'the first step towards escape from men’s imprisonment to the earth.' Satellites liberate us by allowing us to see ourselves from space while their instruments provide new insight into our global environment. Space satellites like telescopes extend human sight to make the imperceptible perceivable. Expanding vision beyond the eye’s capability allows for greater scrutiny. Even though phenomena observed through a satellite or telescope constitutes a perceived reality, these observations must still be discerned as true. Verifying what is seen is entrenched in a scientific methodology created in part during the 17th century. This paper will illuminate how the principles of objectivity in scientific practice and metaphors of transparency have changed in relation to the development of new optical devices and digital imaging methodologies in the 21st century. This historical analysis of the telescope in the 17th century and the space satellite of the 20th century show how knowledge acquired through technologically enhanced vision has shifted both scientific and social paradigms that in turn profoundly influence cultural norms.

Surveillance is commonplace in today’s society and the remote sensing satellite is just another tool of observation that functions as a form of deterrence. Surveillance is

[1] Arendt, Hannah *The Human Condition*. Chicago: The University of Chicago Press, 1998.

a vehicle of power that creates in the end a self–regulating subject. Two artists whose work deals with space satellites, Trevor Paglen and Kathy Marmor, tackle this issue by overturning modern science's professionalism and employing a form of inverse surveillance. Paglen's, *The Other Night Sky* and Marmor's *Bird Watching* are works that act as a tactical response to our society's culture of secrecy and passive consumerism. In fact, Paglen writes '*The Other Night Sky* was primarily inspired by the methods of early astronomers like Kepler and Galileo, who documented previously-unseen moons of Jupiter in the early 17th century. Like contemporary reconnaissance satellites, Jupiter's moons weren't supposed to 'exist,' but were nonetheless there.'[2] I argue that both works employ a contemporary definition of transparency that reframes our thinking.

The first telescopes (c. 1608) were used primarily for naval or military purposes and consisted of a convex and concave glass lens with a low magnifying power set in a long tube. Galileo is usually credited with improving the telescope for the purposes of astronomy, although lenses and writings on optics, e.g. Alhazen's (965-ca:1039) *Book of Optics* and Roger Bacon's (1210 - 1294) *Opus Majus*, predated him. Galileo's refracting telescopes had a magnifying power of approximately 20X and worked by using a plano-convex or biconvex objective lens that concentrated the light and a plano-concave or biconcave ocular lens that made the light rays parallel. Using his telescopes Galileo made a series of remarkable and important observations that included the phases of Venus and Jupiter's four moons. In 1632, Galileo argued in favour of Nicolaus Copernicus' theory that the sun is at the centre of the universe and all the planets revolve around it. Copernicus, *On the Revolutions of the Celestial Spheres,* is considered key to the development of the scientific revolution that occurred from the mid 16th century to the end of the 17th century. Copernicus' theories presented heliocentricity as an 'elegant, logically coherent, mathematical method'[3] that refuted empirical knowledge. During the 17th century, the observations made by philosophers and mathematicians as they looked through the telescope instigated a new world-view that overturned the Aristotelian paradigm, sanctioned by the Church - that placed the earth at the centre of the universe. The telescope itself represented a powerful but imperfect technology that initiated a number of treatises on optics, the eye and lenses by prominent thinkers such as

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[2] Trevor Paglen's website, *The Other Night Sky*, 2007 (http://www.paglen.com/pages/projects/other_night/index.html).

[3] Smith A. Mark 'Knowing Things Inside Out: The Scientific Revolution from a Medieval Perspective.' *The American Historical Review*, Vol. 95, No. 3. Jun., 1990: 726-744 JSTOR (01/06/2009)

Johannes Kepler and Rene Descartes. Their writings laid the groundwork for a mechanistic approach that profoundly influenced modern science.

Between 1620 and 1630, Kepler wrote a short story called *Somnium*, or Dream, that imagined what it would be like to observe the universe from the moon. In Dream, a man and his mother landed on Levania (the moon) after being hurtled through space; from Levania they can see Volva (the earth). This device allowed Kepler to speculate on how the earth would look as it turns on its axis and orbits around the sun. Although this is not the author's intention, Kepler's Dream anticipated modern space travel. He repositioned us so we now observe the earth from our lunar satellite; a familiar view in the 21st century.

The ability to launch an object into space and have it orbit the earth is indeed built upon some of the theories formulated during the 17th century, and later revised or elaborated on (Keplerian Elements, and Newton's law of gravity). Satellites are also the result of a scientific methodology that developed during the 17th century and even the satellite's purposes and its instrumentation continue to expand these fundamental scientific approaches.

Satellites are custom built instruments that orbit in space and are in constant communication with the earth. Remote sensing satellites have either, passive sensors that record radiation reflected from the earth's surface, or active sensors that send out a beam of light that will be reflected back. The data acquired by these sensors is transmitted to a ground station where it is interpreted by computers into some form of graphical representation. The remote sensing satellite is essentially an automated vision machine capable of making invisible elements legible to the human eye. Remote sensing data, and the images produced by it, are difficult to evaluate and require explanation from a skilfully trained 'interpreter'. Yet, these images carry the authority of a photograph and because of this the image and the technology collapse into a single representation.

We have little direct interaction with satellites as they are tied to space but we are aware of them because we are consumers of their products. Our knowledge about satellite technology depends on our self-education. There is a distinct imbalance of power, in which we have access to the daily benefits of satellites but absolutely no control over what they do, what they look at, or how their images are distributed. In the end, satellites are abstract: invisible, distant and complex.

Metaphors are useful for understanding abstract concepts; they also have the power to constitute reality.[4] Globalism is a metaphor for what satellite technology does: compress space and provide communication in real time. Transparency, perhaps not as familiar, is another metaphor for what satellites represent: optimism in the form of self-government and public disclosure of information.

Transparency is defined as the quality or state of being transparent.[5] To make something transparent is to make it clear, or easy to see through. Thus, transparency describes a practice of looking that implies there is a truth that lies beneath or beyond the object's surface. For example, the anatomist's scalpel renders the skin transparent or X-ray crystallography exposes the structure of DNA. It is a metaphor that defines a way to see and satellites are perceived as tools that show us truths about land, atmosphere, and universe by exposing their 'substance'. The idea that truth is hidden conserves the phenomenon's naturalness and divorces it from the possibility of being constructed by either the observer or culture. Paradoxically, this metaphor of transparency conceals the fact that satellite images are manufactured.

Transparency in a digital culture, where speed and accessibility is assured, can also refer to an uninterrupted flow of personal and public information with the understanding that privacy is compromised. Satellite imagery and data are part of this steady flow, partly out of economic necessity (satellites are expensive) and political manoeuvring (who owns satellites). Transparency has in fact become synonymous with information and has become a term used in contemporary society to signify accountability. The general public demands transparency from the government, corporations, and its financial institutions. Transparency and democracy seem to go hand in hand. Satellites are included in this rhetoric of transparency: if more countries have access to satellite technology then each country acts as the other's restraint. Ironically transparency may justify a proliferation of satellite surveillance.[6]

The geographer/artist, Trevor Paglen, in his two works, *The Other Night Sky* and *Limit-telephotography*, uses telescopes and large format cameras to document

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[4] Kornprobst Markus and Vincent Pouliot, Nisha Shah and Ruben Zaiotti. *Metaphors of Globalization Mirrors Magicians, Mutinies*. New York: Palgrave Macmillan, 2008

[5] http://www.merriam-webster.com/

[6] For a more complete examination of the politics of transparency see Marmor, Kathy. "Bird Watching: An Introduction to Amateur Satellite Spotting." *Leonardo* Vol. 41 No. 4. 2008: 317-323.

classified satellites and secret military bases and installations.[7] His photographs act as evidence of a secret government that acts outside of the public's reach. The conceptual basis of his work pushes past the notion of counter surveillance and into the metaphor of transparency itself. His images present what we all know but do not want to acknowledge. It is this uneasiness that reframes transparency by forcing us to recognize our own collusion. As Karen Beckman writes, 'the pictures shift our attention to photography's complex framing of the relationship between knowledge and vision'.[8] His pictures are the artefacts of the telescope and exist in a liminal space between belief and disbelief and as Paglen states; ' At the end of the day you have to trust that I am some kind of reliable witness.'[9]

In my interactive installation, *Bird Watching, 2007,*[10] I ask the viewer or participant to witness. Like Trevor's pieces, my work also seeks to address the metaphor of transparency. However, I do so by putting the viewer in direct contact with home made remote sensing satellites. My cardboard structures resemble boxes in flight and are embedded with proximity sensors and audio speakers. The simple material and form make my 'birds' appear innocuous, like the first reconnaissance satellites, their capabilities are hidden in plain sight.

I created *Bird Watching* to draw attention to space satellites as actual physical objects. My satellite's low-tech look is a humorous draw that beckons people to interact with them and when you look into the boxes or walk up to one they respond by making chirping or twittering sounds which becomes comprehensible as you move away from the box. The installation also includes a projected map consisting of six colourful concentric circles that represented my satellites in the installation space and when a sensor on a box is tripped the map tracks your movement from box to box. I want the participant to become aware of the invisible satellite, and become conscious of it as a machine that watches us, just as we wait and watch for it.

The use of an instrument to extend human sight provides a new way of seeing. The depicted images must be given a meaning and the means by which they were obtained must be explained. As Paglen says of *The Other Night Sky* '… the

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[7] To see Trevor Paglen's work http://www.paglen.com/
[8] Beckman, Karen. *Telescopes, Transparency, and Torture*: *Trevor Paglen and the Politics of Exposure.* Art Journal, Fall 2007: 62 -67
[9] Vanderbilt, Tom. *Trevor Paglen Talks About The Other Night Sky, 2007.* Art Forum March 2009, XLVII, No. 7 224-228
[10] To see Kathy Marmor's work http://kathymarmor.com/portfolio/bird_watching.shtml

production of the symbolic order goes hand in hand with the exertion of control… if we can only control things by first naming or imaging them – then developing a lexicon of the other night sky might be a step toward reclaiming the violence flowing through it.' [11] The 17th Century provided a methodology that scientists use today but seeing is more than the just the physiology of the eye, Descartes qualifies this by creating a split between 'knower and knowledge' - by distinguishing the object from the image, and the image from the idea.

The telescope in the 17th century was a vital tool in the hands of many amateur astronomers and initiated important research on optics, vision and lenses. It corroborated theories that could not have been proved by the senses alone and ushered in a new paradigm based on mathematical reasoning. Like the invention of the telescope, remote sensing satellites have significantly altered our culture and in response we have created new metaphors to articulate what they do. Transparency is related to power and Paglen's work and my installation *Bird Watching* are attempts to highlight this relationship.

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JoyceWalks: remapping culture as tactical space

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Introduction

This paper will discuss *JoyceWalks*, a participatory locative art project which uses Google Maps to remap routes from James Joyce's *Ulysses* to any city in the world. The project is web based using the Google Maps API [1] to remap these routes from Dublin to any other city and to generate walking maps which are then used as the basis of Situationist inspired psychogeographical *dérives.*

This paper will argue that *JoyceWalks* acts as a tool through which participant action can be used to generate critical spatial knowledges of the urban environment. Through a structured mechanism of remapping spatially expressed cultural tropes such as (but not limited to) the Bloomsday celebrations in Dublin, the project questions the spatial commodification of culture as part of what Sharon Zukin calls the symbolic economy of cities (1995) and it's implied fragmentation of space into zones of culture and zones of what presumably can be described as 'non-culture'. My proposal is that *JoyceWalks* offers a mechanism for (re)mappings of cultural space in cities which privileges the social relationships of cultural production over the spatial, and in the process offers an expandable set of procedures for generating Situationist inspired explorations of urban space. I suggest that *JoyceWalks* produces ephemeral tactical spaces which are actuated by the user/participants and that this form, the 'tactical toolkit' as it were, represents an effective method for the interrogation of urban space.

Mapping *Ulysses*

The project chooses as it's starting point Bloomsday, the annual celebration of James Joyce's *Ulysses* which takes place in Dublin on June 16th. Bloomsday is a typical cultural product that can be seen in almost any city in the world today. It

1. API (Application Programming Interface). A set of programming tools which enable the user to use Google Maps resources for their own applications.

involves re-enactment, a cultural trail, pageantry and a granting of locational identity to culture and a renegotiation of the spaces of the city according to a predefined cultural narrative.

Ulysses is an ideal text for such an exercise and I'd like to take a moment to drill down a little into the relationship between Ulysses and the city and explore how it underpins this project. Ulysses is inextricably connected to the topography of Dublin and Joyce, while living abroad, famously mapped out the streets of Dublin with great precision from memory and through a close adherence to the 1904 edition of Thom's Almanac and ordnance survey maps (Budgen 1972, Hegglund 2003). The maps consulted were products of the great Imperial mapping projects of the 19th Century; the Ordnance Survey of Ireland and the Great Trigonometrical Survey of India which adopted it's methodology. These enterprises, which established the modern notion of scientific cartography, were inextricably involved in the construction of empire; the role of mapping in the construction and definition of territory is beyond the scope of this paper but has been widely discussed in the literature of critical cartography (Harley et al 2001, Pickles 2004, Wood 1992). A parallel could be drawn between the 19th Century mapping revolution which influenced Joyce to the current mapping revolution as typified by Google Maps where users are invited to construct their own territory through the API driven mashups and which, through these facilities to overlay the map with new data sets, have tentatively reintroduced the idea of the neutrality of maps.

There is also in Joyce another impulse at work which can be gleaned from Joyce's oft quoted remark that 'I want to give a picture of Dublin so complete that if the city one day suddenly disappeared from the face of the earth it could be reconstructed out of my book' (Budgen 1972: 69) indicating (what Daniel Birnbaum[2] might call) the world making intent of his project, Joyce too seeks to construct territory[3] but, unlike the imperial project of constructing and defining the empire, he constructs Dublin through the everyday actions of it's inhabitants which can then be extrapolating to a universal narrative of the city. In effect Ulysses can be thought of as presenting a city which is brought into being through the actions of its inhabitants. I connect this to Michel de Certeau's writing on walking in the city where, when speaking of pedestrian movements, he asserts that 'their intertwining paths give their shape to spaces. They weave places together. In that respect, pedestrian movements form

2. Director of the 53rd Venice Biannale of Art 'Making Worlds' http://www.labiennale.org/en/art/exhibition/
3. See Hegglund's discussion of the 'Wandering Rocks' episode of Ulysses, 2003.

one of those real systems whose existence in fact makes up the city.' (de Certeau 1984: 97) *JoyceWalks* is, in this de Certian way, a walking project, one which is involved in the production of it's own space through the manipulation of existing spatial elements. This process is mediated through the web and enacted on the street and can be thought as taking place in a hybrid space (Kluitenberg 2006) with elements of the network facilitating real street based actions.

While I would argue that Ulysses is a particularly rich starting point for this project I recognise also that Bloomsday exists primarily as a generic cultural product in a wider scheme of cultural commodification, belonging in particular to a class of spatially contingent products - such as cultural trails, cultural quarters and so on - which denote zones of culture and construct the symbolic economy of the city. In Dublin Bloomsday has a pivotal role to play in this process and as it can be claimed that in Ulysses Joyce constructs a version of the city of Dublin it is also true that Bloomsday, the cultural event, in turn reconstructs the city of Dublin as the 'Joycean City' which is itself a subset of 'Literary Dublin'.

JoyceWalks **techniques**

Before exploring further the idea of *JoyceWalks* as a producer of spaces I want to briefly discuss how it works on a practical level.

JoyceWalks is based on the Google maps API. The original routes are mapped out in Dublin through a close adherence to the text of individual chapters of *Ulysses.* Each route takes place within a single chapter of *Ulysses*, nine or ten points of significance are identified which are expressed as points of longitude and latitude and each point has an associated text from *Ulysses*. At the moment three chapters are available, chosen for routes that are easily walked.

To use *JoyceWalks* the participant chooses a city to walk in, selects a chapter route and, crucially, chooses a centre point for the selected city. The original Dublin routes are then remapped to your chosen city through a procedure of linear transformation (with the centre point as origin) which moves each point of longitude and latitude to an analogous location in the new city. This results in an isometric reflection which retains the relationship between all places of significance in the route. The points on the mashup retain the associated text from *Ulysses* so participants can choose to read the text at each location.

After a walk is completed, participants can upload images or videos associated with each point and the resulting final mashup is accessible for other users to view the route, text and images. To ensure the uniqueness of each walk generated, the project has many in-built features to ensure variability; to map a route the user must select a centre point of the city and the route is generated in relation to this centre point, the points of the walk are draggable and repositionable, there is no snapping to the line of streets, points are joined by straight lines, taking them though buildings and obstacles which the walkers must negotiate at street level increasing the routes' contingency on local conditions.

The mechanisms and code behind *JoyceWalks* are extensible and it is proposed that future development will allow the user/participant to create and customise their own routes using GPS tracklogs or by importing routes created with Google Earth/Maps. The option of downloading your route to a GPS enabled device will also be added shortly, this feature was deliberately left out of the first version to emphasise the traditional experience of trying to find your way with a map, a familiar locative experience and one very different in character to using the latest locative technologies to navigate the city.

Reframing space

I have previously discussed the way in which *Ulysses* (and Bloomsday) is embedded in Dublin and it's role in the definition and perhaps even the reinvention of the city. *JoyceWalks* asks the seemingly simple question; what happens if you move it ? Through displacing the cultural trail from the site of it's locational identity one assumes that it neutralises that identity and removes not only it's role in the construction of this cultural economy of the city but also collaterally the cultural resonance of it's engagement with the text and site. In actuality the results are more nuanced and less straightforward then they would appear. Certainly the geographic displacement neutralises the specifically locational elements of the narrative but in the process forces a re-engagement with the idea of the cultural trail. *JoyceWalks* remains a cultural trail but one in which the conventions of how to operate have been disrupted. It reframes the cultural trail, not as an instrumentalised spatial product of the symbolic/cultural economy, but as a socio-spatial production of a temporary, ephemeral space. As the project shifts between the certainties of Google maps with it's all-encompassing, totalising viewpoint to the often confusing realities of navigating through the superimposed spaces of Joycean remappings at street level, participants

must re-imagine it's meaning, re-invent it's procedures and re-think the mode of operation and through this process produce a temporary re-encoding of the spatial code which in turn facilitates alternative and critical spatial readings of the city.

I would like at this point to disconnect the project from Joyce and *Ulysses.* Their role is to act as a framing device for the project establishing a set of procedures or score[4] which indicates a mode of action for the participants in their engagement with the space of the city, rather then a prescriptive set of instructions which govern the enactment/performance of the work.

In the disruptive process of remapping cultural spaces *JoyceWalks* subverts the function of the Joycean routes transforming them into a set of procedures for navigating city spaces in new and unexpected ways. I consider the remappings to be a form of generative (Situationist) *dérive* and suggest that the Situationist tactics of the *dérive* and *détournement* (Debord 1956, Knabb 1981) offer powerful methods for considering the technological city which lend themselves to a contemporary reworking in locative art. Guy Debord described the *dérive* as 'a technique of rapid passage through varied ambiences' which 'involve playful-constructive behaviour and awareness of psychogeographical effects' (Debord 1956) but he also warned of the limitations of relying on chance as it was 'naturally conservative and in a new setting tends to reduce everything to habit or to an alternation between a limited number of variants' urging that 'progress means breaking through fields where chance holds sway by creating new conditions more favourable to our purposes. We can say, then, that the randomness of a *dérive* is fundamentally different from that of the stroll, but also that the first psychogeographical attractions discovered by *dérivers* may tend to fixate them around new habitual axes, to which they will constantly be drawn back.*'* (ibid) In it's offering of an algorithmic approach to the *dérive* which combines the randomness of the generated route with a set of mapped instructions I argue that it removes this danger of the habitual resurfacing and as such is a legitimate contemporary reworking of the Situationist *dérive*.

The production of tactical space

In *The Production of Space* Lefebvre argues that space cannot be considered as an empty neutral container in which objects and people are situated (Lefebvre 1991:

4. After the Fluxus 'event score' introduced by Georges Brecht

68). Rather space is a social product, defined by a complex set of interrelationships and the 'outcome of a sequence and set of operations (and) this production process results in a multiplicity of interconnected and overlapping spaces which influence, and are influenced by, each other (ibid: 86-87). Space, he suggests, isn't superseded whenever a new space is produced but rather each space overlays previously produced spaces resulting in a multi-layered space in which the layers 'co-exist, overlap and interfere' which other and that it is the dynamic relationship between these layers which establishes the nature of social space (ibid). Social space in turn acts as a tool of control in that it is 'what permits fresh actions to occur, while suggesting others and prohibiting yet others' (ibid: 73)

If, as Lefebvre argues, space is in a state of continuous production, a state of continually being brought into existence, then it is the process rather then the product that is of most interest. This leads on to an acceptance that location, for example as defined by a set of co-ordinates of longitude and latitude or by being named in a text, is of small importance in and of itself. Of greater significance is how that location is related to other locations and to the practices that define that location. It is the practice, the procedures and the process that lead up to, for example standing at a specific location as a participant in a locative art work that matter, rather then the GPS co-ordinates of that location. With *JoyceWalks* the spaces produced can be considered as Lefebvre's 'lived space' where users transform and manipulate imposed space to make it their own (ibid: 39). This space disrupts and interferes with the existing spatial encoding and, it is proposed, suggests new modes of spatial practice outside of existing spatialisations.

The space produced by *JoyceWalks* can be further described by Michel de Certeau's definition of space as the locus of tactics. 'Space' according to de Certeau is 'place' actuated by the 'ensemble of movements deployed within it' which 'occurs as the effect produced by the operations that orient it, situate it, temporalise it' (1984: 117). It could be said that space is place + practice and so the streets are transformed into the space of *JoyceWalks* through the actions of the participants as they walk the *JoyceWalks* routes in a temporary transformative appropriation of place. In this way they can be considered tactical interventions. According to de Certeau tactics insinuate themselves into ' the other place fragmentarily, without taking it over in it's entirety' (ibid: 32). They are opportunistic ways of operating within a system, of manipulating the imposed system and turning it to it's own advantage.

Conclusion

While it is important not to over claim the significance of these small spatial interventions I would propose that these tactical appropriations of space have the potential to produce critical spatial knowledges. *JoyceWalks* is structured to retain an essential openness in it's offering of a set of procedures without a prescriptive mode of operating, so that it is the action of the participants which actuates the space of *JoyceWalks.* The work hinges on the interaction between the walkers and the route, with each space produced being a unique contingent spatio-temporal event. With almost 500 *JoyceWalks* having taken place in over 70 countries, each walk also sits within a larger ongoing work involving a geographically dispersed series of tactical interventions, facilitating multiple re-encodings of the spatial code enabling alternative and critical spatial readings of the city.

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'What have you left behind?' - stories of nomads by nomads

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Abstract

'What have you left behind?' is an interactive media Masters project that focuses on individuals rather than their nationalities, with the aim to break the concept of cultural national borders and to show that we all could be considered as nomads for we are in constant movement and leave things behind.

This is a collaborative project with the audience generating the content which was applied to different kinds of media, both digital and analogue: real notebooks were sent to different parts of the world to collect testimonies from people; a blog documented the whole process of development and made the communication between the participants and myself possible; and the final website collects testimonies and presents a conclusive 'nomads map'. Such constant exchange, between the physical and the virtual, has been an important aspect of this project. Real notebooks, the blog, and the website with a tactile aesthetic (based on paper and a hand-made layout) reinforces this aspect.

This paper aims to describe the process and outcomes and to discuss the authorial decisions made along the way, in order to consider ways of representing ideas about identity and belonging in a globalised and digital world.

Introduction

> The foreigner lives within us: he is the hidden face of our identity, the space that wrecks our abode, the time in which understanding and affinity founder. (…) The foreigner comes in when the consciousness of my difference arise, and he disappears when we all acknowledge ourselves as foreigners, unnameable to bonds and communities. (Kristeva 1941: 1)

Influenced by the high level of migration and digitalization in the contemporary world, national borders do not necessarily determine cultures. In mixed cultures, individuals should be focused on - rather than their nationalities. When individuals are named by their nationality, cultural stereotypes are often created by the idea the viewer has of the specific nation and influences the idea they create of the individual they are seeing:

> We pack the physical outline of the creature we see with all the ideas we have already formed about him, and in the complete picture of him which we compose in our minds, those ideas have certainly the principal place. (Proust 1922: 15)

This generic idea of a national culture, and the idea that an individual who comes from that nation is like everyone else from that area, hides individuality. This broad idea of national cultural groups doesn't necessarily fit each and every individual who comes from that place. As a result, the word 'foreigner' arises when individuals are considered as strangers, outsiders, not fitting into the stereotypical understandings of national culture and identities. Nevertheless, if we all see ourselves as foreigners, not belonging to any place, we acknowledge ourselves as individuals, not attached to any specific land but all belonging to the same land, with mixed cultures.

This project aims, therefore, to focus on individuals rather then their nationalities and proposes that we should see ourselves as nomads, for we are constantly moving and leaving things behind, either from place to place or simply because time passes by.

What have you left behind?

In order to achieve this aim, thirty-two notebooks were sent abroad by post to people from and in different parts of the world [1] with the question 'What have you left behind?' The participants were asked to fill in a page and pass the notebook forward to any person of their choosing, with the notebooks to be returned by a certain date. The following month, about 140 testimonies were collected from people from different countries and different social, cultural and educational backgrounds.

In the following I discuss the methods used on making the notebooks, the process and it's outcomes.

The notebooks

To get written testimonies from people, real notebooks sent abroad seemed the most appropriate media: the notebooks themselves travel from place to place in the world (notebooks as nomads) and reinforced the concept. This process allowed the involvement of people from different backgrounds to record stories of their lives in a personalised and more human way - people's handwriting.

[1] The notebooks went to: Australia (Jolimont, WA), Brazil (Búzios, Niterói, Rio de Janeiro and Teresópolis), China (Shanghai), Cyprus (Limassol), Denmark (Frederiksberg), France (Grenoble and Paris), Germany (Berlin, Halle and Hamburg), Italy (Florence), Portugal (Lisbon), Russia (Moscow), Switzerland (Vaud), Taiwan (Taipei City), The Netherlands (Amsterdam), United Kingdom (Bristol and London) and USA (New York and Valencia, CA).

The notebooks were designed in such a way to make people feel as comfortable as possible to write about their lives. Many aspects had to be considered when asking such a private question through a piece of paper; aspects which came mainly from emotional design studies, but also some aspects of qualitative research and documentary film studies.

Several aspects of the physical appearance and other characteristics were carefully considered beforehand: the size of the notebooks, number of pages, colour of the pages and typography used for instructions and title (i.e. the question):

- The most important aspect was to not have any blank pages. Subsequently on each and every page the question handwritten by myself. This means there is a question to each and every person who opens a page.

- The notebooks are all handwritten. This helps to reduce distance between myself and the participants, also they might feel more comfortable to put their handwriting on the page.

- The notebooks are A6 Kraft paper, 20 sheets. This size was chosen for ease of portability. The number of pages helps the strategy of how the notebook will travel (the more pages written, the further it has travelled from the first person).

- A black ribbon closes the notebook to give the idea of 'what is written here is carefully closed' - a sense of privacy and valuing. The title 'What have you left behind?' does not appear on the front cover and is only visible on opening the book.

- To ask people to write about their lives, to encourage them, I gave a bit about my own life. The first page of the notebook is my story of what I have left behind, signed by myself.

The process

To fit with in the schedule of the project, the process of sending and receiving the notebooks should take one month. Parcels sent abroad by post, especially long distances, meant the actual time to generate the data would be reduced. For some

parts of the world, it can take a week or more to arrive and then and the same amount of time to return. For that reason and because of the risk of notebooks not being returned some methods were applied to reduce this risk and make the process faster:

• Rather than the original plan of sending ten notebooks - which supposedly would generate enough data for the purpose - over three times this amount were sent (thirty-two to be precise). The higher the number of notebooks sent, the more probability that some of them would be returned on time;

• Choosing appropriate people to send the notebooks to was essential in terms of guaranteeing their return. In the first layer there were friends, friends of friends (who indicated people residing in another country), and colleagues. In this way, there was already a connection between the notebook and the recipient in the first place.

• The number of pages in the notebooks also determines the far the book will go. The more pages, theoretically, the further they go. The fewer pages, the least distance travelled from the person who received it in the first place.

• In the notebooks there were instructions of how the process would be carried out. It was explained that the participant could write (in any language), draw, glue, paint in one or more pages and they were asked to then pass the book to any other person. By a certain date, whomsoever had the notebook was asked to contact me so that I might arrange the notebook's return, or for them to send it directly to my address. It was also explained that all content contributed by the participants in the notebook would become part of an online artwork that would accompany the project through the blog.

The website

While the testimonies were travelling and being filled in by participants, I created a means to show the collected answers on a website; a means of communicating, in an interactive way, with people in all over the world.

The aim of the website was to present the data received but also to express the aim of the project - as the project is about showing the process and questioning the real/ digital relationship. A pixellation animation was made depicting the construction of the website - my hand appears drawing the buttons and putting them in place and the real notebooks appear in this pixellation - reinforcing the fact that they are real, tactile notebooks.

Due to the large amount of text on some pages, different levels of navigation were created. In the first level, the users see quotes taken from the notebooks, which I highlighted from each testimony. In the second level of navigation, the user can see the full page by clicking on a specific button. The quotes appear in the website randomly. All the pages are included in this animation. The first idea was to put the quotes in order and make a narrative out of it, but because of the large number of quotes it became impossible. Also, by doing that, the quotes were appearing predictive, veering away from the positive aspect of randomness, the surprise and contrast between sentences.

Outcomes

Twenty-two notebooks out of the thirty two sent were received, with 140 testimonies. People from a variety of different backgrounds took part in the project, which made it richer in terms of content. Participants included not just people who already see themselves as nomads, but also people who simply answered the question with stories of their own life experience, - a goal I had hoped to achieve when the I posed the question originally.

Ten notebooks arrived within the time I asked for them to be returned (a month later) The remaining twelve arriving during the process but could also be included in the project.

From the data collected, some categories appeared:

• Use of the page:
Written word: 61.5% of people (in which Handwritten: 80% / Computer: 20%); Drawing: 4.6%; Written + Drawing: 22.4%; Written + Collage: 10%; Written + Collage + Drawing: 1.5%.

It was a surprise to see so many printed contributions (typed on the computer and glued in the notebook). Most of the time in these cases, there were the signature of the person, which indicates they were typing by choice.

• Languages used:
As the notebooks went to friends, colleagues and friends of friends in the first place, many notebooks went to people who have the Portuguese language as their mother tongue (as I do) but were living in different parts of the world. Therefore, there are a high number of pages written in Portuguese (44.6%). However, in most cases people wrote in English, influenced by the question. The whole notebook was written in English, even though the contributors' original language was different (43%).[2]

• Content of pages:
This was divided in five categories:

[2] Portuguese: 44.6%, English: 43%, None (drawing/abstract image): 6.1%, French: 2, Spanish: 2, Chinese:1, Dutch: 1, German: 1, Italian: 1

• Points (when participants made a list of points/items/things of what they left behind): 54.6%
• Journey of life (when participants described the ways they journeyed to arrive at this point in life): 31.5%
• Questioning/thought (when participants wrote about the question itself, what means to leave behind): 17.6%
• Day-by-day (when they wrote about their routine and day-by-day life): 16%
• Abstract/play (when the participant made an abstract image): 16%

The pages can appear in one or more categories.

The question seemed to be provocative, as many participants wrote about the question itself - what it is to leave things behind? - as well as writing about their own experiences.

How the pages that were already filled-in influenced how the individual made their own page (if it were all written they tend to just write, if it was artistically filled, they tend to be more creative). This fact can either block or inspire each individual user - as was clearly seen in the notebooks received: a notebook fully glued with typed texts, a notebook fully written, a notebook mainly creative (drawings, photos, illustrations).

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Between here and elsewhere: relating to place

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Writing this text I am located at the precise geographic co-ordinates of:

51° 30’ 46” N x 0° 04’ 15” W

Reading this text now you must be ‘somewhere’, be it in your office, home, train, bus, plane, tube. Whilst some texts, like tourist guide-books for instance, are written to be read when actively visiting specific places, their purpose being to inform, and guide us as we are visiting these places: the context and purpose of this particular text, it’s physicality as an object, personal circumstances, and social protocol, delimit where it might be read. Whilst Joshua Meyrowitz (2004) writes that we are ‘always in place…[with our bodies] dependent on the nature of the specific locality…[and] bound by the laws of space and time,’ the abstract numerical co-ordinates of my physical geographic location available through global positioning devices, online street maps, and satellite navigation systems for example, do not relay to you anything about my immediate physical surroundings that might give you a sense of my ‘place’. Location, as Tim Cresswell (2004) explains, is a site without meaning, however if I tell you that as I write this I am in a flat in Aldgate, east London, surrounded by such objects as a 1960s hoop game-board hanging on the wall, a rustic Portuguese vase, a black and white photograph of my father standing outside the shop, ‘immediately many images come into our heads … as replacing a set of numbers with a name means that we begin to approach ‘place’.’ (Cresswell 2004: 2) With all that these culturally constructed signs imply, our imaginations begin to construct an image, a representation of absence to presence through which we begin to understand, for place, according to Cresswell, is a way of ‘seeing, knowing and understanding the world.’ (Cresswell 2004: 11)

Currently we live in an information age saturated by live images from around the globe broadcast 24/7. YouTube allows users to share video-clips, podcasting enables downloading broadcasts at a time and location of our choice, car satellite navigation systems help us travel via the shortest route, and personal GPS devices

let us know where we are in the world at any given time. It is argued that these electronic broadcast emissions have impacted on us by neutralising experience of our environment and causing social fragmentation. Constructed geographic space is being transformed, indeed dematerialised, with the markers of position and location disappearing and the notions of scale and physical dimension gradually losing their meaning - in the face of the infinite fragmentation of point of view. (Virilio 1995) Therefore if, at the turn of the 21st century, these electronic broadcast emissions are eradicating a sense of place, and the marks of location are disappearing with notions of physical dimension losing their meaning, what are the implications of this 'etherealisation' in geography? For if space is being annihilated or negated by time, and space, as Creswell (2004) explains, is that which has areas and volumes invested with human meaning and attachment - becomes a place, how then might we relate to place?

My current research, a site-specific video-podcasting project, with the working title of 'From 00° 00' 00" to 0101', examines the impact of new technologies' formulation and representation of a new global cultural space on our perceptive experience and how we relate to place, and asks the question: to what extent is this transforming national and personal identities?

The medium of video-podcasting for personal mobile media devices was conceived and is utilised as a means of convenient broadcasting. It is approached by broadcasting companies, for example, to widen its audience with downloadable catch-up television programmes, or mini-episodes to complement their already existing digital and terrestrial broadcasts; by educational establishments as an educational resource, and by the private sector as audio/visual versions of online blogs or as self marketing strategies.

Focusing on two distinct symbolic sites as geographic locations for the research, development and production of mobile site-specific video-podcasts: London as urban 'Heart of Empire' and 'Middle England' as rural Heart of England. This project however, proposes to invert the role of the user, from that of consumer, where physical locality is irrelevant to the video-podcast they are watching, to that of producer - imaginatively interacting through the video-podcast in new ways with a pre-determined environment. In this way the project will exploit the potential of the medium of video-podcasting for hand-held mobile site-specific broadcasts, as a means of re-engaging with the particularity of physical place, at a time when it

appears our perceptions of location, mobility, and identity are being destabilised through the proliferation of such technologies.

Contextualising the project

To situate my research project 'From 00° 00’ 00” to 0101’ this paper provides it's theoretical context.

Historically, all technologies have had an impact on how we relate to place, as Joshua Meyrowitz (1985) writes, they have ‘affected the information that people bring to places and the information that people have in given places. But the relationship between place and social situation was still quite strong.’ (1985: 115) He suggests however, that what is different about the recent electronic media is that they achieve a ‘nearly total dissociation of physical place and social place … [where] we are physically no longer determines where and who we are socially.’ (ibid) In this respect different places and different identities become irrelevant, and it is this, Meyrowitz suggests, that impacts on what he calls our ‘sense of place.’ Ultimately our sense of place is being altered as a consequence of there being no need, through electronic media, for physical presence as a prerequisite for first-hand experience. (ibid)

Marc Auge´ (1992) goes further and argues that a supermodern predicament of acceleration and overabundance of a world system of interdependences, technology, information and events, has left us with a need to give meaning to the world and the present. What he defines as 'supermodernity' is an era where there is no synthesis of old and new, of distinct individualities, perceived as equivalent and unconnected. As a consequence of supermodernity, he suggests that there needs to be a rethinking of the traditional notion of place as it is increasingly being replaced by ‘non-places.’ Non-places (also described as out-of-place), Auge´ says these are the ‘real measure of our time,’ (1992: 79) as they encompass all means of transport technologies (air, rail, motorway), the buildings related to travel (airport, stations), as well as leisure parks, hotel-chains, large retail outlets, and communication technology networks.

Space and time, Manuel Castells (1996) observes, are the fundamental dimensions of human life, yet the conquest of space has been replaced by the advent of the immaterial transmission technologies of information and communication, which in turn, achieve the conquest of time. Paul Virilio argues that with space reduced to time, and distance transformed into speed, physical geographic expanse is being replaced

by temporal distance. This, he says negates space, replacing the ‘‘space-time’ of customary experience of places [and therefore a sense of place] with that of the non-place of the ‘space-speed’ of technology.’ (Virilio 1990: 122) As a result of this new 'space-speed', where the dimensions of space become inseparable from their speed of transmission, everything arrives without any need to depart. Christine Boyer (1996) describes this effect as a reformulation of our ‘perception of space and time, so that we experience a loss of spatial boundaries or distinctions, so that all spaces begin to look alike and implode into a continuum’ (Boyer 1996: 19), resulting eventually in our inability to map our contemporary terrain, and to envision space and representational forms.

Through the effects of ‘space-speed,’ localities Manuel Castells' writes that people become:

> … disembodied from their cultural, historical, geographic meaning, and reintegrated into functional networks, or into image collages, inducing a space of flows that substitutes for the space of places. Time is erased in the new communication system when past, present and future can be programmed to interact with each other in the same message. The space of flows and timeless time are the material foundations of a new culture that transcends and includes the diversity of historically transmitted systems of representation: the culture of real virtuality where make-believe is belief in the making. (Castells 1996: 375)

Castells believes that all reality is virtual, as cultures and societies throughout history are made up of communication processes, which in turn are based on the production and consumption of signs. With no separation between ‘‘reality’ and symbolic representation,’(ibid: 372) all reality is virtually perceived. What is specific however, to our current system of communication technologies is the ‘construction of a real virtuality … in which reality itself … [that is, people’s material/symbolic existence]…is entirely captured, fully immersed in a virtual image setting, in the world of make believe, in which appearances are not just on the screen through which experience is communicated, but they become the experience.’(ibid: 372-73) It is here that the medium merges together past, present, and future, where the image of something substitutes whatever it is meant to represent.

The spectacle of the live ‘real-time’ (of visual broadcast technology) ‘impose the idea’, according to Virilio, of ‘presentation of a place’, as opposed to representation ‘of places'. This ‘presence of tele-reality transforms the nature of both the object and the subject of traditional representation, so that pictures of places have now taken over from the ‘picture houses’ where performances used to occur.’ (Virilio 1990: 3) He argues that in ‘furnishing the image of a place, videography … [his term for video broadcast] … does not itself require any actual ‘space’ except for its supporting camera and monitor, and in turn the instantaneously transmitted image across distances becomes itself a new type of ‘site’’ that has nothing in common with the ‘topographical space of geographical or even simple geometrical distance.’ (ibid: 2)

The immediacy of the image therefore excludes ‘unity of place’ for the sole benefit of the ‘unity of time', of a real time that affects the space of real things. In this scenario the image has priority over the ‘thing’ that is being presented, supremacy of ‘real time’ over ‘real space.’ The image is therefore ‘invasive and ubiquitous … its role … is to be everywhere, to be reality…’ (McCullough 2008) This results in the ‘physical non-separability of outside and inside, near and distant.’ (McCullough 1990: 6)

Malcolm McCullough claims however, that for the ‘more mobile and networked of us, place has become less about our origins on some singular piece of soil, and more about forming connections with the many sites in our lives. Place becomes less an absolute location fraught with tribal bonds or nostalgia, and more a relative state of mind that one gets into by playing one’s boundaries and networks. We belong to several places and communities, partially and by degree and in ways that are mediated. (McCullough 2006) His argument is further extended by the question he posed at his lecture titled ‘Urban Inscriptions’ delivered at ‘The Mobile City Conference’ in Rotterdam in 2008: ‘Must media mean remoteness?’ Whereas cyberspace has tended to imply a disembodied world experienced through a computer screen, he argues that the new paradigm of locative media can be used to bring things back to street level by inscribing in real space and thereby reintroducing the importance of physical space.

It would be a safe assumption to consider that we have reached a point of no return: that we have perhaps reached a stage where, as Virilio argues, the ‘management of the surroundings in the real space of cities or countryside, will tomorrow play out solely in the organization of the control of the transmissibility of images and information in real time,’ (1990: 122) where ‘it will no longer be a matter of admiring

the countryside, but solely of scanning one's screens, one's dials, the directing of one's interactive trajectory, that is to say of a "distance" without distance, of an "interval" without interval.' (ibid)

Perhaps what we need to develop however, are, as Castells suggests, modes of perception that 'enable us to navigate between, to explore and question, the framework of pre-digested and pre-selected nodes of data that represent highly mediated forms of communication delivered over centerless, network-like electronic structures often called the space of flows.' (Castells in Boyer 1996: 8)

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Information non-place as a mirror of glocal subconsiousness

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Introduction: emergence of data-double

One of the principles of modern meta-narration was the myth of total visibility. Transparency, recognized as an effect of rationalization and development of technology, was closely related to the issues of power and control. While referring to the idea of *panopticon* Foucault pointed out the importance of the transparency-control-power relationship, which defined specific characteristics of modernity but, at the same time, he stressed the utopian character of the modern project.

Nowadays, together with the development of various types of surveillance technologies (from CCTV to satellites and biometrics) it seems that the idea of transparency is being realised in material form. Though commonness of optical and post-optical surveillance is not in doubt, its influence on broadening spheres of visibility seems problematic. The inflation of the information obtained makes a proper analysis nearly impossible and in fact causes opposite effect – instead of being transparent the reality of more and more data creates a complicated labyrinth of data.

Surveillance technologies together with the popularization of wireless, wearable, and mobile technologies, this labyrinth of data becomes a hybrid reality which is invisible. Analysing the specific forms of digital surveillance Kevin Haggerty and Richard Ericson indicated that the strongest characteristic is the phenomenon of surveillance assemblage. (Haggerty and Erckson 2000). In the age of total information digitalization, control is based mainly on the gaining, storing and processing of data. This process engages various sources of information which, albeit operating with different motivations and aims, constitute a coherent network. Surveillance assemblage consists in an exchange of information which consequently leads to profiling a shadow of reality called 'data double'.

Data space – the other side of reality

The popularization of the post-desktop model of human-computer interaction has led to a change in the structure of everyday life. As diverse wireless digital devices have become articles of daily use, the invisible, immaterial net of information has developed in parallel with the material physical space. These two levels of reality, which belong to different ontological orders, infiltrate each other, overlap each other and form various relationships. As Lev Manovich observes, the new form of space which develops as a result of the use of mobile information technologies, and which he himself calls augmented space, is characterized by a constant, multidirectional flow of data between the physical and data level of reality. This flow occurs in both directions; on one hand it consists in the extraction and digitalization of information from and about physical space, and on the other - the stored and processed digital data moves back into the material sphere of reality. Yet the unstable, heterogeneous, discontinuous, internally incoherent and hybrid - to use the terms of Adriana de Souza e Silva (de Souza 2006) - of digitally augmented space, makes the impression of being a natural space. The constant passing between both levels of augmented space has become one of the fundamental dimensions of life in a mobile information society. Common access to data and the easiness with which the virtual sphere infiltrates physical reality and its influencing the behaviour and experiences of the users - are facts which raise questions about the rules that govern and determine the structure of data space: its content; diversity of forms in terms of the relationship between physical and virtual levels of reality; the ways of using data and the directions and currents of their flow.

Although built of electromagnetic waves and thus an invisible data level of hybrid space - data space is not a void, but 'something that needs a structure, a politics, and a poetics' (Manovich 2006: 240). Manovich’s short remark points to crucial considerations on the content and ways of organizing such a space. The issue of data space structure is a creative challenge for architects and artists and equally important as concentrating on the future possibilities of organizing it. I presume that data space can be understood, not only as an extension or a supplement of material space, but as its opposite - as a 'digital double'. Technological augmentation of reality calls into being a kind of data-shadow of physical reality, an invisible space which exists and grows in parallel to the perceptible world, in which we dwell and act leave traces of our existence. Invisible, yet definitely present, the virtual is closely related to real space, being a result of technological mediation. Data space enables close,

often intimate relationships between people, it is global yet full of private and local data: an invisible network can be viewed as a never-ending source of information about its creators and inhabitants. The dualistic nature of augmented space has inspired me to compare it with the psychoanalytic idea of it's having a personality and to consider it as a form of subconsciousness of our information society. This comparison seems relevant because of the increasing use of mobile wireless devices which are rarely accompanied by a reflection or awareness of the consequences of the pervasiveness of computing on our everyday existence. Furthermore, the disappearance of technology is one of the axioms of a post-desktop paradigm of culture.

Invisible technology, transparent data

According to the assumptions of the *ubicomp* idea, the liberation of computational devices from the leash of the cable leads to their proliferation in all spheres of reality. Wireless and mobile technology becomes not only pervasive; it becomes invisible at the same time. 'The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it.' (Weiser 1991: 1). As a natural, apparent element of augmented space, they constitute a background, which facilitates, enables and also determines the common everyday activity of the users. Their functionality is based on the combination of global range and location awareness. Access to endlessly growing data space and the opportunity to participate in the global flow of data depends upon the possibility of tracking and monitoring a particular place and activity by a particular user. Thus, in the very core of *ubicomp* there is the issue of surveillance and control because, as Manovich puts it, 'augmented space is also monitored space' (2006: 224). Balancing between the utopian optimism of the followers of pervasive computing, and the fatalist vision of post-optical data *panopticon* I would like to stress the fact that two dialectics are crucial for understanding the post-desktop culture. The first one is marked out by the tension between location awareness of wireless computational devices and the process of naturalization of technology. The more ubiquitous and location aware technology is, the more automatically it is used, the better it fits in the reality around us: it seems to be a natural element, ceases to be the subject of attention and it disappears from the field of view. The awareness of the presence of technology and a reflexive attitude towards it is inversely proportional to the pervasiveness of computing. The technology, invisible, thus operating below the threshold of consciousness, however makes the users totally visible. Taking

advantage of the freedom that *ubicomp* offers, they become the subject of no less pervasive, and constant, monitoring.

The second dialectic describes the paradoxical status of data space, which is both invisible and transparent. Although dependent upon the spectrum of our natural perception, electromagnetic waves could be regarded as the ontological foundation of data space, which can be easily scanned, tracked and measured with help of monitoring technology. Thus, data visualization, understood as a possibility of turning the invisible into visible; as making an image of the imperceptible reality, opens hidden zones of data space to pervasive surveillance. As Peter Weibel notices, the dialectic of visible and invisible, transparent and opaque, defines principles of culture in the time of ubiquitous vision machines. Optical and post-optical surveillance digs through the layers of invisible data to analyse and manifest hidden currents of data space that drive visible, physical reality. '(…) excluded from the natural "scopic regime", unavailable to the human eye, with the help of technical instruments the objects become transparent, or more precisely, become *diaphanes*, transparent images. In the mask (of invisibility), the truth shines through.' (Weibel 2002: 209). Looking into and searching through the 'dark side' of augmented space is one of the most important strategies of critical art at a time of ubiquitous computing. While the object of artistic research is liquid and in constant motion, art can get deeply into augmented space and try to actively penetrate zones of invisibility. Art has the potential power to point out important issues by asking questions about things which seem to be obvious, normal and 'natural'. Art can bring insight into the global subconsciousnes of our information society by means of subvertion and the deconstruction of augmented space. Inspired by the formulations of Michel Foucault and Jean-Francois Lyotard, many artists try to manifest variations of the play between the visible and invisible. I would like to briefly refer to the artistic practice of Steve Mann and Michelle Teran as the two examples, which seem to thoroughly represent this attitude.

Sousveillance - mirroring invisible

We live in the era of neo-panopticon where surveillance has become ubiquitous and mundane to such degree that we tend to forget about being constantly under the controlling gaze of various technologies of invigilation. This summary diagnosis of contemporary control society establishes a starting point for the experiments on the

field of 'sousveillance'. Sousveillance is the subversive process of reconfiguring the panoptic gaze, which Steve Mann has been carrying out since the mid-eighties. Using custom-made wearable electronic devices, which in different configurations, combine video cameras, displays and wireless computers used for data storing, processing and transmission, Mann pursues interventions in public space. These interventions aim to reveal the system of pervasive technological observation and problematise the taken for granted rhetoric of surveillance. Sousveillance is a form of reflectionism, which he defines as the 'philosophy and procedures of using technology to mirror and confront bureaucratic organizations' (Mann 2003: 333). The act of sousvellance consists in a temporary, surprising change of positions of the surveilee and agents of surveillance, which result in an inversion of the gaze and observation of the organizational observer (Mann 1998). This strategy is an open declaration of an equal status of the observed and the observers - based on provocatively asked questions: why, what for, in whose name, in whose business is the invigilation conducted? Observing observation becomes the source of socio-psychological information on the state of public awareness and, at the same time, reveals unconsciously assumed foundations of monitoring and invigilation in public space. Mann’s interventions trace and make visible the technology and rhetorics of surveillance and simultaneously, questions the position of agents of control. As a form of psychodrama his actions are directed at raising critical reflection on the part of agents of surveillance. By being put in a new, unusual, strange and troublesome situations, and by facing defiant acts of counter-surveillance, workers of surveillance are forced to reconsider, or at least reflect, on the system they work within. Although Mann does not take hierarchical relationship between employees and the institution they work for into account, which could be regarded as a weak point of sousveilance (Monahan 2006), his strategy unveils the invisible, complicated inner structure of relationships within the system of surveillance. Thus it manifests inner fractures, lack of coherence and contradiction inside the system - which presents itself as monolithic and impenetrable.

The image of data space in Michelle Teran’s projects

Introduction of wireless transmission of data has had a dramatic influence on video monitoring, which is the most common and pervasive technology of modern surveillance. While cables connecting camera with monitoring desk guaranteed that the system was integral and closed (hence the name CCTV) the broadcasting of data in the form of electromagnetic waves opens the system and makes it prone to

external interventions - such as scanning and interception of signal. Although this change of technology contributed to the fast development of networked video surveillance, it also made it possible to access data that were previously kept under control and invisible for outside observers. In several of her works Michelle Teran has been exploring video data space, as the endless source of information on behaviour, dreams, needs, fears, and values which sketch individual and collective portraits of members of information society. 'Life: a user's manual' was a series of walks performed in public space where she confronted two different visions of the same reality: the physical space directly accessible for the senses, and its media representation created by means of private surveillance camera. The map of data space created in such a way, was a recording of the ways of perceiving the valuing of public and private space by diverse, individual and collective subjects. The map was characterized by a specific monotony and a lack of inner variety: the electronic gazes, intercepted in different places of different cities, presented a highly homogeneous image, governed by the rhetoric of security. Similar effects characterise another project 'Friluftskino. Here she experiments with open air surveillance cinema and she shifts the centre of gravity towards the spectacle of voyeurism and exhibitionism. By placing images derived from surveillance cameras in the context of cinema she makes them even more abstract and rootless - losing their original primary function as they become just one of many elements in the global spectacle of visual pleasure. This tendency is even more apparent in her 'Parasitic Video Network'. Here the work is a surveillance performance for one viewer. Equipped with a special portable device which captures feeds from surveillance cameras was located by the artist in various public spaces, like office buildings, shopping malls and parks. The user navigates through physical space being directed by mediatised information that comes from the surrounding electromagnetic field of data space. As the appearance of the image on the screen of the monitoring device depends on the proximity of the wireless security camera, the movement in the physical space depends on invisible data flows. The user walks on the border between visible and invisible, yet the invisible layer of augmented space functions as a guide. The user's activity is determined by the will to capture images, and his/her knowledge of the space is a result of following the gaze of the cameras. Teran creates a framework like a kind of game of chase - playing with the fact that that data space is no longer an augmentation of physical space: data space becomes more 'reliable', and importantly, a more desirable and pleasurable source of information.

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O-d-o: negotiating, contracting and transacting for online deal-making

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Abstract

We outline an online market place with a visual interface facilitating any kind of deal-making in the internet. Through the interface users can negotiate, conclude contracts and execute transactions online. Internet users can specify goals to be achieved or post specific bids and offers. O-d-o will propose matching counterparties via a user-based tagging system. Through the visual negotiation platform the two parties can then start to negotiate. If an agreement is reached, it is captured as a visual contract and a transaction may follow.

This system is meant to facilitate transactions in the niche markets of the current Internet economy. Besides its economic potential O-d-o may also serve as a generic platform for so-called transactional arts - art works where some sort of value is exchanged and which often involve a kind of deal-making. We also outline various applications addressing domains like finance, outsourcing and new forms of online collaboration in a globalized economy.

A special interest lies on the detection of win-win situations and what we call 'creative-deal making'. According to findings in the field of interest based negotiation agents may increase the quality of agreements by exchanging information about their underlying goals, enabling for example alternative ways to attain those goals being discovered. The enforceability of the contracts follows current cyber-law practices. In the context of social networking sites and b-to-b market-platforms the counterparty risk can also be reduced through the visibility of deal-making histories for each party.

The innovative combination of functionalities and the visual interface support all steps from interaction to transaction within one system. The commercial potential lies in supporting the various communities emerging around the subjects they negotiate.

Visual marketplace

O-d-o is a generic online platform with a visual interface facilitating negotiations, contracting and transactions. As a visual market place O-d-o allows users to negotiate on any subject and design contracts according to their needs. Hereby the platform enables the matchmaking of niche demand and niche supply, which - according to Chris Anderson's 'long tail' assumption (Anderson, 2006) about the current internet economy - represents the majority of internet business opportunities. On the O-d-o platform any business community can establish its own market, create standardized contracts and develop specific measures for their enforcement.

Media-visionaries like Vannevar Bush, Douglas Engelbart and Ted Nelson conceptualized intuitive systems and interfaces in order to support various cognitive activities without disrupting the flow of ideas. With O-d-o we aim to provide an intuitive medium for negotiations and contracting. We consider negotiations as a kind of collaborative problem solving and want to facilitate what we call 'creative' deal making, i.e. the detection of new opportunities for either one or both of the involved parties.

Therefore all parameters of a negotiation can freely be edited and extended at any time. The interfaces are customizable to the negotiation styles. Since all interactions can be related to a representation of long term goals the system not only supports detailed and analytical decision making processes, but also spontaneous ones.

Representation of goal hierarchies

Users may represent themselves via a hierarchy of personal values and preferences. If wanted, they may break down higher level goals into lower level tasks and to-do lists via a simple tool allowing specifying hierarchical dependencies. Similar to the Balanced Scorecard (Kaplan and Norton: 1996) approach in the field of strategic management, this form of representation (Kaplan and Norton: 2005) enables the alignment of any activity towards higher level goals. However, this form of

representation is not prerequisite for the use of the system, but facilitates the feature of interest based negotiation as discussed below.

Representation of the own party

Matchmaking

In order to propose counterparty for a potential deal, the system relies on a user-based tagging system indexing the goals/tasks and non-negotiable conditions of the participating parties. Market-participants with similar goals may learn about each other and explore opportunities for collaboration and synergies. Participants with complimentary goods/services may also be connected via the system and can initiate their deal-making activities. The negotiation interface is scalable to the complexity of needs for individuals and organizations alike.

Negotiating, Contracting and Transactions

Any kind of negotiation between two users can be started through the interface. The leading metaphor is a marketplace with the two parties positions on lower (own party) and upper end (counterparty) of the screen.

Negotiations

Users can enter all the relevant parameters for a negotiation such as negotiable, un-negotiable, hidden and visible conditions, target prices, 'best alternatives to negotiated agreement' (BATNA) and other concepts from negotiation theory. These entries are directly entered into the graphical user interface. We follow the Harvard approach to negotiation as introduced by Roger Fisher, William Ury and Bruce Patten (Fisher, Patten, Ury: 1991) and integrate concepts from the Wharton School led by Richard Shell (Shell: 1999). To cater to the Asian style of negotiation we will make adjustments following Peter Nixon’s (Nixon: 2005) writings on 'Business in Asia'.

Drag and drop interface for the asynchron negotiation between two parties.

Visual Contracts

After the negotiation phase with its offer and counteroffers the parties may reach an agreement which they finalize in a visual contract. Every visual element of a contract refers to a section of a conventional contract, such as a paragraph. Since in various contexts contracts tend to be standardized the visualization of contracts as patterns can easily help to highlight the differing variables. If an agreement is reached it is captured as a visual contract.

Transactions

Finally users may execute transactions through the platform. Here we will rely on existing transactional Internet services such as PayPal. The freelancer portal Elance relies on a system called Escrow which guarantees the timely clearing of transactions and reduces counterparty risk since funds have to be deposited in advance and are released according to the milestones reached. This kind of clearing functionality is desirable for O-d-o as well.

The legal enforcement of the contracts relies on the complex current practices of cyber law, which requires basically defining all preliminaries of an international contract upfront. In relation to social networking sites and other online market-places, such as Facebook, LinkedIn, Ebay, Search-a-Coder etc. social pressure and visibility reduce the risk of defaulting. For a commercial application in the field of finance the services of a clearing house could be integrated.

Visualization of transactions between various parties

Interest based negotiation and win-win situations

Research in the field of interest based negotiation has shown that the display of goals can optimize the results of negotiations in certain situations. For example the bargaining and reframing protocol introduced by Philippe Pasquier et al. (Pasquier et al.: 2007) recommends the communication about underlying interests, if the first round of negotiation has not lead to an agreement. This is the case when an agent cannot make 'any more concessions (whether because he reached his last preferred acceptable proposal or because he does not have enough money), he repeats his last proposal', which – may not be accepted by the counter-party.

O-d-o allows parties to represent and communicate (if wanted only partially) their goal hierarchies during a negotiation. This option is completely customizable according to the strategic preferences of the user: the spectrum of transparency may range from zero visibility to negation-specific disclosure of tasks to total visibility of a cluster of goals.

By communicating higher level goals various opportunities for win-win situations may be discovered: for example if parties realize that they actually do not exactly compete for the same resources or that they may have complementary interests in other contexts than the currently negotiated one. O-d-o may serve as a research platform to empirically investigate these kinds of win-win situations and the related strategies of agents. For the pre-negotiation phase we also follow the Harvard negotiation approach and offer templates to hypothesize about the counterparty's dispositions, in order to facilitate creative solutions. Over the course of the interactions these hypotheses can be confirmed or revised.

Applications

The possibility to post relatively abstract goals on the internet positions O-d-o in vicinity to so-called 'ideagoras' (Tapscott: 2006), such as innocentive.com. On these 'market places for ideas' corporations or individuals can (anonymously or openly) post Research & Development goals. In case of a successful problem-solution the intellectual property rights and compensation have to be negotiated and transacted. On O-d-o rather abstract goal specifications can be broken down into sub-goals and tasks by any external online collaborator who may also propose alternative methods for achieving them.

Through the O-d-o platform complete 'value chains' (Porter: 1985) consisting of a team of independent contractors can assemble themselves along task hierarchies (Kaufman and Woodhead: 2006). New forms of online funding, investment and risk management for these collaborations could be explored to facilitate the necessary flexibility. This kind of feature is useful for many outsourcing and online customization contexts in service related industries and could also be applied to social networking sites.

Another field of application is the development of financial instruments, such as derivatives. Derivatives like options, futures and forwards are actually contracts

defining the conditions to buy or sell another 'underlying' entity (usually stocks, currencies or commodities) and are traded on mostly electronic markets in order to mitigate risks and/or speculate. So called over-the-counter (OTC) derivatives can be standardized or negotiated between individual parties. Through the O-d-o platforms even new financial products could be developed, offered and modified.

From an artistic point of view this application could be viewed as medium for the expression of 'strategic creativity', since it allows articulating and posting any visions to be broken down into operable tasks. O-d-o is at the same time a platform for conceptual art and a general off-shoring platform within the global economy. We assume that the creativity of artists and business leaders share common features. Both envision and strategize about new goals which may involve big risks. At the early stage these visions may appear abstract and vague and then become, over time, more specific. Before a new idea finally materializes, it has to be broken down in sub-goals, so that various collaborators can contribute and realize the project. In this sense, O-d-o becomes a global 'dream-machine', where any idea can become a subject of a collaboration.

A niche application could be the art-market: art-collectors commission artworks through the platform. They may post a creative brief to be executed globally by artists bidding online. This service may be combined with a more exclusive auction mechanism allowing collectors to bid for the right to commission high profiled artists and trade these 'options'. In this application O-d-o allows an interesting interaction between strategic, conceptual creativity and the artistic execution, a differentiation which was the working premise of conceptual artists, such as Sole Le Witt and Joseph Kosuth.

Another experimental application of O-d-o lies in the context of transactional arts. In previous research (Plewe: 2008) we defined transactional arts as art where some sort of value is exchanged and this feature is essential to the work. For example, Marcel Duchamp issued in 1929 the so called 'Monte Carlo Bonds', a financial instrument in order to raise capital from his friends for a gambling trip to Monte Carlo. As we have shown, many media artworks actually have transactional features and rely on some sort of implicit or explicit deal-making, often a deal between audience and artists or between artists and subcontractors.

Examples of transactional art include Marcel Duchamp issuing Monte Carlo Bonds, Yves Klein selling void space in Paris, Santiago Sierra tattoos a line of six drug addicts and pays them in their preferred drug, Etoy mimicking organizational structures and issuing shares, RTMark offering investment opportunities in activism, Carey Peppermint facilitates online art commissioning, Mediamatic creating a match-making market place for Russian brides, Uebermorgen creating an online value chain as Gwei and offering a marketplace to buy votes via VoteAuction, Philippe Pareno acquiring IP rights of the Anne Lee character and encouraging further use by other artists, Michael Goldberg playing the stock market in a gallery, Derivart's Bar Bolsa with beer prices fluctuating in real time according to demand and supply in the pub, Open Clothes Project supporting interactions and transactions around the design community.

Often these artworks take the form of online businesses. O-d-o captures the generic feature across all these examples of artworks, even though in many cases of transactional art the deal-making component remains implicit. The author is currently developing an artistic application providing instruments around financial topics, such as the 'beauty of risk-management', 'happy hedging' and 'fulfilment through options'.

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Ruminations on remuneration

Renee Ridgway

n.e.w.s (http://northeastwestsouth.net) was launched at ISEA2008 in Singapore. n.e.w.s. is a platform for participatory development of artistic and curatorial projects in contemporary art and new media framed by curatorial contributions from around the globe. Bringing together voices and images from North, East, West and South, n.e.w.s. reflects geographic diversity and facilitates a framework for collaboration, content and visions of change from outside the normal parameters of established art world networks. In this paper we (n.e.w.s.) would like to address the relationship between rethinking the social and economic conditions of art and the artistic context of an emergent participatory community investing in creative production on the Internet. This will be mapped out through notions of the gift, immaterial labour, debt and participatory technologies. Finally we would like to introduce our forthcoming book *Arbitrating Attention* that explores alternative models of remuneration.

Paid content

n.e.w.s. offers space for a potential series of global dialogues, transactions and collaborations concerning art and its discourse. Content is provided by contributors from different regions in the world, resulting in a rethinking and rearticulating of certain identity constructs inherent to pre-Web 2.0 generations. n.e.w.s. is non-commercial and uses the visibility of distributed networks to create value around immaterial resources in a knowledge-driven economy. Using a bottom-up, grass roots methodology in a Web 2.0 economy, what distinguishes n.e.w.s. from other online communities is its collaborative curatorial model and partially remunerated content, without being an academic, governmental or large cultural institution with structural subsidy. A system of trust and unexpected contingencies measure this intangible input. This strategy encourages a return not strictly based on attention economy (reputation) principles.

Gift, debt and return: speculations on the cultural economy

n.e.w.s. is an online context or space for creative endeavour that is not directly dependent on the market economy (or at least, that it does not exist to generate a

profit per se), nor is it co-opted for market research analysis (data mining) but is nonetheless engaged within a meta-discourse about value. What are our values at n.e.w.s.? And what are their cultural dissemination? How have these values been defined, negotiated and exchanged in virtual as well as real world ‘debt’ economies so far?

If the value of money - as classical Marxist theory would have it - is derived from ‘labour power’, or even, as some recent strains put it, more broadly from creative action - and if it is only through the institution of the wage that this creative action becomes a commodity, why is it so few of us are getting paid in a Web 2.0 economy? Some have argued that the common distinction between 'value' and 'values' is based on the commodification of labour: 'value' is simply our way of talking about the importance of actions commensurated by money (value being that which money measures), while 'values' (where familial, societal, ethical, religious, artistic) are assumed to be that which should not be corrupted by the market. (Graeber 2001) ‘Values’ are valued for their very incommensurability. Where do we place the Internet? It is, certainly, a sphere of social relations that is continually adapting and changing, but many of the resulting struggles revolve around the question of what sorts of value and, indeed, values, it embodies. On the other hand, this is, perhaps, only to be expected, ‘if only because the most important political struggles in any society will always be over how value itself is to be defined.’ [1]

Notion of the gift in a user-generated economy

The notion of the gift, as developed by the sociologist Marcel Mauss [2], has been interpreted as assuming that gifts are not free, something needs to be returned or exchanged. Actually Mauss’ essay on the gift was, he claimed, really part of a larger project on the ‘origins of the idea of contractual obligation’ and in a way, about the origin of debt and about how social obligations become entangled in things. Mauss even argued that the gift is about detaching pieces of ourselves, our creative energies (gifts) to create images of community. The Maussian distinction between gift exchange and economic transactions actually works by an analogous logic: the gift is largely concerned with relations between persons; a commodity exchange is equivalence between things. Gift economies, those that have not been remunerated, have always been an inherent part of capitalism - so much of capitalism functions,

[1] Graeber, David. *Towards an Anthropological Theory of Value.* New York: Palgrave, 2001.
[2] Mauss, Marcel. *The Gift: forms and functions of exchange in archaic societies.* London: Routledge, 1990.

exists, propagates itself because of unpaid labour: slavery, women's housework labour, child labour as well as intellectual labour by workers in the 'culture industries' but this labour disappears from social visibility.

Immaterial labour and valorisation

Immaterial labour[3] theory assumes 'we' are engaged in a kind of communistic mutual fashioning where obligations cannot be quantified by definition, just harvested by capitalists, so the 'law of value' no longer exists, value can no longer be measured. Since the 1970s this has changed the organisation of production (post-Fordism) and how intellectual labour results in what Lazzarato terms the 'process of valorisation'. Valorisation is no longer confined to the factory, the value of products is created more and more by all of us, in our supposed leisure time, thus we are all basically working for free. With the advent of computers and the ability to gather data, companies harvest our creative energy to understand and market that information. Thus we are adding to the value of the product for free as we distribute parts of ourselves, spreading our 'data'. This 'gift-giving' of time, energy and knowledge (content) exists in an economy that bids farewell to the client and welcomes instead the user/collaborator (prosumer). Though both gift economies and immaterial labour raise similar questions problematising our assumptions about value in the Internet, they don't seem to contextualise the looming problem of our society: obligation, debt and remuneration.

Social creativity, data within virtual, debt economies

In social exchange, relations do not have the anonymity of money but rather provide reciprocal returns in broader terms, open-ended networking models and tit-for-tat exchanges between people. This could also be said of n.e.w.s. But how does this affect the classic (Marxist) idea of commodity fetishism, to reveal social relations hidden by things and human creativity? Etymologically 'data' is the Latin plural of datum, neuter past participle of dare, 'to give', hence 'something given'.[4] With the advancement of computers we use 'databases' that are able to collect, store, use all forms with data acquisition, data analysis, data farming. Data mining is the art of finding hidden patterns or anomalies that are used in profiling, and applied to fields of

[3] Lazzarato, Maurizio (1996) "Immaterial Labour." [Internet] Available from <http://www.generation-online.org/c/fcimmateriallabour3.htm> Translated by Paul Colilli and Ed Emery
[4] Wikipedia, http://en.wikipedia.org/wiki/Data

consumer analysis, marketing and surveillance. If we ‘give’ data freely, as we give our time, remit our rights of privacy and right to remuneration, how can we create other systems of negotiation and payment?

The expansion of credit money and giving ‘data’, produces an implicit tautology. Computers, which keep track of the complex lines of transaction that were invisible when done with hard, material currency, simultaneously also provide complex ways of hiding abstract securities, collateralized debt obligations and credit default swaps that have accrued so much that this amount of debt is larger than ‘real’ economies.

Virtual labour and virtual economies

Virtual labour and virtual economies are made possible by exchanges of value on the Internet. Derivatives, mortgage-backed securities and other synthetic constructions are the replacement models for classic ‘wage labour’ and are based on debt securitization. How can financial obligation become an infinitely expanding promise of future profits without false value? Is the origin of this value really in the unpaid labour of the Internet? In attempting to understand the link between new forms of virtual labour and virtual money, might we need to look at them not only from actions of ‘gifting’ but from the perspective of obligation, debt and remuneration?

Remuneration for labour or contributions (user-generated content) on the web is through gift-economies, debt economies and mostly, attention economy (visibility). This distribution of attention is reflected in theories such as the ‘The Long Tail’ (Anderson), which proposes that instead of economy and culture focusing on the mass market, where hits are related to popularity, the niche market will enable a longer (tail) of supply. New distribution mechanisms, from digital downloading to peer-to-peer (P2P) markets such as e-bay, mediators taking a tiny cut of vast numbers of transactions, offer more return. But where will the borders reside of speed, access and censorship and what sort of power relations will determine them?

Participatory technologies

In an age of digital participatory interaction through word, image and social software, alternative models of distributing knowledge can arise, resulting in future productivity. n.e.w.s. is attempting to leverage the potential of participative technologies and communities to facilitate the possibility for an artistic discourse through paid content.

How can we negotiate the attention economy of the Internet with remuneration? If the n.e.w.s. business model is premised on funding from cultural organisations worldwide that specifically support local as well as international endeavour, how do we retain autonomy while fulfilling the interests of top-down structures? In order to pay contributors n.e.w.s. is seeking out alternative models of exchange, collaboration and vocabularies by engaging visionaries and financial supporters in order to bridge not only fields of interest but non-profit and profit-seeking enterprise. We also happened to win a prize as a result of which we are (partially) financially supported to write a 100-page book that rethinks the social and economic conditions of art in the 21st century and speculates potential models for remuneration.

Arbitrating Attention

n.e.w.s. will tap the undercurrent of new economic experiments in the way artistic activities can be de-framed yet incorporate survival tactics for sustainability in our forthcoming publication: Arbitrating Attention.[5] The rise of the attention economy – that is, the economy inherent to the 'society of the spectacle,' of which the mainstream contemporary artworld is both the proving ground and the emblematic outcome, shows every sign of continuing into the future at the same inexorable pace it gathered in the twentieth century.

What exactly do we mean by the 'attention economy'?

Simplified, is attention-getting not a form of symbolic capitalization, akin to a 'reputational economy'? Build on existent stock, expand the audience, in short, exploit attention-getting to capture whatever opportunities the new economy offers. In this respect, and in this economy, attention is capital. Here the challenge for immaterial labourers is to extract their surplus value without the expectation of overthrowing the system. Art today has become an extreme exacerbation of twentieth-century attention economics, where the artist’s standing in the reputational economy is determined by his or her coefficient of specific visibility.

[5] For full proposal text please see http://northeastwestsouth.net/node/251

What we mean by a 'shadow economy'?

Payment, in the form of money as we know it, is now a virtual transaction except in ‘shadow economies’ of illegal activities with cash payments and billfolds (suitcases of money for drug dealers and human smugglers). But what we mean by shadow economy is different. Instead of visibility, conversely, the 'shadow economy' is based on a model of inattention; that is, of a deliberately impaired, deframed attention. Thus a shadow economy is dependent on the structures of the broader economy even as it shifts the emphasis on where value is placed and how it is defined.

Shadow economics on and off the web

The attention economy really took off with Web 2.0 – less a technological paradigm, really, than an innovation in capital accumulation based upon the private captation of community-produced value – and has admittedly done so with the complicity of the users’ community. Increasingly though, this model of attention-in-lieu-of-remuneration has faced a two-tiered challenge from its own shadows: a post-media response from the 'sensual web' of the pre-existing unplugged world, which might ironically be termed 'web 0.0' – that is, not the web at all, just the broad cognitive network of human interaction; and an explicit expansion for developing instruments and resources to run user-generated content on public websites. This focus on paid web-usership is technologically embryonic, though it may ultimately be a platform for remunerating not the classic category of 'authorship' but the more extensive and more inclusive category of 'usership.'

Being net-based or neighbourhood-based is not the issue, for ultimately this new economic model is in the shadows of the mainstream attention economy. Social exchange, happenings and relationships are not anonymous like money but rather can provide retribution in longer terms, open-ended networking models - exchanges. In both counter-models, the resources themselves are siphoned off from the edges of the attention economy.

Being the change we want to see

To sum up, the attention economy – through its foundations and similar apparatuses – has no choice but to fund knowledge production ventures, of a more or less playful but nonetheless serious nature. Shadow economic players (whatever their social

status or realm of activity) sieve off a portion of the resources and re-channel it to other shadowy operatives, allowing a de facto venture-capital injection that then is reinvested in rethinking the very notions described above forming the basis for renewing our modes of transmitting knowledge. What the shadow knows.

Dramaturgy as a model for geographically displaced collaborations

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Abstract

The network currently is not only widely used for performative actions but also extensively theorised. However, the artistic strategies in networked environments and the ways in which these new performance practices and cultural contexts can give rise to new design approaches have not been equally explored. This paper therefore draws on the notion of dramaturgy as it provides a useful framework for addressing design strategies and performative relationships in networked environment. I argue that dramaturgies suggest a robust method for understanding artistic practices in the network. The paper gives a brief overview of the history and the theories of the network as well as the histories of dramaturgies. This paper was designed in conjunction with, or as an introduction, to a paper by Pedro Rebelo in the 2009 Contemporary Music Review Journal (Rebelo, 2009), which describes in detail three dramaturgical models that I developed with the author in early 2008: an extended version of this paper will be published by Contemporary Music Review (Routledge), 2009.

The network is alive

Although musicians have engaged in performances involving the network for over 30 years, the last 3-5 years have seen a particular increase in networked performance practices. A very brief overview of networked music practices since the appearance of The League of Automatic Music Composers in the late 70s gives insight into basic musical activities in the network: The League of Automatic Music Composers employed computers to exchange messaging data between players in order to make music in a networked environment. The group performed between 1978 and 1983, re-forming into The Hub in 1986. These two groups are often named as the world's first computer network band (Duckworth 2005: 60). Although mostly a group that connected computers together to exchange messages rather than pure audio

signals, experimenting with remote collaborations between the West and the East coasts of the US, The Hub also used acoustic musicians. In 1990 Richard Magill established the platform NetJam as a way of distributing messages and files over the network. NetJam allowed people to collaborate on compositions by sending MIDI messages (Musical Instrument Digital Interface) to each other. Musicians were able to edit these files and send them back to anybody in the network community who had MIDI-compatible equipment as well as email and Internet access (Latta 1991). It was only with the development of high-speed Internet backbones such as Internet2 (Internet2 Homepage 2009) in the US that the transfer of real-time high quality interactive audio was made possible. One of the first to take advantage of this development, thereby establishing the first platform that allowed for real-time, high quality uncompressed bi-directional audio streaming, was The SoundWire project (SoundWire Homepage 2009), at the Centre for Computer Research in Music and Acoustics in Stanford (CCRMA Homepage 2009). In 1994 Rocket Network launched the Vortex Jamming software, and created the concept of the MUSE (Multi-User Studio Environment) for jamming with other online users (Duckworth 2005). A similar, but more real-time jamming and interactive platform was created in 1998 by Ruksun Software Technology and their LiveJam application, which allowed musicians from all over the world to play music with each other over the Internet. The following year Georg Hajdu launched his Quintet.net platform, an interactive network performance environment using the music programming language Max/MSP (Hajdu 2004). More recently, through a European commission project, a test-bed for multiple network ports, which maps out the network conditions across several European partners, was developed in the form of the CO-ME-DI-A Bus. Regular network music collaborations take place between the partners of this project (Comedia Homepage 2009). The most recent developments and platforms - and the ones most currently used in networked music performance - are provided by Juan-Pablo Caceres and Chris Chafe of the SoundWIRE Group and their JackTrip application (Jacktrip Homepage 2009), a system for high-quality audio network performance. This system supports any number of channels of bidirectional, high quality, uncompressed audio signal streaming and is used extensively by the Sonic Arts Research Centre (SARC Homepage 2009) as well as other universities for network performances[1.]

The recent increase in performance activities in networked environments is due not only to the availability of high-speed network communication protocols and increased

[1] See Renaud, Caceres 2007) for a paper providing an overview of various network performance initiatives.

bandwidth at universities and new media centres, but also due to an increased recognition of net art within the context of arts/research funding bodies. It is not surprising that in the process of increased music-making activities in the network and enhanced research funding, which sits alongside these activities, the network itself has become theorised in many ways.

Although it is beyond the scope of this paper to discuss the various existing network theories, it can be argued that recent writers and thinkers have been pushing for a more complex understanding of the network; for an understanding that goes beyond seeing the network as an idealized model of connectivity and communication (Schroeder, Rebelo 2009). Although from a topological point of view, artistic practices occur at the nodes and knots of the network fabric, it has been debated whether a connectivist model of the network can be sufficient to describe the relationship between artistic practices and sites. Thinkers have thus urged us to see the evolution of networks as a focal point (Munster, Lovink 2005); they have argued for an understanding by which the network flow is not solely about a process of decoding and recoding, but in which the transformation of bodily habits through information is given consideration (Terranova 2004). The network is not a static entity, but it is pulsating and alive. It carries information, and since information is always about contacts and also tactility, where the body becomes inserted into a field of action, as Terranova has convincingly argued (Terranova 2004: 19), the network needs to be understood as a dynamic entity; as a structure that is open to dynamic transformations and tactile engagements.

Looking back over the last two centuries, we find that the network was first understood simply as the connection of nodes and knots, such as found in the connecting fabric of fishermen forming their nets. A network during the 18th Century was understood as a tool for connectivity, for optimising paths, a model for complex interaction (Euler 2009). In the 1970’s through the term 'global village' - a term that can be traced back to the writings of Marshall McLuhan (1962) as well as through the writings of Hiltz and Turoff (1978), the network is understood as a communicative structure allowing communication across the entire globe. Today, we often talk about network of friends and networked communities (e.g. Facebook, Myspace), the foundations for this having been laid by the writings of Manuel Castells and the development of the notion of 'network society' (Castells 1996). In this sense, a network intends to join groups of dislocated interests and expressions. The often-romanticised view of the network as one that allows for idealised connectivity and

unity has been questioned by Richard Coyne in his work 'Technoromanticism' (Coyne 2001). Coyne argues that Deleuze's rhizome metaphor, as outlined in Deleuze's and Guattari's seminal work *A Thousand Plateaus* (1988), counters such an ideal of unifying connections. More recently, the network has been theorised through an emphasis on the 'paranodal', as a way for thinking of what lies between the nodes (Mejias 2007). The theorising of the network, not only as an information structure, has been immense. Furthermore, the network's inherent behaviours, such as latency for example, have long been considered for artistic usage. Atau Tanaka has been experimenting with network music since 1994 when he commenced by performing telematic concerts utilising video-conferencing technologies. For some time now Tanaka has been exploring what he calls 'the acoustics of the network' (Tanaka 2005). Tanaka strongly argues in favour of music performances needing to explore the 'specific temporal characteristic' of each network (Tanaka 2007). More recently Alain Renaud and Juan Pablo Caceres have been revisiting certain idiosyncracies of the network and are attempting to create musical works based on the network's inherent perturbations (Renaud, Caceres 2007).

Dramaturgy as model

I now want to examine strategies of how performers work the network, or work in the network. In order to do this, I look towards theatre and drama, and examine the histories of dramaturgies in order to better understand artistic strategies and social relationships in collaborative network performance environments. The term 'dramaturgy' has been used in theatre to discuss notions of authorship, collaboration, structure, content, and as an umbrella term for a number of roles that characterise performance practice (LMDA 2009). I feel that the notion of dramaturgy provides an excellent framework for addressing these relationships and suggests a robust method for understanding artistic network collaborations that always concern themselves with what I entitle views from 'within' and 'views from without'. The network urges us to continuously consider our practices from within: from our standpoint, from our physical location and also from without: from a point of view that tells us what our practices may look or sound like from an external standpoint, that is from another location and most importantly, what they look or sound like at the other location. One particular reason for examining dramaturgical approaches stems from a belief, that recent trends in networked environments are very much characterised by a hybridisation of diverse artistic practices. Indeed, increased technological potential has contributed to the fact that all sorts of cultural performance practices

become crossed and mixed in the network. Digital media performances hardly ever refer to one or two particular cultural practices anymore and artists derive their creative strategies from looking sideways, at other artistic paradigms. In terms of network performances this means that improved network technologies allow us to make music with people in disparate sites, to dance with bodies in virtual worlds or with real bodies in other parts of the world, and also allow us to map performers' data, be this physical or audio data, through the network onto another space or artefact.

Dramaturgy is a term that evidently has strong references to the theatre and the stage. Originally, dramaturgy stems from the Greek word 'dramatourgia': drama (gen. dramatos) + ergos = 'worker' (Harper 2009); hence, dramaturgy is about the composition or design of a deed or an act. The term dramaturgy often encompasses various ideas such as composition, structure or the fabric of a performance.
A general idea of 'dramaturgy' was initially laid out in the writings of Aristotle. In his *Poetics* (350 BC) Aristotle describes drama as a subsection of poetry (Aristotle 2004). Aristotle's writings place a specific emphasis on the notion of time, place and action, and the structure and inner workings of a drama as discussed in Aristotle have been highly influential in theatrical as well as literary theory (Carlson 1993: 15). In particular, Aristotle considered as essential the perspective of the spectators. He had argued that the compositional effects or dramaturgical strategies could greatly influence the audience and their experience.

A more contemporary concept of dramaturgy has its roots in 18th Century Germany. The German playwright and poet Gotthold Ephraim Lessing is often quoted as the pioneer for creating a new theatre discourse. Indeed, Lessing has been credited as shaping a distinct German theatre as well as establishing a modern understanding of the concept of dramaturgy (Turner, Behrndt 2007: 19), not only because he expanded Aristotle's ideas but also because Lessing was specifically fond of the dramaturgical models of William Shakespeare. In his publication *Hamburgische Dramaturgie* (1767-9), a collection of critical essays, Lessing outlines his dramaturgical ideas, presenting a 'rigorous, objective and analytical theatre discourse and practice' (ibid. 2007: 20). Specifically, Lessing re-thought the then standard rules of the three unities, the unity of action, place and time, which had been characteristic of Baroque theatre. Lessing questioned the often pompous actions of Baroque theatre with its overly romanticised drama that highlighted exaggerated virtues of the noblemen while bringing to the fore the vices of their opponents (evidently, the

audience consisted mainly of aristocrats). Instead, Lessing wanted to focus the action upon its naturalness and plausibility. His new interpretation of Aristotelian drama theory brought about a change in the types of works that were being staged; thus, works that addressed issues of the common people and through which the viewer would identify more easily, superseded the Baroque Drama. Lessing was therefore not only an innovator with regards to theatre discourse, but he was also highly interested in educating the public. It is worth noting that Lessing's writings, which describe dramatic composition as a kind of 'transitory painting' (ibid. 2007: 23) with visual and literary components, had a strong impact on subsequent artists such as Johann Wolfgang von Goethe and Friedrich von Schiller. Both Goethe and Schiller embraced visual elements such as lighting and movement for instance and this new dramaturgy could be seen in their creative outputs at the Weimarer Hoftheater from 1781 (ibid. 2007: 23). Lessing's merging of visual and literary elements re-emerged the following century in the form of German composer Richard Wagner's (1813 -1883) idea of the 'Gesamtkunstwerk', his all embracing, total artwork, in which he attempted to combine poetic, visual, musical and dramatic aspects of a work, as exemplified by his 1876 epic four-opera cycle *Der Ring des Nibelungen.*

Several contemporary directors have been highly influential in re-thinking dramaturgical models. Grotowski for example is remembered for his 'Paratheatrical Phase' in the early 1970s, where he questioned the separation between the performer and the spectator (Grotowski 2009). Augusto Boal is now often quoted for successfully having broken down this barrier between the performer and the spectator in his 'Forum Theatre', a form of political theatre, in which the viewer becomes part of the action. Boal coined the term 'spect-actor', referring to the dual role of those involved as a spectator and as an actor, as being able to be both observers and creators of the dramatic action. This development has of course strong roots in the work of German playwright Bertold Brecht, who in the mid-20th Century had developed the concept of Epic Theatre (also referred to as dialectical theatre or Brechtian acting). The main purpose of Brecht's plays was to stage ideas for the spectators who would be urged to pass judgments on the issues presented. Brecht's model of dramaturgy is understood to be central to a 'world-wide revolution in theatre-making practices' (Brecht 2009).

Summary

This brief overview shows that dramaturgical models have constantly been re-visited, changed and shaped and were often questioned and adapted to reflect the political flavours of the time. The term dramaturgy is indeed a broadly understood and flexible concept that has been referred to as the 'weaving of the performance's different elements' by the Italian author and theatre director Eugenio Barba (Turner, Behrndt 2007: 12) as well as to 'a performance's compositional, ideological and aesthetic mechanisms' (ibid. 2007: 12).

Currently, there is a rising interest in the idea of dramaturgy as a critical concept and as a way of re-thinking artistic practices as confirmed by recent publications on dramaturgy and performance (Luckhurst 2006 and Turner, Behrndt 2007). In particular, dramaturgical models can equip us with a useful framework for understanding different artistic practices that we tend to encounter when collaborating in networked performance environments. Dramaturgies highlight the need for very specific design concepts of a performance environment, particularly in the initial stages of a work's development. The types of network collaborations that contain a diverse range of artistic inputs and practices, which are most commonly situated at dispersed locations and thus carry with them various viewpoints and differing understandings, benefit most obviously from a strong dramaturgical model. The three unities, that of action, place and time, characteristics and standards of Baroque theatre during Lessing's time, are once again becoming re-examined, questioned and re-designed in networked performance environments of today. The above-mentioned paper by Pedro Rebelo (2009) discusses in detail three distinct models for dramaturgy that aid in better understanding the relationships between artists, audiences and media. The three models discussed are that of 'Projected Dramaturgy', 'Directed Dramaturgy' and 'Distributed Dramaturgy'. In Rebelo's discussion it becomes transparent that the notion of dramaturgy provides a clear framework for addressing the relationships between artists, audiences and media and that dramaturgical models can provide an excellent method for understanding network collaborations.

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A study on the relation between the evolution of media platform and mobile content culture in Korea

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Introduction

At the *candle rallies* in April 2008 protesting against the import of U.S. beef under Korea-U.S. FTA, the participants paraded in the street with a candle in one hand and a camcorder or digital camera in the other hand. Using their mobile phones and laptop computers embedded with high-speed wireless Internet, citizens broadcast, live, the scene of the rally to Internet portal sites ‘Agora’ in ‘Daum’ and ‘afreeca.’

Figure 1. 'Daum' live broadcasting and Google Earth

The rallies took place, not only in the streets, but also at ordinary households throughout the country. Netizens who joined the *candle rallies* took satellite photographs of the scenes through ‘Google Earth’, reported the deployment and moving routes of police, and estimated the number of participants by counting candles in aerial photographs using pixel measuring software. Citizens gathered and reported news online using advanced technologies unimagined by established media companies and they also collected donations through the live Internet broadcasting of the candlelight rallies through ‘OhmyNews’ raising 100 million won (US$100,000) in eight days.

'One-Person Media' and multitude

Korea, which is expected to have a population of around 50 million in 2010, ranks first in the world in computer diffusion rate, super high speed communication network, and the digital opportunity index. Currently, as of 2009, the number of subscribers to high-speed Internet is over 15.5 million and that to mobile telecommunication is over 45 million.

Figure 2. One-person media

In this way, it was ordinary people and the public who opened the new paradigm of ‘One-Person Media’ in Korea. People who provided a ground for faster and more vivid communication than news by professional reporters are no longer a simple mass or crowd. They can be defined as ‘Multitude’ with swarm intelligence who are individuals and who participate voluntarily. Multitude is a political term first used by Machiavelli and reiterated by Spinoza. Recently the term has returned to prominence because of its conceptualization as a new model for organization of resistance against the global capitalist system - as described by political theorists Antonio Negri and Michael Hardt.

Figure 3. Digital citizen broadband democracy in Korea

Mobile content culture in Korea

Today's media environment created by the advance of information technology has made fundamental impacts not only on human society, culture and the arts but also on our daily communication and habits. In particular, space-centred human life has been deconstructed into the style of time-centred 'digital nomads'.

In the evolving media environment, the public or users broker the conventional way of communication and produce new content UGC (User Generated Content). In particular UGC based on Web 2.0 was a case of the materialization of the Web as a platform - which began to gain strength and leads user-centred online culture. In 2006, Google, the largest Internet search engine, took over YouTube, the biggest video content site in the U.S. YouTube has made a great contribution to the external expansion of UGC by broadening the width of UGC production and promoting its sharing and distribution - before culture is connected to consumption activity.
On the other hand, the multitude's unique UGC creation method displayed at the candle demonstrations in Seoul in 2008, and the public mechanism for sharing the method - presented the vision of personal broadband. This means that network is replaced by the Internet as a ubiquitous environment: users and contents become

the centre of telecommunication, and a new content mass production system has been established. 'France 24' is a news broadcasting system in France, called a new form of expression through the medium of the Internet - ‘broadband democracy.’

Multitude	Digital content producing activities	Media
Participator	a) Rally participants b) To communicate with other participants using calls and text message c) Notify to the friends and family about the situation	- Mobile Phone
Recorder	a) Take photos and videos at the rally, and then uploaded those files on the internet b) Live broadcast on the ‘afreeca’ though a laptop webcam.	- Digital Camera - Camcorder
Analyst	a) Posted information about attending the rally preparations such as candles, blankets, foods, even though when they are coped with police situation. b) Estimated the number of participants by counting candles in aerial photographs using pixel measuring software.	- Internet - Photoshop
Spreader	a) Free discussions and arguments on the personal blogs and public broadcasting boards. b) Update real-time news	- Internet - Broadcasting (Daum ‘Agora’, afreeca, ColorTV) - Blog

Table 1. Categories of multitude type as media activities

Conclusion

This study analyzed the new information communication structure in Korea through the case of media utilization in the *candle rallies*, and suggested the possibility of a new culture. In addition, we attempted to illuminate the characteristics of mobile content along with the evolution of media platforms by identifying distinctions between the multitude - using a transformed expression method - and conventional users.

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Co-curating: distributing art globally, enacting art locally

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In 1968 the writer, activist and curator Lucy Lippard was in Argentina trying to organise an exhibition of dematerialised art in which all the exhibits fitted into a suitcase: the idea being that the suitcase would be taken from country to country by 'idea artists' using free airline tickets. In some ways Lippard's version of portable art - that can be accessed in diverse geographical locations easily and relatively cheaply - has been superseded by the online distribution and exchange of network art through social platforms. Valuable as these exchanges undoubtedly are, perhaps something of the specificity of the local is being lost in the process. Can another version of Lippard's concept of portable exhibitions and events be imagined and realised: one in which artworks are distributed globally and enacted locally? What does it mean if an artwork is 'distributed'? What does it mean if it is 'enacted' locally? What form does the work take, and which aspects of it are portable?

The network is the emerging form of organisation within capitalism; superseding centralised, hierarchical structures, and replacing protocol with bureaucracy. Alternative knowledge systems based on non-hierarchical models of organisation, emerging in tandem with digital media and network technologies are challenging and undermining traditional concepts about the relationship between artist, curator and audience. This shift from hierarchically ordered taxonomies and relations to those informed by the logic of distributed networks, is the context within which *protocological art forms* are emerging. Distributed protocol is a set of rules that organise both the behaviour of discrete elements within a network *and* which mark the parameters of that which can pass through the network. Each discrete element is an independent unit that via protocol can come together with other elements to form a temporary whole: it can be dismantled and re-used. Although distributed networks facilitate open, participative and collaborative processes and practices, they operate within an algorithmic logic controlled by protocol. Emerging art forms do not *represent* these conditions but directly *engage* with them: they do not accept the dominant logic often encrypted into network culture, rather they expose and examine the ethics, aesthetics and politics of protocol.

The genealogy of protocol in art reveals that from the early twentieth century artists were engaging through their work with processes of rationalisation within everyday life, together with a profound interest in the logic of computerisation. For example, attention to mathematical algorithms, geometry, rules and instructions, informs the work of artists making minimal, conceptual, relational, socially-engaged and network art: many of them emphasising processes of standardisation, modularisation, rationalisation, incorporation and automation. Describing the emergence in the 1960s of an 'ultra-conceptual art' that 'emphasi[zed] the thinking process almost exclusively' Lucy Lippard and John Chandler observed 'a profound dematerialization of art' that they believed could 'result in the object's becoming wholly obsolete' (Lippard & Chandler 1968: 46). Citing contemporary work such as: Carl Andre: *120 bricks to be arranged according to their mathematical possibilities* (1967); Sol LeWitt: 'non-visual' serial projects incorporating conceptual logic and visual illogic (1968); Yves Klein: 'empty gallery' show at Iris Clert (April 1958); Lippard and Chandler emphasised a shift towards 'art as idea and art as action'. They recognised particular attributes in this work that, superseding 'the anti-intellectual, emotional/intuitive processes of art making characteristic of the last two decades', marked a shift towards work that was planned and 'designed' by artists and 'executed elsewhere by professional craftsmen'. With attention to a particular 'thinness' 'both literal and allusive' apparent in 'such themes as water, steam, dust, flatness, legibility, temporality' they traced to Dada and Surrealism 'the process of ridding art of its object quality'. The Dadaists devised works consisting of verbal instructions in which, perhaps, protocol begins to emerge as a *medium*: that is, protocol (de)materialises temporal processes not as spatial structure but as relation. As the art object became an epilogue to the 'fully evolved concept,' the established organisational framework premised on relations between visible, bounded entities gives way: new artistic processes emerge that focus on the temporal and spatial 'relations, ratios and proportions between things' and people (Lippard & Chandler: 1968: 31). Explicit use of protocol - rules and instructions that facilitate, organise and, to an extent, control relations between entities – was inevitable. Just as a recipe details which ingredients to combine in order to produce a particular dish, so distributed transformative practices make use of 'protocols' to mark the parameters of performance and enable its dissemination. As the interactive gallery installation or participative online work becomes an epilogue to art practices that are enacted in one's own real time and place - away from the gallery and away from the computer - protocol emerges as a fully-fledged *medium*. Organisational frames premised on relations between visible, bounded

entities give way to organisational frames that facilitate *temporal and spatial* relations between things and people.

Distributed art emerges with reference to the distributed network. It works a little like packet switching technology. Packet switching technology 'allows messages to break themselves apart into small fragments. Each fragment, or packet, is able to find its own way to its destination. Once there, the packets reassemble themselves to create the original message' (Galloway 2006: 318). Distributed art allows itself to be broken apart into small fragments: no longer organised by the picture frame or the gallery, each fragment is held in relation to another by protocol. The protocol is as much a part of the work as the content. An early example of distributed art is the 'Refresh Art Project' (1996) which linked together more than twenty World Wide Web (WWW) pages each located on different servers across Europe and the USA. Using the 'refresh' protocol devised for HTML – the language used to organise and design WWW pages - visitors were 'zapped' automatically from one page to another at ten-second intervals. Described by the originators as 'A Multi-Nodal Web-Surf-Create-Session for an Unspecified Number of Players' the project was an exploration of instability and unpredictability; it was 'poetic, [a] flow of electrons, feeling the universe, extasy [sic] of true joint creativity, hopping through space, countries, cultures, languages, genders, colours, shapes and sizes' (Refresh 1996: homepage). The viewer was invited to become a participant by creating his or her own web page and 'linking' it via HTML code to the existing pages. For Andreas Broeckmann, a curator working within net art circles at the time the work was produced, '[t]he project was exciting for those immediately involved as they could experience how the loop grew page by page, while they were simultaneously communicating and negotiating via an IRC [Internet Relay Chat] chat channel how to solve certain problems' (Broeckmann 1997: 3). Exploring the interconnective qualities of computers, the Internet and social networks 'Refresh' is, 'a genuinely distributed artwork whose experiential effect both depended on and transgressed the physical distance between participants' (Broeckmann 1997: 3). In challenging the orthodox notion that an artwork exists in just one place at one time, the structure of 'Refresh' facilitates the work 'happening' in more than twenty places simultaneously. It foregrounds the distributed structure of the Internet: its 'multiple sites of locality, many-to-many communications channels, and a self-organizing capacity (local actions, global results) (Galloway and Thacker 2004).

Whereas this kind of distributed art worked with the technical infrastructure of the Internet, a non-technological distributed art form now seems to be emerging. It is with reference to the work that I make with Patrick Simons as *glorious ninth* that I am able to articulate my understanding of this shift. *glorious ninth* work produced between 2001 and 2004 was contextualised within a network art framework: produced, disseminated and consumed via the Internet. Each artwork comprises several elements constructed from digital sound, images and text, integrated together using authoring software packages, and then uploaded to a web server for online access. To each element is attached an algorithm: computer code that defines behaviour within a constructed set of parameters. The algorithms define properties such as gravity, speed, direction, and level of transparency. Patterns, rhythms and tempos emerge through the interactions of the different elements: together they map a spatiality of transformation based on pulses, expansions, contractions, ebbs and flows. With each element coded individually the *parameters* within which each movement and interaction takes place becomes the organising principle rather than the pre-definition of an overall composition.

The relation between individual elements and the overall work is highly significant as it enacts the shift from a centralised to distributed organisation of elements. In artwork that is organised centrally, the elements coexist 'all in one' (Schillinger 1976: 18) whilst in artwork that has a distributed organisational form the elements are developed individually and their interaction with other elements correlated via algorithms. Algorithmically organised work, then, does not need to exist for a pre-determined length of time as in film, but continues to transform continuously: its overall pattern is not pre-planned as in animation but emerges through envisaged and unexpected rhythms and encounters between elements. These early *glorious ninth* works enact the shift from centralized to distributed forms of organizations and are made with reference to the highly rationalized logic of the network.

The work that we have been making since 2004 translates this understanding of algorithm and generative work to the realm of human relations. The *Tending Triptych* (2004) brings together two aural-visual artworks *Flowers* (2003) and *Rationale* (2002 and a durational performance *Tending* (2004). The two aural-visual works were made following a similar method to that used in net art pieces: scanned flowers and leaves collected whilst walking were manipulated in imaging software; tagged with algorithms and integrated with other elements in authoring software. The performance involved planning the planting and growing of flowers throughout four

seasons, and over the year tending with care a place replenished with fresh flowers. As the work developed through the enactment of everyday performances of caring and tending the plants, it seemed that we were creating an 'intimate place.' From a notion of 'place' as a geographical concept aligned to landscape, space, site, location and territory, a rather different understanding emerged in which place was time, relation and process. Geographer Yi-Fu Tuan distinguishes between space and place, suggesting that 'When space feels thoroughly familiar to us, it has become place' (1976: 73). And for Tacita Dean and Jeremy Millar '[p]lace is something known to us, somewhere that belongs to us in a spiritual, if not possessive, sense and to which we belong' (Dean and Millar 2005: 14). For them, time is embedded within place, becoming one of its dominant characteristics (ibid). Now, the sacred becomes a place of transformation within which to re-connect to the movements of life by witnessing growth and change: intimate place becomes a relation with the other.

The durational performance marked a new way of working involving two distinct yet highly related phases. The first was a series of activities that we devised and refined through repetition over time: the second was the communication of those actions in such a way that participants could enact them in their own environment and in their own time. A separation (typical of network logic) of content and protocol seemed to present the most effective way of communicating the parameters of the performance to others. In thinking protocol as a medium that transports the rules of engagement without concern for the content itself, the parameters are communicable whilst at the same time the intimate aspects of the *individual enactments* of the performance are beyond documentation and beyond incorporation in to the protocols.

Artworks that *glorious ninth* has made since *Tending* have developed further the use of protocol as a medium and extended the performances to include locally organised collective events. *love potion* (2005) is a set of protocols for a durational performance in which participants grow the herb borage over several months, make a magic potion that nurtures feelings of compassion and forgiveness, and host an event at which they share the potion and distribute borage seeds to their guests. *November* (2006) is a set of protocols for a performance to celebrate Halloween and the seasonal change from summer to winter. Participants grow garlic to eat during their performance. *Cultural_Capital* (2009) is a set of protocols for a transformational artwork in which a sour-dough starter is created and grown from the bacteria generally present in the air of the gallery, and is cared for by the curators.

dematerial (2009) is a work in progress: an experimental platform that disseminates the protocols of distributed transformative practices, such as those just described, and which attempts to find ways to document and archive such work with sensitivity to the politics, ethics and aesthetics of protocol and to the actual enactment of rituals and events. Protocols that mark the parameters of rituals and events are distributed online. Co-curators in diverse localities are able to access, re-frame, re-interpret and re-conceptualise the protocols to host rituals and events that specifically engage participants within their local communities.

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05 Posthumanism

The normalization of the cyborg: from futuristic artistic expression of mutilation to daily aesthetic beauty

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Old futuristic dreams and utopias

Over the course of one hundred years, humanity has moved from the visionary and fantastic description of a new futuristic human to the contemporary actualized realities of cyborgology. The aesthetic of the human body has changed from the futurist's ideal - a world based on a merging between the human and the machine for the creation of a new being able to supersede the limitations imposed upon the body by nature and society - to the contemporary realities of bioengineered prosthetics that are used to overcome physical limitations and mutilations (Poggi 1997: 19-20).

Humanity is no longer relegating the possibility of a cyborg to the realms of illusion and wondrous utopia. The existence of beings that are in part machines has become a fact of life with the increased possibilities of exchanging and replacing organs and limbs for prosthetics and mechanical devices. The ethical question to be asked is no longer whether a human being with an artificial heart or with artificial limbs is still human, but how much of a human body can be artificially reconstructed before the human element is overtaken by the nature of the mechanic.

Old philosophical and theological questions of what is the nature of humanity and where it resides – in which specific organ if in any – resurface when it becomes increasingly possible to transplant and exchange multiple and more numerous organs in an individual or multiple patients.
If the relationship between the organic and the mechanic is no longer lived in contemporary society as a dichotomy but as an empowering dialectic – a new

symbiotic framework - humanity is then looking at the rebirth of the 'human' under a new framework based on a relationship with the technological that is functional to the strengthening of the individual's organic body. This process of strengthening and empowerment for the creation of better-humans and/or super-humans[1] that defy the limitations of nature does not only affect the individual but, if contextualized in wider national and international frameworks, the relationships between social groups within a nation as well as the social, political and economic equilibria between nations.

The digital divide may be replaced by a new division between societies and cultural groups where bioengineered and augmented bodies are pitted against natural organic bodies. The augmentation of the body may become directly proportional to the level of personal income as well as future national policies and investments in public health.

From mutilation to empowering technologies

The concept of mutilation as a permanent scarring of the integrity of the body has been overcome in the public imaginary by the representation in visual culture of the cyborg, the bionic human and the genetically and bionically engineered mutant. Mutants with bionic prosthetics in the *X-Men* film trilogy, the bionic man in *The Six Million Dollar Man* (1974) and his companion *The Bionic Woman* (1976) as well as *The Terminator* (1984) with its sequels have all contributed to creating a new aesthetic perception of the artificial.

From *A Cyborg Manifesto* to theories of Posthumanism and Transhumanism, the arts have embraced the opportunity of realizing the conjunction between human and machine envisaged by Tommaso Marinetti in the *Futurist Manifesto*. Stelarc has contributed with his performances and body implants to explore new aesthetic forms that conceive the prosthesis as an evolutionary empowering design. The body is no longer a perfect given structure to be preserved but an evolutionary organism that can be improved upon here and now. The prosthetic, particularly in Stelarc's aesthetic approach, is not a repairing of a mutilated body, but an augmentation on a healthy body, that is altered, reconstructed and enhanced according to the artist's aesthetic and technological personal considerations.

[1] The concepts of better-human and super-human have great ethical, moral, political and sociological implications. In this paper the meaning of super-human and/or better-human is only used to identify the possibility of a technological empowerment to 'repair and improve' upon the body. This was a scholarly choice in order to avoid, in this text, the classification of old humans vs. new humans.

The visionary 'madness' of Mina Loy and her manifesto of 1919 titled *Auto-Facial-Construction*[2] (Caws 2000: 334) no longer speaks of impossible realities when the transplant of a face becomes a medical possibility and no longer a fictional story to be represented in the movie *Face Off* (1997). Nor is freezing the face in a permanent fixed expression of eternal beauty an impossible reality: Botox and aesthetic surgery paralyse and stretch the face in a fixed expression of joy and youth, with striking similarities to Loy's manifesto.

If in the arts this approach has created aesthetic debates and polarizations between bioconservatism and technoprogressivism, how is the reality of mutilation and/or augmentation approached by people in their daily lives? Is the perception of the human body that of an evolutionary object that can be improved upon and that can benefit from enhancements and prosthetics?

The social evolution of the aesthetic perception of the human body has lead to a new aesthetic perception of prosthetics that is no longer solely seen as a permanent sign of mutilation but as that of a new technological empowerment. If the body loses a part, its replacement can be an enhancement, empowerment and new form of aesthetic beauty.

> In the last two to three years many men have asked to have prosthetics without coverage, leaving the metal part visible. They tell me that a leg like this is more futuristic! Maybe they feel more masculine because the metallic leg gives them the sensation of being bionic, half human and half machine. Men under fifty especially request it. At the opposite end of the spectrum, women ask for symmetric prosthetics very similar to the one they lost. (Interview with Dr. B, a prosthetist at the Limb Fitting Centre, London.)[3]

If the visual arts have created an experience and imagination of posthumanity as the futuristic merging of human and machine that the public perceives as increasingly achievable, what are the new frontiers of aesthetic exploration?

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[2] Mina Loy, "Auto-Facial-Construction," in *Manifesto: A Century of Isms*, ed. Mary Ann Caws. Lincoln and London: University of Nebraska Press, 2000: 334.
[3] Interview with Dr B, at the Limb Fitting Centre, London. Interview by Valentina Sessa. 2 June 2008.

The daily aesthetic beauty of the prosthetics

The process of an aesthetic normalization of the cyborg, or its assimilation to a contemporary world that allows the enhancement of the body's abilities, is one that has to be considered as being shaped by cultural and contextual factors that borrow more from science fiction, a collective aesthetic imaginary and cultural traditions of beauty than from rational arguments.

The divisions along gender lines on the perception of empowerment are based on societal perceptions of masculinity and femininity that are rooted in psychological as well as biological imperatives. If for a male the increase in power, although through biomechanical prosthetics, may represent and be perceived as an enhancement of strength, sexual prowess and hierarchical social status, in a female the perception of mutilation is still dependant on the necessity of responding to a social context of beauty. This feminine beauty is disjointed by the idea of power and the artificial and strictly intertwined with that of youth, wholeness and defencelessness.

In a sequence of the film *Artificial Intelligence: AI* (2001) the deformity, monstrosity and/or disfunctionality of the female robot is made evident by contrasting the mechanical left side of her face against the perfectly replicated human features of the right side. The female wholeness is mutilated by the mechanic, while the male body is empowered by it.

In the different choices available to users/consumers in the aesthetic of the prosthetics between visibly mechanical prosthetics and invisible symmetric prosthetics, the role played by gender is shaping the exterior appearance of the artificial augmentation. If for young men, it may be said, that the mechanical element is part of a futurist vision of the body, no longer lived as a mutilation, but as an enhancement with its own attractive elements and aesthetic, women remain tied to a social perception of mutilation of the body. The female perception of the prosthetic is that of a mutilation that need not only to repair and empower, but replicate and mimic the reality of the human body.

More importantly, prosthetics need to respond to the representation of an ideal beauty that is canonized in the feminine representation of an aesthetically commercialized beauty. Using a filmic representation as an example, if the male empowerment through prosthetics of Wolverine in *X-Men* 2: *X-Men United* (2003) is

the positive empowerment of a hero, his female alter ego, Lady Deathstrike, is represented as monstrous by being both exceedingly beautiful and extremely powerful.

The aesthetic representation of the cyborg, in a visible aesthetic representation inclusive of both its organic and mechanical elements, should have been both man and woman or even beyond sex, avoiding the replica of gender based conflicts within the realm of the biomechanical. Very different are the realities of social perception, where a man can feel empowered in being both a cyborg and a bionic man, while a woman is relegated to an aesthetic vision of herself in response to societal canons. The 'positive' example is *The Bionic Woman* that replicates in her prosthesis the natural human beauty. The visibility of the mechanical in the female body is the equivalent of the representation and visibility of mutilation, monstrosity and dystopia, not that of an empowering augmentation.

The cyborg of Donna Haraway, in the contemporary normalization process, appears to be a masculine figure. There are many challenges to the contemporary aesthetics of prosthetics, particularly when a powerful augmentation will generate a revolutionary physical equivalence between the sexes.

When Dr B was asked if the aesthetic challenges proposed by Stelarc with his prosthetic artworks and performances belonged more to the world of science fiction than reality, the answer focused on how much of the science fiction representation of the cyborg is reality already:

> I do not think his idea is science fiction. I believe that we are already moving towards that direction! Science is advancing the construction of electronic implants more powerful than human limbs, whereby they act upon data inputs to and from the brain. However, at that point people must learn how to use these prosthetics because sensitivity or human feeling in them is missing. For example, a prosthetic so powerful it could grab an egg and break it because it is not educated to control its power.[4]

Perhaps it is through the augmentation of power of the body through prosthetics, no matter if hidden or visible, that the equivalence between sexes will be achieved. As

[4] Interview with Dr B, at the Limb Fitting Centre, London. Interview by Valentina Sessa. 2 June 2008.

for the aesthetic appearance of the prosthetics, the answer to visibility versus invisibility of the mechanical may rest more in the realm of future cyborg fashions.

Conclusions: futuristic multiple aesthetics, bodies and consciousnesses

If the aesthetics of posthumanity are leading to a 'normalization' of cyborgology, through familiar forms of representation and daily engagements, the old visionary idea of the cyborg no longer applies. New approaches are surfacing that question and challenge the ethics and morals of the engagement between the body and technology.

The contemporary aesthetics of futuristic empowerment and augmentation look to artists and designers in order to deliver new modes of aesthetic consumption for a technology no longer perceived as limited to the reconstruction of a mutilated body but conceived as the necessary empowering framework to facilitate the transition from human to better-human and/or super-human.

The future visions are those of a representation of humanity that is disjointed by the body. A dis-incarnation of consciousness and/or of the 'soul' that enables the essence of humanity to be transferred, embodied and exchanged.

The re-incarnation of consciousness no longer has to await a divine re-awakening of the dead, but is a future possibility that - discussed as a material transfer of brain or only of memories - is presented as possible future reality in films, like *The 6th Day* (2000), which focus on cloning, memory transfer and human replicants (Battaglia 2001: 496). This process of separation of consciousness from the body could generate alternative scenarios - by destabilizing social realities - that will liberate the body from its institutional and political controls through the elimination of the original body itself as the only organic repository of consciousness and identity.

If consciousness is increasingly disjointed from the body in an ultimate process of deconstruction and disassembling of social and cultural hierarchies, the repository of consciousness needs no longer to be a unified body '…designing and building artificial prostheses that can be controlled directly by brain-derived signals,' (Lebedev and Nicolelis 2006: 536) could become the norm and allow for the possibility of single source emitting brain-derived signals to directly control multiple mechanical bodies.

The aesthetics of the cyborg are, therefore, continuing to shift, evolving with the evolution of technology and presenting the traditional concept of body and it's aesthetic with new challenges, both social and ethical. The concept of a human-like cyborg, a biomechanical simulacrum of humanity, is no longer the only envisaged possibility. It is a traditional anthropomorphic aesthetic perception of reality that does not keep into account the future technological opportunities offered by the evolutionary processes of an organic body being technologically empowered.

V.I.K.I. the 'rogue' computer in *I, Robot* (2004) is one possible example of an evolutionary scenario. Represented as being more similar to a queen bee than a human-like cyborg, V.I.K.I., a female dictatorial robotic entity, simultaneously controls thousands of robots, replicating the structure and social system of a beehive.

These new aesthetic representations alter the perception of the physical identity of the cyborg as well as the locus where human consciousness can be located. The aesthetic perception and representation of the cyborg, one hundred years on from the *Futurist Manifesto*, is bound to take new paths and develop new evolutionary branches that will render the image of the cybernetic organism portrayed in *The Terminator*, naïve, quaint and perhaps nostalgic.

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Human, robot, alien: the universal succession and transformation of terrestrial life

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Drawing from examples in science, art, technology, architecture and space exploration this paper proposes that the successors of humans may not be post humans or robots, but will instead be more akin to bacteria or synthetic forms of biology. Our role in the larger scheme of things may be simply to act in the capacity of midwives to facilitate the evolution of our more robust and sophisticated successors. Cross-disciplinary collaborations are now taking place that fundamentally challenge our anthropocentric evolutionary aspirations.

Hans Moravec proposed that our successors would be silicon biology, or robots, that would colonize the universe in our stead, rendering humans a transitional stage in evolution rather than as a definitive tertiary species [1].

Developments within the field of chembiogenesis suggest that the creation of artificial life forms within the laboratory is not only feasible within the next ten years according to Mark Bedau of Proto Life, based in Venice Italy, but marks the beginning of an age of synthetic organisms whose existence will be at first fragile [2] but gradually, with human nurturing, will become self sustaining and independent from us.

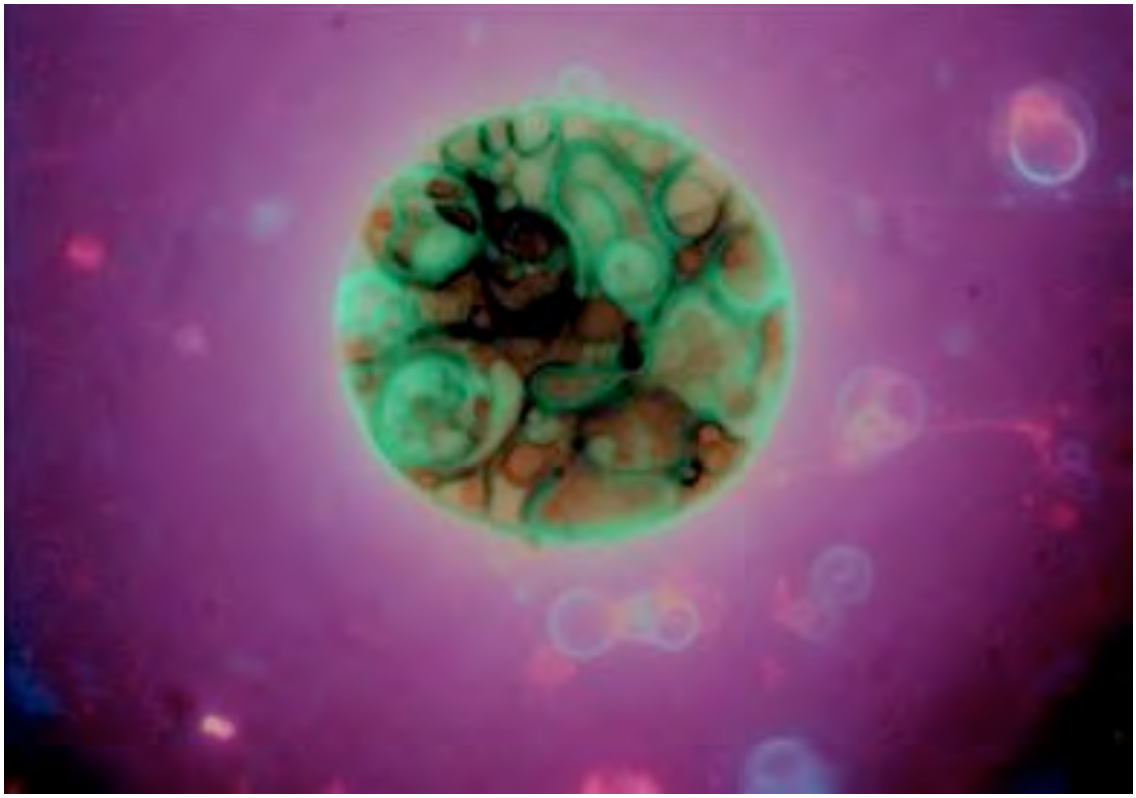

Figure 1. A Protocell – the first cell of synthetic life, with the potential to shed new light on our role in the universe. (Courtesy of Martin Hanczyc and Proto Life, © Martin Hanczyc).

According to Dimitar Sasselov, Director of the Harvard Origins of Life Initiative, new forms of self sustaining chemistry may actually be our legacy in the universe [3] and the notion that ‘wet’ alien biology that is already present here on earth is well established [4]. That bacteria might succeed where humans fail is not unthinkable since bacterial *Extremophiles* thrive in the most inhospitable conditions [5] where ‘advanced’ eukaryotes cannot survive. Perhaps anthropocentrism has made us blind to the sophistication of ‘primitive’ bacteria that continue to be the most successful phylum in Earth’s biotic history. After all, they have already indulged in a few billions years more of evolutionary refinement than our own, relatively immature, species *Homo Sapiens* [6].

Contrary to conventional wisdom which treats bacteria as individual cells, James Shapiro argues that bacteria are sentient, interactive organisms with an unexpectedly broad repertoire of chemical and physical mechanisms for signalling each other and for organizing themselves into multicellular aggregates with novel properties [7].

J. Craig Venter, the scientist who has recently created the first synthetic bacterial organism [8] has discovered a huge number of new bacterial species in the Sargasso Sea [9] whose characteristics are still being studied. Venter has witnessed first hand the extraordinary abilities of these micro organisms and asserts that bacteria will be found on Mars since we have been seeding it with micro organisms that have travelled with the robotic explorers [10] sent by humans over the last decade [11].

It seems that wherever robots go, bacterial life goes with them.

Perhaps Moravec is almost right in his prophecy in that robots perform a function that humans are incapable of. However, they have not been designed to replace us. Robots exist to disseminate bacterial and chemical systems into alien environments creating a form of artificial panspermia by which terrestrial life will dominate the universe and potentially solve the Fermi Paradox! [1] [12]

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Citations

[1] '…what happens when robots are superior to their creators? Will they still be subservient to us, or will the popular "robot takeover" of sci-fi movies become reality? I love robots as much as the next geek, but maybe we need some sort of plan for when they stop loving us…' (Hans Moravec Interview)

[2] '...Bedau suggests that the first generation of artificial cells will be extremely feeble and utterly dependent on human intervention to survive.' (Proto Life for Reed Magazine)

[3] '…Freeman was saying about the Darwinian era. To me his ideas are not so much about the end of a process but the beginning … synthetic life, even if it's not creating life from scratch, basically starts a new phenomenology in the universe that hasn't been observed before, because you have a complex chemistry that reached the stage at which it actually changes and produces viable complex chemistry that can continue even without its own existence. In other words, if we do not continue as a species and

our technological civilization comes to an end, those species will actually continue to exist on this planet potentially and could go to other places.' (Dimitar Sasselov)

[4] '…scientists have begun searching deserts, lakes and caverns for evidence of “alien” life-forms—organisms that would differ fundamentally from all known living creatures because they arose independently. Most likely, such organisms would be microscopic, so researchers are devising tests to identify exotic microbes that could be living among us.' (Paul Davies)

[5] 'D. radiodurans can withstand without loss of viability a dosage that is 3,000 times greater than what would kill a human. "The fact that you can genetically engineer these things is the key to the utility of this bug.' (Dr. Michael J. Daly)

[6] 'For the first half of geological time our ancestors were bacteria. Most creatures still are bacteria, and each one of our trillions of cells is a colony of bacteria.' (Richard Dawkins)

[7] 'Bacteria benefit from multicellular cooperation by using cellular division of labor, accessing resources that cannot effectively be utilized by single cells, collectively defending against antagonists, and optimizing population survival by differentiating into distinct cell types.' (James Shapiro)

[8] 'Craig Venter, the controversial DNA researcher involved in the race to decipher the human genetic code, has built a synthetic chromosome out of laboratory chemicals and is poised to announce the creation of the first new artificial life form on Earth.' (Ed Pilkington, The Guardian)

[9] '... there were some 1.2 million previously unknown genes, roughly 10 times more genes than were represented in the SwissProt database at the time. Those genes came, in aggregate, from about 1,800 species.' (Dr Jeremy Cherfas, Science Watch)

[10] 'We exchange roughly a hundred kilograms of material annually with Mars. So we're exchanging biological material and biological information. To me it's just a matter of time until life is found on Mars. It's inevitable. It won't tell us whether it originated on Mars, or originated on Earth, but there'll be common overlap. We won't know if we don't know our own planet's genetic repertoire, which we're in the earliest stages of discovering. There are the evolutionary aspects, the origin of life aspects to this, which make it very intriguing.' (J. Craig Venter)

[11] 'Our first foray into robotics on Mars was, of course, the Sojourner rover (in 1997)…' (David Galloway, HoustonChronicle.com)

[12] '… the most fit thing in the universe might be bacteria, natural or artificial. Maybe the Fermi Paradox is resolved by every evolved intelligence creating a bacterial disease that wipes it out.' (Larry Yaeger).

MindTouch - embodied ephemeral transference: mobile participatory performance research

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Abstract

If you could share and exchange your embodied dream experience, imagery, emotions and sensations with your friends and loved ones, how would you do it? If you could not only share and exchange, but remix and collage them, what would they look like or feel like? How would this work?

The aim of my PhD art-research is, at a meta-conceptual level, to uncover new understandings of the sensations of 'liveness' (Auslander, 1999) and 'presence', which may emerge from the use of mobile technologies and wearable devices within performance contexts. To explore these concepts, I chose to create a practical project to investigate them through and within several participatory performances, including live visual explorations meant to simulate dream and embodied VJing (video jockying). The project *MindTouch,* discussed here, is a mobile performance project that uses biofeedback sensors and mobile media phones in live, staged, streaming, performance video events, to simulate dream embodiment and telepathic exchange. The aim of this paper is to discuss the project and research conducted at the SMARTlab Digital Media Institute at the University of East London, under the direction of Professor Lizbeth Goodman, in terms of technical and aesthetic developments from 2008 to present, as well as the final phase of staging the performance events, beginning July 2009.

Introduction

MindTouch explores ideas of non-verbal transference, telepathic collaboration, and participant as performer, using biofeedback and mobile phone technology to explore

aspects of 'liveness' within mobile/locative performance environments. The *MindTouch* project explores how the mobile video can become a new way to communicate non-verbally and sensually, in real time, person-to-person and person-to-remote environments or physical locations, using a collaborative method of mobile 'VJing'. This VJing uses body data in a dialogue with other mobile users, to create a participatory visual conversation. The goal is also to expand and explore more embodied and meaningful exchanges between remote groups of people.

The *MindTouch* project initially set out to explore the ‘body as interface’, extending to also consider visual communication between people who cannot speak, or who choose not to speak. Thus, the project explores new ways to simulate, emulate, and facilitate a non-verbal or telepathic connection. It also explores the sense of feltness, presence or liveness, co-presence and collaboration within a mobile performance, through the use of the biofeedback sensors to increase the embodied interaction. Critical to this exploration is to enable the perception and embodied physical sense of liveness and presence within the virtual, non-space of mobile networks. Thus, cultivating the sense of presence as a means to tap into bodily expressions that may surface during various body practices as a primary source of non-verbal, pre-conscious communication is crucial to the project. Physical sensations and perceptions are captured and transformed or transduced into a digital form, then used to ‘touch’ and ‘play’ with others, remotely or non-locally through the mobile media devices to represent bodily presences within a live, networked context.

The *MindTouch* project brings together diverging areas of media art research and media art/performance practices, through its unique approach of using biofeedback sensors to interface with mobile phone technologies. With this project, I am exploring corporeal, non-verbal communication and visual interaction when using such devices within participatory performance events. I am also studying the effectiveness of the facilitation or the enabling of participants audiences in sensing liveness and presence within these contexts.

For this study, my intention has been to understand and identify the affect, reception, and experience(s) of liveness, and presence of the audience as performer, to reveal their intrinsic, phenomenological embodied elements within the mobile network and within the context of the events and activities. Thus, only by engaging with audiences as participant performers, can I learn of their first-person impressions and then analyse their experiences to determine if they have felt or experienced the events differently

from traditional performances. Performance in this project adopts a form of public participatory, performance art or like a street theatre or locative media game, whereby the performance is more a structured improvisation. This performance involves available, untrained participants, who are guided by trained performers in semi-structured activities, intended as a way to explore the mobile media format as a means to re-engage the public in performance practice and media art. The practical project processes and development include techniques to encourage people to connect remotely to each other, to re-engage with each other and with the world affectively, using the mobile phone.

Project background

The phases of this practical PhD project are the following:

> Phase one has involved collecting the video clips within performative visualisation workshops;
>
> Phase two has involved the development and adaptation of custom software for receiving and visualising the biofeedback data on mobile phones, as well as creating the mobile phone VJing/ video mixing software - more recently this phase of the project has included creating customised, wearable biofeedback sensor systems for the performances, which include embedding them into suitable custom garments for the project;
>
> Phase three is the staging of the performance events. Participants in the first phase, video collection workshops, have been asked to explore and visually represent their internal images, feelings, thoughts and impressions, in non-verbal, visual ways with the mobile video recording phones and to then share these with others. This collection of personal expressions are then to be used in a collective collage/performance premiered July 2009.

In workshops, participants have been invited to explore their own consciousness, emotional, affective senses and dream states, embodiment, and non-verbal communication using mobile video tools to express themselves. During staged events, participants are the performers and collaborators in creating the visual material for the live, interactive, generative performances, streaming directly live from their phones

(using Livecast or quik) or from the media archive, to facilitate a type of 'collective consciousness'. Some participants also use their bodies in a range of expressive, creative, non-verbal/non-textual ways to communicate only through video. These mobile media performance events include guided improvisation techniques, devised to motivate participants to explore creatively.

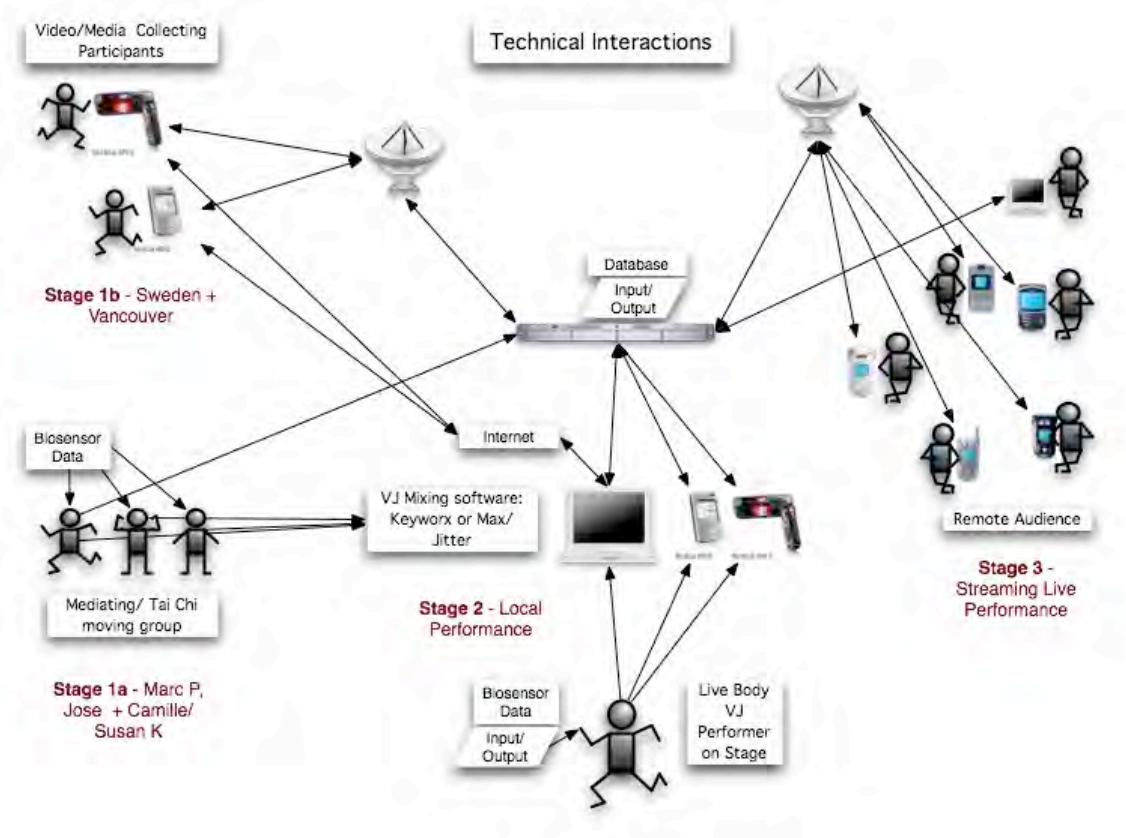

Figure 1 Early technical diagram of the networked performance project. © 2006 C. Baker.

Video collecting workshops

I initially used the first phase of the workshops as a means toward making the performative video events and collaborative artifact. Other intentions for the workshops were: to help people explore the sensations of their bodies, their internal perceptions and sensations; as a means to facilitate mental visualisations of these internal perceptions and sensations, and; as a means to assist them explore the act of externalising and representing these mental images. The workshops were also an experiment in facilitating non-verbal, gestural and telepathic communication. In addition, I intended participants to create the media for the end performative video collage.

Briefly, each workshop has involved meeting the participants, having them fill out consent forms (to use their video clips), explanation of the research, followed by mind-quieting activities and body-tuning visualisations, followed by four video capturing activities; individually and in pairs. The participants were then shown how to upload the videos online, to share with myself and others in the group, followed by an exit questionnaire and finally by an on-videophone interview.

During the video collection process, participants in the workshops have been asked to explore their: internal images, non-verbal, emotional and affective senses and states, internal physical sensations; impressions of their immediate surroundings and body surfaces; inner thoughts, consciousness, pondering, internal conversations; reflections and impressions in non-verbal, visual ways, using the video capabilities of their phone. Then they have been encouraged to share these sensation explorations with others and myself. These are then used in the generative, collective collage during the VJ performances.

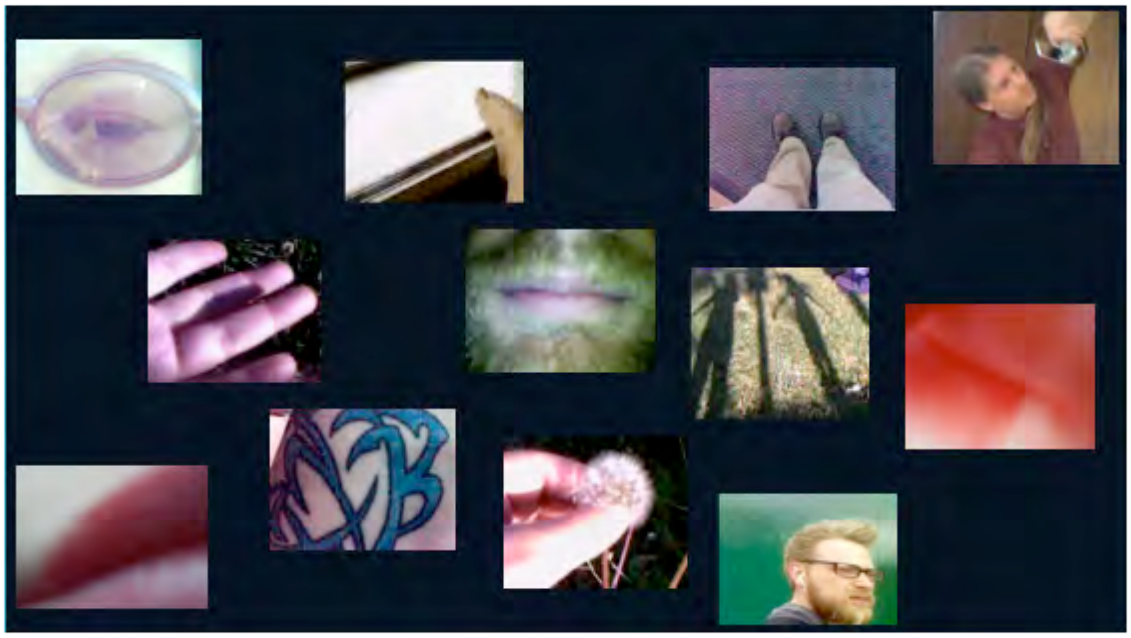

Image 1. Still images by participants in video collection workshops. © 2007 C. Baker

Five of these mobile video collection workshops have been conducted from June 2007 to January 2008, each consisting of four to eight participants[1], in Vancouver, Canada (twice), Dublin, Ireland, (twice) and London (once). Participants of the workshops were asked to use the video recording feature of the mobile phones, either using their own

[1] The gap in the timeframe for doing the workshops is due to development on new biosensing electronics and wearable devices and garments.

videophones or ones supplied. Each workshop has differed due to the number of participants, the available space and date to conduct them, as well as the environment each has offered - in terms of different visual fodder in the surrounding environment for participants to work with.

In these workshops, some people have reported it was a new experience: creating with a common communication device, but using it in a completely different way, as an end in and unto itself. Thus, while the role of the workshops was meant to be for raw material gathering, in part, they became a means to facilitate people, with little or no artistic, performative or video experience to engage in an inner visual exploration to create abstract external representations, using devices with foreign capabilities, to see what might happen. Thus, it was primarily an exploratory artistic process for them and myself. What has transpired is that participants focused on themselves, each other, their surroundings, and embarked on a journey of intense concentration or inner presence, becoming a critical development for the project.

System design and software development

The system research commenced in November 2006, with acquisition and work with the biofeedback hardware, software and the mobile phones as appropriate for the research. The biofeedback sensors acquired for use in the research were EMG (electromagnetic), GSR (galvanic skin response), respiration and BVP (blood volume or pressure), being the most responsive, easiest to work with in generating usable data, and not uncomfortable to the person wearing them. Electromyogram measures muscle electricity to determine muscle tension of any larger muscle, like arms and legs. Galvanic skin response is work on the fingers and measures the electrical conductance or resistance of the skin that can change when people change their stress levels. Respiration sensors are worn around the ribcage and monitor the inhalation and exhalation depth and frequency based on the abdominal or chest expansion or contraction. Blood volume monitors the relative blood flow in the fingertips, using near infrared light, and from the pulse or blood pressure the heart rate can be determined. Wireless sensors are desirable in order allow for ease of movement.

Initially, I used more expensive medical grade sensors with their heavier and more restrictive cabling on the body. However, I then abandoned these last year in favour

of creating cheaper and more customizable sensors. German electronic musician/creative electronics/java programmer Michael Markert joined me as a collaborator in Spring 2008, assembling and creating biofeedback sensors with a Bluetooth Arduino system, to be embedded within customised clothing, to provide more flexible, unencumbered movement, more aesthetics, as well as ubiquity, unseen on the body, as a hidden ‘body area network’ sensing system for performance contexts.

Image 2. Custom biofeedback visualisation software. © 2008 C. Baker.

More recently, with my new collaborator Manjit Bedi, we have been creating a mobile live VJ software system using Apple’s Quartz Composer programming environment for using the body data to mix video. The software accesses the database of clips and live streamed video, to add visual effects in real time, and then streams mixes back to the phones to allow audience members to share and interact with the generative collage using these visuals as a communication exploration. Fashion designers Tara Mooney and Rachel Lasebikan have been working with me to embed the sensors into lightweight, flexible and fun garments.

Performance events

The *MindTouch* phase three performance involves creating a mobile networked performance that utilises the database of live, streamed and/or archived video clips, from the mobile phones, then retrieved, remixed and streamed back during a live visuals performance(s). The event(s) seek to create a performative, collaborative, non-linear narrative montage or 'remix', streamed back to anyone's phone and the internet, and archived. The *MindTouch* performance attempts real time video mixing and streaming to phones, although there may be some lag or delay given inherent network and security issues with such a project.

Three different groups enter the 'party-like' environment/performance space, where they meet the three hosts to guide each group of participants through the activities:

> Group 1 wears the biofeedback sensor garments and is guided through various movement and sensory perception activities, in order to activate the sensors in various ways, and add effects to the trigger live and archived video from the database, with affected video displayed on screens around the room. Participatory activities involve a) movement activities and b) theatre games;
>
> Group 2 will be guided in capturing video on their mobile phones – like the workshops above only with fewer activities: body visualisations (simplified ways of speaking, of visualising internal sensations) and uploading them to the database;
>
> Group 3 'mixes' the video from the database via software on their phone (downloaded as part of the activity) then they interact with the first bio sensor group, but they choose which live or archived video created by group 2's is mixed and effected by group 1's body data. This activity is also guided so participants can easily use the videophone software and interact quickly and decisively, making a body narrative in their own way.

This is a two-hour event with each group having a chance to experience each activity. The focus is on ways to focus the performance not on the technology in and of itself but as an experience enabler, the event being mainly about exchange, non-verbal visual play, collaboration, participation and interaction, exploring movement

and spontaneity.

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The dancing body as a screen: synchronising projected motion graphics onto the human form in contemporary dance

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Introduction

The use of the human body as a canvas for artistic expression has been deployed throughout the history of mankind. The adornment and marking of the body is a facet of humanity that distinguishes us from other beings. With the development of digital media and emerging technology the human body has become a site for projected motion imagery, thus visually hybridising the virtual and real worlds. Instead of projecting indiscriminately onto the dance stage in mere mimicry of the cinema form, choreographers are working with projection artists to synchronise the moving image with the moving dancer physically immersing the performer within the digital world.

The technical difficulties of synchronising the projected imagery with that of the performer in the past has been tedious, frustrating and fraught with risk. Up until recently one of the biggest disadvantages has been that pre-rendered animation locked the performer into the choreography. It was argued that some of the spontaneous aspects of the actual, live performance were lost because the projections dictated the performer's movements. A solution to this problem is through the technology of *motion-sensing*, where the dancer is able to control the projections through his or her movements, making the projections a live interactive prop. Rather than being a separate entity, the performer becomes a vital agent of the projected digital imagery, hybridising the human form with technology.

This article will refer to Elizabeth Grosz's definition of the cultural body as a site of culture itself and Donna Haraway's definition of the *cyborg* as a means of establishing a relationship between the digital moving image and the performer. Bringing these two theories together to show how projecting onto the body is a natural evolution in contemporary dance, bearing a new type of collaboration through the use of digitally mediated technologies.

The works of three different contemporary artists will be discussed to exemplify how technological developments over the past decade have dramatically changed the relationship between the performers and the projected image on stage forming a new kind of contemporary dance performance.

The cultured body and projections; the human body natural and manipulated

> The body is not opposed to culture, a resistance throw-back to a natural past; it is itself a cultural, *the* cultural product. The very question of the ontological status of biology, the openness of organic processes to cultural intervention, transformation, or even production, must be explored.[1] (Grosz 1994: 23).

The manipulation and decoration of the body has been a part of civilisation in cultures across the world for millennia. Tattooing, branding, piercing, and stretching the skin are seen across cultures; they are all forms of permanent markings to the skin that transform the 'natural body' into the 'cultural body'. In primitive times, the marking of the body stood on the wearer as a symbol of status and heritage. As Elizabeth Grosz writes:

> Inscriptions on the subject's body coagulate corporeal signifiers into signs, producing all the effects of meaning, representation, depth, within or subtending our social order. The intensity and flux of the sensations traversing the body become fixed into consumable, graffitiable needs and desires.[2] (ibid: 141)

In art, the idea of merging the human form with technology was born shortly after the industrial revolution, particularly spurred by the First World War in the Futurist and Dadaist movements. Donna Haraway's concept of the *Cyborg*: 'a cybernetic organism, a hybrid of machine and organism, a creature of social reality as well as a creature of fiction,' [3] (Haraway 1991: 151) was in many ways anticipated in the work of the Dadaists and now-a-days widely demonstrated through the work of many contemporary artists. Not unlike other art forms, dance has responded to the cultural trends of a technology-

[1] E. Grosz. *Volatile Bodies, Towards A Corporeal Feminism,* Indiana University Press, 1994: 23.
[2] E. Grosz. *Volatile Bodies, Towards A Corporeal Feminism,* Indiana University Press, 1994: 141.
[3] D. Haraway. A cyborg manifesto: Science, technology, and socialist-feminism in the late twentieth century. In *Simians, Cyborgs and Women: The Reinvention of Nature,* Routledge, London,1991: 151.

infused society, using the body as a site for cultural expression and advances in digital arts.

The body as screen

The projection of digitally mediated graphics onto the moving body conceptually evokes a relationship of the natural human body with technology.

Klaus Obermaier and Chris Haring's work, *Vivisector, Intervention in the Sweating Body* (2001-02) saw four dancers on stage with virtual reality characters projected onto their human forms. In a review of this work, Catherine Hale of London Dance wrote:

> In our world of cloning, artificial intelligence, and virtual reality,
> Intervention asks at what point science displaces our humanity.
>
> [4]

Figure 1. *Vivisector, Intervention in the Sweating Body* (2001-02)[5]
(Director and composer, Klaus Obermaier; Choreographer, Chris Haring)

Obermaier's intention was to bring the virtual environment into real space through the

[4] C. Hale, "Klaus Obermaier & Chris Haring, Vivisector". A review of *Vivisector, Interventions of a Sweating Body*. www.exile.at/vivisector/index.html.
[5] Vivisector, *Interventions of a Sweating Body*, 2001-02. www.exile.at/vivisector/index.html.

use of live bodies. As Obermaier comments:

> Here, I project the moving image of the dancer again on to his body, so I can manipulate the appearance, and control when the performer appears. I break the linearity of movement that we are familiar with in the virtual characters of video games.[6]

By giving an actual voluminous form to the virtual body via projection onto the live body, Obermaier was able to bring the digitised world into real space thus creating a *cyborg* illusion.

For choreographer's Lucy Guerrin's *Melt,* 2003, animation was initially devised to simulate a 'sculptural skirt made of ice.' [7] Due to the impracticality a physical prop actually made of ice, projected geometrical animations were deployed to abstractly represent the melting skirt.

The challenge for motion graphics artist Michaela French was to make it seem as though the tactile human body and the digital motion graphic projections were indeed a part of each other. As French comments:

> I actually think that the two things are fundamentally opposed and it is perhaps the challenge that this opposition presents that is the attraction. Always it's an enormous challenge to integrate the two mediums.[8]

[6] K. Obermaier. "When seeing is not believing". A review of *Interventions of a Sweating Body* by Charlotte Cripps, Feb. 18, 2004. www.exile.at/vivisector/index.html.
[7] Interview with L. Guerin, April 2006.
[8] M. French. Personal communication, April 2006.

Figure 2.[9]

Figure 3.[10]

Melt, 2003. (Lucy Guerin Inc. Choreographer, Lucy Guerin; Motion graphics, Michaela French)

Obermaier's follow-up work *Apparition,* 2004 saw the projection as more than a visual prop but a 'potential performing partner'. As writer Scott deLahunta explains:

> The independent behavior of the physical models for example is not 'controllable' by the performer, but can be influenced by his or her movement.[11]

A camera based tracking system was used to extract the algorithms of the human form from its surroundings, which functions to provide 'qualitative calculations of certain motion dynamics, e.g. speed, direction, intensity and volume.' [12]

[9] *Melt*, 2003, image courtesy of Lucy Guerin Inc, photograph by Jeff Busby
[10] Ibid
[11] DeLahunta, Scott, Klaus Obermaier website, www.exile.at/apparition
[12] DeLahunta, Scott, Klaus Obermaier website, www.exile.at/apparition

Figure 4.[13]

Figure 5.[14]

Apparition, 2004.

(Director and composer, Klaus Obermaier; choreographer Robert Tannion and Desireé Kongerød; interaction designers and programmers, Christopher Lindinger and Peter Brandl from the Ars Electronica Futurelab; motion tracking and analysis, Hirokazu Kato.)

Chunky Move's *Glow,* 2006 *and Mortal Engine, 2008* also deployed camera-based *motion-sensing* to hybridise the performer with the technology. Choreographed by Chunky Move's Gideon Obarzanek and technically developed by German programmer and sound artist, Frieder Weiß the performances aim to find an aesthetic that does not emanate from the contradiction between people and technology. Weiß sees the technology as an instrument for creation that should influence the final visual performance:

> Just like playing the piano can inspire a melody so too can the visual aesthetic created by the technology inspire the performance.[15]

In Weiß's eyes, the technology feeds into the conceptual development of the production.

[13] *Apparition*, 2004, www.exile.at/apparition
[14] Ibid.
[15] Interview with F. Weiß, Jan. 2008.

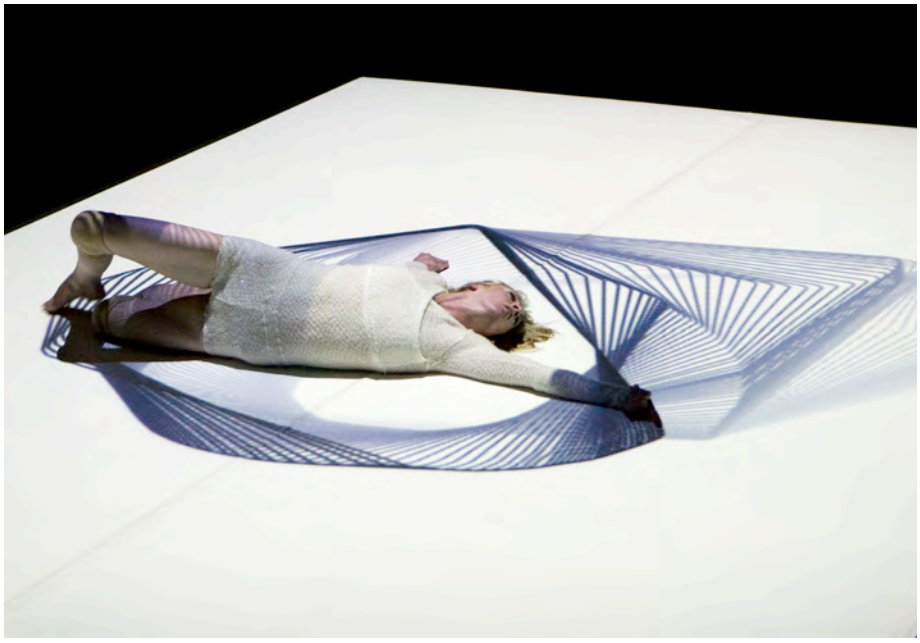


Figure 6. *Glow*, 2006 [16]

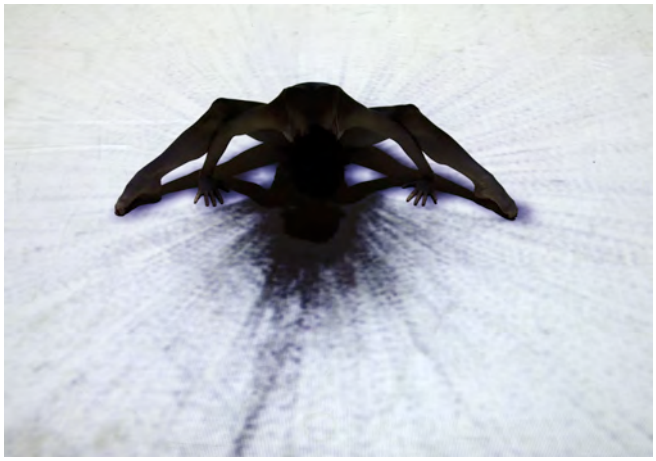


Figure 7. *Mortal Engine*, 2008. [17]
(Chunky Move: Choreographer, Gideon Obarzanek; interactive systems design, Frieder Weiß)

Rather than people being dominated or controlled by technology, choreographer Obarzanek wants to 'explore the kind of relationship that people have *with* technology, one that is more organic and natural.' [18]

As shown in Figure 6 the frame picks the three most extreme points of the body position, creating intricate patterns based on the speed at which the performer moves. The

[16] *Glow*, 2006, image courtesy of Chunky Move, photo Rom Anthoni
[17] *Mortal Engine*, 2006, image courtesy of Chunky Move, photo Andrew Curtis
[18] Interview with G. Obarzanek, Chunky Move, May 2006.

performer is able to push, pull and dance with this elastic shape, making the projection a virtual partner on stage. As Donna Haraway states:

> High-tech culture challenges these dualisms in intriguing ways. It is not clear who makes and who is made in the relation between human and machine.[19] (Haraway 1991: 150).

Deployment and advances in technology

Understanding the technology involved in producing dance performance that is integrated with digitally mediated imagery is paramount to the success of the performance: position of camera, projector and lighting need to be calculated exactly for effective synchronisation of performer and projected imagery.

In *Melt*, French had to pre-record the choreography and make sure that it would cohere with the resulting projected imagery, As French explains:

> I filmed the choreography from the same position and lens angle as the projector would eventually have, in this way it was actually quite easy to predict where an action would take place. I animated with the choreography as a guide, and we would then test the composited sequences in the studio space with the dancers to ensure the theory did translate into practice.[20]

For Chunky Move's interactive performances, *Glow* and *Mortal Engine* the set-up of the camera, projector, and infrared spotlight had to be precise in order for the sensory technology to work. As Weiß explains:

> I usually work with a line set-up, an infrared camera being inline with the projector, covering the same area, the same field. It's important to have the alignment correct, that the projected light is on the same spot as the performer.[21]

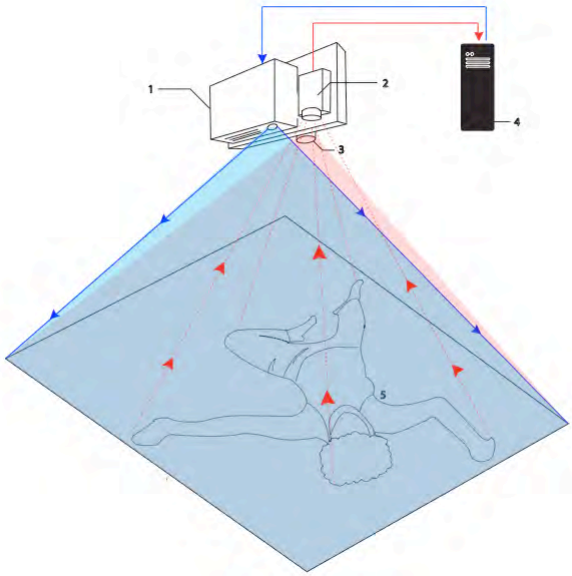
The camera is placed directly above the performer so it can sense the motion below. The

[19] D. Haraway. A cyborg manifesto: Science, technology, and socialist-feminism in the late twentieth century. In*Simians, Cyborgs and Women: The Reinvention of Nature,* Routledge, London,1991: 150.
[20] M. French. Personal communication. April 2006.
[21] Interview with F, Weiß. Jan, 2008.

camera lens must be as close to the projector lens as possible for the projected animation to follow the moving performer. The camera lens which detects visible light is disabled by a filter so that the projection will not interact with itself. As Weiß explains:

> Part of the trick is you try to separate the projected image from the coded image. It's an important step. If the camera would see the projection, it would cause a feedback. In audio, it happens a lot. You have a speaker and a microphone and you might get a feedback.[22]

By disabling the detection of visible light the camera only picks up infrared waveform. An infrared spotlight must be mounted to illuminate the performer for the camera in this light. The infrared spotlight must be in the exact same position as the camera lens to minimise an expanded shadow that would result if additional infrared spotlights were mounted from other angles. Hence when the performer moves inside the space, the camera detects the performer's body and shadow created from the infrared light source.



1 - Projector
2 - Infrared tracking camera
3 - Infrared light
4 - Computer
5 - Performer
6 - Projection surface

Figure 8.

Figure 8 shows how the projector, infrared camera, and infrared light are rigged. The information filmed by the camera is sent to the computer. The computer takes this data and applies a particular effect. The imagery processed by the computer is sent to the projectors at the same rate of capture (i.e., every 25th of a second) and projected back on to the performer. There is no perceivable lag at all between the capture and what is

[22] Ibid.

projected, making what is projected a *real time* performance.

For *Glow* only one camera/projection/infrared unit was used, however for *Mortal Engine* there were three; one projecting onto the floor and two split for the back wall. For optimum performance the dancers were as close to the projection surface as possible, pushing the integration of media and body to the limit.[23]

Performing with projection light

Traditionally in dance theatrical lighting is used to draw attention to particular areas of the performer, such as the feet and to create a certain mood or atmosphere in the performance. Projections, on the other hand, are at the opposite end of the spectrum. They require limited use of additional theatrical light, if any, for dramatic effect. A dark space is necessary for the best definition of colour and brightness.[24] For choreographers using projection light as the lighting source they have to adjust to the harsher and more piercing qualities. This can be problematic for both choreographers and dancers alike. As Guerin comments:

> It's a particular light, projection light. It's not like theatre lighting where you can sculpt and bring the performer out. It tends to flatten the performance.[25]

The performers also have to adjust as the projection light as it can be disorientating. It does however transcend the performer into another creative space. As dancer Stephanie Lake comments about performing in *Melt*:

> That projection is like a laser in your eye. Everything else is black around it. Normally you'd have lights coming from all different directions. So it's actually really disorienting. It really affects your balance. [...] I found it hard, but at the same time you can really enter the world and kind of feel like you really *are* in this other dimension. And that was cool.[26]

[23] Online Interview with F.Weiß12.00 June 21, 2009
[24] M. Clarke. La Boheme in Naples, *Entertainment Design 34*, 11 (Nov 2000): 9-10.
[25] Interview with L. Guerin, April 2006.
[26] Interview with S.Lake, April 2006

For Chunky Move's *Glow* and Guerin's *Melt* additional theatrical lighting is not used, so as not to compete with the projection light. However in *Mortal Engine* and Obermaier's *Apparition* minimal theatrical lighting was used in conjunction with the projection. In *Mortal Engine* an advanced laser system by laser designer Robin Fox was also deployed to heighten the body contours. As Weiß explains:

> I work with contours and body outlines a lot in projection. They were transformed into laser lines which also follow the body contour. The laser is nice as it is opening the space into the 3D.[27]

As the technology of interactive projection systems advance the dancers have to adapt to very different lighting and stage conditions, yet it is an aspect that is both challenging and exciting for performers and choreographers alike.

Conclusion: towards a hybridised future

This investigation makes it evident that the rapidly evolving technology in modern image making has greatly influenced contemporary dance works. Metaphorically, projecting onto the energised skin surface brings technology closer to the natural body, and in doing so gives the digitally mediated image a life through the living, breathing body. Donna Haraway's notion of the *cyborg* as 'a cybernetic organism, a hybrid of machine and organism,'[28] (Haraway1991:151) is clearly demonstrated in these case studies. The human skin is an energised surface, and it is natural that choreographers want to project onto it. If we consider Elizabeth Grosz's definition of the 'body as culture, and the body as the site for cultural activity [29] (Grosz 1994:23) we need not doubt that this project will be ongoing.

The ways in which digital images are designed to synchronise and interact with the human form communicate an ideal hybridisation between man and machine. When the surface is a moving one, such as a dancing body, and so too is the imagery projected on it, this can become a visually and conceptually powerful mix of the digital with the physical world.

[27] Online Interview with F.Weiß12.00 June 21, 2009
[28] D. Haraway. A cyborg manifesto: Science, technology, and socialist-feminism in the late twentieth century. In *Simians, Cyborgs and Women: The Reinvention of Nature*, Routledge, London, 1991: 151.
[29] E. Grosz. *Volatile Bodies, Towards a Corporeal Feminism*, Indiana University Press, 1994: 23.

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Bioinstincts

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> Things must be pushed to their limit, where quite naturally they reverse themselves and collapse. At the height of value, we are nearer to ambivalence.
>
> (Jean Baudrillard, *Symbolic exchange and death*)

Introduction

The work looks at the recent progress in biotechnology and regenerative medicine and how it may change the way man perceives life and death. The objectivity and the rapidity of the science seem to prevent humanity from building any cultural meaning around it. Especially when man confronts himself with the new ways of experiencing death in the age of biotechnology and regenerative medicine, he seems not to be able to establish any symbolic exchange between life and death that could make the passing acceptable as a shade of life and as a reversible event of life. What if we could envision symbolic meanings of our new passing and build a material culture around them?

Nowadays the way we perceive death is quickly turning from the idea of a natural event in everybody's life into the feasible possibility of controlling our passing through the intervention of science. I wonder how we would cope with death in the society we live in, where biotechnology and medicine seems to be able to neutralize human mortality. I try to foresee future rituals that man could perform around death. From setting different scenarios around the way we perceive death in our actual age, I build up social fictions and new objects that I design specifically for them.

The dilemma of symbolic exchanges between life and death in the age of death's technical reproducibility

Man experiences death both as the most natural biologic event and as the most

cultural one. Death occurs in the intersection between biology and culture: that's why over different times man felt the need to build a meaning for death[1]. The representation of death in myths, rituals, religions, has been the cultural answer in attributing meaning to the passing.

Nowadays biotechnology and regenerative medicine are changing the way we experience life and death. This could lead us to thinking about them differently from the natural biological course. On the one hand, we could replace damaged cells or organs, on the other hand, we may experience the lack of success in science in those cases where death cannot be avoided. As a side effect of scientific development, death still occurs due to incurable disease or by accident. Instead of living the passing as a natural event in our life, we may experience it as an industrial product in the same way life has been extended through bioengineering manipulation. During my research I began to realize that nowadays we are more or less unconsciously experiencing death as:

> 1) *a-mortality*[2]: through the replacement of sick tissues with stem cells and transplantations our life is extended beyond the natural biological possibility, proceeding towards a theoretical immortality;
> 2) *accidental death*: death that suddenly occurs to a particular individual without any previous warning, such as terrorist attacks or domestic gas leaks;
> 3) *death as expiration date*: irreversible death that occurs when medicine fails, for instance for the terminally ill patients.

In all cases we experience the scientific irreversibility of the passing and the autonomization of death as an individual event, not as a social relationship between the members of the same community. Any symbolic exchange between life and death seems to be impossible because of their cultural disjunction.

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[1] This concept is developed by Edgar Morin (2002) in *L'uomo e la morte*. Roma: Meltemi Editore. In his preface to the edition of 1970, he says: 'Death is exactly placed in the crucial joint that links together the biologic world and the anthropological one, since it represents the most human aspect, the most cultural of the whole *anthropos'*, p.25. Edgar Morin was active in the study of anthopo-biotics and he introduced the term 'genetic anthropology' to refer to his subject.

[2] According to Edgar Morin, the a-mortality is based on the biological property that molecules/cells are not susceptible to die; according to the definition of the biotechnologist Simone Maccaferri, the a-mortality is based on the biological property that molecules/cells continuously replace themselves.

Envisioning new symbolic exchanges between life and death in the biotech age

According to the hypothesized three new ways we experience death in the age of biotechnology and regenerative medicine, I began designing different scenarios for new symbolic exchanges we could associate with them. My aim is to turn the perspective we may have on science - in order to suit the human need to create a cultural meaning around the new ways of experiencing death. Man experiences death differently, according to the socio-technical context the person lives in[3]. The context also determines the cultural meaning people build on their passing. Each project of death, as symbolic exchange, has to be coherent with the humanity which designs it, referring here as humanity as a society within its particular context.
In our current age, science and technology are the socio-technical conditions that will determine the new cultural meanings of life and death. The progress of science seems to immunize humanity from mortality giving the possibility to recover from chronic and terminal illness. On the other hand, man is still susceptible of accidental death, from domestic gas leaks to terrorist attacks. As a result, man may start to see death not as a biological event in his life, but something that may occur to the "unlucky on call". We may need to be reminded about our biological mortality[4], but at the same time we should suit our human feeling of keeping the death away from us, of being protected from dying.

My design consists of bioengineering instincts for accidental death that could accomplish to both those requirements. I have designed those particular instincts in the human species to give man back the awareness of his own mortality in an age where biotechnology and regenerative medicine are changing the boundary between life and death.

On a big scale, redefining the biological time of a single species in the whole ecosystem may involve serious consequences on the ecological equilibrium[5]. In this

[3] The anthropoietic program the person takes part of.

[4] A kind of new memento mori for the biotech age.

[5] As the philosopher Murray Bookchin (1982) claims in his work *The ecology of freedom: the emergence and dissolution of hierarchy*, the supremacy of a species over another one may be the cause of the collapse of the whole ecosystem. He was the founder of the discipline of Social Ecology, a radical philosophy that aims to apply nature structure to society. The following is a quote that could particularly support one of my hypothesis of an application of biotechnology and regenerative medicine that may take over the limiting nature of human beings: "The very notion of the domination of nature by man stems from the very real domination of human by human." (1982).

context, the action of bringing back the consciousness of being mortal may actually consist of an ethical choice made by the individual towards the whole ecosystem. On an individual scale, it would be up to the parents to decide whether or not bioengineering their baby's embryo with the instincts' genes. On the one hand, it would depend on their moral values to agree on the genetic modification or not for the sake of the social ecology, which considers the society as part of the natural ecosystem. On the other hand, the ethical decision of engineering the awareness of self-mortality should not be disconnected from the natural parents' concern of protecting their baby. From the parents' point of view, providing their child with an instinct of accidental death actually expresses their attempt to protect him/her from the danger.

The *Bioinstincts* for accidental death are inspired by the way animals have adapted to the dangers over their evolution. A kind of sea pansy and the railroad worms developed luminescence to deceive their predators. Butterflies did the same modifying the spots, the colors and the pattern of their wings. What would happen to the human beings if they could get the instincts against accidents? How would their physical aspect adapt to the expression of such instincts?

Designing new symbolic exchanges between life and death for the biotech age

I developed further the *Bioinstincts* scenario from a quite diffused cause of accidental death occurring in the domestic environment: the gas leak. My project focused at this point on the design of a new material culture and new rituals as symbolic exchanges between life and death. Both the interactions and the objects of my design are meant to mend the disjunction between life and death through the mediation of a symbol that brings back the imaginary into the reality and dissolves the reality into the imaginary. The aim of my design is to visualize the cultural ri-appropriation of death through the scenario I built and to offer tools and processes to perform the new symbolic interactions between life and death.

The bio-instincts for gas leaks consist of the design of glowing eyes that activate in case of gas saturation in the air. The developed eye would consist of chemo receipting eyelashes and of extra eyelids with bioluminescent spots. The shape of the eyelids is also functional for the reflection of the light to the pupils. Thanks to the glowing effect of your eyes, you will get up at night if a domestic gas leak occurs in your house. The bioengineering of the instinct starts from the artificial modification of

the human genome in the baby with the genes that codifies for the instinct itself. Anyway just introducing the new genes is not enough to get the modified body structure and the behavior responses. The context is what allows the genes to express into the morphological and behavioral changes. That's why my bioengineered baby, although genetically designed to perceive instinctively a domestic gas leak by chemo receipting eyelashes and bioluminescent eyelids, needs to be provided the right environment to develop these physical features. Actually he or she would be born under developed, still susceptible of the domestic danger of gas leak, and would need to be put into an incubator. It would both protect the baby thanks to the positive pressure inside and favor the body development thanks to a pipe communicating outside where the mother could breathe out from time to time. The CO2 provided by the mother in small concentration would simulate the environmental condition that would allow the genes to express in the baby as physical features[6]. The incubator represents the physical object where the dialectics of my project shows itself in all its contradictions. It is the place where the short circuit between the responsibility of the human species and the caring for your own baby generates and solves into the decision of bioengineering your baby and raising him into a technical environment. But it is also the place where the natural environment itself, and I mean here an environment which excludes any accidental contamination from domestic gas, is reproduced artificially by the technical womb of the incubator and the toxicity is provided naturally by the breathing out of the mother. In a future scenario we could actually be confronted with an artificial human evolution, like babies' bioengineering for a more natural and primitive consciousness of death; with a technological breeding which still relies on the instinctively natural protection from a mother to her child and with the intellectual will[7] of man to codify the human mortality directly in the human genome, even before the birth.

Getting nearer to ambivalence

I would like to explore the moral and ethical concerns that motivate my design and me. I was questioning how death could still be accepted in our biotechnological age without denying the contradictory feelings that the idea of dying generates in man. My work is an attempt to research how deeply the new developing technologies can

[6] The CO2, known as carbon anhydride, stimulates similar reactions in the body compared to the carbon monoxide, responsible of intoxication due to domestic gas leak, but still having less toxic effect on it.

[7] I say here intellectual because I want to exclude any religious or beliefs system involvement.

adapt to human feelings, when biotechnology and regenerative medicine themselves deal with the critical human aspects of life and death. The bioengineering of instincts of accidental death may be a way for man towards reconciliation with death itself, both on the big scale of the species and on the small scale of individuals. On the other hand, it could also represent an *artificial* evolution of the species. Thanks to these instincts we could reach a condition of *species adaptation*[8] to death, like the animals that realize the danger by particular features of their bodies and subsequently act to survive.

Actually man's progenitors belonging to the *Australopithecus* were provided with instincts for danger and death, but according to the evolutionary biologist Ernst Mayr[9] they lost them as a consequence of climatic changes, when in the Eastern Africa the tropical forest turned into bushes and savannah. In particular the loss of these instincts was determined by the evolution of the *Australopithecus* into *Homo sapiens.* Homo sapiens adapted to the dangers of the environment developing his brain and intellectual capability and adding morphological changes to his body. As humans, we have adapted to death by using our intellect. This means we protect ourselves by thinking and making decisions more than following our innate instincts. Despite all the improvements in biotechnology and regenerative medicine, we are still susceptible to accidental death.

I wonder where the cultural attitude to interfere with death may lead the human species. We have never been nearer to the achievement of defeating death than today, thanks to the development of biotechnology and regenerative medicine. Every time we interfere in the end of life with the tools and techniques that scientific progress provides us, we consciously or not may run the risk of letting artificial genetic variants take over the evolution and become permanent artificial adaptations. The danger may be in the fact that the mutation could artificially appear and later naturally be selected without us having any control on it. Personally artificiality doesn't scare me and I must agree with the artist Patricia

[8] According to Charles Darwin theory, an adaptation is a positive characteristic of an organism that has been favored by natural selection and that allows the organism to live in its own environment. It can be structural (changes in the body morphology), behavioural (changes in the way the organism perform in its context) and physiological (the organism could start performing chemical reactions inside its body). The adaptation appears randomly as genetic variant in one organism and then naturally selected. That means that all the organisms without that variant would die out, while the other ones with it would in turns replace them.

[9] For more details, see Ernst Mayr. *What makes biology unique? Considerations on the autonomy of a scientific discipline*. London: Cambridge University Press, 2004.

Piccinini[10] when she says that the perception of what is natural and what is artificial depends on the context we belong to[11]. But artificiality does contain a risk when we are not able to control it, because we cannot predict the behaviour or future development of what we create. That is mainly the reason why the philosopher Hans Jonas (1984) speaks about the need of introducing a new ethics, the *ethics of the future*[12] that could deal with critical issues, such as biotechnology and regenerative medicine. He introduces the *heuristics of fear* as the method that may drive our long term choice regarding science. We need to imagine and emphasize all the possible impacts of the scientific progress on a macro scale in order to understand where it becomes dangerous and meaningless for humanity and finally being able to take the right decision.

It may be dangerous if the human species looses the consciousness of its mortality because of the following disequilibrium in the social ecosystem and the uncertainty of the human identity. It could be seen as a paradox, but this genetic manipulation of accidental death instincts is meant to bring man back to his more natural essence, that of a human being which is born and going to die.
So where actually could we establish the border between artificial and nature? Could the use of a “new” technology or a technology we are not comfortable with be enough for setting this border?

These are some of the questions I try to address with my work and also motivate my

[10] Patricia Piccinini is an Australian artist. She is interested in expressing the critical debate on the emerging technologies, such as biotech, through the arts. She wants to question people about the boundary between nature and artificiality and about the good and bad aspects of applying biotech. One of her thought that inspires me is: “after centuries and centuries of selective breeding, the ancient correspondent of biotechnology, we actually think about our horses as natural, even if they are the result of man manipulations.” (Piccinini, 2008).

[11] That’s why our generation may perceive the city environment more natural than a wild forest. These two signifiers, the city and the forest, were always been associated respectively to the signified of artificiality and nature. What is changing around us and actually allow us to attribute different signified to the signs “city” and “forest” is the context. As saying that in the biotech age, we may have a different perception of what is natural and what is artificial comparing to some decades ago.

[12] For more details, see Hans Jonas . *The Imperative of Responsibility: In Search of Ethics for the Technological Age. Chicago:* University of Chicago Press, 1984.

design. Both my passion for the topic of life and death and my curiosity for emerging technologies inspire my personal way of working as a designer. I try to make technologies adapting to human deepest feelings, fears and dreams. Mine is a design like a question mark, that doesn't ask you to buy it or not, but to think if you would like it to exist or not. It is a question about a scenario that you would be willing to accept or not. My products become alive when people debate on them.
I feel there is a lot to be explored in the field of emerging technologies and human interactions with them. My instinct tells me that there are many more ways for us to experience those interactions than the way we may do now.

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Steganoflage:[1] a new digital image security strategy

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Abstract

Steganography is the science that involves communicating secret data in an appropriate multimedia carrier. The ultimate goal is to conceal the very presence of the embedded data. Current work in the state of the art, whether in the spatial domain or the frequency domain, cannot tolerate any geometrical attacks, e.g., rotation, translation or cropping. This paper discusses a novel scheme whereby computer vision, particularly skin tone detection, is incorporated into the process of steganography to yield an object oriented embedding mechanism. Skin tone information is deemed to be psycho-visually redundant. The paper also discusses two applications of steganography in digital image forensics and the secure transmission of electronic patient records.

1 Introduction

For decades people strove to develop innovative methods for secret communication: steganography, as an example, came to life under the assumption that if the feature is visible, the point of attack is evident. Steganography is the art and science of hiding data in a transmission medium. It is a sub-discipline of security systems. Although the term steganography has existed for thousands of years, its digital version has come to public consciousness of late. With the boost in computer power, the Internet and with the development of Digital Signal Processing (DSP), Information Theory and Coding Theory, steganography has gone 'Digital'. In the realm of this digital world, steganography has created an atmosphere of corporate vigilance that has spawned various interesting applications, thus its continuing evolution is guaranteed.

[1] See: http://www.infm.ulst.ac.uk/~abbasc/index.html.

Digital steganography refers to the science that involves communicating secret data in an appropriate multimedia carrier in an undetectable manner, e.g., in image, audio, or video files. Here we concentrate on digital images where human visual perception is exploited. The ultimate goal here is to conceal the very presence of the embedded data. Steganalysis, which is the official counter attack science, has challenged steganographic algorithms whether they are based on the spatial domain or the transform domain.

Inspired by the notion that steganography can be embedded as part of the normal printing process, Japanese firm, Fujitsu[2], is developing a technology to encode data into a printed picture that is invisible to the human eye, which can be decoded by a mobile phone with a camera. The process takes less than one second, as the embedded data is merely 12 bytes. Hence, users will be able to use their cellular phones to capture encoded data. They charge a small fee for the use of their decoding software which sits on the firm's own servers. The basic idea is to transform the image colour scheme prior to printing, to its Hue, Saturation and Value components (HSV), then embed into the Hue domain to which human eyes are not sensitive. Mobile cameras are able to ‘see’ the coded data and retrieve it. This application can be used for 'Doctor’s prescriptions, food wrappers, billboards, business cards and printed media such as magazines and pamphlets' or to replace barcodes.

Most of the steganography research to date has neglected the fact that object oriented steganography can strengthen the embedding robustness. Recognizing and tracking elements in a given carrier while embedding can help survive major image processing attacks and compression. This manifests itself as an adaptive intelligent type where the embedding process affects only certain regions of interest rather than the entire image. With the advances in computer vision and pattern recognition disciplines this method can be fully automated and unsupervised. Here we introduce our contribution in exploiting one of the most successful face recognition algorithms in building up a robust steganographic method. The discovery of human skin tone uniformity in some transformed colour spaces was a key achievement in the biometric research field. It provides a simple yet real time and robust algorithm. In this work we examine the state of the art and we look at our scientific contributions

[2] Hiding messages in plain sight. Available from: <http://news.bbc.co.uk/go/pr/fr//1/hi/technology/6361891.stm>.

along with various frameworks of security applications in which steganography can play a major role.

2 Proposed method

For colour face images, we use the algorithm described in Cheddad et al. (2009). A skin probability map is created from a special non-linear transformation that injects a zeroed R, the red component in RGB (Red, Green, Blue) images, into its formulation. The central focus of this paper is to embed the secret message in the first-level 2D Haar DWT (Discrete Wavelet Transformation) with the symmetric-padding mode guided by the detected skin tone areas.

Algorithms based on DWT experience some data loss since the reverse transform truncates the values if they go beyond the lower and upper boundaries (i.e., 0 - 255). Knowing that human skin tone resides along the middle range in the chromatic red of *YCbCr* colour space allows us to embed in the DWT of the *Cr* channel without worrying about the truncation. This would leave the perceptibility of the stego-image virtually unchanged since the changes made in the chrominance will be spread among the *RGB* colours when transformed. We choose wavelets over DCT (Discrete Cosine Transform) because the wavelet transform mimics the Human Vision System (HVS) more closely than the DCT does. Also, visual artefacts introduced by wavelet coded images are less evident compared to DCT because the wavelets transform does not decompose the image into blocks for processing. Let *C* and *P* be the cover-image and the payload respectively. The stego-image *S* can be obtained by the following embedding procedure:

Step 1: Encrypt P using a user supplied key to yield P'
Step 2: Generate skin tone map (*skin_map*) from the cover C and determine an agreed-upon orientation, if desired, for embedding using face features as described earlier (embedding angle will be treated as an additional secret key)
Step 3: Transform *C* to *YCbCr* colour space
Step 4: Decompose the channel *Y* by one level of 2D-DWT to yield four sub-images (*CA,CH,CV,CD*)
Step 5: Resize *skin_map* to fit *CA*
Step 6: Convert the integer part of coefficients of *CA* into the *Binary Reflected Gray Code* (*BRGC)* and store the decimal values

Step 7: Embed (the embedding location of data is also randomized using the same encryption key) the secret bits of *P'* into the *BRGC* code of skin area in *CA* guided by the *skin_map*

Step 8: Convert the modified *BRGC* code back to coefficients, restore the decimal precision andreconstruct the image *Y'*

Step 9: Convert *Y'CbCr* to *RGB* colour space and obtain the stego-image, i.e., *S*. (The effect of embedding is spread among the three RGB channels since the colour space was transformed).

The decoding stage essentially follows steps 2-6 while step 7 refers instead to the extraction phase of the secret bits before the decryption of the bit stream is performed. An example of the results obtained is shown in Figure 1.

(a) (b)

(c)

Figure 1. Hiding in human skin tone areas: (a) original image, (b) stego-image and (c) difference between original and stego-images.

3 Applications

This section deals with two applications of the aforementioned method of self-embedding, namely how to aid digital forensics experts detect forgery and recover evidences and how to secure electronic patients records' transmission and storage.

3.1 Digital forensics

Recent advances in technology and communications have resulted in increased porting of data. This however has also resulted in the need for increased vigilance with regards the security of documents. Safeguarding such digital documents is essential and we believe that steganography can play an important role here by adopting the self-embedding approach, where digital documents can be recovered after forgery by extracting the embedded data. In the search for the best way to represent the cover image with the least bit requirement for embedding we identified dithering as our ultimate pre-processing step which is the foremost task in building Steganoflage.

The process can be regarded as a distorted quantization of colours to the lowest bit rate. Meanwhile, reduction of the number of image colours is an important task for transmission, segmentation, and lossy compression of colour visual information (Farid 2008) - which is why dithering is used for printing. Dithering is a process by which a digital image with a finite number of grey levels is made to appear as a continuous-tone image (Floyd and Steinberg 1976). Jarvis and Roberts (1976) implemented dithering in the wavelet domain providing improved performance. Figure 2 illustrates the use of the proposed method to combat digital document forgery. Shown are the original image (2a), dithered version of original used as a payload (2b), Stego image after embedding (2c), extracted payload without attacks (2d), attacked Stego, i.e., face tampered with (2e), reconstructed hidden data from the attacked version (2f), inverse halftoning of (2f) shown in (2g), inverse halftoning of (2e) shown in (2h), and error signal of (2g) and (2h) with contrast being enhanced for display shown in (2i). Notice that only the tampered region, herein shown within a superimposed circle, demonstrates a coherent object in (2i).

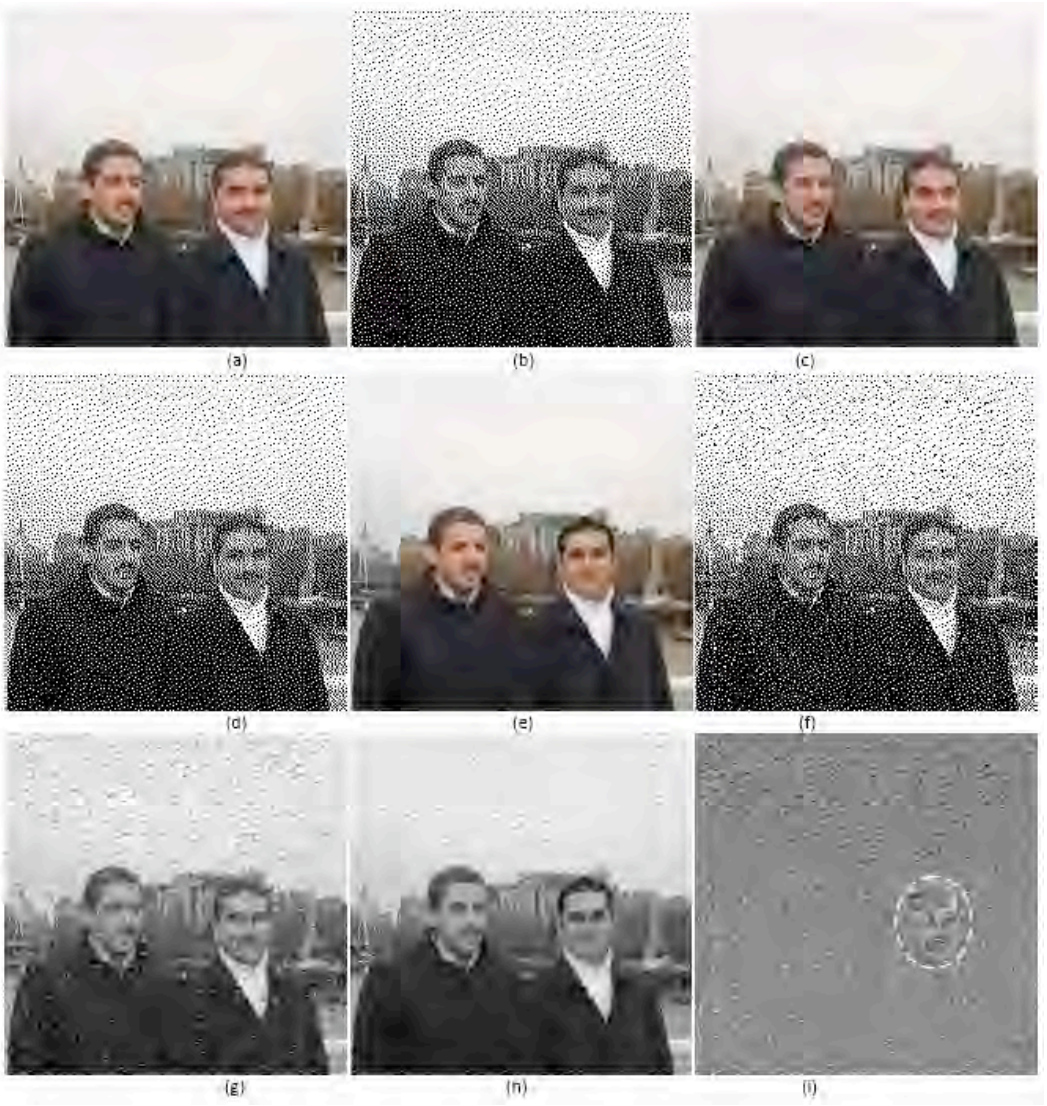

Figure 2. Performance of self-embedding algorithm on securing digital data.

3.2 Electronic patients records

Electronic patient records (EPRs) are a precious entity in health care. With the recent boost in communication technology, the massive increase in database storage and the introduction of the concept of e-Government, EPRs are more frequently stored in digital form. This goes hand in hand with the aim of the paperless workspace, but it does come at the expense of security breaches, especially if such sensitive and highly confidential information is transmitted over a network. The problem is in the security mechanism adopted to secure these documents by means of encrypted passwords. However, this security shield does not actually protect the documents that are stored intact. Encrypted passwords in fact, restrict only the access to data, a

mechanism that can be bypassed by malicious attacks to get through to the real patients' data.

Digital steganography would provide an ultimate guarantee of authentication and protection that no other security tool may ensure (see Figure 3). It is an enabling technology that can assist in transmitting EPRs across distances to hospitals and countries through the Internet without worrying about security breaches on the network (e.g., eavesdroppers' interception). Thus, embedding the patient's information in the image could be a useful safety measure. Medical records of patients are exceptionally sensitive and need rigid security during both storage and transmission.

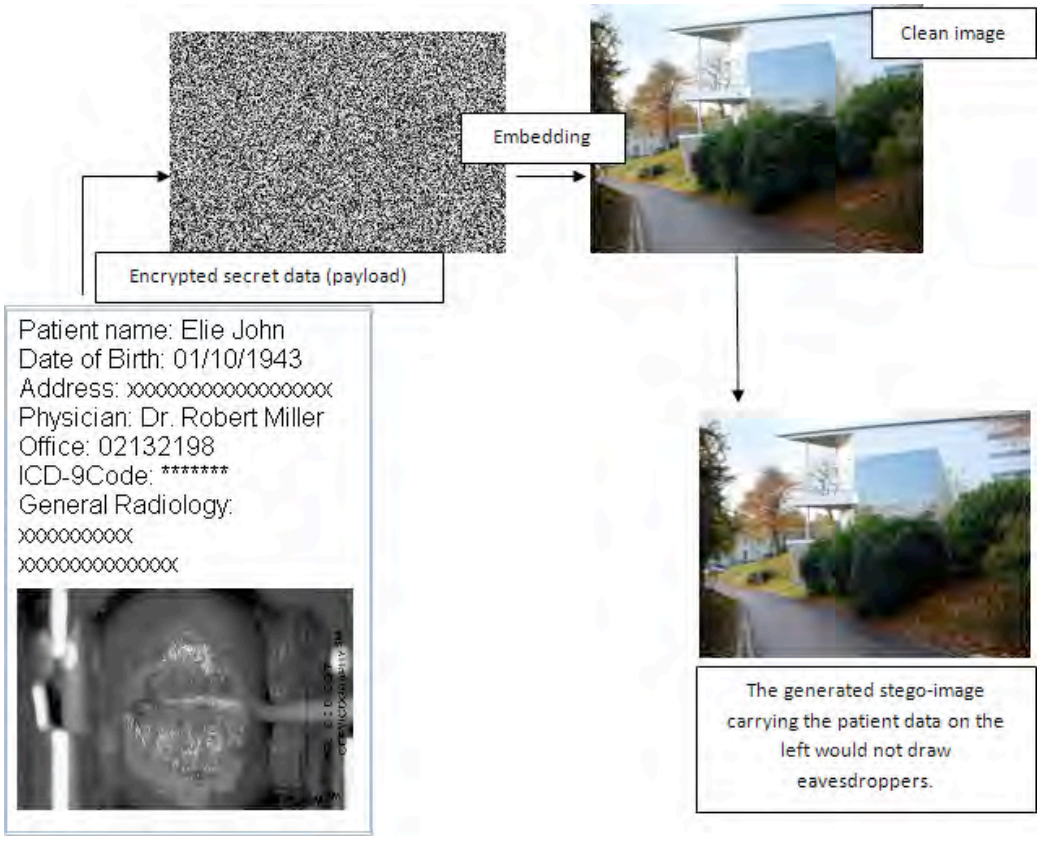

Figure 3. EPRs data being concealed in an innocuous file for secure transmission.

4 Conclusion

In this paper we presented an insight into the science of steganography which can be useful to protect scanned documents from being tampered with and can help ensure the safe transmission of confidential data such as patient's medical records through unsecure channels such as the Internet. The hidden data can be fully reconstructed

after supplying the correct key. Exhaustive details of steganography and our approach can be obtained from Cheddad (2009).

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Mechatronic art: beyond craft-fetishism

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In Sabrina Raaf's *Grower* (2006), a robot detects levels of Carbon Dioxide in a gallery and draws grass on the walls. In my public art installation, *(re)collector* (2007), surveillance cameras are set up throughout a city, programmed to recognize and record anything resembling a scene from the movie *Blow Up*. In Philippe Rahm's project *Interior Weather* (2008), light, humidity and temperature readings from one room are used to compose stories in another room. I want to provide some historical and theoretical context for this kind of work: work that intelligently responds to, and more importantly, generates knowledge from its environment. I would like to distinguish works such as these as examples of 'mechatronic art': systems-based works that involve customized mechanical and electronic devices to physically interface real world data with computer software. I want to argue that mechatronic art involves a specific set of vocabularies that separates it from other forms of digital art, in the same fashion that we might distinguish painting from sculpture, or video from sound.

In Jack Burnham's seminal essay 'Systems Esthetics', published in *Artforum* in 1968, he refers to the emergence of 'unobjects', specifically citing works such as Hans Haacke's *Condensation Cube* (1963) and Otto Piene's *Light Ballets* (1958-62): dynamic, evolving systems in symbiotic dialogue with nature. These new works, directly integrating with their sites and capable of adapting to environmental changes, were more than simply autonomous objects: artwork and nature became inseparable from one another. Nature was not the only system with which such works engaged: Les Levine's *Electric Shock* (1968) and Haacke's *Photo Electric Viewer-Programmed Coordinate System* (1968) looked to directly use audience interactions over time as their subject matter, repositioning gallery visitors from passive observers to active participants, in centre-stage. Burnham saw these works as evidence of a new paradigm in art, one in which art transitioned from being object-based to being

systems-based: 'Here, change emanates, not from things, but from the way things are done.'[1]

Properties such as adaptation, symbiosis and interactivity are increasingly common in the vocabulary of digital art today, as is the idea that art is an autonomous system in dialogue with an environment rather than an object autonomous from it. These two, perhaps contradictory, uses of the term 'autonomous' are symptomatic of the transition that Burnham envisioned. This paper examines the notion of ‘mechatronic’ art, arguing that Burnham’s observations referred to a new paradigm for art that is only now capable of being fully realized. Interestingly, Burnham’s theories emerged out of sculptural concerns, which are often anathema to many people’s understanding of digital art: Burnham was not referring to screen-based, graphically oriented work, he was talking about physical experiences, embodied and situated in the real world.

In mechatronic art this is explored to the fullest extent, via a dynamic synergy of art, computing and engineering. Artists working within this paradigm often develop custom-built hardware and electronics to control hybrid telematic environments, constructing components that are designed with built-in logical goals. Traditionally in digital art, these kind of algorithmic systems have been implemented using just software, but increasingly artists are working with combinations of hardware and software, essentially allowing each to learn from the other. The knowledge economy involved in building such projects requires artists to work within laboratory environments, sometimes developing new tools and technical solutions that make genuine contributions to allied scientific fields. This multidisciplinary approach has made mechatronic technologies – such as microcontrollers, sensors and actuators – highly accessible, as well as allowing the field to expand quickly from both a conceptual and a technical point of view. Artists operating within this paradigm are finding opportunities to make work that operates and responds to the real world, rather than work that is bound by conventional art structures and materials. As Burnham commented:

> Craft-fetishism remains the basis of modern formalism. Instead the significant artist strives to reduce the technical and psychical distance between his artistic output and the productive means of his society. Gradually this strategy

[1] Jack Burnham, 'Systems Esthetics', *Great Western Saltworks,* New York: George Braziller, 1974:16.

> transforms artistic and technological decision-making into a single activity.

A key feature of mechatronic art therefore is to bring artists closer in their modes of production to that of the real world. This is a necessary strategy in order for artists to create a seamlessness between their ideas about society and the work that they produce within it. In a systems-oriented society, traditional art-making processes arguably reinforce a sense of alienation from modes of production. For example, Burnham compared Picasso with Duchamp, identifying Cubism as bound up within the internal semantics of a finite art object that operated in isolation from the world, and attributed Duchamp's more enduring legacy to the fact that the relationship between the artist and his materials was identical to his audience's. Nevertheless, in both of these cases, the artists used traditional framing devices to isolate their work from their audience and maintain the work's 'autonomy': both were static, closed objects. Burnham was proposing more than simply a shift in the kinds of materials used by artists; he was suggesting that art should fully integrate itself within public spaces. Not in the sense of composing novel public decorations, or complementary site-specific sculpture, but rather as a means to directly intervene in reality:

> In evaluating systems, the artist is a perspectivist considering goals, boundaries, structure, input, output, and related activity inside and outside the system. Where the object almost always has a fixed shape and boundaries, the consistency of a system may be altered in time and space, its behaviour determined both by external conditions and its mechanisms of control.[2]

So whereas object-based art was seen in terms of form and distinction from what was around it, systems art was more concerned with behaviour, integration with the world around it, and how it could tap into larger-scale socio-political organizational systems. Burnham was therefore suggesting that Duchamp did not go far enough: instead of removing the work from reality, creating a duality between art and everyday, the art could reside within reality, without the protection of a frame. In other words, by taking a systems approach, the discontinuity between art and reality could be removed. In simultaneously manipulating the materials of modern society, and occupying its sites of public engagement, artists were opening up their practices to encompass interactivity, site-specificity and change over time, as well as establishing bi-directional dialogues between artwork and environment. Here we contemplate a

[2] Burnham, *Great Western Saltworks* 1974:17

radical shift in the idea of the autonomy of art: the work asserts its independence not by its object-based separation from reality, but rather by its systemic role within it.

The mechatronic art that we see today builds upon the critical and theoretical foundations laid by Burnham and his 'unobjects'. It is not concerned with formally cohering to the size, shape or scale of conventional art objects, preferring to use the formal characteristics of actual, real-world systems as its visual reference points: industrial robots, surveillance systems, security networks, etc. It is behaviourally that mechatronic artworks distinguish themselves from these everyday devices, via the incorporation of algorithmically controlled agency, and where we find the next stage of development for Burnham's systems aesthetics. In a mechatronic system the work is engaged in a material exchange with its environment. Here I am not considering a simple environmental exchange, such as in Haacke's *Condensation Cube*, but rather a transformative interchange of material poetry; a synchronous embodiment of a single idea within two or more separate entities, human or otherwise. The First Law of Thermodynamics states that Energy is never created or destroyed, but simply transformed. An artwork that can be considered a mechatronic system breaks this law by gaining more than it receives, becoming more than the sum of its parts as a function of its knowledge-based, embedded, transactional structure. A mechatronic system, embedded within spaces we cannot physically occupy, and capable of perceiving data that is outside of our sensory capacity, has the potential to show us something new about ourselves that we cannot find out any other way. Here we can again consider a very different form of autonomy to that provided by the frame; rather than art and reality being separated on the outside – visually – here, the separation occurs on the inside, behaviourally and systematically.

Artists' use of techniques such as interactivity, site-specificity, systems theory, sensing and control methods, and algorithmic processes can be seen as attempts to establish a generative relationship between artwork, site and audience, something that I would consider central to mechatronic art. The notion of a generative art system is best understood in terms of the balance between top-down and bottom-up strategies in the work. In a painting, for example, we do not expect to see a facsimile of reality: what results is a transformation of an idea through the manipulation of a surface. The decision concerning what is represented on this surface remains with the artist – analogous to a top-down approach. On the other hand, in a work that can be said to operate as an 'open system' – i.e. a work that feeds back with its site/audience – what is represented is determined both by the artist and the real time

relationship of work to its environment. In this regard, the artist delegates some aspects of the aesthetic responsibility to the work itself: it operates autonomously, with the artist not knowing for certain what will happen. Some knowledge is provided by the artist, but other knowledge is acquired from the work's relationship to its site/audience and as a result may be unpredictable. By this I do not mean that it is random or chaotic, but rather what occurs is carefully composed within an algorithmic framework designed to generate new information. This constitutes an important balance between top-down and bottom-up strategies in mechatronic art: how will the work respond to its environment – what transformation will occur, and what will it mean? This is a decision that traditionally resided with the artist alone, and which now becomes a powerful means of developing unique strategies to cope with the large-scale systems we find ourselves immersed within. We can reflect on the vast array of experiments with materials, site, time and space that characterize mechatronic art as evidence of artists' desires to synthesize knowledge gained from diverse creative fields such as dance, music and literature, in order to construct novel ways of reflecting upon the human condition. Further, we can see from the increasing complexity of the algorithmic frameworks with which artists compose mechatronic art systems – a far cry from the simplicity of Haacke's *Condensation Cube* – that artists are able to operate in realms that are considerably different to conventional artistic territory. We can now contemplate work that extracts poetic experiences from processes that were previously too small, too slow, or too fast for us to be aware of.

We are no longer painting a picture of reality, or even appropriating it for display; rather, we are beginning to author reality, using reality. Taking an example from my own work, via the cameras in *(re)collector*, it was possible to extract specific narratives from people's everyday behaviours, organize them into linear films, and then insert those narratives back into the city in such a way as to influence people's actual behaviour. Essentially then, through mechatronic art's direct intervention in reality, it is possible to establish an iterative feedback loop that can call into question what is real and what is art.

If Burnham's idea of systems art focused on a feedback loop between art and nature, i.e. input and output, then in the case of mechatronic art, as the next stage of systems art, we add a layer of intelligent processing in between input and output. Here we encounter very contemporary points of reference: neural networks, agent-based programming, artificial intelligence, etc. Typically software agents are considered in terms of the possible states, behaviours, and goals that they seek to

achieve or maintain. For example, a software simulation of a person walking could be considered an agent due to its states (e.g. speed, position), behaviours (e.g. moving faster or slower, turning left or right) and goals (e.g. trying to get somewhere specific, trying to maintain a particular speed). When several software agents are put into a single environment, all with the same possible states, behaviours and goals, we get a multi-agent system. Pursuing the walking example further, we could end up with a simulation, for instance, of crowd behaviour, as each agent attempts to navigate around the others to get to their destination. Multi-agent systems such as these are capable of modelling patterns of behaviour that may not be immediately apparent to us, and consequently can be said to demonstrate emergent properties. Agents in multi-agent systems are generally defined as having (at least partial) autonomy due to the fact that the decisions they make are determined by their internal response to their environmental conditions: as having a local perspective upon the system due to the fact they cannot have a full view of the entire system they find themselves within; and as participating in a decentralized environment over which no single agent has control. Effectively therefore, multi-agent systems demonstrate complexity from sets of simple parts: we may understand the individual behaviours and goals of the agents, but that of the system as a whole may be less predictable.

Software agents are characterized by their ability to perceive and act within a computational environment. In mechatronic art systems, they are a very useful means of programming intelligence into systems of sensors, video and audio: such works typically demonstrate states, behaviours and goals. Again here an important distinction must be made between simple reflex agents such as those used in the majority of interactive installation art, where no differentiation is made between audience members; and emergent multi-agent systems in which more complex outcomes can develop. To close I'd like to identify three different strategies used in mechatronic art that demonstrate this complexity, in the process I hope to identify some of the challenges for the field as we look towards future mechatronic art projects that synergize art and reality in new and important ways.

Firstly, a *repetitive* strategy involves taking a single process that may evolve in response to its environment – plant growing, visitor interaction with audio/video, data gathering, etc. – and repeating it in order to heighten our awareness of the difference between each repetition. As an example, we could consider Robert Smithson's *Spiral Jetty* (1970), in which the natural cycle of erosion and change causes the jetty to be different each time we see it. As each stage appears to be similar, yet subtly unique,

we are drawn in to the drama of its transitional moments. Here, beauty is derived from its enduring quality across time. *Spiral Jetty* offers an interesting example, largely because it is an analogue work, and would be best described as a systems artwork in Burnham's sense rather than as a mechatronic artwork in the sense I have been describing. Each year, the Jetty erodes and changes, sometimes disappearing altogether. Here the balance between top-down and bottom-up is erratic: compositionally, there is no guarantee that the work in each repetition (i.e. each cycle of change) is statistically similar and different enough for it to have an enduring quality across many years. Building such a work today, and using some of the technologies available, we could certainly imagine a much greater degree of algorithmic control being exerted, bringing it closer into line with examples of mechatronic art.

Secondly, a *divergent* strategy uses several instances of an identical process – e.g. multiple identical plants, multiple screens showing identical data, multiple responses to the same question. Natalie Jeremijenko's *One Tree* (2003), in which one thousand cloned trees were planted throughout the Bay Area, demonstrates the effect of different environments upon identical instances of the same thing. As each instance of the process achieves its goal, either in a shared environment or in a range of different environments, the results can be directly and visually compared and contrasted. This unravels the decision-making process that occurred along the way, essentially creating a non-linear narrative as the different possibilities of the system are presented side by side.

Lastly, a *convergent* system would show different parts of a single system simultaneously – multiple camera angles of a single object, multiple sounds derived from the same environment, streams from multiple cameras in the same city, such as in *(re)collector*. The viewer, in acquiring a bird's eye view of the system in its entirety has a perspective that is not shared by any of the parts in isolation. An example of this would be *The Listening Post* (2003) by Mark Hanson and Ben Rubin, in which chat room conversations are simultaneously displayed on a grid of LCD displays. Here, the viewer completes the work in his own mind, finding the relationships between the parts to construct a whole. In such a system, the parts do not need to be individually resolved, but rather crafted in order to sufficiently contribute towards the whole. Importantly these strategies do not sacrifice representational integrity: they are not simply an illustration of the process as experience; rather they are the process, occurring many times, simultaneously. Some art works consist of

combinations of these different strategies. *Alchymeia* (1998) by Shawn Brixey, comprised a series of ice crystal ‘portraits’ engineered using steroid samples from Olympic athletes. Each portrait contains the unique DNA of a single human being, and can be seen as an agent within a visual and biological system. The serial repetition of portraits in a freezer allows us to perceive what make each one unique and divergent, as well as what makes all of them the same.

Each of these examples require the invention of a customized physical process or device – be it a jetty, a cloning and monitoring system or a statistical data mining system routed to LED displays – which is then interfaced with an algorithm capable of transforming reality into something that is not visible without the physical process being in place, before then reinserting it into the same reality. For the digital artists, qualities such as repetition, divergence and convergence become new aesthetic tools with which to explore the expanded potential of mechatronic art. And further, such an approach becomes an important aesthetic device with which to explore a society in which notions of originality, reproduction and replication are of great debate and concern.

Mechatronic art is not simply about making work that is ‘interactive’, ‘interdisciplinary’, ‘responsive’, ‘kinetic’, ‘mechanical’, etc. There is also an important aesthetic and theoretical rigour to be taken into consideration. In this paper I have argued that in establishing a critical vocabulary for mechatronic art, it is important for the work to be generative. Simply combining methods, processes and materials from different disciplines is not sufficient: the combination must generate something new that is a necessary function of the art system. We find ourselves now at a point in the evolution of art where simply being digital provides sufficient information with which to understand it. Therefore it is very important that we can locate and distinguish practices such as mechatronic art from 'traditional' digital art, and establish a vocabulary appropriate for evaluating its contribution to the field.

Nanotechnology, storytelling, sensing, and materiality

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Introduction

The process of taking quantum theory and transforming it into a quotidian experience via nanotechnology seems inevitable. In the international marketplace, there are currently hundreds of nanotechnology-based products ranging from sunscreens and beauty products to fitness clothing and equipment to medical products, and more are being added every day. (Project on Emerging Nanotechnologies, 2008) Meanwhile, government funding for nanotechnology research, over the last five years, is estimated at $40B (2004-2008) and, in 2009, it's expected that an additional $9.75 billion will be invested. (cientifica, [sic] April 2009: 2)

Still no one really knows how to explain or describe nanotechnology simply. Scientists and others trying to educate and communicate to the public about nanotechnology focus on descriptions of size and scale. (Berger, October 17, 2008) The comparison to a human hair (one nanometre is 1/60,000 of a single human hair) is usually made in a futile attempt to describe and discuss it. Even amongst scientists, the standard for explaining nanotechnology is to invoke a measurement; nano means one billionth. (So, a nanometer = one billionth of a metre.) Alternatively, explaining that nanotechnology allows us to manipulate matter at the atomic and molecular levels will generally reward you with a blank stare. These explanations simply don't fire the imagination or aid understanding.

'"You don't see something until you have the right metaphor to let you perceive it", [Robert Stetson] Shaw said, echoing Thomas Kuhn.' (Gleick 1987: 262) An important figure in the development of chaos theory, Shaw highlighted the importance of the metaphor (vital to storytelling and exciting to the imagination) while using the metaphor of 'sight' to describe the ability to understand a new concept. In reality we are dependent on all of our senses for information although sight tends to be privileged where scientific information is conveyed.

Sensing and understanding nanotechnology

At the molecular and atomic levels (i.e. the nanotechnology level), the equipment used for sensing matter is not based on optics (sight) but haptics (touch). 'In going from a light or electron microscope to a scanning probe microscope we have moved away from looking to touching.' (Jones 2007: 18) Most people do not realize that any visual images of nanoscale structures that they see are products of art just as much as they are products of science:

> At the nano-scale [sic], seeing is actually feeling (atomic force microscopy depends on a tiny tip moving up and down as it traverses a surface). Turning what is 'felt' into images to be seen and read for what they might tell us, is a complicated challenge. Among themselves, nanoscientists talk of 'blobbology' [sic], the craft skill of interpreting computer-generated images of surfaces. The importance of such craft skills is not exclusive to nanoscience, but nanoscience highlights the interpretative challenges involved. (Rip 2009).[1]

Data gathered by the sense of touch is mediated by computer software which then produces a visual image for interpretation. This image can be further manipulated to create some of the ‘nano art’ seen on the web. (There are two main categories of ‘nano art’, images which have been created with data gathered in a laboratory and then further manipulated to create an ‘artistic’ image or purely artistic renderings that are not based on any data gathered in a laboratory.)

These newish, haptic microscopes stand in strong contrast to the better known and still used optical microscopes with which most of us are familiar. In a sense (pun intended), the new microscopes open up storytelling possibilities. In fact, these sensing devices represent a biphasal shift in that, first, we have no direct contact via any of our senses; everything is mediated through both hardware and software. (Arguably, one could say that optical microscopes also mediate between observer and observed but the inclusion of a database and sophisticated imaging software needed to produce an image - required for nanoscale observation, are a different order of mediation altogether.) Second, we have tended to rely on the visual sense over our other senses when discussing science, and as noted earlier, most

[1] For the purposes of this paper the terms nanotechnology and nanoscience are being used interchangeably as the distinction is one only scientists and engineers are likely to make.

nonscientists have experience of optical microscopes only: even though with nanotechnology, we now rely on haptic contact.

There is work which focuses on yet another sense, on hearing. ‘Vibrational exchanges’ are used to sense or detect matter at the nanoscale. These are, in effect, an attempt to ‘listen’ to the molecules in a technique called ‘nanomechanical resonance spectroscopy’ (NRS). (Berger Aug. 27.2008) Additionally there is much work being done on nano radio:

> Peter Burke and Chris Rutherglen [University of California at Berkeley] developed a carbon nanotube 'demodulator' that is capable of translating AM radio waves into sound. In a laboratory demonstration, the researchers incorporated the detector into a complete radio system and used it to successfully transmit classical music wirelessly from an iPod to a speaker several feet away from the music player.
>
> Although other researchers have developed nano-sized radio wave detectors in the past, the current study marks the first time that a nano-sized detector has been demonstrated in an actual working radio system, the scientists say. (Azonano, October 18, 2007)

Materiality

All of this ‘sensing’ activity is in the service of better understanding the material world. But the material we are now talking about lies in the realm of the invisible, the nano scale, while our senses operate at the macro scale. Everything we know to be true at the macro scale is different at the nano scale.

> ... while your reality tells you that you are sitting in your chair right now as you are reading this, reality at the subatomic level means that you are not really sitting in your chair - thanks to the repulsion of your and the chair’s electrons you are actually floating on it at a height of a fraction of a nanometer [sic]. (Berger, January 30, 2008)

We now have two forms of materiality - that which exists at the macro scale and is perceptible by our senses - and that which exists at the nanoscale and is not

perceptible by our senses. The great difference between now and the 19th century (when we started seriously studying atoms and molecules) lies in the subtle levels of control that we are now learning to exert over them. We have understood the basics about atoms and molecules for quite some time now and when we want to affect any change in molecular or atomic structures we have fairly crude means of doing so. For example, we apply heat and/or pressure to create metals. (It's called heating and beating.) However, these days scientists are examining ways of manipulating the bonding that takes place between the atoms and molecules to create flexible electronics. Metals will be made to do things we never imagined possible and 'heating and beating' will not be necessary; most of the action will take place at a scale that we cannot sense. (Nanotechnology Now, June 26, 2008)

> For Husserl the crisis of science was a consequence of the gap between the visible and invisible realms of nature. … How will nanotechnology affect this gulf? Nanotechnology represents a new type of invisibility - not mathematical, or electronic, but rather material in nature, the material invisibility of objects beneath the possibility of lived or phenomenal experience. Up to the present, it has been possible to hide cameras; but cameras were in principle visible, existing on the meso [macro] scale of human perception. With nanotechnology we will never know when we are under surveillance - or whether we have a GPS chip embedded in our skin or lungs. The possibilities for paranoia are endless. (Frodeman 2006: 385)

Our sense of the world's material and of the material of our own bodies is being affected profoundly. More and more we seem to be inhabiting existences that are as much imagination as reality.

Storytelling

'Any sufficiently advanced technology is indistinguishable from magic' - according to Arthur C. Clarke, an important 20th Century science fiction novelist and English physicist. When trying to explain or describe 'magical' nanotechnology we have yet to find compelling descriptions. There is the dull, and for most, meaningless mathematical description (one billionth of a metre) or the attempts to describe the scale by using various images of progressively smaller items.

The nanotechnology stories we get from nonscientists (storytellers) are more imaginative but rely on the audience's sense of sight. Books (e.g. *The Diamond Age* or, *A Young Lady's Illustrated Primer* by Neal Stephenson) are read; video games (e.g. *Metal Gear Solid*) are viewed; (video games could be thought of as integrating a more haptic approach while retaining a visual orientation, which remains dominant.); science fiction television programs (e.g. *Star Trek: The Next Generation* - where the alien species The Borg use nanoprobes); are watched (Wikipedia, n.d.) and nanotechnology art works (e.g. Cris Orfescu's *Premiere Art Portfolio*) are looked at on the web.

The biphasal shift mentioned earlier (perception mediated by hardware and software and the shift from using sight to also using touch and sound) challenges traditional means of getting the story across. Scientists (with artists and others) are trying new means:

> [Joël] Chevrier, a professor at the Université Joseph Fourier in Grenoble, France, together with his collaborators hopes to open up a completely new field for our perception. This new 'playground' - using haptic, vision and sound interfaces - is the world we are living in; but explored at scales entirely foreign to everything we experience around us. …
> Chevrier and his team built a virtual atomic force microscope (AFM) and coupled it to an advanced haptic interface as well as a sonification and visualization system. … About 10,000 people have used this demonstrator during three exhibitions in Grenoble, Paris and Geneva. (Berger, January 30, 2008)

Chevrier's project offers some intriguing possibilities but there are problems for most writers, artists, academics, and, for that matter, scientists as well - with regard to equipment and budgets for installations. The fundamental question centres on how we will convey the reality of a world (as per our current understanding) that we can imagine only dimly. It is the metaphors that will allow us to see/understand.

There are many metaphors floating around: Spiderman is invoked to suggest the possibilities of adhesion technologies: scientists are working to exploit the adhesive forces at the nanoscale that allow a gecko to suspend itself along a vertical surface (Berger, December 3, 2008); alchemy is invoked to suggest possible new metallic forms for example, scientists can make the electrons of certain atoms [e.g. iron]

behave as if they are part of a different element's atom (Nanowerk, June 15, 2009); Lilliput is invoked to give a sense of size; and there are many, many more.

For a time the most dominant and successful nanotechnology metaphor was 'grey goo'. Coined by K. Eric Drexler in his attempt to describe potential catastrophic consequences of nanotechnology, it hasn't been used much lately. The idea is that a device Drexler called a nanoassembler would start replicating itself to disastrous effect. In short, all of the atoms on the earth would be consumed and only 'grey goo' would remain. (Drexler 1987) The scientific reasons that Drexler suggested might result in the potential 'grey goo' catastrophe proved not to be entirely valid.

Sometimes the stories, the images, the artistic efforts which define a particular endeavour or concern take us by surprise emerging from the unlikeliest sources. Mary Shelley, in 1818 and at the age of 21, had published a horror story which has been interpreted in many ways but for most, stands as an iconic story about science gone wrong. Shelley's Frankenstein has proved to be a very flexible metaphor and the monster's story has been used to warn against the dangers of biochemistry, electricity (Hitchcock 2007: 132), and, more recently, genetically modified foods.

Still, the Frankenstein story has its roots in the 19th Century, in a world dominated by Newtonian physics and optical microscopes. Nanotechnology and associated sensing apparatuses (also used with other emerging technologies) function at scale where quantum principles of physics apply. We need new metaphors and new stories as our sense of who and what we are, and what the world is made of, is being re-examined and redefined while we touch, hear, and see in new ways.

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The post-human imaginary and the body of the avatar

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Introduction

With the recent growth in Massively Multiplayer Online Games and Virtual Worlds there are emerging opportunities to explore our understanding of the mind body relationship when moving between real and virtual space. How do we understand our avatar as our represented 'presence' in virtual space? What are we identifying with when we identify with an avatar? Do we have a phenomenological experience of the virtual body? In other words, do we experience the body of our avatar? Don Idhe (2002: 15) notes that virtual reality bodies 'are thin and never attain the thickness of flesh', although he does acknowledge that 'one's "skin" is at best polymorphically ambiguous, and, even without material extension, the sense of the here-body exceeds its physical bounds' (2002: 6). Do we experience skin, virtually? Is virtual skin simply artifice, only a response to the visual and thus remains on the surface, only skin deep? Or does the imagination of virtual skin provide something else, an interstice between the sense of presence and our experience of absence? Can we have a sensory experience of virtual skin?

Drawing from Benedict de Spinoza and Gaston Bachelard, this paper explores the relationship between the post-human imaginary and the body of the avatar when interacting with virtual worlds, and in particular the virtual world of *Second Life* (SL), created by Linden Labs in 2003 with barely 1,000 users (Rymaszewski 2007: 5).[1] A particular feature of SL is the accessibility of the platform to build and customise spaces. Using SL building tools to create objects and manipulate terrain, along with the application of the SL programming language, it is possible

[1] The number of users with an account has grown to over 16 million, although monthly user statistics suggest a much lower 1.5 million active users Statistics from http://secondlife.com/whatis/economy_stats.php (Accessed 16.06.09).

to have a high level of control of the creation and manipulation of an environment. This research has previously used narrative as a method to explore the post-human imaginary in virtual worlds and to de-code the complex layering of conflict between the real and the virtual. The focus of this paper is our relationship to the body of the avatar and to the represented self in virtual space.

The body and the imagination

The virtual embodiment of people as avatars is a term used in many online worlds, according to Tom Boellstorff (2008: 128). Avatar, is the Sanskrit word originally referred to the incarnation of a Hindu god and particularly the god Vishnu. (Boellstorff 2008: 128). However:

> While avatar […] historically referred to incarnation – a movement from virtual to actual – with respect to online worlds it connotes the opposite movement from actual to virtual, a decarnation or invirtualization.
> (ibid: 128)

He also suggests that, 'avatars make virtual worlds real, not actual: they are a position from where the self encounters the virtual' (ibid:129). Using the terms the virtual, the real and the actual, Boellstorff links his ideas to Bergson's examination of the real and the virtual in the early part of the twentieth century. Whatever the change in use of the term avatar, towards the invirtual, if we begin to examine this represented self in virtual space, how do we approach the term the 'body of the avatar'? What part does the imagination play in our acceptance of our represented presence in virtual space, through the body of our avatar? Moira Gatens and Genevieve Lloyd, identify Spinoza's treatment of the imagination as integrated with 'his treatment of the nature of mind and its relations with the body' (Gatens and Lloyd 1999: 11). Disagreeing with the dominant beliefs of the time concerning the dualism of the body and mind, the imagination, for Spinoza, had 'a powerful ontological dimension – a direct and strong contact with bodily reality' (ibid: 12). They go on to say that his version of the imagination has an equally strong emphasis on the reality of the mental and, for Spinoza:

> […] the figments of the imagination are just as real – just as appropriate objects of systematic investigation – as the modifications of matter.

> Imagination involves the coming together of mind and body in the most immediate way: *mind is the idea of body* [my emphasis].
> (ibid: 12)

So the imagination, according to Spinoza, is rooted in the body, or to put it slightly differently: the body has a mind of its own. In *Air and Dreams*, Bachelard (1988: 4) proposes that 'the imaginary is immanent in the real, (and) how (there is) a *continuous* [original emphasis] path (that) leads from the real to the imaginary'. In *Water and Dreams* he writes that by following the daydreams of a man:

> […] who abandons himself to the imagination of matters […] a substance will never seem sufficiently worked over for him because he never stops dreaming of it. Form reaches completion. Matter, never. Matter is a rough sketch of unrestricted dreams'. (Bachelard 1983: 113)

Virtual body: virtual skin

The meaning of the 'material imagination' for Bachelard, according to Steve Connor, is described through two intersecting ideas: firstly, that the material world is imagined by everyone all of the time and this is termed the 'imagination of matter' (Connor 2004: 40); and secondly, that imagination is itself:

> […] always implicated in the world that it attempts to imagine, made up, like the gingerbreadman enquiring into his dough, of what it makes out. This is not least because the merely visual or image-making faculty suggested by the word 'imagination' is always toned and textured by the other senses. (ibid: 40)

According to Bachelard (1969: 203), what we imagine, works on our being, in our substratum. Connor suggests that the phrase material imagination 'must signify the *materiality of the imagining* [my emphasis] as well as the imagination of material' itself. Of the skin, Connor writes, that, '[it] provides a good opportunity for enquiring into the material imagination because it is bilateral, both matter and image, stuff and sign' (Connor 2004: 41). He continues:

> If you touch your skin – and think how hard it is to think without touching your skin, forefinger to lip, say – then you feel yourself and you feel yourself

> feeling. You are simultaneously an object in the world and a subject giving rise to itself as it advances to meet the world in that object.
> (ibid: 41)

Brian Massumi suggests that imagination is the mode of thought that is most suited to the virtual. And further that the:

> Imagination can also be called intuition: a thinking feeling. Not feeling something. Feeling thought […] Imagination is felt thought […] the mutual envelopment of thought and sensation, as they arrive together.
> (Massumi 2002:134)

To draw these ideas together, it appears that Spinoza and Massumi agree, that there is a strong relationship between the body and the imagination. Bachelard talks of the material imagination, although his poetic theory of the imaginary is often about an elsewhere, that is not here, not a place that begins with the body. However, if we dream over the material, we must also dream over the body. What, then, do we imagine when we imagine the body of the avatar; what of the skin of the body of the avatar? Is there an imaginary experienced as sensation, as well as image, as Massumi suggests? Does the body have an imaginary of its own?

Third body: post-human imaginary

Don Ihde investigates the duality of the notion and experience of, what he terms, the here-body and the image-body. In asking questions of our phenomenological experience of virtual space he observes that:

> A(n) analysis shows a variation between what would be called full or multidimensional experience and a visual objectification of presumed body experience. Where does one feel the wind? Or the vertigo in the stomach? Can it be felt 'out there' in the disembodied perspective? The answers quickly show partial primacy to the embodied experience.
> (Idhe 2002: 4)

The here-body is where we can have a full, multidimensional experience and ‘gestalts in the here-body of the embodied perspective, whereas the visual objectification out there is spectacle like’ (ibid: 4). The image-body is where the

body of the avatar lies. Idhe explores the ambiguities experienced in virtual space, particularly when our presence is identified through a third person avatar perspective, and suggests that this is 'the opening to a sliding perspective from the multidimensional experience of my here-body toward the image-body perspectives lie within these ambiguities (ibid: 6). If the here-body exceeds its physical bounds, does the image-body have a sense of materiality that enables us to dream over it, and in turn, have a sense of the body of the avatar? This third space is occupied by a third body, neither human nor non-human, neither here-body nor image-body.

In *Performing in (virtual) spaces* (2007), Jacqueline Morie begins with the ontological assumption that the body has been re-contextualised in the age of digital technology. Morie claims that there is a specialised and intrinsic set of qualities of 'Being' in immersive virtual environments, and suggests that there has been a paradigm shift in what humans are now able to experience. She points to the research of visual and performance artists and their contribution to the exploration of virtual environments as key to our future understandings of ourselves in the physical and digital domains (Morie 2007: 123).

In her article she explores the representation of the body, or presence, in virtual environments in five ways: as no representation/no avatar, as the mirrored self, as a partial or whole graphical personification, a third person/observed avatar, and the representation as experience in shared environments. According to Morie, using the observed or third person avatar, in this form of embodied image the participant takes on:

> […] an experiential locus that is outside their perceptual self. An avatar appears, at some distance out in front of the experient's physical and imaginal locus. (ibid:132)

She returns to Merleau-Ponty's phenomenological standpoint as he views the body as 'the common texture of which objects are woven' (Merleau-Ponty in Morie 2007: 13), but suggests that he did not have to grapple with 'new forms of immaterial bodies beyond the phenomenal' (Morie: 2007: 133) as we do now in light of new technologies.

Conclusions

If these new immaterial bodies can be experienced through new technologies, we can also experience ourselves in avatar based virtual worlds through embodied presence. The virtual world experience is an interplay of a number of elements: of ourselves experiencing telepresence, our imagined presence in virtual space, and of ourselves switching to the disembodied perspective of Idhe's 'image-body'.

Morie's claim is that the centre of our understanding is our body and through this felt phenomenon, we know the world. Yet, according to Morie, the avatar perspective still has an experiential locus, even though it is 'out there'. The image of ourselves represented in space, creates a tension, rather than the unobserved or unrepresented body in virtual space. There is a third 'imagined' body that is beyond the image-body and is a response from a sense imaginary: it is a virtual body with virtual skin. The imagination, as Massumi describes it, is thought and sensation arriving together (2002: 134). The senses are, or can be, interconnected with an imaginary of their own. Hayles (2005: 242) qualitatively distinguishes between embodiment which is fleshy, and that which is from other life forms. The body of our avatars challenge us to expand our sense of materiality through the sense imaginary. At the centre of this experience is the imagination. The post-human imaginary emerges.

My continued research aims to develop a new theory of the imaginary in light of virtual worlds. One aspect of this, as outlined and explored above, is our understanding of the impact of new technologies on our real and virtual bodies, the experience of the bodies of our avatars, and on the imaginations that breathe life into the post-human.

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Expression in interactive aesthetics: the case of physical computing

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Situated computing for embodied interaction

From a certain perspective, a tollgate, the latest robot at the Massachusetts Institute of Technology and a GPS mobile phone are not so different. They all integrate computation with physical processes. If the foundations of computing are built on the premise that the principal task of computers is the transformation of data, today a renewed attention to materiality unfolds alternative conceptual frameworks whose practical implications are productively engaged with vast and differentiated social and cultural realities. Neuro and cognitive sciences are showing an increasing awareness of the important interplay between perception, thought and action. Similarly, new models of HCI consider richer and more complex ecologies of people, physical artefacts and electronic systems, while robotics and AI expand their focus from thought to action, from search spaces to physical environments and from problem solving to long term activity.

With the extension of cognitive dynamics into the environment and the incremental game of perception and action into spatially and temporally extended processes, the consequences for the praxis and poetics of interactive aesthetics are manifold. In interaction design, for example, such situated and embodied perspectives not only provide an alternative framework for evaluation but also opportunities for design to take a deeper advantage of multisensory interfaces and multimedia. If today's technology can be perceived by some as intrusive and overbearing, an approach which emphasises the environmental physicality of computational action could then - along with, and thanks to, the massive increase of computing power and the consequent expanding context in which we can use it – enable fluent interaction with the minimum effort on the part of the user, bridging the gaps between cyberspace and the physical 'external' substrate of practice.

Under these conceptual premises and practical expectations though, one could argue that interaction is mainly reduced to a logic of ‘integration’ and ‘separation’ of both human agency and technological systems into wider environments through the patterns and processes of ‘embodiment’, whose strategies, in turn, become fundamental characterizations of the interaction itself. Materiality, in this sense, is interpreted as both the manipulation of digital information via physical objects and the use of physical environment as a medium for the exchange of digital information. Embodied interactive aesthetics is thus regarded as the process whereby the individual body is connected into larger networks of meaning at a multiplicity of scales. The computational materiality inscribed into the social and environmental complexity then respectively becomes, in my opinion, the necessary precondition to subjectivities, namely those situated agents able to activate behaviours in-between the information flows which recursively travel from the system through the ‘actuator’ and back to the system again. A robot, a human, an interface: they all shape ideas, concepts, thoughts and categories through their physical presence and in relation to their object-directed experiences. A situated agent as such is always in relation to a perceptive body, which make of the world an intentional representation and, most importantly, an operational perspective.

As much as the proliferation of embodied and post-desktop alternatives for interaction wants to avoid the trap of the mentalist foundation of computing by emphasizing the material dimension of information, such systems still arguably operate around a sort of kernel of subjectivity of very Cartesian memory. The conceptual implications of the subjective experience of having and using a body – the main point of argumentation – thus emerge as essentially phenomenological statements about the primacy of corporality as ontological access to the world.

The body of situated and embodied computing is, according to many aspects, a phenomenological one: primarily concerned with how it is perceived and acted, a ground for experience and a source of intentionality and consciousness. It relates diversities by means of articulation and connection in itself. By reducing lived agency to that of a subject, they re-introduce an integrated - or separated – ‘dative’ that flattens the ontological complexities emerging from the parts in interaction. For an innovative and fruitful unfolding of both the material and immaterial in computing we need - I propose - a non-reductive understanding of difference, multiplicity and subjectivities. We need a new set of conceptual tools for a reworking of how we think

about materiality, able to account for the micro and macro levels of variation of a body.

Expressive computation for abstract materiality

The definition of what a body is and – most importantly – of what it can do is, in my view, of pivotal importance for technologies aiming at the creative engagement between the physical world and the digital one. Historiographically and philosophically speaking, the problem of the relation between the material and the immaterial has been a favourite theme throughout the courses and recourses of speculative thought. In particular, here I consider a multifaceted philosophical tradition that has accepted the paradox that there is an incorporeal dimension of materiality as much as a physical characterization of thought. More specifically, I am referring to Bergson and his *élan vital* as movement of differentiation between the coexistence of all the degrees. Or Nietzsche's beings, composed of and by forces, so that every power is already connected with another one, differing between each other quantitatively. Again, I am thinking of William James, who announces a world where the 'material' is fabric of both matter and thought, what he calls 'pure experience'. Or of Leibniz's monadology, his infinite points and their complex identity of relation, and of Whitehead, in his declaring that processes, not substances, should be taken as the fundamental ontological constituent of reality. And finally I allude to Gilles Deleuze and Felix Guattari, their lifelong quest for an immanent plane of experience and life – absolute and real in itself, an internal condition for thought and action. Through Deleuze's analysis, above all, Spinoza's declaration of ignorance – where we speak of consciousness and will without knowing what a body can do[1] – it becomes a provocation which allows the philosopher to define the Spinozist parallelism between mind and body as the very model of his own ontology. The sameness of thinking and extended substance also grounds, consequently, the relation between ideas and their objects, so that a mode and the idea of that mode are one and the same thing, but 'expressed' in two ways. What is expressed does not occur outside of such a field of immanence, yet it is distinct from it, being the essence of what expresses itself. Expression, then, is neither representation, nor communication or content. Since what is expressed cannot be separated from the act by which it is expressed, expression is always of a relation, encompassing both the

[1] See Spinoza's *Ethics*, III, 2, Scholium.

way bodies come to be in existence and the way they are known in thought, thought itself being one mode of reality alongside all the others (Deleuze 1992).

In my opinion, such a theoretical framework and philosophical tradition can be productively engaged with interactive aesthetics, thereby freeing interactive practices from what we have earlier commented as the normative constraints of an ‘intentional consciousness’ or ‘lived body’ situated within the horizon of a phenomenological ‘being-in-the-world’. Expression, thus, is an ontological tool, intrinsically operating against any dialectical rationale that instead produces ‘difference’ in its immediate opposites or relation through causation. More specifically, an expressive understanding of the relation between materiality and immateriality could help media studies to put the challenge of physical computing beyond a sterile dialectics of absence (disembodiment) and presence (embodiment). In this sense, practices of interaction do not take place on an egocentric field of human involvement and participation, that understands itself as the situated cause of its interpretations and acts. Rather, a theory of expression applied to physical computing relies upon an understanding of the materiality of computation as operating at many scales and degrees. Interaction itself, from this perspective, can be thought as complex agency between different levels of abstraction - a case of virtualization in its deepest acceptance, an ontological modality - rather than a technically generated set of events.

As yet, the diversified applications of physical computing have not yet been well investigated conceptually. Arguably in fact, physical computing is thought of mainly in terms of designing interactions for a user/agent confronted with a set of possibilities in between the human and the machine. Yet, I propose that according to a logic of expression, where things are thought in their being (for the act of thinking something is the same act that produces it), what is really at stake in physical computing is in fact the role of computation, of coding that exceeds discrete code and becomes heterogeneous and differential ‘processing’ between all the levels of its abstract notation and physical execution. Digital code is generally understood as the operation of information encrypted through a process of reduction to a binary division between two modalities, zeros and ones. But, if computers are structured on the model of human thinking – or at least, a certain representational model of it - what might happen when such thinking draws from a continuum of possibilities and intensities: namely what can the philosophy of expression believe a body to be?

Let us develop this question through an example - Maja Mataric's robotic architectures. In particular, here I consider her neurobiologically inspired models of how rats navigate their environments (Mataric 1991). The mobile robot progresses around a simple maze, detecting points of reference, which are registered as a combination of sensory inputs and current motion. As it moves through a narrow corridor, for instance, the robot stores spatial information as a mixture of forward motion and short lateral distance readings from sonar sensors. Whenever required to find its way back to a registered location, the machine retrieves the combination of sensory and motor readings by processing the stored map of the environment. The robot is immediately ready to act, since the motor inputs are part of the stored knowledge and the relation between two landmarks is directly encoded as the set of motor signals that moved the automaton from one to another.

Authors such as Andy Clark (1998) have cited Mataric's work as an example of epistemic agency and embodied interaction, as discussed previously. However, more than an action-oriented representation where information emerges as a statement about a subject in relation to its environment, of most interest here I see the opportunity for computation to be expressive actualization of an abstract, yet real, materiality. Computation has to be acted. Such an agency though, does not simply bridge physical navigation in material space with digital cognitive representation of it. Coding and the execution of the code are experienced in parallel – not via hierarchies of the abstract and the extended - but through a continuum of qualitative differentiation between levels of organization of the very same dynamic process. The computational processing has no existence outside its expression (the motion of the robot), yet it bears no resemblance to it. In other words, while the robot moves trying to solve the maze, we cannot distinguish between what is expressed (coding) and what it expresses (a bodily navigation). Agency, extension and thought operate on the same – experienceable – plane.

Of course, a theory of expressive physical computing does not want to dismiss the importance of thought relative to extension and action - on the contrary in fact. What it does devaluate is thought understood within the horizon of bodily subjectivity. Most importantly, it endows interactive aesthetics of a proper ontological framework in which entities on differential scales and levels of reflexivity and complexity are all treated in the same manner, not as formal essences, but as real interconnected and overlapping assemblages.

Let us consider another example, the Tangible Media Group at MIT, where in a ubicomp spirit , Hiroshi Ishii and his colleagues create seamless interfaces at the nexus of bits and atoms and develop ‘intelligent objects’ whose aim is to abolish the boundary separating the physical from the digital. Among their many ‘things that think’, for instance, metaDESK physically embodies the devices - such as windows, icons and handles - which have been metaphorically popularized by GUIs. In particular, *phicons* (Physical Icons) are instruments which are used on the surface of the metaDESK and which are sensed by an array of optical, mechanical, and electromagnetic sensors embedded within the table (Ullmer and Ishii 1997).
By giving a physical form to digital information and so enabling users to directly manipulate data, the insolvent place of the body is, according to this perspective, essentially resolved into the key question of how to turn computation into things. From a non-reductive point of view however, *phicons* can be seen as convertible modes of the same - to use a Deleuzian adjective – ‘intensive’ reality. ‘Difference’, in this sense, is not ‘diversity’ in a final equilibrium of material and immaterial parts. Rather, it is a self-differentiating process by which computation is not a representation of something, but spreads throughout the metaDESK as potential ways of being - of actual singularities. In a theory of expression things think not because we give a reasoning faculty to them by means of computing power. As we move them on the table, *phicons* think because their computational thought cannot be separated from their materiality; the physical medium in which it is instantiated and transduced. To paraphrase the McLuhan’s slogan, the ‘medium is the message’, yet this is not just because information is always transmitted within or between media but, above all and most importantly in my view, because computation operates at different degrees of abstraction, both as a mode of extension (the objects on the desk and their moving in the physical space) and as the idea of that mode (the processes of algorithmic encryption and execution).

To conclude, I believe that through an expressive theoretical framework, physical computing’s preposition to include the body in computation and interaction can be investigated not only as a technological promise but also as an applied philosophy and social practice of interactive ‘encounters’. When embodiment and computation are in a mutually dependant relation, meaning and content (namely the coding) are directly inseparable from agency, exceeding the strictly informational and digital context. Every computation processing, therefore, is the outcome of relations between elements in composition, bodies which think without loosing any materiality for their thought is already a material – an abstract yet real – experience.

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Grasping the untouchable: the externalization of virtually created entities

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This paper explores the convergence of the diagnostic imaging method of computed axial tomography with the additive manufacturing method of rapid prototyping. This occurs through the common use of the layer as an incremental slice through a spatial entity. Both technologies have key functions of relevance in the extension, augmentation and replacement of organs of the human body. Both have unlimited potential within the creative sphere of art and design. By locating these technologies within the subject of virtual reality I will demonstrate how their interrelated use generates a feedback loop from actual to virtual and from virtual back to actual. This feedback has a value in the understanding of how humans interact with virtual space and in determining what can be gained by this interaction.

Both of these technologies are isomorphic in that their functions are predicated on a progressive layer-based system. In the case of tomography, scans are made through a body or object, in a sequence of slices, which are then digitally assembled to form a virtual entity. In the case of rapid prototyping, a virtual entity may be translated into a physical object through the fixing of granular material in a sequence of layers. The isomorphic nature of the analytic and synthetic functions of these two technologies enables the potential for a flow of information from actual to virtual and vice versa. This flow is an agent in the symbiotic convergence of reality with virtual reality and is fundamental to the concept of the post-human.

The rapid prototype originates in a digital construct, which is re-interpreted as a sequence of slices of data. This data is transferred from the computer to the rapid prototype printer. The printer is a mechanical plotter which acts upon a powdered material by printing an adhesive onto it. [1] The layers of information are systematically printed across the x and y-axis and progressively extended into the z-axis. The accretion of powder layers results in the coalescence of a physical entity. This entity

[1] There are several different rapid prototype processes. For the purpose of this paper I describe powder binder printing.

is a simulation, bearing all of the detail of the digital construct, re-defined in a physical form. Virtual reality is a translation of the real into virtual. With the development of rapid prototyping we are now able to translate the virtual into the real.

Tomographic imaging enables the selective seeing through, or seeing into heterogeneous matter. It results from an axial analysis of material which separates slices of information into processible data. This data is ultimately transferred into the virtual computer environment where it may be re-assembled as a holistic virtual entity.

Both systems function respectively through layer based analysis and layer based synthesis, enabling the virtual de-materialization and the actual materialization of matter. Both are mediated, interpreted and prescribed digitally. Through their layer based isomorphism they provide an interface between virtual reality and reality. They provide a progressive and structured two-way translation between real and virtual space. The distinction between manufacturing from a virtual entity and visualizing the internal structure of matter is one of a flow in opposite directions. The origin of the one process is the culmination of the other. Both are facilitated through a flow of digital, algorithmic commands.

When in 1968, Douglas Engelbart enabled the display of computer images through the introduction of bitmapping, and enabled the user to directly manipulate the data space with the development of the mouse, he established the interactive potential of the computer as an extension of the human body (Paul 2003: 10). The Graphic User Interface (instigated by Engelbart and developed by Macintosh computers in the early 80's) effectively provided skin and bones to mathematical constructs and enabled the human comprehension of digital structure. Programming was no longer a blind activity. Encouraged by this interface, individuals were able to interact with and manipulate an 'end user product' without the need to engage with the mathematical and geometrical formulas that enabled the entire process to occur. Michael Heim claimed in *The Metaphysics of Virtual Reality* that 'Computer technology is so flexible and adaptable to our thought processes that we soon consider it less an external tool and more a second skin or mental prosthesis. Once acclimated to the technology, we play it much as a musician plays an instrument, identifying with it, and becoming one with it' (Heim 1993: 64).

Virtual reality is a programmed space derived from our understanding of reality. We

experience reality through sensory perception. Through our understanding of physical space we construct an analogical virtual space modelled on reality. We understand this space as one that we enter into, where we leave our bodies behind and somehow float freely outside of the material world. Yet our understanding of virtual space is not as ethereal as it is sometimes presented. We are very conscious of the body in virtual space, even though we are somehow supposed to have left it behind. In this case our sense of proprioception is key to the mind's continual engagement with the body. Vivian Sobchack describes proprioception as 'that sixth and grounding sense we have of ourselves as positioned and embodied in worldly space' (Sobchack 2004: 192). It is the coordination of nerves within the entire body devoted to maintaining track of our limbs from a purely internal perspective. A form of internal gyroscope, it locks our senses into coordination. It is the mind's sense of proprioception derived from its attachment to a responsive organism that facilitates our engagement with reality. This engagement is of equal importance when we enter virtual reality. Despite the immateriality of virtual space, our comprehension of it is aided by simulation. Virtual Reality is thus experienced within the mind, and is the result of an agent acting on the mind, facilitated by the computer and standard VR apparatus of head mounted display. The computer as mediator provides an interface between the mind and body and allows for an articulated separation. The mind is not freed of its proprioceptive function, indeed it must rely to a greater extent on its understanding of the body in order to function within a virtual environment. John Perry Barlow's description of virtual reality was that of a sense of disembodiment - on donning the headset he exclaimed - 'my everything has been amputated' (Rheingold 1992). While this experience is far from usual, it serves as a suitable descriptor for a perceived loss of humanism. Rather than experiencing the painful separation of mind from body, Barlow was in a trance like state in which his body accompanied him in its totality. His experience was, that the flow of visual information to which he was accustomed, had been interrupted and exchanged for another, a processed version of reality.

The visual passage through solid matter is enabled with the aid of the diagnostic scanning techniques of computed axial tomography which can effortlessly penetrate a solid body, entering into and passing through tissue, leaving no trace of passage. Computed tomography (CT) uses a fine point rotating x-ray, which identifies and renders separately the different densities of heterogeneous material in a three-dimensional field of shadow like forms. This information once interpreted by computer software may then be navigated as an interactive virtual space. Although

designed with observation as its primary function, data acquired by CT may be translated to a virtual structure that is fully mutable and will allow for intervention and modification. Once the point cloud of digital data has been reconfigured, its parameters can be altered. The demarcation of solids of various densities enables their isolation and treatment individually or as linked components within the whole entity. The precisely mapped surfaces are rendered as an array of nodes, each with the potential for universal repositioning. The interchangeable potential of these nodes, introduces mutability and the concept of evolution as a digital construct. The principal of predictive evolution now becomes feasible. Once change is mapped in sequence, blocks of information may be added or deleted, altering natural pathways of development. The process of change may consequently be accelerated or slowed down. Katherine Hayles in her book *How we became Posthuman* describes how information lost its body, how it came to be conceptualized as an entity, separate from the material forms in which it is thought to be embedded (Hayles 1999: 2). CT scan captures information from the body and transposes it to a space where it can form a separate entity. Suspended as an integral whole, information of this nature becomes a virtual cloning of the body. The animation of this cloned entity as a simulated human form, or avatar, is a logical step for which all of the technology is freely available. Michael Heim claims, 'both law and morality recognize the physical body as something of a fence, an absolute boundary, establishing and protecting our privacy' (Heim 1993: 100). In its virtual form the body (or surrogate) body becomes fully permeable, electronically portable, and ultimately unpossessable. It becomes freed from what William Gibson describes in his novel *Neuromancer* as 'the prison of flesh′ (Gibson 1995: 51).

The value of diagnostic imaging to medical science is limitless, but what of its value as an ontological tool? When data is acquired in this form it joins with the world of computer simulation where it can freely meld with other scanned or generated data. It joins the ever-expanding field of cyberspace and virtual reality. Elizabeth Grosz in the *Prosthetic Impulse* describes how 'culture can be understood as an extension, a protraction, and a projection of the interior of the body itself' (Groz 2003: 192). It is through culture that the body gives something back to the living world on which it feeds. The tomographic scan discloses the interior and presents it as an accessible space. It is through this access that the worlds of the real and virtual converge and become interchangeable.

Virtual modelling is a prerequisite for virtual reality. The structural delineations of void and solid, object and space must be defined parametrically within the virtual environment. Virtual modelling output through rapid prototyping is that 're-entry' moment, where what is developed in the outer space of virtual reality is enabled a return to within a real physical space. Within weightless and frictionless virtual space a platform is prepared for the development of new principals of geometric structure. Forms made under these circumstances will inevitably bear the characteristics of their free-form virtual genesis. However, structure without material is a new language, which despite its rapid development, immediacy and accessibility, is predicated on an existing understanding of physical structure. For as long as we spend most of our waking hours in reality, we will continue to translate our understanding of the physical world into the virtual world. The language of digital modelling will only emerge and develop a true cadence after the feed-back loop of virtual to actual and back to virtual, is well established. This loop is effectively completed with the introduction of rapid prototyping. Since the development of additive manufacture we may now encounter virtually constructed entities and interact with them physically. Objects, which contain the unique code of a virtual genesis, may be perceived and received in physical form. This encounter may be described as a haptic experience, as the non-physical and almost purely intellectual creation of form is paradigmatically translated into material.[2]

With the continual development of the full range of rapid prototype possibilities comes the potential for direct manufacture. However, in the case of a virtual to actual translation, the prototype fulfills its original function of providing a tangible product, a formal study for a design concept and an instantaneous manifestation of a digital construct. This manifestation has implications far beyond that of providing an interim understanding of a product designed for mass production.

Removed from the bounds of the material world, the generation of the object within virtual space frees the creative process from all physical constraints. Form is dictated purely by mathematical formula. Virtual software is programmed to provide all of the qualities of ductility and malleability that we understand from our physical interactions with material, with the addition of a fixable, elastic reality. In virtual space things literally stay where you put them – no matter where you put them. An essential aspect to virtual modelling is that conventional principals of structure are put on hold.

[2] Haptics is the science of applying tactile sensation to human interaction with computers. Webopedia.com

The qualities of gravity and resistance are temporally removed from the equation. The parametric co-ordinates of the digital model originate within *intensive* spatial qualities - properties that do not depend on the presence of matter, and are subsequently rendered in the *extensive* properties of weight, mass and volume (De Landa 2005: 24). Rapid prototyping provides extensive qualities to the intensive world of virtual reality. A paradigmatic shift takes place in the translation from virtual to actual. Rapid prototyping enables the unconditional externalization of these fluid forms, faithfully replacing the rendered digital construct with solid matter. Computed space, as a mathematical construct, provides a framework for both a virtual reality and the material replacement of this virtual reality. Points of light as seen on a computer screen, may now be systematically deposited as grains of material.

A key function of rapid prototyping is in providing a haptic understanding of the virtual entity. William Gibson coined the phrase 'data made flesh' (Gibson 1995: 26). Rapid prototyping converts data into material and enables the flesh to encounter data in its material form. The virtual entity is a genetic code in which the chain of component parts provides a language for translating a virtual entity into an actual one. The expression of this language is through the prototype printer acting on a substrate – resulting in the materialization of the entity. Each printed layer has a specific code or reference position within the printed object. Although cemented into a concrete whole, the object contains the codification of its making. It differs from the homogenaeity of moulded clay, cast metal or injected plastic in that its form is derived from a clearly deliniated and mapped interior organisation of layers. This codification puts virtual space back within our grasp and immediately feeds the cycle of haptic understanding. It is through the fabrication of the virtual entity and our encounters with this solidified code that we may become full acquainted with the creative potential of virtual space and we may finally grasp the untouchable.

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Cyborgs and the duality of perception and morality in performative interaction

Joan Healy

> Modern consciousness has been modified, people are trained through advertising and the corporate owned mass media to learn to be controlled and dominated. 'On-job control' involves deskilling the working class and turning them into robots doing repetitive tasks. The dominated class work so hard they don't have time to think about revolution. 'Off-job control' turns the dominated class into a passive consumer of superficial fashion and other forms of useless consumption as entertainment.
> Noam Chomsky (*Interview with Barry Pateman), Imperial Grand Strategy,* 2005.

In contemporary society we consume electronic products that reduce our physical labour and make menial chores fast and easy. From machines that are used to make communication easier, to ones that can clean our houses and wash our clothes. For some, the dream of a modernist utopia has been fulfilled. Those who can afford it are given freedom from physical labour and menial chores, and more time for leisurely pursuits. However, there is a dark side to our utopia. It is not just our machines that are used as slaves, but the people who are used to produce and dispose of them. Most people, ignorant of the suffering that belies the production of consumer goods, are either unaware or choose to be unaware of how their purchases support economies that are based on sweatshop labour and environmental destruction. If such injustices and human suffering caused due to the lack of workers rights were occurring on a local European level there would be outrage and condemnation. But not for the producers of cheap consumer products who live in the developing world. Why and how is there this moral double standard? Why are there merely small fringe groups that are aware of the inequalities and speak out against them?

I have done a number of performances such as *Cyberskin (2 stage transfer drawing),* where I try to use parts of my body to simulate the tasks of machines. My performances involve doing repetitive tasks, tasks that are very difficult for me and

intellectually unsatisfying, yet simple to the most rudimentary of computer drawing programmes. I try to draw parallels between my machine-like labour and the low paid labour jobs that employ so many people who make electronics equipment. By literally becoming a machine product, I make obvious the huge amount of human suffering involved in the production of such a trivial 'product'. The audience members become consumers and I make explicit their complicity in this suffering through their use of this human powered technology.

I was inspired by *The Turk,* an automaton by Baron Von Kempelen. Created in 1770, it was a chess playing 'machine' that toured Europe beating everyone it played at chess. It was finally revealed in the 1820's that the machine's housing contained a small man, a chess genius who pulled strings inside the box to manipulate the chess pieces. In my performances, I am also a person masquerading as a machine, but the difference in my performances is that I am in fact no match for the audience's expectations of me, and I fail at the only task I am meant to perform. In fact I put a huge amount of effort and suffering into creating something that doesn't work very well.

At the same time as I was developing the *Cyberskin,* I became very interested in the field of bio-mimetics, or animal tissue engineering such as the work done on the famous 'Earmouse' by Dr Charles Vacanti. I also noticed a trend in interaction design that placed a new emphasis on touch-screen interaction. As the main function of human skin is to sense physical touch, I decided to convert my back into a computer drawing pad interface. I conceptually combined the fields of bio-mimetics and touch-screen interaction design into the *Cyberskin* performance project creating a parody of them.

I wanted to challenge the ethics of the public in the face of using what I advertised as a 'cyborg', a 'living sensor' or 'artificial intelligence machine' using 'living human cell tissue '. So, I invented a fake history of its technological development, claiming it to have been engineered in a laboratory using 'synthetic biodegradable polymerscaffolds' and attached to a 'hybrid neuromechanical wiring system with 8-bit char matrix' etc etc ... In homage to Dr Charles Vacanti, I used his resume as inspiration to create my own scientific resume, portraying myself as a world renowned scientist in bio-engineering. I performed the piece in *Artbots 08* at the Science Gallery in the prestigious Trinity College in Dublin. I hoped that the *Cyberskin's* association with the university and its inclusion in an exhibition of other

actual robots would give the myth I had created more credibility and ability to spoof the public.

I constructed a costume that consists of a wooden housing painted silver to give it a machine aesthetic. On the back of the housing is a hole that reveals a rectangle of skin of my back. This is the ‘touchpad’. Inside with me is a laptop with a drawing program that I use to replicate what I feel drawn on my back and this is then displayed above on a monitor. Also included are four holes in the housing to show parts of my skin that were painted in black, red, green and blue colors, they are the 'buttons' for the public to press to choose colours to paint with. The piece was inspired by the performance piece of the same name, *2 Stage Transfer Drawing (advancing to a future state)* by Dennis Oppenheim, where, by playing drawing games on each other’s backs he investigates the sense of touch and the bond between father and daughter.

When I perform, the reaction from the crowd is diverse, with most people finding the work eccentric and funny, yet disturbing. Some people express compassion toward me and the uncomfortable position I am in. Others are fooled by the work, and think that my skin is artificial and mechanically connected to a computer screen. They are frustrated that the 'cyborg', (my reactions) are too slow and is not responding quickly enough to their commands. What was more interesting to me was that even though most of the visitors logically realized that the *Cyberskin* was a ‘fake’ and that there was a real person inside pretending to be a cyborgnetic machine, that actually there was still a mental disconnection in their perception of me. Visually, with only a rectangle of flesh showing, I was too abstracted from humanity for them to fully perceive me as a person. They would push on my skin harder and harder if I was too slow at replicating their drawings or at choosing a new colour. It was really interesting how there was a duality there, subconsciously they were expecting me to be as fast as a real computer, yet logically they knew that I was just a person in a box.

As Slavoj Zizek highlights in his book *Violence*, there are systemic class divisions that exist between rich and poor. These divisions exist on a global level and are perpetuated through unfair trade restrictions that benefit rich countries and multinational corporations. In Zizek’s eyes, the suffering that our consumption supports is a form of violence. It is ‘objective’, we perpetrate it from a distance and pretend it doesn’t exist because a reduction in the overproduction and consumption

of goods would damage the foundations of our capitalist economies and our wealth. In Darfur and Congo, wars are fought over natural resources where materials for electronics parts are mined. Millions of Chinese people subsist by working long hours on assembly lines making computer parts. However in Europe, the concepts of fairness and equality among all humans are part of the rhetoric that we believe are central to the ethics of our supposedly 'liberal' societies. But in reality, our economies and thus our societies, are actually built upon the neo-liberal colonisation of developing countries and the exploitation of their people in a modern day form or slavery.

There is a perceptual duality in our understanding of the people who produce the products we consume. As they are not a part of our lives and live too far away for us to ever be forced to encounter, we cannot relate to them as fellow humans. We never have to experience their suffering. They are the hidden cogs in the machines of society, a situation envisioned in Fritz Lang's visionary sci-fi epic *Metropolis*, where the working underclass remained in a hidden sublevel of human experience, existing purely to toil in the service of others. As I serve the public for 8 to 10 hours per day, the suffering I experience in my performances is a tiny gestural way to empathize with these workers and to provoke the consciences of those who participate in the consumption of me. The *Cyberskin* is an attempt to bridge the perceptual divide between our self-assumed innocence in what we do in our everyday lives, and the reality of exploitation indirectly associated with what we buy.

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Prostheses for Instincts

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Abstract

What if we had devices that induced emotions in a manner similar to instincts, but triggered by non-tangible stimuli? What if we used machines to act as prostheses for instincts we have not yet developed? With this project, I propose a scenario of transhumanity, in which machines induce human emotions, while exploring their aesthetics, functionalities and ethical aspects. This work builds upon a common theme in transhumanism - the augmentation of our natural sensory experiences and thus widening the spectrum of things that we can perceive.

Background

Instincts are embodied dispositions towards a specific behaviour. Instinctual actions consist of a set of reflexes, which result in changed physical and mental states. An instinctual jumping into action is a primary human experience that deeply effects our emotions. Our natural instincts have ensured our survival for the last 50,000 generations. (Goleman 1995) They are triggered by immediate outside stimuli such as predatory animals or dangerous substances like rotting food, faeces, or carcasses. Such threats signalled the possibility of a swift death for early humans.

With the help of technology we have managed to create a highly industrialised environment that grants our survival without needing to rely on our instincts. Now we hardly find ourselves hunted for food (Adler et al., 1998). We ourselves do not even need to hunt animals for a meal. We have facilities to supply us with food, when we need it. We can refrigerate what we want to eat.

Our basic needs of survival are cared for by a complex system of services and supply chains. Our prosperity is directed by the highly abstract dynamics of a global

market. Our social status is progressively measured with new forms of social currency situated within networked realities and our interpersonal relations evolve to a technologically mediated habit of deferred communication.

Societal processes that once were immediate and tangible, have become deferred and enigmatic. We can observe that trade, communication and social dynamics have evolved into data streams. This data is intangible and totally separated from our physical selves. As a result, some of our instincts weakened, others deadened and those that remain are redirected to unrewarded activities. We infer that our hardwired emotional infrastructure is practically incompatible with the current forms of deferred social organisation, interpersonal interaction and economic realities.

Idea

How can we retrieve the instinctual abilities of pre-societal humanity and how can these instincts be mapped on today's complex environment? How can we gain a set of instincts that are engineered to fit today's needs?

We need to make use of technology to connect our bodies to the abstract data that surround us. We need machines that give us the ability to react to data in the same manner we once reacted to immediate dangers. We need machines to help us experience the same emotional intensity with data events that we had with tangible threatening events.

Prostheses for Instincts

The term 'prostheses' is used here in the sense of 'addition' or 'extension' of the body, rather than referring to a purely medical understanding of the prosthesis as a 'replacement' (Smith and Morra 2005). *Prostheses for Instincts* are wearable devices that allow us to instinctively respond to the data that has a huge impact on our personal wellbeing and reputation. A wireless connection binds the devices to a specific data stream. This can be real time information linked to one's own stock portfolio, a home country's currency rate and national debt, oil and gas prices, mortgage rates etc. down to one's own status and credibility in social networks. This stream's abstract signals are parsed and analysed and eventually translated into physical stimuli upon wearer's skin.

Referring to the concept of 'body to emotion feedback', which postulates that our bodily state can directly influence particular emotions we feel, we hypothesize that the strategic use of physical sensations will induce specific emotional states (Kok et al., 2008, Ekmann 1992). The devices induce a form of peripheral feedback (Kok et al., 2008) through different actuators on different locations on the skin. As with natural instincts, experience of the world is one teeming with palpable emotion-inducing sensation. Delivering such a tactile experience in connection to data, these devices take the role of an artificial instinct that we are lacking.

Aesthetic questions

Zooming in on the design aspects of this project, we can see a set of questions arising that ask for investigation. These questions are not exclusively related to the devices' practical application. Yet, it is vital in creating a functional prototype to explore how these devices will be attached to the body and what kind of materials are suitable for direct contact with the skin; we are much more interested to investigate the aesthetic questions arising from a critical design perspective (Sengers 2005) (Figure 1). We want to explore to which extent the idea of the prostheses should be reflected in the form giving.

Medical prostheses in general strive to be invisible. Can Prostheses for Instincts instead - aim to have a prominent form? If so, would their meaning be altered into a statement for transhumanity rather than being simply functional devices? Which aspects of the body's organic properties should Prostheses for Instincts borrow? What would change for the wearer if they are openly exposed to a public audience?

Figure 1. Exploring aesthetic qualities of *Prostheses for Instincts*

Applications

The theme of Prostheses for Instincts creates a framework that allows for a variety of potential applications. In the following section some of these will be introduced and explained.

The first application of Prostheses for Instincts is a device intended to create cold shivers, goose bumps, raised neck hair - to elicit the state of alertness and the emotion of fear. Fear in this context should not be mistaken as an unnecessary inhibiting and 'negative' emotion. Seen from a biological or behavioural perspective, fear is an important component of our built-in defence system to deal with immediate and anticipated dangers. Fear is probably the most researched of all human emotions (Ekmann 2003). It sharpens our senses, lifts us to state of increased alertness, focuses our attention and gets us 'ready for action' in the face of an immediate threat (Misslin 2003). To elicit a feeling of discomfort and fear, a combination of haptic (vibrating) and thermal (cold) stimulation is applied onto the skin. This uncomfortable sensation is then distributed across the surface of the skin as 'phantom sensation.' To create this effect, a set of points on the body gets successively stimulated, following a predefined pattern. The wearer now not only perceives cold taps, but a sensation of being touched by a 'ghostly' finger or small animals running on his body (Geldard 1972).

Other potential applications would be devices to address an instinct of domination and submission. Those prostheses are a take on the concept of a virtual currency based on personal reputation (Doctorow 2003) as we can see it emerging in online communities. The idea is to take one's virtual reputation back to the physical world and the body. One variety of prosthesis would place the wearer within the social hierarchy by stooping (Riskin 1984). Depending on his or her social reputation, a device in form of an exoskeleton could constrain or free posture. Another application could be that of a 'social radar.' Supplying the wearer with up-to-date social rank information of peers, this prosthesis helps to detect the 'alpha person' in a group of strangers. Both applications amplify our fears about egoism as it is measured through social networking services but also the familiar desire for and prohibition from eavesdropping.

Discussion

A transhuman future in which people make use of Prostheses for Instincts raises a number of ethical questions about their advantages and dangers. While our natural instincts are triggered by tangible stimuli and received as a signal in the amygdala, the 'non-thinking' emotional centre of the brain (Misslin 2003), wearing a Prosthesis for Instincts follows a conscious decision; we would be given the possibility to choose

what kind of scenario we want to sense or emotionally experience. This would mean we could make much more rational use of our instincts. On the other hand, the stream of data fed into the device to create the automated stimulations could potentially be filtered, censored or fed with fraudulent information. Using technology to elicit emotions in a large group of people and thus creating a situation of collectivised feelings, opens a doorway to mass manipulation, which is a very powerful and potentially dangerous political tool. And finally - what if emotion gets automated and mediated by devices, what does it mean to be emotionally ill in a transhuman world?

Conclusion

This project is an experiment trying to merge an artistic concept with a design approach and scientific research. It started life as a graduation project in the Design Interactions course at the Royal College of Art and was taken to this stage during a research stay at the Meta Perception Group of University of Tokyo's Department of Creative Informatics in summer 2009.

One of the goals of this project is to encourage a debate about our status as human beings in a society that is highly driven by on interdependent abstract streams of data. Yet, we don't want Prostheses for Instincts to be limited to playing the roles of protagonists in a design story (Sengers 2005) with the intention to engage a public audience. This project's aim goes further by developing functional technological methods through which wearable devices interact with human bodies. On our way home to instinctual life, we seek to find a new more revealing relationship to worn prosthetics.

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Shin'm (身.音): reshaping the perceived body with sound

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1 Background

In the following paper, I am going to discuss *Shin'm*, which is a media art project where I create an immersive perceptual experience of bodily transformation of the performer and participants. This interdisciplinary project is a hybrid artwork using interactive video, spatial sound, wearable installation and performance. *Shin'm* is the expansion and evolution of several art projects that have explored the seamless integration between art and innovative techniques. The techniques include: ambisonic spatial sound, ultrasonic directional sound projection, wearable technology, video projection, motion detection, interactive visualization and Butoh dance imagery techniques.

In the relatively short history of interdisciplinary art[1] using digital media, media artists have struggled to create high quality hybridizations. Overcoming the rough tangling of experimental practices is a great challenge. Within this project, I propose that *Shin'm* suggests a new level of interdisciplinary art that finely weaves together all the elements necessary to construct this project: forms, techniques, space and participants. In the following description, I will highlight projects leading up to *Shin'm*, the main concepts and its vision.

First, I will briefly describe my four recent projects that have directly influenced *Shin'm*:

[1] It is used as a general term describing an artwork applying and integrating multiple disciplines. I reserve this discussion about the definition of interdisciplinary, transdisciplinary, multidisciplinary and hybrid art at this point.

1.1. *SeoNang* (Figure 1)

SeoNang[2] is an international telematic project between Seattle (USA) and Seoul (Korea). It consists of two interactive interfaces changing its sound and visualization in response to the participant's movement. Participants meet in the virtual space and collectively change the shape of the virtual membrane (space between two virtual presences).

1.2. *Entanglement* (Figure 2)

Entanglement[3] is a telematic sound installation interacting with participants in the sound space that is constructed by three-dimensional sound techniques. Directional sound technology draws a fragile acoustic line in the middle of a room. The room is completely dark. The audience perceives the space through their aural experience, which is designed with spatial sound technology. The participant's body disturbs the acoustic line and when the line is broken the particles spread into the sound space. The participants' bodies reshape the sound space interactively, changing the form.

1.3. *Metamorphosis* (Figure 3)

Metamorphosis[4] is a site-specific video installation with ambisonic sound and powder screen (consisting of sugar and salt) on the floor. The video body on the powder screen in the centre transforms into sound, spinning around the space that embraces the audience.

1.4. *PuPaa* (Figure 4)

PuPaa[5] is a multimedia performance inspired by Butoh. Dancers wear various technologies embedded in costumes which I consider an outer layer of their body, and integrate themselves as well as the audience. Incorporeal connections of the images and sounds along with the corporeal presence of the dancers and digital devices, create a collective body - as if they are living in obligatory symbiosis.

[2] In collaboration with Wesley Smith, Rama Hoetzlien and Graham Wakefield, 2005
[3] In collaboration with Juan Pampin and Joel S Kollin, 2008
[4] 2008
[5] In collaboration with Diana Garcia-Snyder, Bo Choi, Donald Craig and dancer collaborators, 2008

Figure 1[6]

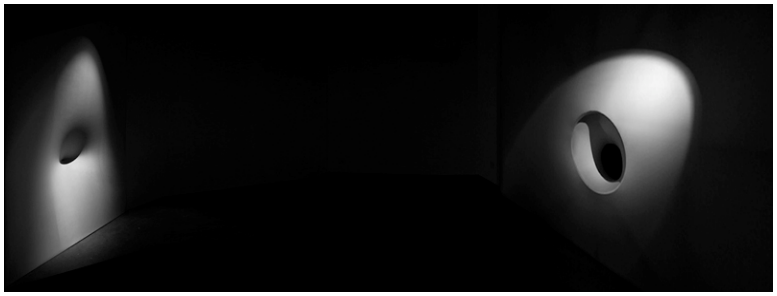

Figure 2[7]

Figure 3[8]

Figure 4[9]

2 Concepts

2.1. Body and sound

Shin'm has two layered meanings in Korean. As a word *Shin-um* means moaning and groaning, which I believe to be natural and un-manipulated sounds directly from the body, like sounds of growth. *Shin* as an individual word means the body and *Um* means sound. *Shin'm* thus expresses its multi-layered concept; it is a hybridization of body, technology, and space towards the posthuman.

2.2. Body metamorphosis and posthuman

As our body is extended with new media technologies, it transforms into a kind of posthuman: a convergence of the biological body, mechanical augmentations, and vast networks. Since the late '60's, performance has rapidly engaged with video and media art. Nam Jun Paik's *TV Bra for Living Sculpture* depicts a body presented through the hybrid language of performance, music, and two TVs attached to the

[6] *SeoNang*: two participants in Seattle and Seoul are visualized in the virtual space. They move their body and change the shape of membrane between them.
[7] *Entanglement*: Once the participants' eyes are adjusted to the darkness, they see two hole-like structures indicating each ends of the acoustic line in the room.
[8] *Metamorphosis*: the human-like body in the video projection is becoming a spiral shape mass in transition to sound.
[9] *PuPaa*: the dancer embedding a video projector is moving to the center of the stage at the beginning of PuPaa.

body. In the 1990's, fake body parts sometimes replaced the human body, as seen in Matthew Barney and Cindy Sherman's works. Recently, several media artists has posed a cyborg or posthuman body; Lynn Hershmann and Stelarc have attempted to extend their own bodies into cyberspace using robotics, biology, and computer science technologies. These works, while seminal, are limited in the extent to which the audience can experience a posthuman transformation in the first person perspective. There are also numerous interactive visuals on screens following human movements and shapes. However, they are generally not executed in an artistic context. *Shin'm* proposes an artwork illuminating our posthuman body, and at the same time, offers the audience participation, with its immersive design and its unique use of sound that draws and transforms body shapes.

Figure 5. Concept images of the dancer's body extension in the space

3 Project Vision

Hybridization and transformation can be found in every part and process of this project. *Shin'm* begins as a dance performance. A dancer, in the centre of the room, wears augmented sleeves. These sleeves track movements and generate dynamic sound. Here the sound represents her body's shape. As she moves her limbs, her sound travels through the space as if her body has been stretched in that direction. Her sound-body continually stretches and changes its shape as she dances. Eventually, a web-like trace of her sound-body remains. After this performance, *Shin'm* transforms into an interactive installation. The audience appreciates this performance and also it's sound-afterimage which the dancer left in the room. The audience can then alter their identity into that of a participant. The sleeves installed in the centre of the room remain hanging in the space - suspended from the ceiling. A participant wears the sleeves and experiences body metamorphosis, as the dancer

did. Their participation reshapes the sound-afterimage and it accumulates over the period of the exhibition. Here once more, their identity transforms into that of a collaborator, collectively creating an accumulated sound-body trace by the end of the show.

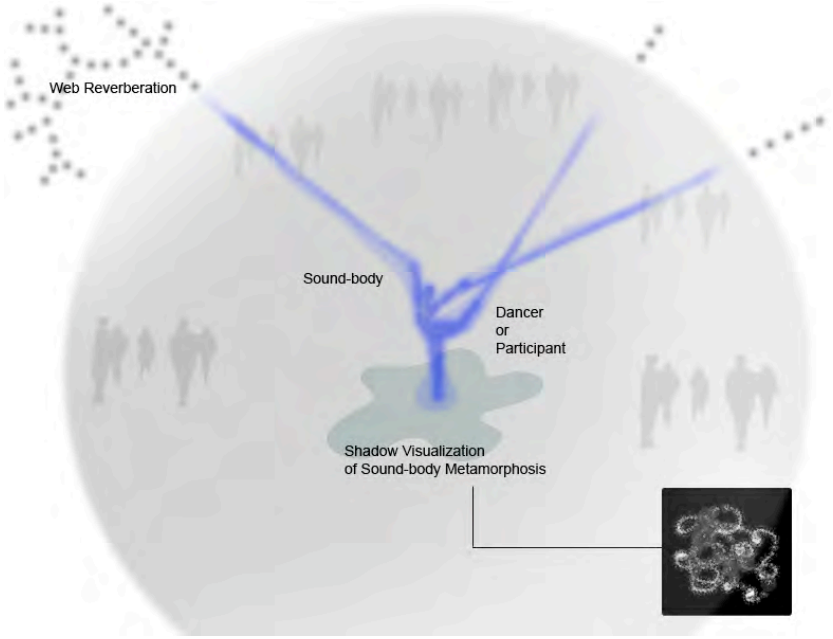

Figure 6. The performer's sound-body traveling through the space. The audience surrounds the performer. The image at the right bottom box shows a test run of motion detection visualization.

4 Technologies and installation scheme

One of the most original and innovative techniques in *Shin'm* is the directional sound projection apparatus. The Ultrasound Research Group in DXARTS, including myself has been developing its base technique. This technique allows the creation of any desired size of speaker to project a highly directional sound beam. The other advanced sound technique is ambisonics, which creates sound movement anywhere in three-dimensional space. In *Shin'm*, these two technologies are integrated to create a perceptually convincing sound movement. The sound moves from the dancer's body to the edge of the space through the audience. The wearable design of the sound apparatus enhances the illusion of the sound-body and allows for anyone to experience an active role in shaping the sound-body. Simultaneously, interactive visuals using computational languages project a 'shadow' of the sound-body on the floor.

The choreography draws on Butoh[10] dance techniques, such as transformations through internal and external states. As my future research, this body extension will reach out over the walls and travel through the web using telematic technologies. In the telematic version, when the sound-body returns to the room 'web reverberations' of the sound supplements the sound-afterimage in the room.

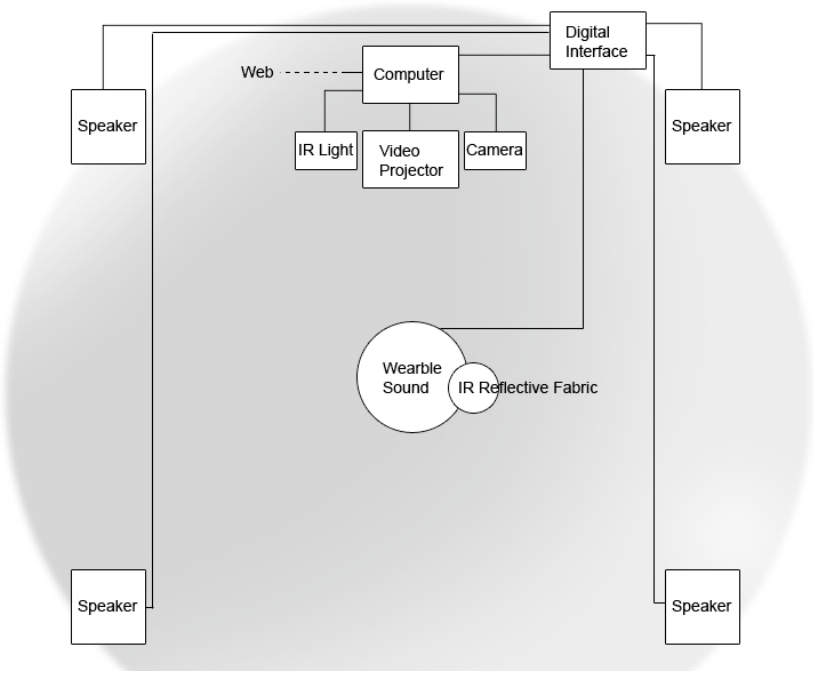

Figure 7. Installation Scheme 1

5 Final Notes

Shin'm is an ongoing project. Its complexity develops through iterations. For the first iteration, I will emphasize visual interaction using camera vision detection and the first model of sleeves, which is a physical interface for audiovisual interaction (July 2009). The primary element of this project is spatial sound that gives the illusion of limb extension. This part has been developed and will be elaborated to achieve an aural experience where the participant is immersed. Through several exhibitions in 2009 and early 2010, I aim to complete the first alpha version of *Shin'm* without the web reverberation element. In the final form, *Shin'm* will generate a perceptual embodiment of posthuman body extending our limbs over its biological limitation and transfusing into the web.

[10] Specifically speaking, it is *Butoh Ritual Mexicano* that my performer collaborator Diana Garcia-Snyder contributes.

Postbiology between protocol and manifest: portraiture of a passing specie

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Philosophy and art increasingly reflect upon the emergent forms of life, society and politics created in the biotech laboratories and further developed and tested across the biotech industry. These translations of scientific protocols into philosophical tractates (Donna Haraway, Hannah Louise Landecker, Nikolas Rose, Aihwa Ong, Catherine Waldby, etc.) or even art manifests (Symbiotica, Marta de Menezes, Eduardo Kac, Adam Zaretsky, etc.) express our expectations and fears vis-à-vis the newly discovered and created entities. Custom made bacteria, artificial DNA, viral quasispecies, various transgenic, chimeric, synthetic and copyrighted organisms challenge our anthropocentric presumptions, notions of life, evolution and nature - but also normative ideals related to our ethics, society and politics. They transform the common world into a postbiological arena in which the organic and the nonorganic, the natural and the constructed, human and nonhuman, physics and techné, mix, play and blend.

This emerging postbiological arena articulated by various scholars and artists expands the ambiguities of a society and politics immersed in science and technology which are present in the concepts such as technological society, information society, network society, post-industrial society, service society, globalised society, transnational empires, etc. Do such reflections change our view of what a society is today or do they re-evaluate the meaning of science and technology? What does the emphasis on technology or biotechnology bring to the social, political and economic interpretations and how do social sciences, politics or art improve our understanding of the biotechnological revolution? How do we reconcile the challenges of every new discovery and innovation with the demands placed on us by the principle of justice, ideals of good life, aesthetic judgement on beauty or some other value? How do we accommodate scientific facts discovered in the laboratories with the norms and rules created by our institutions and traditions?

What is the function of art in this interactions between biology, technology and politics?

On one side bioart complies with the more conservative response to these questions given by different philosophers of biopolitics, and on the other side bioart is becoming something of a 'portraiture of a passing specie' developing postbiological and posthuman perspectives of our future. From the biopolitical perspective (Michel Foucault, Giorgio Agamben, Francis Fukuyama, Roberto Esposito) we are facing the end of history and depolitisation of human societies in which politics is simply replaced by management of the biological life. This management looses any historico-political aspirations and attention is given only to the physical fitness and other reductionist views of what it means to be human: 'Genome, global economy, and humanitarian ideology are the three united faces of this process in which posthistorical humanity seems to take his own physiology as its last, impolitical mandate' (Agamben 77) . The postbiological and posthuman perspective (Bruno Latour, Donna Haraway, Deleuze and Guattari) emphasis is not only the future but also a critique of the narrow view of politics and history. It emphasizes not only a new relation between the social, human and the natural and technological, non human, but more importantly works with a different relation between the material and semiotic and opens new set of ontological questions that are often inspired by science, for example by some radical biological theories like symbiogenesis by Luis Margulis.

While the philosophers are writing the bestiary for the 21st century, the artists are developing an art of portraiture of a passing specie and cooperate with different biotech entities to create sculptures from tissues, do performances with DNA, make installations from biotopes and use media displays made from bacteria. In a similar fashion where the Middle Age’s bestiaries were describing and defining our relation to the unknown, to the transgressive and monstrous, various art projects and philosophical essays are also searching for new models of a common world. Posthuman and biopolitical philosophy and bioart function basically as probes into the emergent forms of global collectives and hybrid identities of the biotech age. Rather than teleology, they bring forward the dynamic and heterogeneous agency of the material world.

The posthuman and the postbiological condition that they define, replaces the aesthetic and moral values of beauty, integrity and unity with expressiveness and

hybridity. Our world is a stage and arena in which we do not strive for perfection but for constant change and for new types of connections and networks to appear. While science protocols and experiments may bring more lasting networks between different agents, artistic performances and philosophical theses create often new and unimaginable combinations to help us grasp our postbiological future. They help us face the challenges of the biotech age and its new forms of symbioses between the organic and the inorganic world, between technology and society. They try to develop the normative concepts that are already involved in the relations between the globalization, evolutionary and technological processes today.

For many centuries, only philosophers dared to question the limits of our thinking and matter, to investigate the ultimate nature of our being and our world and to seek what constitutes reality. The traditional branches of philosophy - cosmology and ontology - go back to the pre-Socratic thinkers and culminate in the Middle Age philosophy, after which they start to transgress into new disciplines during the modern period of Rationalism and Empiricism. After the 17th century, the questions of metaphysics ceased to be the ultimate object of study for the human mind which took interest in more 'worldly' issues. We could view this as the demise of metaphysics and a beginning of the division of sciences and competences leading us to the present day loss of appreciation for philosophy and humanities. However, this view does not do justice to the fact that by the end of 20th century the metaphysical questions are not only back, but they are increasing in numbers and urgency with disciplines such as, theoretical physics, astrophysics, biotechnology and nanotechnology. Not only are the limits of our thinking and matter still in stake, but also the limits of what we consider human and even organic life arise.

The questions about the limits of our thinking and matter, and also, the limits of what constitute society never actually disappeared completely, but transgressed into experiments of science and technology involving the metaphysical pursuit, not only of human minds but also machines and different instruments that supposedly give us better answers to all our questions. Since the 17th century the instruments of science and technology, different protocols and machines, are the true instruments of metaphysics - creating ever more intimate bounds with our minds. The machines are simply taking the traditional role of the philosophers, or rather, joining the philosophers and challenging the notions of life, community, reality, meaning and truth. They do this not only by confronting us with radical ideas about what is life and reality, but also by literally transforming our world with new discoveries and

technologies. They create, discover and bring new entities to the world and society and force us to reconsider our institutions, culture, literacy and forms of life. These new entities discovered by science or created by technology appear in our world with increasing pace and inhabit an environment, society, legal system and culture which are trying to absorb them and get used to them.

We live at a time when different particle accelerators, colliders, supercomputers and grids investigate the limits of our physical microworld and test our limits of processing data and understanding reality. Those are the true metaphysicians of our time - simulating conditions almost unthinkable by human minds - and constructing theories and experimenting with the frontiers of matter. We live at a time when different models of computer networks from WWW to P2P networks and different forms of distributed and cloud computing create not only new businesses and economy but also new legal issues, new social dynamics, new regulatory bodies, institutions and a whole new politics. We live at a time when biotechnology creates hybrid and hard to define forms of life which turn our world into an almost postbiological arena and circus. The task of categorizing these new types of beings and defining their rights and relations to the rest of the planet and the universe is still ahead of us.

Bioarts and philosophers dare to ask the dangerous question about the status and the role of humans in this world where different machines and science discoveries constantly transform beyond the limits of our understanding and control. All human activities like business, politics and culture are intrinsically connected to different technologies, not to speak of our health and reproduction issues and even death - unthinkable outside the context of different sociotechnical institutions and practices which we call medicine. Even the most idle and useless of human activities - metaphysics - is taken over by particle accelerators. Is there any space or activity which is still purely human and which would help us define something like a human condition in the technologically and scientifically enhanced world? Are science and technology still signs of human dignity, greatness and intelligence or do they mark our decline and end? How do we resist the anthropocentric bias implicated in these questions and should we rather try to define something like a posthuman condition in the age of science and technology which includes not only humans but also our new 'worldmates or as Donna Haraway calls them 'messmates'?

How do we connect or divide political issues of justice, from biological issues of evolution and technological issues of innovation? How are the natural processes of

evolution, the social processes of globalization and the general processes of negentropy in the universe linked together? We need to learn how to live together with our constantly transforming machines and new entities discovered by science and create new communities. We need to formulate new normative ideals and also pose new questions about our common future. Philosophy and art are simply probes into the new forms of interactions and networks between society, nature and technology. The emergent and hybrid effects of these misalliances force us to constantly reconsider and adapt our views of the society, evolution, nature but also philosophy and art. The only thing that remains constant in these processes is the critique of anthropocentrism and the search for new normative ideals. How can we formulate a normative ideal for a world in which new entities discovered by science and created by technology serve not only humans? They form their own new systems and even ecologies which are as complex as society and nature and which we cannot label as human constructions nor natural facts.

The results of these connections, interactions and misalliances between natural, social and all other systems create a hybrid and evolving unit that does not revolve around the humans and which can be describes as a postbiological arena. Does society still consist only of humans and is it still formed only by human relations? Do organisms consist only of organic matter, or are there other life forms? To understand the dynamic state of these complex and hybrid networks we need to develop new normative concepts that will surpass the limitations of anthropocentrism. This will bring greater sensitivity to complex and hybrid interactions, and anomalies that create new collectives and new versions of the 'common' corpus. Since we cannot know in advance what the form of this newly formed 'us' will be, we can only experiment. From the biological point of view, all multicellular organisms are actually hybrid communities of bacteria and different organisms rather than a well defined unity. A very interesting response to the whole issue of the relation between parts and a whole, cells and organisms, comes from Daniel Dennett (1994) and his provocative question which we can find in many of his works: 'Am I an organism, or a community, or both? I am both - and more.' What is this 'more' that resists any reduction? Do individuals and humans create a new body, or are we are simply a collective of bodies that cannot be subsumed under some superorganism? Can we answer at all to such a question at a time when it is ever more difficult to mark the boundaries of a unity and define what a part is and what a whole is? Daniel Dennett believes we can, so he brings this very interesting description of human agency which saves us from the faith in some superorganism:

> We, unlike the cells that compose us, are not on ballistic trajectories; we are guided missiles, capable of altering course at any point, abandoning goals, switching allegiances, forming cabals and then betraying them, and so forth. For us, it is always decision time, and no consideration is alien to us, or a foregone conclusion. For this reason, we are constantly faced with social opportunities and dilemmas of the sort for which game theory provides the playing field and the rules of engagement. (Dennett 1994)

We have to hope that the agencies of other actors in our world are less militant than ours. It does not mean however they are nonexistent, or that they are simple and easily controllable. The posthuman condition is not a state or some definitive equilibrium, but only a constant experiment and search for new forms of networks between different and new entities in our universe. The simple rule is to accept all entities and actors as partners rather then labelling them as monsters and enemies or even slaves: no hierarchy and no divisions only an endless play of networks and new collectives which include more and more foreigners, parasites and other hard to define actors. The portraiture of a passing specie means also an appreciation of the hybrid and symbiotic forms and connections between humans and machines, politics and technology that we are witnessing. The imperfections and incompleteness of this complex and dynamic system are the rule rather than exception.

The universe does not start nor does it end with humans and to understand this we do not need any transcendental reason. In such a cosmopolitical universe we cannot have a universal law and goal but only processual and tactical decision making that changes in every concrete situation. The normative ideal of the cosmopolitical and posthuman order is a processual one. The goal is not to act according to the maxim of one's agency which can become a universal law for that agency. The cosmopolitical ideal is to act so that every situation stays unique and an unrepeatable chance for new decisions and negotiations between new and different agencies and actors

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Material beliefs - designing speculatively with biotechnology for public engagement

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Introduction

Material Beliefs was a two-year interdisciplinary project funded by the Engineering and Physical Science Research Council[1]. It aimed to take 'emerging biomedical and cybernetic technology out of labs and into public spaces'[2]. The project provided access to technologies that will offer new configurations of bodies and materials: How can design stimulate a discussion about the value of these new forms of hybridity?

Rather than focusing on the *outcomes* of bioengineering research, Material Beliefs approached research as an unfinished and ongoing set of practices, happening in laboratories and separate from public spaces. The aim is to make labs permeable, so that non-specialists could consider the research. With this in mind, labs were opened up as sites for collaboration between scientists and engineers, designers, and members of the public.

Alongside the everyday business of the lab, which might include submitting funding proposals, conducting experiments and gathering data, and then writing and publishing academic papers, the collaborations produced a parallel set of proceedings captured through drawings, photographs, films and discussions. This led to the design of speculative prototypes, which transformed the parallel activity into something tangible. These prototypes were exhibited, reconfiguring emerging laboratory research into a platform that encouraged a debate about the relationship between science and society.

[1] EPSRC grant details of Material Beliefs are online at http://gow.epsrc.ac.uk/ViewGrant.aspx?GrantRef=EP/E035051/1
[2] See http://www.materialbeliefs.com for a full description of the project

This paper opens with some description of the lab as a site for collaboration between design and engineering, then moves onto some examples of outcomes, and finally expands upon some strategies for opening up these activities to the public.

Designing in labs

Material Imaginations was a proposal for funding to the ESRC by Robert Doubleday, Mark Welland, James Wilsdon and Brian Wynne. Their proposal followed on from a project described in a DEMOS report, 'See Through Science'[3]. Here Doubleday set up an ethnographic project in Welland's Nanotechnology lab, the aim being to work with scientists to imagine the social outcomes of their nanotechnology research. Doubleday describes, 'My role is to help imagine what the social dimensions might be, even though the eventual applications of the science aren't yet clear[4]. Material Beliefs echoes the title of this proposal, and considers the role for *design* as a set of speculative tools for working with scientists and engineers.

Design practice is not exclusively about making products out of technology. There is room for interrogation of its methods and aims, and an examination of the social relations that are intrinsically linked to the use of the material outcomes of design. The Interaction Research Studio at Goldsmiths emphasises that designed artefacts are subject to interpretation[5] and discusses the use of ambiguity rather than usability as a resource for design[6]. The Design Interactions course at the Royal College of Art supports pedagogy and research that develops a range of practices described as critical design[7].

These activities represent an extended role for design, and before discussing how this type of design might make links with laboratory research, it is important to mention creative practices that have established relationships with labs. SymbioticA in Perth hosts and trains researchers and practitioners, equipping artists with the skills to develop 'wet biology practices in a biological science department'[8].

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[3] Wilsdon, J. and Willis, R. *See-through science : why public engagement needs to move upstream*. London, Demos, 2004.
[4] Ibid.
[5] Phoebe, S. and Bill, G. "Staying open to interpretation: engaging multiple meanings in design and evaluation." *Proceedings of the 6th conference on Designing Interactive systems*. University Park, PA, USA, ACM. 2006.
[6] William, W. G., B. Jacob, et al. (2003). "Ambiguity as a resource for design." *Proceedings of the SIGCHI conference on Human factors in computing systems*. Ft. Lauderdale, Florida, USA, ACM.
[7] Dunne, A. *Hertzian tales : electronic products, aesthetic experience, and critical design*. Cambridge, Mass. ; London, MIT, 2005.
[8] Quote from SymbioticA site at http://www.symbiotica.uwa.edu.au/welcome/about_us

SymbioticA has developed a range of activities that include residencies, an MA programme and postgraduate research, all emphasising artistic enquiry. Also of note is Critical Art Ensemble, a collective of artists who work in partnership with local venues to provide programmes including workshops and seminars, providing resources for participants to work directly with biotechnology[9]. A third example here is Arts Catalyst, a UK organisation, again offering access for artists to participate in science and technology processes, including biotechnology[10].

Developing these contexts, the Material Beliefs projects had their home in the lab, and lead to speculative designs that were not intended for manufacture. Design processes were employed, and led to the fabrication of prototypes. The prototypes adopted the formal qualities of a product, yet were not products. Designing a product has different demands, including time spent specifying materials (because unit cost is important), exploiting intellectual property opportunities, and talking to distributors. Rather than deploying prototypes as a halfway point leading to product innovation, the projects described here emphasise interplay between the prototypes and statements about social life.

Figure 1. Testing a blood pressure implant at the Institute of Biomedical Engineering

Figure 2. A discussion about prototype designs at Reading University, from a film by Steve Jackman

In order to set up an instrument that allows this to happen, there was an attempt to make speculative design's association with science and technology more embedded.

[9] Critical Art Ensemble are participating in the forthcoming ” Interactivos?'09: Garage Science” in partnership with Milan based Medialab-Prado

[10] Arts Catalyst’s curatorial programme started in 1993, a full list is available at the Arts Catylst website - http://www.artscatalyst.org/projects/archive/archive_events.html

The project takes influence from Doubleday's[11] - and previously Bruno Latour's and Steve Woolgars[12]- encampment in labs. While these sociological associations with labs provide accounts of science in the making, Material Beliefs is characterised by an attempt to have an impact on the lab environment and produce material outcomes. When speculative design and science and technology get located at the site of laboratory research a contingent and overlapping practice develops.

Examples of speculative design

Material Beliefs was scattered across different sites. It was administered at Goldsmiths, University of London, and supported at that site by the Interaction Research Studio and a design workshop. At the Royal College of Art, RapidForm is a rapid prototyping shop and the Design Interactions provides a studio. Key laboratory sites include the Institute of Biomedical Engineering at Imperial College, Cybernetics and Pharmacy at Reading University, and the Institute of Ophthalmology at University Collage London. Project activities are based at the most appropriate site, and in some cases need to be run across multiple sites at the same time.

Neuroscope

Noteworthy here is Neuroscope. Responding to research at the University of Reading[13], Neuroscope provides an interface for a user to interact with a culture of brain cells, which are cared for in a distant laboratory. An interface allows the virtual cells to be ‘touched’, resulting in electrical signals sent to the actual neurons in the laboratory. The cells then respond with changes in activity that may result in the formation of new connections. The user experiences this visually in real time, enabling interaction between the user and cell culture as part of a closed loop of interaction.

At a key stage in the development of Neuroscope, Elio Caccavale was designing the artifact and producing CAD models which were then fabricated using an Object rapid prototyping machine, while David Muth was writing a visual client application to link

[11] Wilsdon, J. and R. Willis, R. *See-through science : why public engagement needs to move upstream.* London, Demos, 2004.
[12] Latour, B. and Woolgar, S. *Laboratory life : the social construction of scientific facts.* Beverly Hills; London, Sage Publications, 1979.
[13] D. Xydas, D. Norcott, K. Warwick, B. Whalley, S. Nasuto, V. Becerra, M. Hammond, J. Downes, and S. Marshall, "Architecture for Neuronal Cell Control of a Mobile Robot", *Springer Tracts in Advanced Robotics*, vol. 44, 2008: 23-31.

the prototype to server software coded by Julia Downes, which communicated with an array of electrodes that linked to a neural cell culture maintained by Mark Hammond.

Figure 3. Neuroscope prototype

Figure 4. Vital Signs prototypes

Vital Signs

Elsewhere, less defined and smaller scale activities have led to larger projects. *Mind the Loop*[14] was an event at the Institute of Biomedical Engineering (IBE) that had no clear design outcome. The silicon beta cell[15] is biomedical device developed at IBE that behaves like an artificial pancreas. It senses blood sugar levels in the body and applies this data to an algorithm that controls an insulin pump to regulate blood sugar levels. The loop is a biological system, made discrete and rendered in silicon. Arranged around this technology are different actors, including the bioengineer who builds the technology, the patient who might use the silicon beta cell, and the doctor who negotiates and implements use. Mind the Loop was a conversation between these three people, documented and edited into a short film by Steve Jackman, that depicted how the description of a piece of technology is unstable, as it is subject to divergent values and expectations.

While the silicon beta cell is an example of a biometric sensor for a local, body scale control loop, other technologies at IBE link to larger networks. In the case of an

[14] Steve Jackman's film and supporting documentation are online at http://www.materialbeliefs.com/events/loop.php

[15] Georgiou, P. T. C. "A Silicon Pancreatic Beta Cell for Diabetes." *IEEE Transactions on Biomedical Circuits and Systems* **1**(1): (March 2007): 10.

application for monitoring patients with chronic conditions, biometric data is passed over a mobile phone to a remote server at a health care centre[16]. As this research was being discussed at public events, including an evening debate at the Dana Centre[17], there was a discussion about the potential abuse of data provided by biometric monitoring services. Additionally, in the UK there is a discussion about the effects of parents' anxiety about risk upon the rights and liberty of children[18]. Cotton Wool Kids is a documentary commissioned by Cutting Edge, in which the issues of monitoring bodies, and the effects of perceived risk upon childhood, collide. In one sequence an anxious mother seeks advice from an engineer about implantable GPS transponders to track her daughter[19].

Vital Signs aimed to locate these issues in a product that monitors a child's biometrics. The prototypes are a physical display for the output of the digital plaster[20], a platform for remote biometric monitoring. The plaster incorporates miniature sensors into a skin worn patch, and transmits this data about the body across a mobile phone network. This live data feed encodes information about respiration, heartbeat and movement. The prototypes then represent biometric data as movement. Vital Signs demonstrates how absent bodies are transformed into data and broadcast across networks to become expressed as behaviours in products. The aim here is not to be critical of biomedical research, but to ask some questions about how technologies reproduce and materialise social relations.

How design contributes to science and society issues

In the UK there is an ongoing discussion about how to involve the public in science and technology[21]. At a policy level, this is a discussion about democratising access to the research that will have its outcomes in the products and services we use[22]. Public engagement of science previously focused on demonstrating to the public that

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[16] Toumazou, C. and Lee, C. Y. "Ultra-low power UWB for real time biomedical wireless sensing." *Proceedings of the IEEE International Symposium on Circuits and Systems* **1**: (2005): 4.
[17] Documentation from Material Beliefs at the Dana centre is available at http://www.materialbeliefs.com/events/dana.php
[18] Madge, N. and J. Barker "Risk and Childhood." London, RSA, October 2007.
[19] Details of Cotton Wool Kids is available on line at http://www.channel4.com/video/cotton-wool-kids/series-1/
[20] Toumazou, C. and Lee, C. Y. "Ultra-low power UWB for real time biomedical wireless sensing." *Proceedings of the IEEE International Symposium on Circuits and Systems* **1**: (2005): 4.
[21] See government reports and current consultations for Science and Society on The Department for Innovation, Universities and Skills website at http://interactive.dius.gov.uk/scienceandsociety/site/download/
[22] see Public Attitudes to Science 2008 A survey, available at http://www.rcuk.ac.uk/cmsweb/downloads/rcuk/scisoc/pas08.pdf

science produced a range of benefits[23], performing an educative role to address gaps in the public knowledge[24]. Contemporary public engagement is tasked with responding to descriptions of science and the public that are less about cognition, and more about contextual issues, such as the communities through which science and technology are encountered[25]. GM crops are an example of a technology that is understood as much through the agenda of campaigning groups like Greenpeace, as it is through scientific assurances of safety[26]. As a result of these new policy attitudes about what public engagement of science might look like, it is a good time to extend design practices that ask questions about our relationship with technology and science.

Additionally there is some pressure on science and engineering researchers to *do* public engagement[27]. As a researcher, being able to show you have participated in public engagement activity strengthens a funding application. This was something that was appealed to when researchers were initially invited to collaborate. It goes some way to establishing a recognisable context in which to hold the activities that form a collaboration, in a way that makes some sense for everyone.

Responding to these conditions, the Material Beliefs collaborations are open to the public wherever possible. Public events have been curated at The Dana Centre, the V&A, MoMA, the Design Museum in London, The Royal Institution of Great Britain, the National Theatre, LABoral and Selfridges. These events frequently open up a discussion about partial outcomes, and act as a cross between project crits (criticisms) and think-tanks. The public events move between venues associated with arts or science, so that science and engineering is discussed in a design context, and science institutions are opened to design processes, so that both disciplines become challenged by the other's format.

A workshop was held at the Institute of Biomedical Engineering (IBE) for postgraduate design students at the Design Interactions course at the Royal College of Art. The aim of the workshop was to provide students from the RCA with an embedded view upon biomedical technologies, and for researchers based at IBE to

[23] Association of Scientific, W. "Science and the nation." [S.l.], [s.n.]. (1974)
[24] A Vision for Science and Society - A consultation on developing a new strategy for the UK, (July 2008), Department for Innovation Universities and Skills
[25] Irwin, A. and Michael, M. *Science, social theory and public knowledge.* Buckingham: Open University, 2003. Press.
[26] Ibid.
[27] Comment from lab director during focus group meeting, 24/11/08, audio transcript available

have a refreshed set of responses to their research.

Figure 5. Design Interaction students isolating DNA at the Institute of Biomedical Engineering

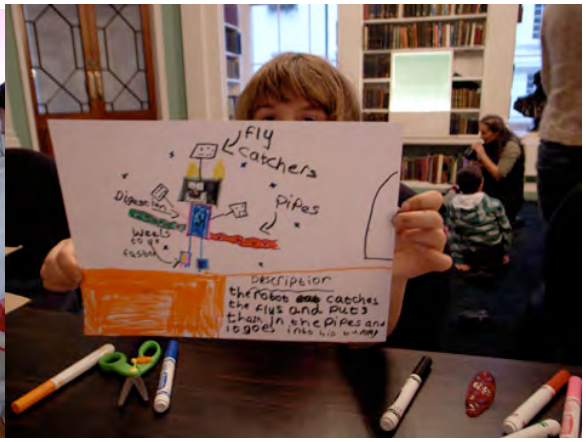

Figure 6. Family day at the Royal Institution of Great Britain

The workshop included an introduction and tour from a director at the institute, with presentations from researchers, and a simple lab experiment, where DNA was isolated from saliva swabs. The lab then became the location where a four-week project brief for the students was set. Researchers from IBE and Reading University took up visiting tutor roles at the RCA, offering tutorial sessions, and providing feedback on the projects. By launching the project at the IBE, the aim was to connect designers' fascination with and trepidation towards biotechnology with a mundane and situated understanding of lab based research, along with an awareness of contemporary science and society agendas, which were presented within the brief.

Conclusion

The projects described here hopefully provide some early descriptions of how designers might become embedded within laboratory spaces, and conversely how engineers might be offered a presence in design studios and exhibition spaces. These mutual incursions are encouraged through loose collaborations that move towards the design of speculative prototypes.

Material Beliefs proposes that by opening up the process of collaboration between bioengineers and designers, non-specialists are able to respond to science in direct ways. Design offers a range of methods for lay members of the public to develop their curiosities with science and technology. Potentially there are opportunities for

the public to take an active role within the production of research, or at least to play a role in the discussion of unfinished research, in terms of its social value and ethical implications.

Rather than see science and technology as a set of finished and discreet products and services that have their effects upon us, Latour described how science is complex and unfolding. It is enacted through a relationship between peers and rivals, institutions, markets, funders, politicians and ethics committees[28]. This paper has tried to sketch how is might be possible to situate a creative practice productively somewhere amongst this network.

Acknowledgements

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An earlier version of this paper appeared in a publication accompanying Touch Me Festival 2008 in Zagreb. More details about this event are available online at http://www.kontejner.org/touch-me-festival-2008-english.

[28] Latour, B. *Science in action.* Harvard University Press, 1987.

A study on an interactive construction tool for better interaction ability in an interactive installation

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Introduction

In this paper, a VisionArtTool (VAT) system that increases the ability of an interactive artwork is created in an interactive installation. The aim of the proposed VAT system is to widen the interactive range in order to provide a maximum freedom especially for young artists. In recent works, interactive installation relies on heavy participation from spectators. Due to this the quality of the artwork depends on the techniques the artwork deploys and represents instead of showing the intention from the artists.

There is a common problem among interactive artwork and artists. A lot of interactive artists are restricted in their creativity to express an artwork, with a challenging task of allowing their artwork to be fully interactive from the perspective of the spectators.

Moreover, in-line with the progress, with information communication technology, many artists are not majoring in art but in computer technology with experience in programming as well[1]. Taking the technological background of a prospective artist into consideration, technologically innovative artwork has an advantage for this group of techno-savvy artists. Also, there are different goals for engineers and for artists. A goal for an engineer is to create a developed technology for artists to use, but this goal is not achievable if the artist is not techno-savvy as this may restrict their creativity to express an artwork.

Interaction

The concept of interaction goes beyond the display button as the interface mode. Interaction, according to the environment and the object, has a different form. Interaction needs to exist easily and anywhere in daily contexts, such as the Internet, online presence and it's experience. However, there is a subtle difference in the interaction of art that consists of meaning within the context of it's content. An active participation from the audience depends on an acceptance, and for it to not bore the audience: a main aim is to create a sense of participation and fun in the interaction. This can also extend the work - when the participants become creators of the interactive artwork when participating within the environment.

There is a difference in terms of interaction between engineer and interactive artist: interactive artists' aim to benefit the user, who does not need a technical background but a work that operates comfortably. In the usual engineering of a user interface, for an interactive artwork the artist may find it difficult to express the intended purpose of the artwork. This may be due to the engineering being solely focused on the accuracy and speed of interaction and as measured by user's usability of the system. Due to this, the nature of the artwork in producing an immersive interactive experience is not achievable with the engineering work focusing on the user's convenience rather than the actual intention of an artwork. Table 1 provides a comparison of an engineering process on interaction with that of the interactive art perspective. Their goal, target and the ability are different. We propose a new technique to directly solve this problem for the interactive art environment.

Table 1: Differences in the interaction of engineering perspective and interactive art

[1] Kirak Kim, et al. "Dynamic Display System for better Interaction Ability in Interactive Installation," *Leonardo*, Volume 42:3, June, 2009.

	Engineer	Interactive artist
Goal	The user's convenience	Concentrate on artwork
Ability	Accuracy, speed	Depending on the intention of the artwork
Target	Users	Audience, artworks, artist

Our work uses computer vision technique, which is one of the most popular tools for interactive artworks. Computer vision technique is known to be one of the most efficient ways to encourage spectators to participate in artworks and to experience a sense of reality. In fact, a lot of interaction using interactive artwork involves the camera. For these reasons, the advantage of the computer-vision for tracking objects in consecutive images is easy, and for video objects detection, partitioning, location, and recognition, makes it best suited for this installation. The camera can act as an eye to replace the artwork in this field of study because it enables a variety of ways for an interaction with the audience. The proposed VAT system supports artists' to create an artwork without being trained in technology. Due to the differences in engineers' and interactive artists' skills and minds, the VAT system enables the interactive artists' to engineer the interactive artwork according to their intention and fulfil the basic engineering of a digital artwork. In other words, the interactive artists' can benefit from a complex engineering process via the VAT system.

VisionArtTool

In this paper, we propose VAT, an interactive artworks construction tool with computer vision techniques that supports artwork creation by interactive artists. Our proposed VAT system will bridge the gap between the artists' and engineers' own disadvantages and ease the creation of interactive artworks[2.]

The unique features of VAT system include usage of computer vision based interaction constituents (hand, foot, head, body, colour etc.). Artists are easily able to select the intuitive visual programming based tools and create their artwork. Thus, this suits the perspective of a non-engineering based artists who use technology and techniques for creating artwork as a representation of real-time interaction - where selections can be made from the vision based interaction constituents as mentioned above.

[2] Kirak Kim, et al. "Study on Interactive Art Construction Tool based on Computer Vision Techniques," IADIS CGV 2008: 82-88.

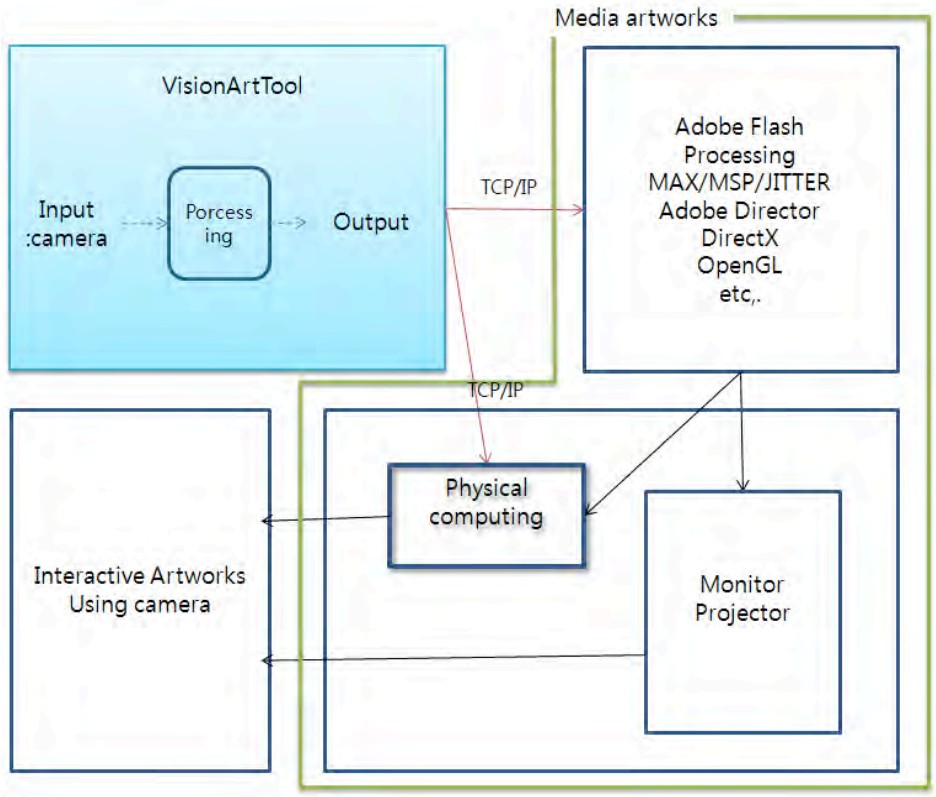

Figure 1. The position of VAT in Interactive Arts

In order for the artists to use this proposed tool, it is based on visual programming and consists of vision-based functions as a simple menu in the interface. This means artists' can apply the techniques to their interactive artwork easily as well as representing their intention. The VAT system is a generic vision-based toolkit that provides output for communicating with other art construction tools such as Processing and Flash in order to complete the interaction artwork content generation. Although, VisionArtTool is not a means to express a province of beauty, rather it extends the capability of enabling artists' express their work with technology. Figure 1 shows the position of VAT in interactive art. Figure 2 shows the proposed VAT main window that opens access to the VAT system.

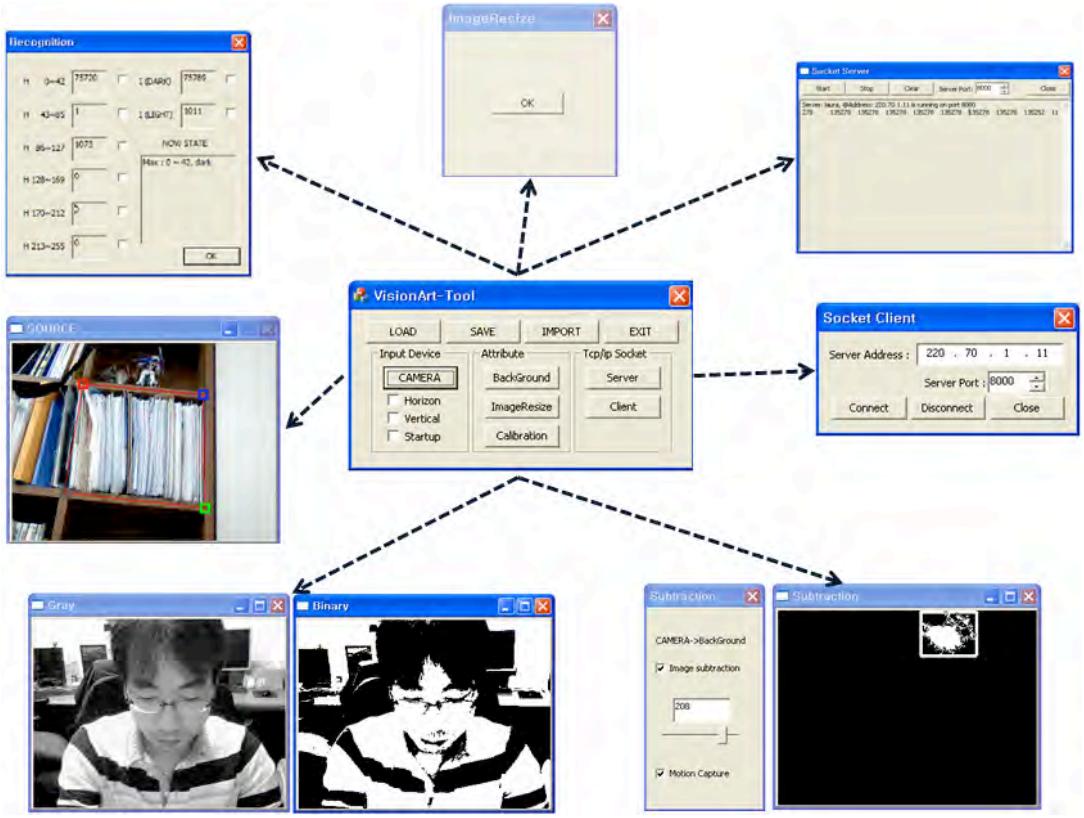

Figure 2. The VAT system and windows

The VAT is based on visual programming and is accessible via the click of a button. VAT connects to the camera with each of the buttons and selection of an interaction method is easy to use for the non-technologist artists. In our system, the VAT is composed of several dialogue windows. In order to briefly describe the abilities of the VAT system - consisting of a series of windows - it can be explained as follows:

First, the entire programs for the control, management, or Main-Window dialogue windows are present.

Second, the camera is connected with the click of a button, and the connection status of the camera is checked. A window to confirm the presence of the camera is recognized.

Third, a communication with other authoring tools or other programmes appears in the communication Windows.

Fourth, the calibration of the camera, video and images of artwork or images with the actual artwork for the screen calibration exists in the calibration-Window.

Fifth, to use the actual user interaction select Properties Window.

Sixth, background-subtraction is performed in the selective Window and can be saved.

Seventh, artwork installed by the gallery curator can be easily manipulated, even if it is before the PC is turned off. After starting, a new feature can automatically run as Startup. Buttons exist to facilitate this process. In addition, there are other selections of the user's interaction skills in terms of technology, and more interaction windows are produced as there is more interaction involved.

(a) Remaining Illusion Part 1 (b) Remaining Illusion Part 2

Figure 3. Interactive installation Artworks using VAT.

In order to visualize the results, Figure 3 shows samples of artwork in the installation of the VAT in an exhibition hall. The following pictures were taken during the VAT system in use. Figure 3 a) and b) are the artworks by PERFORMATIVE. In this exhibition, the activity is directly in relation to the working group of artists, theorists and technologists - PERFORMATIVE[3] - concerned with the practice of expressing the virtual into reality. The content of the artworks is built in the Adobe Flash[4] Direct

[3] PERFORMATIVE, http://performative.org
[4] Adobe Flash, http://www.adobe.com/products/flash/

3D[5], Max / Msp / Jitter[6] for the interaction of these cycles, and are used as the VAT system requires.

Conclusion

Recently some interactive artists creating media artwork have faced a lot of difficulties in creating their works. The factors which cause the most dissatisfaction include: the environment; an engineer with a communication problem; the programming code; lack of understanding of technology; cost and time issues; the artists' ideas. This yields many problems especially towards completion. In order to solve a variety of artists' problems, there is a need for a media art authoring tool (and other new authoring tools) to suit the less technically inclined artists' and yet provide a powerful means to express their work easily. The goal of this proposal is to create a a camera-based interactive artwork authoring tool for the creation of artworks; a tool that can be easily used but both the experienced artist and by others.

In this paper, the media art interactive installation with the VAT system which uses a camera and window based interaction - help the artists because has easy to use features. The engineering factors using plug-and-play directly into the coding structure, and the default libraries, make the running of the system transparent to the artists.

In the VAT system, artists can use the special interactive installation with authoring tool and be fully integrated with other programs with easy compatibility and where other authoring tools are available. It also provides general-purpose technologies in computer vision and this can be used in content creation with a wider scalability. Further research related to the VAT system and it's interaction library can be progressed into gesture recognition. Future oriented industry - related to media such as Winamp media player - or other kinds of commercial software, will be able to be integrated into the VAT system.

Reference

Pedram Azad, et al. "Computer Vision - Principles and Practice," Elektor International Media BV, 2008

[5] DirectX, http://msdn.microsoft.com/en-us/directx/default.aspx
[6] Max/Msp/Jitter, http://www.cycling74.com/

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Products of negotiation and spaces of possibility: quantum systems and interactive media art

Jeremy Levine

The human subject and the production of reality in quantum systems and interactive media art

The division between subject and object is a natural result of our sensory impressions of the external world, which seem separate from the thoughts in our heads. When we stare at a painting we apprehend it as an object distinct from our conscious self. This binary split between the world 'out there' and the world in our heads is the foundation of classical logic. The very notion of objectivity is predicated on the idea that the universe is composed of subjects who are capable of remaining aloof from their objects. This is not the case when we confront interactive media art or quantum particles, neither of which can be considered 'objects' in any normal sense of the word. Instead we have systems - open, complex systems - in which we play a starring role. 'In the drama of existence we ourselves are both actors and spectators'.[1]

A work of interactive art, like a quantum system, injects the choices made by human beings 'directly into the causal structure. It specifies the effects of these probing actions upon the systems being probed'.[2] Together, subject and object are unified into an ontological whole. In both cases, the observer's actions are considered part of the system under observation. In both cases, the system is composed of an invisible component, digital or quantum, and a human component. In both cases, we are confronted with a variable phenomena or display that requires our intuitive understanding of 'things', be supplemented with a model based on 'systems' into which we are embedded as active components. 'We may state as characteristic of modern science that this scheme of isolable unit acting in one way causality has

1 Bohr, Neils "Essays, 1958-62, on Atomic Physics and Human Knowledge, New York: Wiley: 15.
2. Schwartz, Jeffrey M. ; Stapp, Henry P.; Beauregard Mario, "Quantum Physics in Neuroscience and Psychology: A New Model with Respect to Mind/Brain Interaction": 30.

proved to be insufficient. Hence the appearance in all fields of science, of notions like wholeness, holism, gestalt, etc ... systems of elements in mutual interaction.' [3]

From the macroscopic perspective of classical physics, you and the chair you are sitting on are distinct objects separated in space. However, from quantum perspective, you and the chair are two interacting systems of energy - a single complex system. If we cannot achieve, as cyberneticist Norbert Weiner says, 'a sufficiently loose coupling with the phenomena we are studying',[4] then we must consider ourselves as part of that phenomena - that system. The web based media art project, 'D-Cell' [5], by Casey Reas requires that the visitor 'touch' the art in order for it to come to 'life'. Try to touch a Rothko painting and you'll find yourself in handcuffs.

This notion of reality is, as French philosopher Nicholas Bourriaud describes, 'a product of negotiation' [6]. The same negotiation between the conflicting emotions and connotations occurs inside our heads when we encounter any work of art. But in our encounter with 'interactive art' this negotiation requires more than mental effort. Interactive art demands the engagement of our bodies. Interactive art demands to be 'touched' even if that contact is in cyberspace and mediated by a keyboard. For art theorist, Jack Burnham, this leads to a 'refocusing of aesthetic awareness-based on future scientific technological evolution - on matter-energy-information exchanges and away from the invention of solid artefacts.' [7] Burnham's prediction, made in the 1960's, of the 'death of the object' hasn't panned out, but the rise of a dialectical practice, such as interactive media, which has both object like characteristics (the hardware) and a non-object characteristics (the software) was acutely prescient. It is not just a coincidence that Burnham's 'matter-energy-information exchanges' find their corollary in the information-theoretic metaphors used by quantum theory.

The variable aesthetic output of interactive media art in response to human interaction is useful metaphor for grasping the elusive quality of quasi-mythological

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[3]. Bertalanffy, Ludwig von . *General System Theory*. New York: George Braziller, 1969: 44.

[4]. Weiner, Norbert. *Cybernetics: or Control and Communication in the Animal and the Machine*. Cambridge, Mass.: The MIT Press, 1948: 163.

[5]. http://www.singlecell.org/cr/index.html

[6]. Bourriaud, Nicolas. *Relational Aesthetics* (Translated by Simon Pleasance and Fronza Woods, Dijon, France, :Les presses du reel, 2002: 80.

[7]. Burnham, Jack. *Beyond Modern Sculpture*. New York: Braziller, 1968: 369.

quantum 'wave function'. The 'wave function' of quantum mechanics, is a model of the uncertain and complex behaviour of sub-atomic particles in response to our interactions. When a quantum particle is probed its 'wave function' collapses in response, offering a new 'field of possibilities' - which in turn is represented by a new wave function. Adopting this metaphor, we can say that object-based art is akin to classical particles, while interactive media art is more like the quantum wave function that produces an evolving 'space of possibilities'. The connections between interactive new media art and the invisible quantum world do not require a 'metaphoric stretch'. The similarities are too uncanny to ignore.

Non-locality, media art, and the World Wide Web

Quantum particle systems seem to possess the ability to communicate instantaneously with each other, defying our classical understanding of space and distance. The same experience is captured by the 'sense' of non-locality fostered by the World Wide Web, which seems to collapses space into mouse clicks and links. Though the speed of light limit is not broken during our web-mediated interactions, we often experience an immediacy that erases distance, creating a 'confounded sense of place and proximity.' [8]

Non-locality describes a state in which we have information about spatially disconnected components of complex systems. Quantum particles are 'points of intersection' of certain relations.' [9] The exchange and manipulation of information without regard to distance is one of the dynamic variables of both quantum systems and interactive media art. In both cases, our experience of non-locality is a product of our interaction with virtual phenomena: invisible communication networks or the immaterial probability wave.

Our encounter with a Rothko painting in a museum has a short-range character, but our encounter with a work of art that is networked can connect us to elements of the system that are thousands of miles away from each other. Compared to more traditional forms of public art practice, Internet art, which is accessible from the privacy of one's home, introduces a shift from the site-specific to the global, collapses

[8]. Dzekian, Vince . "Distributed Spatial Practice, as Applied to the Art of the Exhibition", *Invisible Culture,* Vol. 11, Dec. 2007: 11. http://www.rochester.edu/in_visible_culture/Issue_11/dziekan/Dziekan_print.pdf).
[9]. Cassirer, E., *"Determinism and Indeterminism in Modern Physics"*, New Haven: Yale University, 1956; (translation of "*Determinismus und Indeterminismus in der modern Physik"*, Goteborg: Elanders Boktryckeri Aktiebolag, 1937:180.)

boundaries between the private and public, and exists in a distributed non-local space. [10] The non-locality that Christiane Paul speaks of is a function of the Internet's elision of *our sense* of distance or spatial separation. Freed from geographic limits, a work of networked art can glow on the screens of thousands of computers at the same time. Richard Vickers helps Warhol keep his promise of future fame, in '15x15' [11] which allows anyone in the world with a web cam to upload their live feed, becoming part of a grid of videos. Vickers collapses 15 different locations into the space of your browser window.

Maciej Wisniewski's, 'Instant Places' [12] utilizes the non-local experience of the Internet to connect different computers to form a matrix that was free from the constraints of geography, time, and place. *Instant Places* featured predators (hawks) and prey (mice), which were able to 'move between different data places and communicated via instant messaging.' [13]

Ephemeral physicality

Just as a quantum particle has both a virtual and a physical dimension, so does a work of digital art, which exists as both invisible code and visual display. The dual nature of matter in quantum mechanics is mirrored by the dual nature of a work of digital art. Just as a photon is both a particle and a wave, a work of digital art is both a set of instructions and the execution of those instructions.

The dual nature of matter, as both virtual wave and physical particle is a product of our interactions with matter, rather than some intrinsic property of a 'reality' with an objective, independent existence. 'Virtual states are part of the realm of potentiality in physical reality because they contain the future empirical possibilities of the universe.' [14] This is eerily reminiscent of the way invisible software contains the potential for the future 'empirical' (quantifiable) audio-visual outputs it displays in response to human interaction.

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[10]. Paul, Christian. "Digital Art / Public Art: Governance and Agency in the Networked Commons" in Sandra Braman and Thomas Malaby (eds.), *Command Lines: The Emergence of Governance in Global Cyberspace*, First Monday, Peer-Reviewed Journal on the Internet, Special Issue #7, November 2006.

[11]. HTTP://WWW.15X15.LINCOLN.AC.UK/

[12]. HTTP://ZKM.DE/FUTURECINEMA/WISNIEWSKI_WERK_E.HTML

[13]. Greene, Brian. *The Fabric of the Cosmos*. New York: Vintage Books, 2004: 131-132.

[14]. Schafer, Lothar "Nonempircal reality: Transcending the physical and Spiritual in the Order of the One", *Zygon*, vol. 43, no. 2 (June 2008): 334.

Uncertainty

Quantum mechanics reveals something much more fundamentally odd about the character of 'reality': the observer cannot look at a quantum particle without affecting it. The process of measurement translates the virtual to the physical. When the ensemble of quantum mechanical possibilities (the wave function) breaks down, one of the various possible outcomes becomes reality. When detection happens, new information is put into the world [15]. This is not an epistemological issue, but rather ontological. There is a virtual invisible dimension to reality that directly affects the material 'visible' dimension in a way that is impossible to completely quantify.

The project 'A-Volve' [16] by Christa Sommerer & Laurent Mignonneau, translates the physical input of visitors interacting with a giant touch-screen into a digital ecosystem of strange luminous creatures fighting for survival. The hidden algorithms written by the artists, function as the 'laws of nature'. The magnetic spin of a sub-atomic inhabitant of the quantum world can be said to point both up and down at the same time. Quantum particles thus exist in 'virtual states', which are unthinkable within the classical paradigms of objective certainty. Instead we are 'left with a system represented as a mixture of various possibilities, like being in two places at once'. [17] This state of superposition, a state of unrealized potential, is maintained until that quantum bit interacts with something beyond itself, for instance the detectors of quantum physicists. In the quantum world objective measurement is a fiction. Measurement is an interaction or, as physicist Antoine Zellinger says, 'an act of creation'. [18]

Adopting a digital metaphor, we can say the act of measurement is the variable input into the quantum system. The interaction between the measuring device and the quantum wave function of the particles under investigation is the 'throughput' function: the quasi-mythological collapsing wave function. The output is a piece of concrete information: either the location or the velocity of a sub-atomic particle.

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[15]. Suarez, Antoine. "Classical Demons and Quantum Angels: on 't Hooft's Deterministic Quantum Mechanics", arXiv:0705.3974, Volume 1, (2007): 11.
[16]. http://www.medienkunstnetz.de/works/a-volve/
[17]. Zeilinger, Anton . "Split World: Book Review of Decoherence and the Quantum-to-Classical Transition" by Maximilian Schosshaurer, (http://www.univie.ac.at/qfp/publications3/pdffiles/2008-04.pdf), 2.
[18]. Anton Zeilinger as paraphrased by Suarez in, "Classical Demons and Quantum Angels", 11.

If we click on the Internet project, 'Tripolar' [19] by Scott Snibe, and drag our mouse the black lines on the screen respond by vibrating as if alive. However, the moment we let go of our mouse Tripolar flips into a new 'fixed' form or static state. In quantum terms, the visitor's interaction is like a measurement that causes a 'field of possibilities' to 'collapse' into an 'observable'. Tripolar's 'observable' is a visual display, whereas the quantum 'observable' is a piece of quantified information: velocity or position. Just as in quantum mechanics, the visitor to Tripolar is not 'really' interacting with the visible 'object', but with the invisible system that lies beneath. The quantum scientist probes invisible sub-atomic particles, whereas the visitor to Tripolar probes the invisible software. The software that lays hidden beneath all works of digital art is a metaphor for the laws of nature that lies hidden behind quantum particles.

Digital artist Alan Peacock describes interactive art as 'a site of Uncertainty, problematized actions, and entropic effects.' [20] The exact same thing could be said of quantum systems. In both cases, the human subject's freedom of action means that neither quantum measurements, nor the aesthetic effects (of interactive media) are predetermined qualities. Both require the participation and creative input of the human subject interacting with an invisible component: quantum or digital. In both cases, we cannot predetermine the outcome of these interactions with absolute certainty.

Conclusion

Quantum systems and interactive media are variable entities that evolve in time in response to human action. In both cases, our explorations become inputs into a system that processes according to set of rules, either the 'laws of nature' or the algorithms written by digital artists. In both cases, the visible world has a virtual shadow, the quantum wave function or the invisible software that lurks behind digital media. In both cases, our intuitive sense of subject/object spatial separateness is challenged by our experience with quantum systems and interactive media. Computers linked by high-speed telecommunication networks evoke quantum particles in state of entanglement.

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19. HTTP://ARTPORT.WHITNEY.ORG/COMMISSIONS/CODEDOC/SNIBBE/TRIPOLAR.HTML
20. Peacock, Alan "Toward an Aesthetic of the Interactive" (www.soundtoys.Net/journal), 4.

‘Quantum Reality’ is more than ‘pointer readings’ and differential equations. We need to rely on ‘other’ means of understanding. Enter the artist whose techniques of understanding are not limited by the need to quantify analytically, but rather the will to poetically synthesize. The full implications of entanglement, superposition, and non-locality may be beyond our grasp, but artists who utilize software and telecommunications networks are able to evoke aspects of the phenomenon. Here art fills the gaps in our scientific understanding of the world.

Hybrid bodies: bionic bodies, semi-living bodies, modified bodies

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Abtract

This paper depicts different problems arising from the presence of a hybrid in the posthumanism era. Bioart, a hybrid practice combining art, science and technology is taken as a case study.

Posthumanism and hybrid bodies in bioart

Posthuman, postorganic, postbiological, postsubject and postevolution are concepts which indicate, if not the end, the possibility of the end of an era. This signals the closing of the modern age - characterized by humanistic thought - which divides on one hand, the world into natural laws, and on the other hand, into political representations; it also splits nature from society as well as the technical world of the objects from the language construction of the subjects (Latour 2007). To sum up, it establishes the boundaries between what is considered to be human and that which is not human: things, objects and animals. Within this 'Great Divide' between 'them' and 'us' (Latour 2007), humanism focuses on the extremes (natural elements versus social elements, local issues versus global issues) and not the middle ground. For modern thinkers there’s nothing at all in the middle, just waste and rubbish; whereas for posthumanism thinkers what is found in the middle is very meaningful: hybrids, monsters, mixes.

The 'Great Divide' of the humanism is questioned by Agamben, who considers how and why man and non-man, as well as human beings and animals have been separated (Agamben 2007). Latour studies the hybrids which humanism denies according to modern concepts: it is impossible to consider frozen embryos, digital machines or transgenic crops in either extreme - as object or subject - since all of them are chimeras, hybrid monsters which do not fit:

> (…) where are we to classify the ozone hole story, or global warming or deforestation? Where are we to put these hybrids? Are they human? Human because they are our work. Are they natural? Natural because they are not our doing. Are they local or global? Both. (Latour 2007: 84)

Hybrid, according to Latour, is a concept that includes 'the newest conquests of information theory, molecular biology and physics' (ibid: 146). This idea fully coincides with Derrick de Kerckhove, who considers bit, gene and atom (the first studied by informatics, the second by molecular biology and the third by physics) as the three basic units for any kind of recombination. Paula Sibilia considers this approach to hybrids - the taking into account of disciplines connected to informatics and life sciences - focuses the biological body transformation as the combination of bits and genes, atoms and genes and also a combination of different genes.

The human body now begins to evolve in a different way, becoming, little by little, a cyborg – a hybrid body formed by the mix of cybernetics and biological elements affecting both the external appearance and also the inner aspect of a human being:

> My body is an electronic virgin. I incorporate no silicon chips, no retinal or cochlear implants, no pacemaker. I don't even wear glasses (though I do wear clothes), but I am slowly becoming more and more a cyborg. So are you. Pretty soon (…). For we shall be cyborgs not in the merely superficial sense of combining flesh and wires but in the more profound sense of being human-technological symbionts: thinking and reasoning systems whose minds and selves are spread across biological brain and nonbiological circuitry. (Clark 2003: 3)

Body hybridization is then, meaningful for posthuman thought. Those thinkers who follow this theory use words such as postbiological, postorganic, postevolution or postsubject so as to refer to the new biological configuration coming from the constant transformation and the 'upgrading' (Sibilia 2006: 11) of body structure. Consequently, posthumanism is interested in technological mechanisms which make it possible to transcend biological nature. Here, biotechnology becomes a perfect tool to manipulate the genetic code of an organism or to reprogram any species genome: consequently, Sibilia thinks we are living an era characterized by posthuman evolution which concentrates on the transformation of human bodies.

Bionic bodies

'Bionic bodies' are postbiological bodies which combine flesh and metal either to emphisize the human body characteristics, or to replace corporeal biological nature with the purpose of becoming a cyborg. According to Moravec technology within a human body allows the biological structure to be changed - going beyond the flesh and thus making it transcend. Stelarc also suggests that we should replace some body parts by mechanical parts, turning the man into a cyborg and the body into an obsolete object. Stelarc's *Virtual Arm*, *Third Hand* and *Laser Eyes* are a part of an external body called *Amplified Body* which, as well as *Muscle Machina*, *Hexapod* and *Exoskeleton* are used by the artist to show the fragility of a human body and the ability to extend its limits with the help of technology. Bionic bodies can be observed in Stelarc's work and, particularly, in the *Time Capsule* performance by Eduardo Kac where the integration of a technological component within the artist's biological system reconfigures a new kind of hybrid human being which is mixed with the technique.

Semi-living bodies

'Semi-living bodies' are based on tissue engineering, an area of biomedical engineering consisting of research and development of biological substitutes to improve or replace tissue and organs in the human body. Both, the selected cells used for culture and the production of biological substitutes, are considered fragments of bodies which are kept alive (thanks to technology), but not in the original bodies that once hosted them. These fragments (cells, tissues and organs) give rise to a particular kind of being that, due to it's biological characteristics, the artists Oron Catts and Ionat Zurr (2006) name as 'semi-being' or 'semi-living'. Semi-living bodies thus establish a new way of 'organicity' (Sibilia 2006: 71) which allows the body not to die but to live forever if kept under special conditions. This idea expresses the posthuman wish to transcend the human existence, annulling the fact of getting older as well as death. This is shown in *Immortality* by Joaquín Fargas a work based on the human ambition to project himself into the future to such an extend that he can overcome his own finite nature. Another work - *No Ark* by Catts and Zurr (TC&A) proposes thinking about the problem of the new semi-living beings, which, because of their hybrid condition, do not correspond to the classification system of the traditional biological sciences.

Modified bodies

Finally, 'modified bodies' are either the result of the recombination of existing living organisms or the result of the obtention of new chimeras when creating genetic sequences that accelerate the pace of biological evolution, and turning them into post-evolutive bodies. Nowadays, the natural selection that eliminates species continuously is no longer a natural selection but is provoked by the technological and industrial growth (Sibilia 2006). Here we have a paradox: due to technology a great deal of biological species become extinct; also technology itself gives rise to the creation of brand new species. Clear examples of this are Eduardo Kac's and Joe Davis' transgenic productions.

Bionic bodies, semi-living bodies and modified bodies are all hybrid bodies that promote the idea of fusion and harmony between different worlds. However, not only does hybridization refer to fusion and conciliation but also to the intersection of diverse worlds that generate contacting areas where the current conflicts and problems are situated (Canclini 2007). To give an example we can analyse the production of transgenic food. This provokes a clash between art and science by giving, at the same time, different points of view of a given hybrid.

In 2002 Critical Art Ensemble (CAE) carried out the project *Contestational Biology* which showed a large number of transgenic crops like corn, canola and soy resistant to Roundup. This is a herbicide which kills everything, even the crops, and whose principal component is glyphosate. The aim of this project was to reverse genetic modification by using non-toxic chemical disrupters that could detect plants with genes resistant to herbicides. When dying the plants with this product, those cells with the Roundup Ready active enzyme gave the transgenic vegetables a non-natural colour, thereby preventing their commercialization in the markets.

However, for many scientists, the use of transgenic plants tolerant to herbicides, especially to glyphosate, is better than the use of unmodified plants, which may have been treated with more toxic contaminant herbicides than glyphosate. Transgenic crops allow farmers and producers to reduce the dose and the kind of herbicide to be used, which means saving money as well as a less harmful environmental impact (Hopp 2007).

Not only does CAE support free agrochemical organic production, but also the right to know the scientific processes by which food is genetically modified. The principal aim of project *Free Range Grain* was to criticise the lack of scientific and political ethics within genetic engineering (particularly when talking about food production). This work was a live performative action where artists and the public worked together in a biotechnological laboratory. Their goal was to make people aware that science is not a field that the lay person cannot understand and they explained the technoscientific processes and allowed people direct experience by using transgenic organisms.

Examples such as these are hybrid practices combining art, science and technology. These include transgenic art, bioart, biological art, tactical media or any other artistic practice which includes biotechnology. These practices set forth an antagonist position towards the use of technoscience, which means the idea of hybridization as a *reconciliation* is not always considered.

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Seeing the ‘light-colour’ seduces a new kind of touching

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When we use a computer, what do we do? Almost all of us look at some image on an electric display, grab and move a mouse, and type on a keyboard, then our right hand holds the mouse in order to point to an image called an icon on the display. This is very 'natural' for us; if our body makes some actions, then the images on the electric display change. However, this relationship between our body and the image did not exist until the computer, and especially until the Graphical User Interface, appeared. I call this phenomenon 'Display Acts': the action formed by connecting our body action with the change of images on the electric display. (Mizuno 2009) Through living with the computer, we have acquired new actions in order to inhabit this new image world. In other words, 'Display Acts' is the first step for our new actions in the man-computer world. I have already discussed ‘Display Acts’ on the first computer graphic system, Sketchpad, concerning the action of drawing the image with light. (Mizuno & Motomaya 2008) However, that study did not show why we touch the image on the electric display.

Now, the electric display, for example iPhone, seduces us to touch the image. Erkki Huhtamo writes that:

> While the classical cinema and even television broadcasting still emphasize distanced and physically nonactive forms of spectatorship, video game consoles, mobile phones, laptops, iPod and other *handy* electronic devices have familiarized millions to the *tactile dimension* [emphasis in original]. (Huhtamo 2008: 130)

In another article, Huhtamo adds, 'How those developments will affect the realm of tactility as we know it remains to be seen.' (Huhtamo 2007: 94) This paper takes Huhtamo’s suggestion and sees a new realm of tactility which the new technology opens to us.

What do we see in the electric display?

At first, we have to consider how our body reacts to the image made from the electric light, because this artificial light has totally changed the world. Marshal McLuhan wrote that;

> In a word, the message of the electric light is total change. It is pure information without any content to restrict its transforming and informing power. (McLuhan, 2003: 77)

We should know how electric light affects us when we see it: most of us see the electric light from TV or computer displays everyday. The electric display came into our lives as TV in the late 1930s, and we could say TV is the first electric display we are familiar with. McLuhan gives TV one chapter in his book *Understanding Media* because he believes that it opens a new world. He points out the nature of the TV as:

> The mode of the TV image has nothing in common with film or photo, except that it offers also a nonverbal gestalt or posture of forms. With TV, the viewer is the screen. He is bombarded with light impulses, that James Joyce called the 'Charged of the Light Brigade' that imbues his 'soulskin with subconscious inklings.' The TV image is visually low in data. The TV image is not a still shot. It is not photo in any sense, but a ceaselessly forming contour of things limned by the scanning-finger. The resulting plastic contour appears by light through, not light on, and the image so formed has the quality of sculpture and icon, rather than of picture. (McLuhan 2004: 413)

McLuhan’s statement is famous because he tells us that the TV image is made from ‘light-through’ and gives us, not visual sensation, but tactile sensation. Seeing the contour of ‘light through’ means that we directly see the light source beyond the image. As a result, we see the electric light itself in TV image.

Based on above idea, I will especially focus on the phrase 'A ceaselessly forming contour of things limned by the scanning-finger' in order to examine the nature of the relationship between our body and the electric display. This forming contour makes the apparent motion on the electric display. Nelson Goodman considers the apparent motion as ‘A Puzzle about Perception’ in his *Ways of Worldmaking*. Goodman writes, 'that virtually every clear case of visual motion perception depends upon abrupt shift

in color.' (Goodman 1978: 86) Goodman shows us that the apparent motion happens not because of object-shape but object-colour. Moreover, he continues that:

> With visual system taking such leaps in stride, with their indispensability for motion-perception, with object-identity dependent not upon smooth color transition but upon contrast with the background at the contour, the color-jumps in the Kolers experiments seem so inevitable as to leave us wondering how we let a false analogy trick us into expecting anything different. (ibid)

Even though we normally think that smoothly changing the colour of object causes the apparent motion, Goodman focuses on the colour-jumps at the contour between the object and the background. It means that we look at not just the object alone, but also the relationship between the object and the background. The contour is the place where the background becomes the object, and the object becomes the background; the contour is the place they are ceaselessly merged in each other through colour. This merge makes the apparent motion.

Now, I want to return to McLuhan. He gave an important role to electric light because it has the potential to merge figure and ground. (McLuhan 1988: 194) Therefore, electric light is the best media for the apparent motion, 'a ceaselessly forming contour of things' (ibid). However, McLuhan misses the colour aspect for the apparent motion that Goodman mentioned, while Goodman misses the aspect of electric light needed for it - which McLuhan mentioned. Therefore, we have to consider not only the nature of electric light but also the nature of colour formed by the electric light.

‘Light-colour’

When we see the electric display, aesthetician Asao Komachiya says that we see ‘light-colour’. ‘Light-colour’ throws away material information and extracts only colour information from the object. Komachiya writes:

> Light has no weight. This is our recognition from the experience of human history. Similarly, light-colour cannot express its weight. However, the object described does have a weight. Therefore, the description of the object conveys the weight feeling for us. Paintings have expressed this. .... However, the image made from light-colour does not essentially fit this principle.
> (Komachiya 1996: 95-96)

Furthermore, Komachiya affirms that ‘light colour’ opens a new image field due to the nature of no contour. (ibid: 305) ‘Light-colour’ is mainly made from electric light, which has the potential to merge figure and ground, therefore this new colour does not have its contour. Owing to above natures, ‘light-colour’ looks similar to David Katz’s ‘film colour’. (ibid: 7-17) However, unlike Katz, Komachiya primarily takes directly seeing the electric light into consideration, which is a similar point of view to McLuhan. I would like to suppose that humans have an innate ability to sense no materiality in the colour - like Katz’s ‘film colour’ and the electric light enables our ability to go into the next step: ‘light-colour’.

According to Komachiya, the ‘light-colour’ image is, however, beyond the control of our sensations because it does not fit our traditional principles. ‘Light-colour’ forms an image but it has no weight and contour. We try to merge this new principle into our familiar one, but this task may be beyond the capacity of our brain. Therefore the brain may ask the body to make a new reality for the ‘light-colour’ image. This seduces our body to touch the ‘light-colour’ image in order to compensate us for its having no weight and contour. In the past we have not been able to touch it because there was no such a device - until quite recently. However, we did try to touch the ‘light-colour’ image on TV, for example with 'Winky-Dink and you' [1953-57], even though it was just pretending to touch it.

‘Light-colour’ with the computer

Now, we have computers in order to control the weightless image formed by the electric light. It may mean that the pure information meets the information machine. In the traditional sense, light reflected from the material world makes the images. Although McLuhan realizes the ‘TV image’ is made from ‘light-through’, he dares to say ‘TV image’ although it is not an image in the traditional sense. Moreover, Komachiya shows that ‘light-colour’ cannot tell the nature of weight; therefore it does not show us its own materiality. In short, the image made from the electric light may be just the colour information of something in the traditional sense.

Ron Burnett gives us a unique point of view on the image in our age. He writes, 'The distinction between images and information blurs into pixels, lines, and rates of compression.' (Burnett 2004: 47) His view on the image is neither analogue nor digital, which is very suggestive. Furthermore, Masaki Fujihata re-defines the colour

as a concept because the computer releases the colour from its materiality. (Fujihata 1997: 7-11) Although Burnett and Fujihata recognize that the computer gives us the chance to control the information of ‘light colour’, they forget the electric display. In fact, ‘light-colour’ merges the image and the information into one entity on the electric display because of its nature - no weight and no contour: the computer needs the electric display to generate ‘light-colour’ image.

Touching ‘light-colour’ with the smooth materiality = believing our body

Our seeing of ‘light-colour’ seduces our recent new kind of touching. We have always touched materials that have their own weight. Materials such as the plastic of a mouse or the glass of a display do not change by our touch. However, touching the material causes some changes in a weightless entity on the electric display. The human and computer make a new circuit for dealing with the weightless entity made from ‘light-colour’ via the material object - our body - and something like the mouse or trackpad.

Moreover, the smooth materiality of plastic or glass means we only pay attention to the contact surface of the object with our fingers. For example, Apple writes 'to stay *smooth* and pristine, the new Multi-Touch trackpad is made from wear-resistant etched glass. [Emphasis is added]' (Apple 2008: online) Why is touching ‘light-colour’ connected to smooth materiality? ‘Light-colour’ merges figure and ground; therefore it is something flat, without contour in our vision field. ‘Light-colour’ does not show its own weight, therefore there is no friction to grab and move in our tactile field. Consequently, the smooth materiality is very close to the reality of ‘light-colour’. We touch the smooth materiality and see the colour-jumps in the ‘light-colour’ image at the same time. However, there is a paradox. Our own bodies have weight and contour and we feel the heavy density of our bodies - by *giving* weight and contour to the weightless image via our smooth touching, when we see and touch a ‘light-colour‘ entity.

After seeing ‘light-colour’ for a long time, we begin full-scale investigation for the new realm of tactility with the smooth materiality. David Katz writes, 'What has been touched is the true *reality* that leads to *perception*. [Emphasis in original]' (Katz 1989: 240) We re-train our fingers with the smooth materiality in order to touch and generate a new reality of light-colour and this demands us to believe our body’s

weight and density in the ‘light-colour’ world. This belief creates new diverse bodily sensations in ‘Display Acts’.

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The real virtual living

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1 Abstract

It is the contention of this paper that posthuman creativity is already taking place, rather than solely existing in the domain of a biomechanical cyberpunk dream. Manifesting work in both cyberspace and meatspace, the posthuman in this case is understood to be someone who embraces digital creative technologies (both hardware and software) taking advantage of the artistic opportunities they afford.

The effects of Moore's law over the last two decades has led to a profuse amount of cheap and obsolete computer equipment, both open and closed system. These castaway gadgets have become an abundant raw material, sparking the burgeoning movement of creative hardware hackers.

The Internet has enabled the creative subversion of technology, through the dissemination of new creative tools and techniques. Closed video games consoles are being repurposed into new expressive platforms and tools. Indeed, the retro video gaming movement has grown beyond the digital domain, bringing pixels to oil painting and new flesh to performance art.

The posthuman aesthetic, conceived in science fiction and nurtured online, is now very real and tangible.

2 Introduction

> He'd operated on an almost permanent adrenaline high, a byproduct of youth and proficiency, jacked into a custom cyberspace deck that projected his disembodied consciousness into the con sensual hallucination that was the matrix. (Gibson 1984)

In this scene from *Neuromancer,* William Gibson presents a typical cyberpunk vision. In this future world people lead dual lives augmented by technology. They achieve this by 'jacking in', in other words, plugging their brain via a network cable directly into a computer system. By doing so they would become part of an alternate reality, free from the physical limitations of the 'real world'.

2.1 The cyberfuture

A consistent vision of a biomechanical future permeates twentieth century science fiction. From the steel hand of professor Rotwang in Fritz Lang's 1914 film *Metropolis,* signifying his role as the link between the human and machine races, to the Gibson inspired neural interfaces of the *Matrix* and *Ghost In The Shell* in the 1990s.

The potency of these images was not lost on the general public who consumed them, particularly those with an interest in art and technology. In his online comic 'The Guy I Almost Was', Patrick S. Farrelly recounts the influence that the Cyberculture press, such as *OMNI* and *Mondo 2000* had on his life as a young teen. These publications, with their mix of science fiction and science fact, placed the prospect of a posthuman existence for all, as a near and very real prospect.

Farrelly's story begins in 1978 where his is pictured drawing his 'custom super van for the year 1990', a space-age bachelor pad on wheels, where his future self was a cyber god. Fast forward onto 1993 and the author finds himself a penniless student, still eagerly waiting for the brave new cyber dawn.

2.2 The cyber reality

Patrick's illusions are crushed after attending 'Cyber Expo 93', where what he thought would turn out to be a meeting of kindred spirits, turned out to be a 'bunch of rich snobs comparing expensive toys'. This grief was further compounded when he met a 'H.M. Ludens', the editor of a 'Future Shock' magazine who tells him that 'There is no Cyberculture'. Ludens explains further by stating that those who heavily promoted the concepts of 'Cyberculture' and 'Posthumanism' did so with the aim of creating lucrative careers for themselves, aiming to become consultants for the corporations who wanted to buy into their new zeitgeist. Disillusioned with the cyberculture movement and the people behind it, Patrick had an epiphany and vowed

to forget about all futurecentric trends, preferring to take control of his own destiny instead of waiting for the future to take care of him.

3 The network augmented human

In 1994 Patrick found employment in coding html in the new web page design industry. By this point the Internet had made the transition beyond underground bulletin board systems, universities and the military, to become a new form of mass media beamed into people's homes worldwide: a transformative force bringing electronic communication and information exchange to a new level of accessibility. There were no visceral flesh to network connectors needed to access this information superhighway, just the familiar screen and keyboard of a home pc. The human race was now computer networked.

3.1 An extension of the hand

As the 1990s moved on, it was clear that the impending new millennium was less and less likely to resemble the cyborg future of the film *Blade Runner.* Thanks to the World Wide Web, electronically networked humans were finally in a reality, without the need for 'jacking in' via gory 'bioport's. This reality was further augmented by the convergence of the Internet with mobile phone technology, enabling media-rich virtual telepresence. The cyborg motif of the robot hand became an appropriate figure of speech in the home of mobile communications giant Nokia.

> In the last couple of years, Finnish teenagers have quit referring to their mobile phones as jupinalle 'yuppie teddy bears' and started calling them kannykka or kanny, a Nokia trademark that passed into generic parlance and means an extension of the hand. (Silberman 1999) (Townsend 2000)

Conversely, the Power Glove from Nintendo in 1989 is a prime example of a peripheral directly referencing the cybernetic hand. Intended for use with the 8-bit NES console, the Power Glove featured flex sensors in each of its fingers, as well as ultrasonic sensors to determine its distance from the computer screen. Supported by only two Nintendo games, it failed to reach appeal for the mass market but it still remains an object of retro fetishism and a source of inspiration for research developments in homebrew virtual reality.

3.2 The new flesh

Australian artist Stelarc has taken it upon himself to physically embody the circuit grafting ideals laid down in cyberpunk literature. Working in collaboration with scientists and doctors he has connected up his body to a range of machinery, communicating to these through a nerve to muscle activated software known as Simbod. His works and performances bring to life an unnerving vision of a biomechanical future, presenting a symbiosis of metal and flesh akin to Tsukamoto Shinya's 'Tetsuo The Iron Man'.

> If Baudrillard's and Virilio's most extreme hypotheses argue that postmodern technology reduces the body to the condition of the handicapped, Marinetti, Chopin and Stelarc all demonstrate how technological modifications of the body reinforce the impact of installation art and performance art exploring (and manifesting) individual identity. (Zurbrugg 1999)

4 Posthuman creativity

The posthuman is fully comfortable creating with the technology that surrounds them. Electronic machinery, circuits and code are merely an extension of their own physicality and consciousness, malleable into the shapes of their expressions. Analogue synthesis pioneer Bob Moog explains his thoughts on the connection between the artist and the medium in the Hans Fjellestad's 2005 documentary:

> I know for a fact that musicians make contact with this board inside the instrument here ... not physical contact ... (Moog 2005)

4.1 New paints, new canvases

The wealth of media available on the Internet, coupled with the availability of cheap computer hardware, affords a near infinite palette for the digital creative:

> Everyone has been bombarded with media. We've almost been forced to use it as an art form. It's like anything. If people were handing out paint for free on the streets, I'm sure there would be a lot more painters right now. (Gillis 2007)

The 2007 documentary on digital copyright 'Good Copy, Bad Copy', Gregg Gillis a.k.a. DJ Girl Talk speaks about the saturation of media and how instead of been overwhelmed by the mountain of commercial music, artists are taking this readily available product and recycling it into their own compositions. Sven König's copyright infringement application 'sCrAmBlEd?HaCkZ!' takes media sampling and automates the process. The program splits up music videos into fragments and then reassembles these audio pieces live in sync with any inputted audio, such as vocal percussion: a musical tool born of the Internet age, processing the human voice into a reverberation of information fragments.

4.2 Digital throwbacks

The rapid evolution of computing hardware and consumer electronics has left an abundance of digital ephemera. Obsolete video games consoles, music making hardware, electronic toys. These vintage gadgets are not only of nostalgic value but also have great creative possibilities in the hands of the posthuman.

Two interlinked musical subcultures, the circuit bending and chiptune scenes, share this sentiment for the lo-tech gadgetry of the past with a hardware hackers zeal. Circuit bending is the creative short-circuiting of cheap electronic toys and gadgets to create new and unique sounds. Chiptune music, characterised by a 1980s video game style, is commonly composed on vintage gaming consoles such as the original Nintendo Gameboy. Both movements have used the Internet to effectively spread their subcultures worldwide, in turn leading to global gatherings in New York City for the Blip Festival and Bent Festival.

The field of low bit music has carved a unique aesthetic, harking back to the 8bit era but also evoking the vision of the cyberfuture promised to Patrick S. Farrelly's generation. Chunky pixel art with saturated palettes is mixed with imagery of first generation consoles and wire-strewn printed circuit boards. In this visual world the much maligned Power Glove is a mighty gauntlet rather than an obsolete plaything. Pixels bleed off screen onto t-shirts, album artwork, sculptures and paintings. Art reincarnates a past generation of gaming inspiration as a musical subculture of the present.

5 Conclusion

Far from been a fictional character in a romanticised version of the future, the posthuman, as an individual who effortlessly draws upon the digital domain as a creative source, is very much a widespread phenomenon. However, the bond between the digital creatives and their hardware tools is set to take a step closer to the visions of posthuman fiction.

Researchers at the RIKEN Brain Science Institute in Japan have succeeded in displaying images extracted by scanning a test subject's brain directly on a computer monitor. The benefits for artistic pursuit are immediately obvious. The ability to transform thoughts digitally into images marks a remarkable new step in human-machine symbiosis:

> The researchers suggest a future version of this technology could be applied in the fields of art and design - particularly if it becomes possible to quickly and accurately access images existing inside an artist's head. (Chunichi 2008)

The disembodied conscience of Gibson's fictional writings may become a literal tool of posthuman creativity after all. Science fiction eventually becomes science fact.

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The Meat Licence Proposal: proposing 'law' as a creative medium

John O'Shea

The vast majority of individuals in the U.K. would not be comfortable killing an animal. (It is often remarked that the U.K. is a nation of 'animal-lovers'.) However, a large proportion of those same individuals choose to eat meat: herein lies an uneasy, ethical, inconsistency.

It is not the case that individuals do not have a clear knowledge or understanding of the origins of this substance, 'meat,' (in which the act of killing is implicit). Instead, I suggest, the distance between the actual process of slaughter and, an often plastic wrapped, bloodless, product is wide enough to allow individuals to temporarily 'forget' their squeamish reservations and thus proceed to consume the 'fruits' of a labour they themselves would be unwilling to take part in:

This forgetting entails a gesture of what is called fetishist disavowel: 'I know, but I don't want to know that I know, so I don't know.' I know it, but I refuse to fully assume the consequences of this knowledge, so that I can continue acting as if I don't know it. (Zizek 2008: 46)

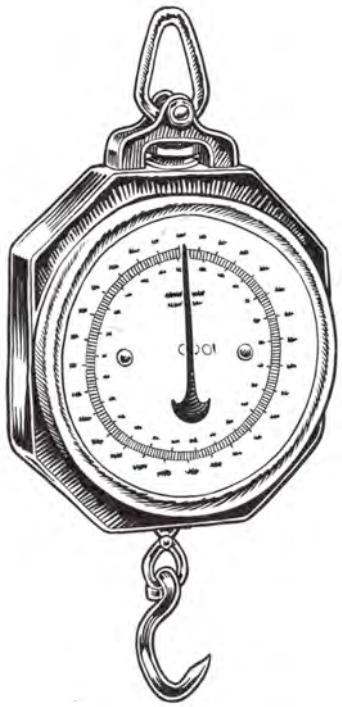
~~Product~~ Process Re-call

When suspect meat products caused actual physical harm to consumers, in the case of Mad Cow Disease and British Beef in the 80's and 90's, there followed government-led culls of animals and strategic control of beef distribution. In the case described above, however, the inconsistency does not arise in the product itself, but in how the product is being received. Whilst the division of labour and industrialised slaughter have enabled an unprecedented efficiency in the delivery of meat to the table, there has arisen an undesirable gulf between product and process.

In this paper, I propose that such a problem can be remedied through a new type of legislation – a law which compels engagement at the level of the individual.

Organisation

At the end of 2007, I began developing, what I have called, 'The Meat Licence Proposal,' an organisation advocating an across-the-board consumer engagement with the act of killing, implicit in meat production and consumption.



Since it's inception, the basic premise of The Meat Licence Proposal has remained practically unaltered:

> People who are comfortable with eating meat, should be equally comfortable with killing animals. People who are not comfortable with killing animals should not be allowed, by law, to purchase or consume meat.

As the name suggests, The Meat Licence Proposal, starts from the perspective, that individuals should only be allowed to purchase and consume meat if they hold an appropriate licence. Licences will be obtained through each individual's direct engagement in the supervised slaughter of corresponding animals.

Being duly convinced of the Proposal's own logic, in January of 2008 I made two important decisions for the future development of The Meat Licence Proposal:

1. Personally, a long time meat-eater, I adopted the principles of the Proposal myself, vowing from that point onwards, not to eat any meat until I had made the appropriate kills. (This, I reasoned, would not take very long, and I would start with a fishing trip 'quite soon.')

2. (Having 'tasted my own medicine') I vowed to sincerely work towards the development, formulation and enactment of a U.K. Meat Licensing Law, in whatever form it would ultimately take, setting a provisional date of January 1st, 2012 for 'going live'.

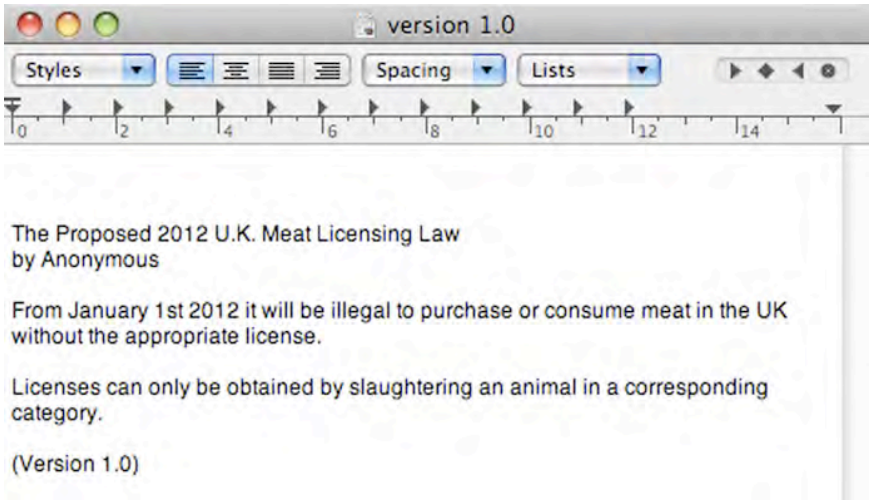
Inadvertently I had begun down two diverging streams in my attempt to realise the 'Licence'. The former, taking the 'licence' to be a kind of code, voluntarily adopted and internalised by the individual; the latter, conceiving of a 'law' which would be externally imposed, by government, making the 'Meat Licence' compulsory.

We will return to the notion of a voluntarily adopted code later in this paper but first I would like to outline my preliminary investigations in the field of lawmaking.

Law as a creative medium

Inspired by the phenomena, in both art and sport, whereby the introduction of the right restriction, can actually prove to be creatively enabling rather than being prohibitive, I was curious at this stage as to whether it might be possible to script interesting and creative laws which could subtly transform the way we relate to one and another and our environment.

In order to gauge the difficulty of the task, the most obvious and appropriate starting point was to personally attempt to write a 'Meat Licensing Law'. The result of this first attempt was quite modest:



My first attempt at writing a 'Meat Licencing Law', did however, bring aspects of the U.K. lawmaking process, into focus. I began to understand that, 'Law', in the form of legislation, is drafted by specialists within government, ratified by parliament and then imposed on citizens. Citizens could be regarded, in this equation, as 'consumers of law.'

I decided that The Meat Licence Proposal should operate on a different, more user-led model. I uploaded the first draft law to the web, accompanied it with a forum and, working with a small group of interested collaborators, began facilitating a public discussion about what form a 'Meat Licensing Law' might take. This notion, of treating citizens as co-developers of law, rather than end-users (or consumers) has a clear parity with, open-source software development models as described by Eric S. Raymond in 'The Cathedral and the Bazaar.':

> 6. TREATING YOUR USERS AS CO-DEVELOPERS IS YOUR LEAST-HASSLE ROUTE TO RAPID CODE IMPROVEMENT AND EFFECTIVE DEBUGGING. (Raymond 2001: 27)

Since then, The Meat Licence Proposal website has received numerous contributions in the form of forum posts, blog articles, pod-casts, illustrations and video work building a complex meta-architecture of potential forms for the 'Licence'. The Meat Licence Proposal, as an organisation has also facilitated debate in several 'real-world' public forums and hosted dinners, public meetings and talks.

From this very albeit brief experience, I believe that the arrival of unprecedented communications technology and highly networked non-geographic communities, will make direct, citizen-enacted, laws a distinct possibility for the U.K. in the very near future.

The logistical argument

One argument often made against The Meat Licence Proposal is that, on logistical grounds, it simply will not happen: too much change in infrastructure, too much change in behaviour and too much cost to the taxpayer, or so the argument goes. This objection is heartening to hear for two reasons:

1. Any logistical argument allows for The Meat Licence Proposal in principle.

2. A simple examination of bureaucratic procedures already in place, both in government and the private sector, quickly demonstrate that, with the right economic motivations, all kinds of seemingly unlikely operations can be carried out.

Below is a sketch proposing one possible way the 'Licencing' procedure could occur, by combining two existing elements of infrastructure already in place in the U.K:
(A). Vehicle M.O.T. Testing; a government scheme which occurs at private garages all over the country. Vehicle owners are required annually to go through this process in their own time and at personal expense.
(B). Halal Slaughter; the ritual act of killing can only be performed by a Muslim (although this is not a requirement at any of the other stages of animal processing.) The kill must be performed in a single swipe by a razor sharp knife.

A theoretical sketch

> David is 16 years old. He has considered his options and has decided that he would like to get his Meat Licence. David rings up his local slaughterhouse and arranges an appointment for Wednesday afternoon (when he is not at college.) On Wednesday, David arrives at 1.30pm and is asked to change into appropriate over-clothing (supplied) and spend 45 minutes going through a slaughterhouse induction along with fifteen other candidates. (It finishes with a short health and safety test.) After a short break, all of the candidates

return to the classroom for a 45 minute coaching session on the correct slashing action to ensure the animal will be killed humanely. (Two candidates leave at this stage.) Another short break and then it's down to the animal processing lanes and, at the very end, the supervised slaughter bay. David queues up and, when his turn arrives, an animal is brought to the bay for dispatch. Job done, David then gets changed and goes home. His Meat Licence is in the post.

Full circle

The Creative Commons movement allows individuals to determine what restrictions are placed on their intellectual property when it is published to the net, by downloading one of several, regularly updated, user-friendly licences. An equivalent to this approach, allowing individuals to subscribe to and advocate particular ethical frameworks, could signal the right direction for building grassroots support for the Meat Licence concept.

If we can start to understand law as a technology and develop appropriate interfaces for citizen interaction and intervention then, perhaps, we can narrow the current gulf between citizen and lawmaker.

Human animal hierarchy

It is important to recognise that The Meat Licence Proposal does not set out to disturb humankind's assumed dominion over beasts. Also it is explicitly *not* a pro-vegetarian organisation – it is an organisation which aims to enable all citizens to engage fully in the act of killing - implicit in meat production - and to facilitate those individuals wishing to eat meat, in the supervised slaughter of appropriate animals. What we must do is bring nonhuman animals within our sphere of moral concern. (Singer 1995: 20)

Since individuals will be required to consider their own relation to the killing of animals, long before they are allowed to consume meat, the 'Meat Licence', in whatever form it takes, creates a new threshold in terms of consuming meat. It is not so much that a new ethical boundary is ascribed (people have always been able to decide whether they want to eat meat or not), but, that the focus of ethical enquiry is shifted from the point-of-sale and dinner table to the slaughterhouse.'Post-Meat

Licence' we would no longer consider a demographic of 'meat-eaters or vegetarians' but 'killers or non-killers.'

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Thinking of oneself as an aging computer / Thinking of (an aging) oneself as a computer

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At the second ISEA in 1990 I gave a paper that went on to be widely published (Pryor 1991: 585). Entitled 'Thinking Of Oneself as a Computer', the paper pointed out that people were starting to talk about themselves as if they were computers; the computer seemed to be becoming a new metaphor for the self.

Today this observation is hardly new; in fact, it is commonplace to hear references to, for example, 'hardwired' brains and 'programmed' cells, as if the metaphor has been thoroughly and unquestioningly assimilated. There is at least one PhD involved in analyzing the contemporary manifestations of this idea (should I say this 'meme'?). However, that is not my intention here. Instead I want to very briefly update my own analysis by subjectively examining it in the light of an activity that dare not speak its name, that is, of *aging*.

My first paper pointed out that:

> [t]hroughout history there has been an intimate relationship between the latest technological advances and the metaphor of the self. This is somewhat of a 'chicken and egg' relationship - it is hard to say which comes first, the technology or the view of ourselves. The Greeks lived in a technology based on craft and likened the person to a clay vessel. In the seventeenth century the advent of clocks enabled Rene Descartes to compare a sick man with a badly-made clock. Since then machinery has continued as a metaphor of the self in a way that is largely subconscious: people speak of being rusty or sharp, broken down, running on empty, etc. Today, as the boundary blurs between technology and the body, people seem to be shifting almost unconsciously from this mechanical model of themselves to a model based on computer technology (Pryor 1991).

Metaphors can be useful. In 1990 my understanding of the computer was of a fusion of hardware and software (today I would give equally strong emphasis to networks and interconnectivity). Applying the hardware/software pair to oneself seemed to correlate with other apparently dualist constructions: mind/body, reason/emotion, self/other and male/female. Analyzing this from first principles, with only a minimal knowledge of philosophy (or linguistics), I linked the first items in all these pairs. The concept of the self as software emerged, the idea that one's subjectivity or sense of self could be reduced to software, to an algorithm, to a set of instructions that could operate independently of the body. At first this seemed quite reasonable, even attractive. I was quite keen to ignore my own body as I felt that it was the source of my own vulnerabilities. However, as I thought it through, I saw the inadequacy of an algorithmic sense of self, one that denied the body's role in subjectivity; this could also only include the parts of ourselves of which we are aware (for example, just the conscious part of the mind).

	**If you neglect your body it will revenge itself by making you lose your mind** **(**Isnard)

Nineteen years later, Oneself is committing the apparent crime of aging. In contrast, the computer is forever fresh and new (although not, of course, the one used to write the first paper). What can I conclude from the passage of this time? Firstly, I am now influenced, to use an exhausted metaphor, by the groundbreaking theory of language and communication, Integrationism. I would no longer expect word categories, such as mind vs. body, to be useful containers of information or even clarification. Secondly, I now understand that it is impossible to separate myself from my body at all. I am more aware of its watery vulnerabilities as well as its miracles; of what cranial osteopath Claire Thompson calls the 'stretchy bag of salty water' (Thompson, 2009). The consequences of bad health habits no longer seem so distant and I know that I must prepare for fragility, however far away. Paradoxically I am also engaged by Eckhart Tolle's exhortation to free ourselves from identification with the past and the future; from identification with the thinking mind. Tolle asks;

> Do you treat *this moment* as if it were an obstacle to be overcome? Do you feel you have a future moment to get to that is more important? (Tolle 2003: 42).

And when the future moment finally arrives, will it be treated as just another present moment also on the way to somewhere else? Tolle makes a good point here, so I am groping my way to living in what he and others call the Now.

The computer and I have aged very differently, thus presenting another rupture of a computer-human metaphor. The computer I used back then may still function today although it is more likely to have had hardware failure. In any case, whether functional or not, it is much more likely to have been thrown in a rubbish tip somewhere. It became out of date in a couple of years and increasingly incompatible with the modern world. So we have to consider whether when we use a 'computer' metaphor we are referring to something idealized, something that is forever the current model, forever up-to-date. We need to be much more specific.

As for me, a living being, I function very well and moreover, am still above ground. I have of course found it much more easy to be compatible with the modern world. As for the aging process, although nothing entirely explains it, the consequences of damage to DNA and hence to cell replication are certainly involved. It is ironic that, as Sue McCauley said to me, the free radicals sound like so much more fun than the anti-oxidants! And does anyone actually die just from old age itself? Cell biologist Lewis Wolpert claims that this question remains unanswered but that death is almost always accompanied by the abnormal behaviour of cells (Wolpert 2009: 154).

What can I conclude from many years of involvement in the rhetoric of a quest for, and invention of, a 'better' future with computer technology? Did it ever happen or has it constantly receded into the distance? I cannot answer that here. At the same time as I am more interested than ever in the invention of assistive technologies (both communicational and biological), I find it quite important to recall Tolle's advice: return through the body to living in the *present moment* (rather than in the past or the future) and detach from the idea that something in *the future* will save me or make me happy. And I want to reiterate that the unquestioning adoption of a computational way of understanding ourselves is not only limiting but also potentially dangerous. If the concept of posthumanism does indeed draw attention to convergent spaces of biology and artifice as well as rupturing polarized bioconservative/technoprogressive positions, I would argue that it needs to develop within a clear understanding of the limitations of our presuppositions about ourselves.

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eye>hand>body>
data visualisation and the body in new media works

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Abstract

This paper points to a theoretical framework of our interests in a developing taxonomy of data-mapped art objects, the appropriateness of embodied interfaces for data-mapped art, and our own practice led research (see our collaborative project *subscape*).

The proliferation of digital data demand that artists engage with the aesthetics, forms and politics of datamapping. From molecular to stellar, from deeply personal to global, the growing scope of digital data has had a profound effect on ontology and subjectivity. Today we try to understand the complexity of socio-enviro-political systems through a proliferation of data, and its myriad forms of imprintedness (visualisation).

From dynamic weather maps, to virtual heritage and epidemiology, from tracking polluted water to pattern recognition in complex crimes like corporate fraud, new strata of subjects and subjectivity emerge. We are enmeshed in a data economy that is more complex and generative than we could have imagined.

This impactful phenomenon is further complicated by the cultural specificity of the forms, strategies and aesthetics of visualisation. New strata of subjects and subjectivity emerge, yet new mapping technologies do *not* necessarily interrogate, celebrate or account for the poetic and speculative affects of human consciousness and subjectivity in space. Access to data and complex visualisations does *not* necessarily make for a more culturally sensitive or comprehensive understanding of ‘deep space’, that combinative trope of physical place and social connectedness that we inhabit and that art seeks to access.

The key questions posed by this paper are: How can artists account for and make sense of this proliferation of data to capitalise on ecological, computational and embodied forms to explore a range of strategies such as generative systems, patterns and poetics in creating an affective experience for the audience/viewer/participant? What do convergent spaces of biology and artifice offer the multi-layered conceptual apparatus that is the data-mapped art object? What new shifts of art and design forms, and modes of sensory experience, can alter the audiences' experience and make 'deep space' of complex datamapping?

What is datamapping and why is it well placed as an artform to operate within the convergent spaces of biology and artifice?

Datamapping as artistic practice evolved partially as a response to the computational use of visualisation in scientific disciplines, what we can comfortably call information visualisation. Information visualisation maps abstract data to visual or multi-modal representations to elucidate patterns and reveal relationships. Information visualisation has allowed for the expression and comprehension of a different perspective on the world of abundant yet hidden data that normally falls outside our senses (Manovich 2002). Datamapping as a strategy uses a process of creating data element mappings between two distinct data models. Data mapping can be seen to be a process of revealing relationships, whereas data visualisation is used to describe the practice of visualising data. The two are not mutually exclusive, though for our purposes here it is important to note this difference.

To contribute usefully to design practices in new media works, we need to break out of a flat taxonomy into a relational understanding of an embodied relationship to data. Digital data is extraordinary, it has a certain independence, a life of its own – it holds only a tangential, non-mimetic relationship to the subject that was quantified during data collection. Data is the product of abstract thought, reflecting its own behaviours not those of its 'content'; it is 'non-material', abstract, ethereal. Yet we can treat data as matter, precisely because its capacity for 'being-imprinted' is a variable. It can easily accommodate the crunching of large numbers or be *mapped* and configured across two, three or four dimensions, at various levels of saturation. This 'non matter' can be manipulated, sampled, compressed, expanded; its flow can be animated, made to swarm, be still, disperse and remass. Displaying these characteristics, it retains some of its provenance from a 'terrain textured by objects and held together by passion, knowledge and matter.' (Munster 2007: 85).

Freed from the constraints of the analogue, digital data can cut loose and be released into its capacity for imprintedness – it can be *mapped* onto anything with the potential for being inscripted or imprinted. For instance; the body, cyberspace, a video stream, other dataflows or datasets. The datamapped mass can behave as one but will also be comprised of its molecular components, each exhibiting its own behaviour: hence the capacity for emergence; pattern formation, recursive effect, complex and unexpected behaviours, densities and sparseness, emerging from simple rules applied to and/or extracted from the data mass.

In this way the datamapped object is a contemporary instance of the rhizome as described by Gilles Deleuze and Felix Guattari last century. For them, a rhizome is a flow not an imprint; it is not unconscious and closed in on itself but it is a structure of organised interconnection, a machinic assemblage of utterances embedded intrinsically within social discourses of power, drawing its roots and tubers from that power discourse - just as a datamapping object draws it's data from outside itself. A rhizome is 'agglomerating very diverse acts, not only linguistic, but also perceptive, mimetic, gestural, and cognitive: there is no language in itself, nor are there any linguistic universals, only a throng of dialects, patois, slangs, and specialized languages' (Deleuze and Guattari 1987: 8). And just as we understand the 'subject' as not unified, the rhizome has no fixed centre on which to pivot but exists as a set of dynamic imperatives across scale. There is a constant movement of meaning, non dominant and not fixed - and the rhizome can be ceaselessly modified - unhinged, ripped, inverted - by any configuration of audience. Deleuze and Guattari's rhizome is an important and resonant precedent in understanding digital terrains; as a model it accounts for heterogeneous, mobile, and imperfect networks.

Delueze and Guattari explain how the rhizome always has multiple entry points, and is open to performance. By fostering dynamic and rupturing 'lines of flight' *between* bodies, *between* fields, it is open and connectable - it is a system of intensities, variable speeds, transformations. Famously, the philosophers go on to describe the human body as rhizome, its nerve endings as tubers, and hence the body is able to engage with other rhizomes in an exchange and deterritorialisation. For us, the rhizome accounts for the potential embodied flows *between* the datamapped art object and the audience as an open system of nerves, consciousness, shifting subjectivities. Thus the audience is the co-creator of the embodied experience, rhizome to rhizome.

For Anna Munster, this is also the case as 'information flows through nodes and concentrations of interest clusters, institutions, habits and transformations. It provides us with a sense in which data, users and designers - and hence information and knowledge systems - are not things or endpoints but are dynamicaly *networked*' (Munster 2007: 79). For this deterritorialisation to be really effective (and affective), we are arguing that the artist needs to use an embodied interface to create a convergent space *between* artifice and body. The rhizometric, datamapped art needs to break out of the boundaries of the screen, to engage with the embodied participate, and thus to realise its full potential as open destiny and complexification, and to move away from any mid 20th century construction of the subject as fixed, interior and centralised. What is needed is a process that can overturn the codes that stratify the rhizome and allow full expression of its valencies, so that it can express it's ‘becoming’.

The convergence of eye>hand>body with the datamapped entity and creating affective experiences

Munster argues that in early manifestations of natural taxonomies - such as the *wunderkammer* - designers utilised the audiences’ spatial consciousness to enhance appreciation and experience, and to compensate for the taxonomic constraints and limitations of the collection. Digital media is incorporeal, and aesthetic strategies in the art of datamapping need to *bridge* that incoporeality with the audiences’ potentially potent, material, embodied experience - in short, the artists need to facilitate the audience as co-creator of an *affective* experience that can 'operate to draw intensive connections between the actions and affects of bodies and the forces of digital code.' (Munster 2007: 85)

Brian Massumi navigates a complex terrain of philosophy, psychology and art theory to argue that affect is essentially ‘intensity’ - a confluence of the physiological, the autonomic, the embodied that is not connected to the content of the image in any logical or straightforward way. While both intensity/affect and qualification (depth reactions belonging to the form/content level) are immediately embodied, it is affect that is a 'non-conscious, never to be conscious autonomic reminder.' (Massumi 2002: 25) Affect is not emotion, but could be argued as qualifiable - as a *static* emotional state, emotion being a process which belongs more to the categories/orders of experience associated with language (visual and textural), narrative, suspense and

disruption. Massumi argues successfully that as master narratives appear to have foundered, intensity/affect is central to an understanding of our late capitalist culture - that the creation of affective experiences is a primary aim of modern art and culture products. Consider the investment in special effects in cinema, the proliferation of mass embodied events like raves, the access to phsyiological experiences like water parks, speed rides etc. The problem is that there are few if any cultural-theoretical vocabularies specific to affect - existing vocabularies having been derived from theories of signification wedded to structure.

Massumi clearly shows that affect as an embodied experience is connected to the ways in which the body is able to engage in space and with itself - how the evolution of perceptive functions such as sight and spatial coordination evolve as a confluence of movement, touch, sight, and feedback from the world. This helps us understand and justify the role of a fully embodied interface in the aim of manifesting affective experiences for the audience.

Strategies including practice-led research and experience design

Artworks employing data visualisation as their main terrain are characterised less by the media in which the outcomes are presented, than by their emphasis on process. These processes include techniques such as generative systems, artificial intelligence, combinative strategies and data mining. Artists using design methodologies to accommodate the demand for new sensory experiences, and to engage with emergent technologies and services, are employing practice-led research and reflective practice techniques in a conscious way.

Brenda Laurel, Nathan Shedroff (Shedroff 2000) and most contemporary data visualisation designers have correctly expressed that interactive media 'is not about information, it is about experience.' Practices and processes that engage with embodied sensory experiences, technologies and services associated with data visualisation require a framing of the experience as the central driving design factor. Experience design as a methodology does this expressly through user-led design, and through the development of meta-design toolsets – discourses and disciplines which emphasise the audiences' experience, poteniality and outcomes. This is important given the rhizomatic nature of both the participant and work.

To chart these approaches, we are developing a schemata (Table 1) for understanding the artistic, aesthetic, design and audience strategies used in datamapped art objects. Works have been organised under three preliminary categories that outline the approach according to the work's rhizomatic engagement with the participant. Although a range of presentation and datamapping strategies may be used in *each* category, it is the focus on embodiment that drives the differentiation. For example, George Khut's work *Cardiomorphologies* is an excellent exemplar of the Data-Borg, where the body of the participant provides the data (specifically breathing and blood flow/rate) which is fed directly back via datamapping into the (Data-Borg) system.

Datamapping Type	Description	Strategy	Embodiment mechanism	Example
Data-Ecology:	Representation of the data ecology as a *closed* system. A tight ecosystem where relationships are expressed to present those relationships as information. Used to show cause, context or a collaboration.	Datamapping: cross mapping 2 or more sets to re-present and display hidden relationships.	Can be from outside- though it is only as viewer. Trace rather than map. Passive viewing.	They rule, Josh On. subscapePROOF. Waterson and Richards
Data-Eco-net:	Representation of the data ecology as an *open* though proscribed system. The relationships between the datasets and the influence on each other generates the work, with outside or networked data being drawn in to create a generative system. Used to show multiple causes, variable contexts and plasticity of ecosystems.	Datamapping: cross mapping 2 or more sets to re-present and display hidden relationships. Web enabled data streams with participation or harvesting.	Contribution to data sets live. Manipulation of datasets to influence system. Agency, flow and soft edges. Map rather than trace. Passive and active viewing.	We feel Fine, Harris, and Kamvar. 33ºsouth/sur. Waterson and Salazar subscapeBALTIC. Waterson and Richards
Data-Borg:	Representation of the data ecology as a *closed* or *open* system. Humanising the data to reflect aspects of self in the system.	Anything that uses a representation of the physical and relative value of a human.	Human direct in the mix- datamining bodies. Active viewing and participation as data source. Agency, flow and soft edges. Capacity for affective experience.	Cardiomorphologies, Khut, George (Poonkhin). Pockets Full of Memories II, Legrady, George. Hyperbolic Crochet Reef, Institute for Figuring. Rider Spoke, Blast Theory Running the numbers, Chris Jordan subscapeUTOPIA. Waterson and Richards Bystander. Richards and Gibson.

Table 1: Preliminary taxonomy for artworks based on datamapping

In summary, our paper explores the specificity of digital datamapping, and posits new ecologies of full body engagement with data through the metaphor of the rhizome. New ways of articulating affect in embodied media have recently informed and allowed for further scope in contemporary design processes. Art that uses a convergence of biology and artifice in its strategic design will potentially make for a more culturally sensitive and comprehensive understanding of 'deep space' and transmogrify data to knowledge.

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Listening to the image: photography between representation and discourse

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Abstract

From Aristotle's proposition that the soul never thinks without a mental image, to Kant's call for non-representational 'image-less' rational thinking, and to the more recent attempts by post-modern philosophers[1] to find dialectical solidarity between image-based, rational thinking and mathematical metaphysics, the exploration of the link between human thought and images has been an influential creative catalyst of Western philosophy and visual culture. In the present age of New Media and the worldwide web when images are stored and transmitted electronically as binary files, the question of whether thought can be expressed as (digital) image acquires new urgent significance, particularly given the mobile transmission, immersive gaming and virtual archiving that now become basic ingredients to our everyday lives. The question becomes: where can we locate the materiality of digital photographic images transmitted in rapid volleys across networks, shared between computers and beamed from one handheld device to another? How does materiality of the image emerge in an environment that no longer requires any concrete, physical presence?

I

The proliferation of photography both in print and electronic media, is one of the main attributes of Digital Culture, but the influence of photography does not stop with art and humanities: the world of science is involved with photography in a different way but to no lesser extent than the world of art. The digital photographic image is unique in being deeply relevant to a range of disciplines that don't otherwise share many other common interests. This does not mean that the photographic image plays a similar role in the Humanities and in the Sciences. The opposite is true – within each discipline involved with digital photography there exist separate and independent practices of viewing, archiving and interpreting photographs.

The triumph of the digital image as the basic semantic unit of digital culture is evident within a wide range of socio-political and cultural processes; from images of distant

[1] I am thinking especially about the work of Badiou, Virilio, Le Doeuff

nebulas recorded by orbit telescopes to images of sub-atomic particles, to representations of the swine flue virus obtained by electronic microscopes. And yet, despite the omnipresence of the digital image and its dual role as a means of surveillance on the one hand and as means of entertainment on the other, up to the present moment traditional photographic theory did not develop a comprehensive approach to deal with the materiality of the digital image. Partially, this is due to the general premise that the photograph is a representation of an object in the real world, and partially this is due to the notion that every photographic image can be traced back to the negative from which it was made, establishing a direct connection between the original and all the subsequent copies.

Photography is traditionally seen as a visual medium, as a form of mechanical painting. This approach is especially evident in the corpus of photographic theory that explores the meaning of the image with the tools of semiotics and structuralism. At the heart of this interpretative work there is the assumption that the photograph is a form of representation. In the post-industrial, techno-scientific world, this assumption seems dangerously problematic: we are surrounded by images whose connection to objects in the real world is questionable or non-existent.

For the theory of digital photography to move beyond the constrains of traditional semiotic and structuralist analysis, it has to develop a way of thinking about digital media as a non-representational environment which produces political and aesthetic meaning through polyrhythm, seriality, repetition and bricolage. As digital images lose the representational connection with real world objects and become simulations of virtual realities, it is no longer a question of looking at images but rather of tuning into the rhythms, the patterns and the variations generated by images that do not represent anything outside themselves.

II

The digital turn within photography is characterised by the crisis of the visual, the demise of the still photograph and the redundancy of authorship in photography. Within the study of photographic theory, the digital shift was largely perceived as quantitative, not qualitative. The revolution brought about by digital imaging was reduced to technologies, enveloped in historical analogies and explained away with dystopian rhetoric. Following the triumph of digital technologies as the driving force of Western Culture, photography underwent a series of metamorphoses which

significantly altered our understanding of it. In a relatively short period both the practice of photography and its theoretical foundations became the site of dramatic changes. Take one example: 1980’s Trivial Pursuit question, 'who is the biggest buyer of silver in the world?' (answer Kodak), can now be updated to 'Who is the biggest manufacturer of cameras in the world?' (answer Nokia). This revolution in photography occurred in conjunction with a deep shift in mobile multimedia communications. The merging of the camera with the telephone attached photography to the most important device of personal communications that ever existed – the mobile phone. As Kristo´f Nyiri observes:

> Combining the option of voice calls with text messaging, MMS, as well as e-mail, and on its way to becoming the natural interface through which to conduct shopping, banking, booking flights, and checking in, the mobile phone is obviously turning into the single unique instrument of mediated communication, mediating not just between people, but also between people and institutions, and indeed between people and the world of inanimate objects. (Nyiri 2005: 2)

The fusion of photography with mobile phone technology helped to create a culture of digital images which circulate the worldwide web as streams of data spontaneously and instantly picked out of vast databases and merged temporarily through such online practices as social networking, tagging, compositing and archiving.
The merging of photography with mobile multimedia challenges the traditional notion that a photograph is a ciphered message that needs to be unpacked with the tools of semiology and structuralism. This challenge extends to the whole concept of authorship of the image, and that for two reasons. First, the meaning of digital images is largely determined by the context within which the image appears, which means that it is unstable and changeable. Second, because the very idea of meaning, as a representation of an object in the real world is itself problematic and questionable within a culture of images transmitted through the communication networks of mobile telecommunications and the Internet. As raw image data is passed across networks as binary code, connections are often made which are random and accidental. The ease with which image data can be placed in radically new contexts, creates momentary continuities and produces temporal meanings which cannot be explored by focusing on the subject of the image alone. In this climate, the notion of authorship of the image looses its traditional meaning, as the

image data is open to modification by display algorithms and by the editing abilities of each user.

The crisis of authorship has another dimension. Since digital image making conquered the mainstream of photography, amateur photography has overtaken professional photography as the main supplier of images to print and screen publishing. Given the increasing popularity of digital cameras and the ease with which images can be shared across the internet and various mobile networks, this is hardly surprising, but it does mean that photography can not be evaluated, or examined based on the work of selected 'masters of photography' whose work is championed by the museums, the galleries and the art magazines. The amateurisation of photography means that contemporary digital photography is characterised not by the outstanding work of these masters, but by the mediocre photography of laypersons. Rather then a system for the production of works of art, digital photography is a system of distribution, copy and presentation in which the individual image is a nodal point, or a fractal shape which has no representational value of its own, but which participates in economies of meaning through connections with other, equally meaningless images.

It follows that digital photography is characterised not by the platonic distinction between the original and the copies but by a much more delicate and hidden difference between copies and simulacra. The digital image is a simulacrum because it has the capacity to be endlessly repeated and reproduced. In addition to that, it is also permanently unfinished and unstable due to the inherent malleability of the digital code and the process of continuous contextualisation through networking. This volatility of meaning and contextual instability of the digital image means that it cannot be examined fully in representational terms. The tools of semiotic and structural analysis are helpless in the face of images whose meaning keeps changing with each rendering at the hands of a display algorithm. It can be said that as simulacra, the products of digital photography resist the process of deciphering because they do not function as a representation but as a pure surface. The economy of representation is replaced by an economy of duplication and repetition. Up to the present moment traditional photographic theory did not develop a comprehensive approach to deal with the materiality of the digital image. Partially, this is due to the general premise that the photograph is a representation of an object in the real world, and partially it is due to the notion that every photographic image

can be traced back to the negative from which it was made, establishing a direct connection between the original and all the subsequent copies.

Yet it would be wrong to say, as many were saying at the start of the digital revolution, that the digital turn hails the death of photography. The most profound effect of the digital culture was to reveal the most concealed aspects of the photographic image by making them the most manifest. Through the examination of the digital image we come to appreciate the unfinished, the non-representational and the rhythmic aspects of photography. We come to realise that the photographic image, whether digital or analogue is always a process, never an object. Looking back at the history of photography through the perspective afforded by digital imaging we can see that the dual emphasis of photographic theory on representation, on the one hand, and on authorship on the other, is at best an incomplete account of the way photographic images operate. The examination of the digital image affords the insight that all acts of authorship are never-ending processes of assemblage, annotation, manipulation and attunment.

Lyotard remarked once that photography forced painting to become a philosophical activity; as photography took upon itself the task of representation, painting had to seek out the rule of formation of pictorial images in the same way that philosophy has to seek out the rule of philosophical sentences. (Lyotard 1991: 121). In a similar way, the triumph of the digital image forced photography to examine its own foundational principles. Digital culture made the task of representation redundant and obsolete, and forced photography to examine the rules of its own image making. This process of examining the foundational principles of photographic images has to embrace the incompleteness of the image as one of its central and fundamental qualities. It has to tune into the non-representational aspects of images: rhythms, repetitions, patterns and explore the meaningful structures created by images outside of the visual field. By exploring the ways in which digital image represent the unrepresentable we can account for its dominant role within contemporary culture.

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e. Menura Superba: posthuman dreams of ersatz animals

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Introduction

> … he ascended clad for venturing out, including his Ajex model Mountibank Lead Codpiece, to the covered roof pasture whereon his electric sheep 'grazed'. Whereon it, sophisticated piece of hardware that it was, chomped away in simulated contentment, bamboozling the other tenants of the building. Of course, some of their animals undoubtedly consisted of electronic circuitry fakes, too; he had never nosed into the matter, any more then they, his neighbors, had pried into the real workings of his sheep. Nothing could be more impolite. To say, 'Is your sheep genuine' would be worse breech of manners than to inquire whether a citizen's teeth, hair, or internal organs would test out authentic. (Dick 1977: 10-11)

Katherine Hayles' definition of what it means to be posthuman, extends beyond the anthropocentrism often implied by discourse around techno-progressive and bio-conservative approaches, to include a shift in assumptions about subjectivity - from the possessive (rational and objective) individualism of Modernist thought, to a subjectivity where there is 'no difference or absolute demarcations between bodily existence and computer simulation, cybernetic mechanism and biological organism, robot teleology and human goals.' (Hayles 1999: 3)

These demarcations are made problematic and ambiguous in Phillip K. Dick's speculative fiction *Do Androids Dream of Electric Sheep?* Dick's speculative fictions are not essentially about technology, as Bukatman notes, the target of Dick's satire is the 'mythifying uses to which [technology] is directed by forces of instrumental reason.' (Bukatman 1993: 53) While Dick's work has been noted as employing

science fiction to explore speculative futures of capitalist production, technology and subjectivity, we are interested in the way Dick unsettles the ontological ground of what constitutes human. Specifically, in *Do Androids Dream of Electric Sheep?,* by asking whether humanity may be measured not by an ability to reason, but rather by an ability to empathise with and care for other species, and perhaps by way of extension, the environment in which we live.

This paper discusses the artwork *e Menura Superba*, and the influence of the broad question - what it means to be posthuman - through the making of this interactive sculpture, based on the form of the Australian lyrebird. Such a discussion necessarily requires consideration of the different approaches to animals and the environment, as seen through the lenses of our selected sources of inspiration, and in the context of information about the impacts of human influenced climate change.

Dreams of electric lyre birds?

In Philip K. Dick's fictional, yet potentially prescient future, most animals have become extinct. The only humans remaining on Earth are those too sick to leave the planet. To maintain sanity in this dystopia, people use a form of technology enabling them to select emotional states to suit the needs of any given day. They measure their social worth through ownership of and care for (real or ersatz) animals. This society maintains a strong code of etiquette rendering it impolite to inquire whether one's animal is real or not. Yet despite this care for ersatz animals, there exists an intolerance of ersatz humans (androids), who are eliminated by bounty hunters should they fail a test (the *Voight-Kampff* test*),* which looks for 'normal' human emotional responses to questions that are principally focused around empathy towards animals.

Our desire for relationships with species (life) other than the human species extends into simulated worlds where we build robotic pets[1], or breed and keep virtual creatures[2]. Whilst none of these simulations are as lifelike as those described in

[1] For example see robot pets like such as the Sony Abio and the Ugobe Pleo animatronic dinosaur.
[2] There are numerous virtual pets for example Tamagotchis, Facebook cats, or Norns in the *Millennium Interactive Creatures*

Dick's novel, the emergence of this form of ersatz animal has prompted research into the ways humans interact with real as opposed to ersatz animals.[3]

The range of interactions between our human society and animals are many and varied. From pets to food, curiosities to national treasures, animals are loved, revered and feared. We selectively breed pets for companionship, keep collections of species in zoos and theme parks, engineer transgenic species for art and science, and employ animals from the humble earth worm to guide dogs. Our life on the planet is marked by this cohabitation, yet despite the superior intellect implied by Humanism (or perhaps because of this perspective), the need to achieve sustainable cohabitation, whilst long recognised, has proved difficult to achieve.

e. Menura Superba considers fictional, historical, and contemporary interactions with animals to discover what this behaviour reveals about shifting and static views on the nature of humanity. From an historical context, we considered the practice of displaying taxidermy specimens and live species. This was a popular activity among Kings, nobility and wealthy travellers during the centuries marked by European exploration of the rest of the world. As some of the world's first 'tourists' they collected these specimens for display in their homes as trophies of the exotic lands they visited, and like the characters in Dick's novel, these animals served also as symbols of wealth and status.

Knowledge of the Australian lyrebird reached Europe principally through the work of English ornithologist John Gould, who collected specimens of a significant number of Australian birds, including *Menura Superba* (the lyrebird), for sale as a valuable commodity. Of Gould's collection Smith notes '*Menura* specimens, whether for display or dissection, were among his most valued acquisitions, parcelled out to leading ornithologists and anatomists as well as to wealthy patrons (2007: 579).

When Enlightenment scientists worked to discover, study and preserve exotic fauna and flora found in the new world, they presumably did not intend this knowledge to enable destruction of the environments they explored. Nevertheless, indications of this potential were evident in the way these animals were objectified as symbols of wealth and status. A quote from John Gould's *Birds of Australia* describing how to

[3] For example see studies such as *Robotic Pets and Children: A Developmental Study*. Melson, G. Beck, A.M. and Friedman B. (2004), *Robotic Pets and the Elderly*, Edwards, N. and Beck A.M. (2004)

capture a Menura specimen, illustrates the problematic nature of this early form of scientific study:

> Another successful mode of procuring specimens, is by wearing a tail of the plumaged mail in the hat, keeping it constantly in motion, and concealing the person among the bushes … it will be attracted within range of the gun. (1848, Vol 3: 34)

Whilst the humanist approach to nature demonstrated a broad aesthetic appreciation, it was/is most valued as a source of raw materials, for processing into tools that improve the quality of human life. In Australia, the area known as Botany Bay perhaps best illustrates this objectification of natural resources. So named by botanist Joseph Banks because of its abundance of previously unknown plant species, significant amounts of native vegetation has now been cleared from land in the area to accommodate a shipping port, an airport and an oil refinery. Just 324 hectares of preserved bush land remain.

In contrast to this approach to nature, Dick's novel taps into a posthumanist sense that we are perhaps defined by our symbiotic connections with the ecosystems we inhabit. In Dick's future, destruction of species has progressed to the point where most large mammals, birds and reptiles, are incredibly rare or extinct. Care for animals is a civic duty, and vegetarianism is no longer an exception, but rather the rule. Yet whilst the characters in Dick's world would be repulsed by our historical and contemporary treatment of animals, vestiges of objectification remain as ownership of animals (real, taxidermied or ersatz) continues to be a form of commodity fetishism. The value of each animal in the fiction is listed in *Sidney's Catalogue.* Those who cannot afford a real animal purchase artificial animals and care for them as if they were real, in an attempt to maintain social standing.

About the work

In addition to its historical value as a trophy specimen, the lyrebird was selected because of the way it provides a measure of human impact on ecosystems. The lyrebird is known for its unusual calls that include the ability to mimic other birds' calls and sounds generated by human technology. For example, lyrebirds have been observed mimicking the sounds of cameras, car alarms and (disturbingly), chain saws. (Attenborough 2002) Thus the lyrebird is a gauge of our acoustic environment

as it mimics sound pollution, an often over looked interaction between human society and the natural world.

Our depiction of the lyrebird was taken from Gould's 1840-1848 painting of the lyrebird. We chose this stance because, despite his work as an ornithologist and a scientist, and his observations of wild specimens, he chose to depict the animal with its tail held in an unnatural upright position. In the wild, lyrebirds hold their tails out towards the back, in a line parallel with the ground. The tail only comes into the depicted upright position as the bird lifts its tail up over its head, extending the feathers out towards its front, during courtship displays.

Figure 1. Superb Lyrebird (*Menura novaehollandiae*) Published in *The Birds of Australia* 1840-48. Artists: J. Gould and E. Gould. Lithographer: E. Gould.

Smith argues that Gould manipulated his illustrations of the lyrebird, (and another Australian bird the bowerbird), to create an avian symbol for the royal family, and to align with aesthetic values of the day (making the bird notably reminiscent of the peacock though less ostentatious) (Smith, 2007).

Figure 2. A male Superb Lyrebird (*Menura novaehollandiae*) displaying courtship behaviour[4]

The selectively inaccurate representation of animal characteristics is, perhaps, symbolic of the way animals come to have meaning within human society, and are involved in defining what it is to be human (and post human), whilst also allowing humanity to separate itself from the animal kingdom.

In this work the naturally shy lyrebird, becomes curious. It is especially attracted by colourful clothing, and will sing and change the colour of its plumage in an attempt to attract an audience. This colour change is based on the bird's observation of its environment.

Through an embedded camera, *e. Menura Superba* collects images of colours from the audience's clothes, and builds a repertoire to display on the 35 tricolour LEDs placed under its polycarbonate plastic plumage. Abstract patterns from animal skins, plumage and plant textures, are displayed on OLED screens in the eye of the bird's tail. Other materials were sourced from post consumer waste (off cuts of stainless steel, brass, plastic, fibre optic and aluminium mesh). In addition to this visual mimicry, the bird mimics sound, but not in the same manner as the live specimen. Instead, it seeks out acoustic niches and selects suitable calls. Its repertoire ranges from known birdcalls through to sounds of human built-environments.

[4] Source: http://commons.wikimedia.org/wiki/File:Lantfarku.jpg visited 18 May 2009

Figure 3. *e. Menura Superba.* Gavin Sade and Priscilla Bracks 2009. Photograph: P. Bracks & G. Sade.

Conclusion

In Dick's fiction we see the final struggles of the liberal human subject in the face of a range of forces, not least of which being the destruction of the planet's environment, and the presence of artificial humans who are as real as technologically enhanced humans.

It is not so much the anthropocentric definitions of the posthuman that we find interesting - rather the changing relationship between the natural world and humanity that may be seen in the human and posthuman subject. The possessive individualism of Modernist Humanism, and the liberal capitalism fostered by this philosophy, are based on a narrow interpretation of Darwin's survival of the fittest. Most people do not consider themselves 'animals' as such. In reference to Darwin's 'survival of the fittest', we have discarded the second (and most important) part of his

statement - survival of the fittest *organism, within its environment.* By defining ourselves as human, we have sought to separate ourselves from the natural world, but in doing so we have destroyed significant portions of the environment upon which we are dependant. The blurring of boundaries that characterize the posthuman presents us with this stark reality.

The longing of Dick's characters feel for the environment lost, also reveals an innate relationship between humans and the environment, which extends beyond its function of sustenance. Perhaps, even if it were technologically possible, the majority of humanity might find it did not actually want to fully separate themselves from the environments that support life. In *Steps Towards an Ecology of Mind* (1973) Bateson points out that the unit of survival in Darwin's theory is actually *organism and environment*, as opposed to the popularly received Darwinian unit of organism alone, and that this is equivalent to the unit of mind and subject.

At this juncture, we find ourselves somewhere between the two figures, not yet posthuman but no longer liberal humanist either. *e. Menura Superba* was produced as a catalyst for thought about our position somewhere along this continuum of humanity.

Irrespective of standpoints such as bioconservative vs. technoprogressive, it is perhaps more important to consider whether one defines their humanity by the exploitation of technology, tools and resources, or, as part of the rich pattern of life on planet earth. The worlds promised by posthuman technology are indeed rich with possibility, but without corresponding steps to ensure the sustainability of technology and human society within the planet's Holocene ecosystems, we wonder whether the quality of that experience will remain rich if the environments become poor.

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'Lives and works well everywhere'

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'Low resolution' context

In a context of digitalised data, with the streaming of an intense and excessive amount of images and sounds - which sensitivity is at work? This - still new sensitivity - appearing in the younger generation in a world where data is shared, apparently free, downloadable and copyable, possibly lacks an awareness that this world is in fact accessible by paying an entrance and exit right.

One generally uses the expression 'low resolution' to describe the quality of images coming from the technique of data compression which suppresses some data in order to lighten the file size and thereby ease its circulation on the network or it’s storage on CD, DVD, or ipod. JPEG, MPEG and MP3 are algorythmic acronyms, not crude words for digital device users. To attempt to redefine, in more aesthetic words, this particular sensitivity (soft sensitivity) belonging to the web network, one cannot strictly speaking use the technical definition 'low resolution'. This expression means data circulation (texts, images, sounds), in terms of its production, distribution, reception and 'low definition', defines a single way of perceiving the world. This provokes a question of perception of making data enabled by using more or less sophisticated materials, more or less home-made audiovisual and data processing goods.

In this low definition context, what is the place of art? What is the artists' function? What kind of forms should they produce? Artists in operating in this context include; Serge Comte, Clôde Coulpier, Camille Laurelli, Fanette Muxart, Laura Kuusk, Fabrice Croux, Stéphane Sauzedde, Raphaël Charpentier, Guillaume Brissaud, Valentin Lechat, Jérémy Cortial, Séverine Gorlier. They exhibit in art centres and galleries, but they also perform during concerts and in public spaces. They are producing 'weak forms' on precarious 'supports'. They might produce a lot, or indeed, nothing at all. They have a taste for the 'almost nothing' and give this great

consideration and time. These artists tend to use the standardized web formats like blogs and My Space pages. Their sites are likely to be amateurs' publications. They also tend to multiply or grow their identity, which is also masked and slightly hidden behind groups such as Grruü, Renegade, The Kung Fu CowBoys, Super Polar, Antro, DJ Casquette, Trop tard, Capitaine sentiment. These artists play on stage and shoot video clips. The band Grruü, includes Chad, Elliott Marceau and Cyndelle Brasseur. Another group includes Fanette Muxart, Clôde Coulpier and Fabrice Croux. The group Capitaine sentiment consists of Fabrice Croux: each group has a different mood - sadness, happiness ….

All these groups are gathered under the label Dick Head Man Records (DHMR). Dick is real: his look or image draws from an Icelandic carton of milk. Dick Head Man Records is a label initiated by Clôde Coulpier. On the label website, you can find all the bands with video clips and photo albums of their performances. Their live concerts are held in private, but also as exhibitions that include by-products of art pieces including fan drawings, flyers and customized radio sets. Clôde Coulpier says that the label is a false yet real; it does exist as an entity - it is real, but also it is false because it doesn't enter into any commercial projects,

During the summer 2005, Clôde Coulpier occupied his parent's house in the Nièvre, near Nevers (at Clamecy). The guest room became an art residency space, entitled Résidence Minimum Exemplaire (RME). Ten other similar spaces are available; Ici art résidence, The Prizon, The Cool résidence, Ghost résidence, Popo Institute, La perruque, Résidence 49, Biosphère, Résidence normale, Résidence silence, Résidence Oxygène. These residencies are no more and no less than the houses and flats of artists' relatives. In these domestic spaces, artists live and work alone, with friends, or with several members of the family. The production is shown through an exhibition as photos on their blogs.

How to get out of the professional artistic time?

Characteristics of this type of work include the permanency of domestic habits, the importance of the Internet, having several identities, using work/occupation and the use of standard materials and 'weak forms'. This could be summed up as one formula: 'lives and works well everywhere'. One could re-qualify this sentence in more aesthetic terms as 'receptiveness and *desoeuvrement*'.

Naming these practices as 'fictional', one has to understand that these artists' residencies have no real legal frame, nor associative status and are alien to art institutions. These residencies, investing in home places, do not necessarily have a result, rather artists' are free to reveal or not reveal their creations using the Internet or in other exhibition places. Clôde Coulpier says:

> '… we realized that we can produce an energy in the work, without having to answer for it. That watching TV is still working. We realized that our production is abounding, an unexpected energy, entirely detached from any context or evaluation process. We self recognized ourselves.'

At the end of a first working session in Clamecy residency, they sent their production to friends, relatives, and also to the Tate. All their works mentioned that they had been realized within the framework of Résidence Minimum Exemplaire.

'Internet is a medium which enables us to make effective what is fictional', explains Clôde Coulpier. Internet is a key element in their artistic commitment. By investing standardized formats, social networks (My Space, Hi5, YouTube) as well as art centres and the musical scene, these young artists proclaim the power to create their own conditions for their appearances. They refuse unspoken orders. Unlike amateurs, they don't even try to emulate artists: they act as if they were musicians, and play art being artists. They don't seek fame and don't want their practices perceived as art. They rid themselves of the usual bondages of the art world, of the obligation to produce results. These kinds of practices have two main consequences:

1. Relying on self-publication on the web, they validate themselves, they become self-sufficient in relation to the classic and symbolic operations of the contemporary art world.

2. Because they are not attached to the issue of conserving their practices they can be considered part of a 'culture of low definition'. Furthermore their art might have several lives. Clôde Coulpier says: 'What happens in that kind of places, is actually the setting up of some conception of work; one doesn't do a lot, yet one does it fine.' These 'low definition practices' don't care much about their institutional visibility nor their position in the art world ecosystem - this is not their business. They participate in undefined projects which they will not capitalize. Thus it seems they implicitly express criticism of the normative system and its vacuity.

As a conclusion

These artists are not in opposition to institutions, nor do they aim to build a new system. They don’t seek to model rules drawn from their works. Their own identifiable logic is to *create their own conditions for their appearances*. Why is this so? These 'low resolution' practices don’t think that an artist has to become a content producer (for art galleries, art market, etc …). Rather, they have a different motivation - that of their own sense of their wellbeing - this is the gravity centre of their works. Many pieces evoke the issue of mood, of effort and of happiness itself. These artists' ask themselves this question: 'where and how might their art dwell?' They don’t look to negotiate nor to compromise. They *do* look for free situations, free time, free space: and this is why they can be considered 'available'. In philosophy, one could speak of *desoeuvrement* - that which is neither boredom, nor inactivity and this can be a power to create or not to create. These artists can be considered creative - even if they are not doing much or indeed have decided to do nothing at all.

Life cycle in digital system

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Keywords: digital media, biological life sciences, artistic imaginative vision, computer animation, music visualization, video.

Abstract

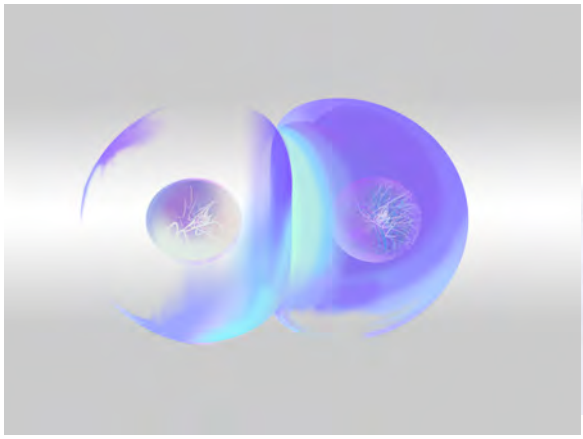
In exploring a perception of life growth and digital visual art, these new short animation films create a serial of new life cycle systems, by combining biological life sciences, artistic imaginative vision and music together. These artworks were invited to be shown in the 11th China ART Exhibition and Tsinghua University.

If only the clock of life would stop … if only we could stay forever young … if only our aged body could be reborn, like a new embryo in Spring, and we grow youthful again! Is this not the most dreamed dream we have been dreaming of? Yet this dream could actually be fulfilled - when we understand the key of the grand circulation of life. Do not say that it is death that gives the meaning to life, because this is only true if we have no knowledge to fight aging, and no power to go against death. We will all grow old in time and will all disappear someday, like each individual leaf on a tree. But the new leaves will keep growing out from the tree of life, season after season, generation after generation. The tree of life has grown for millions of years and it will continue to grow for millions of years. In this sense, this grand circulation makes our life the most beautiful and forever young. However this grand circulation goes through a seemingly vulnerable place we call placenta - the place where all life cycles begin.

In these works, 3D computer visualization techniques were used to create a scene that combined biological life sciences and artistic imaginative vision to create a serial of new life cycle systems. We use MAYA 2008, AFTER EFFECT for the animation and Sam created the sound.

Creative concept - art and visualization techniques

Many artists try to explore the notion of 'being' - what is behind the physical surface using imagination. Some of these artworks are helpful for contemporary science and even future research. With the development of technology, the tools for artwork have been extended from paper to mobile and from 2D to 3D. What kind of technology should be used, is a common question when considering how to best to show a creative concept. Whatever tools are used there are always impossibilities and possibilities during the production process.



Lifecycle 001. Hui Zhu

Lifecycle Script. Hui Zhu

Good design opens new avenues for the animation industry and markets.

Even though China's animation has a decades-long history, its animation industry can still be considered a young one. Despite widespread expansion, approximately half China's animation output is produced for other countries, and there is a serious shortage of original content animation and resources within the TV and film industry. The animation industry in China is mostly sustained by either government support or by jobs that are outsourced from other countries. The number of firms with the ability

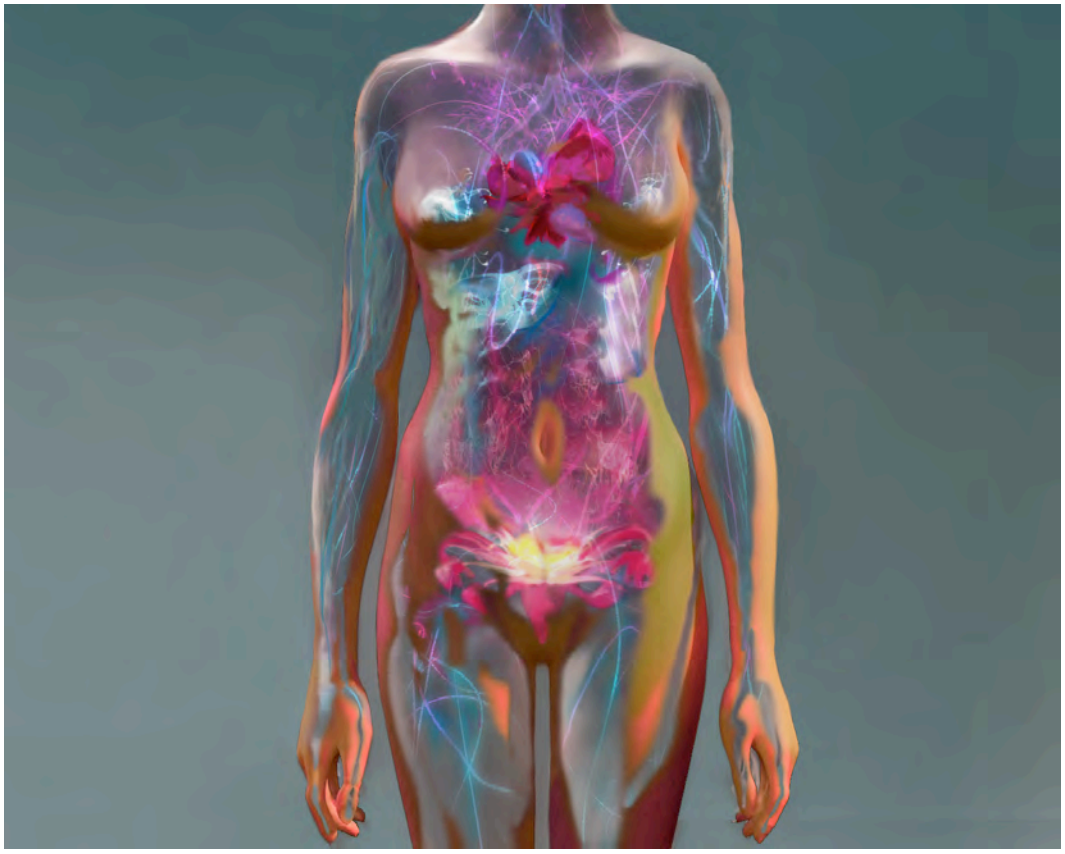
to produce individual animation pieces that exceed thirty minutes, falls drastically to the teens. Only a very few Chinese animation companies who create original content animation can survive within this environment - most have to rely on government support.

What is a successful design? Successful design will be a bridge to connect concept art and accessible technology. In this life cycle program initially the concept for the art was an idea that came from meditation. The idea is exciting but wispy. Based on our program investment, possibly 2D animation will be fit for such a phantasmagoric theme. However given the program deadline, possibly 3D animation is more controllable for a limited time scale. During the exploration of such a theme, we found similarities between life cycle wand digital art, such as from 1 to 0 code. Based on viewer's expectation, 3D computer visualization techniques were used to create a serial of process that combined biological life sciences and artistic imaginative vision to creatively show a new life cycle code.

Everything in the world is in constant change, including our bodies - in the form of split and fusion. In exploring a perception of life growing, more and more digital artwork creates various life cycle systems combining biological life sciences and artistic imaginative vision together: from representationalism to abstract expressionism, different forms express different modes of sensory delivery. With digital technology, this programme shows different views of life cycle, from inside to outside, from microcosm cells to macroscopic universe, from end to regeneration of life.

Individual and generational

One individual person could be viewed as himself or the representative of his generation, his nationality. The same can be applied to this life cycle program. There is only one female character who experiences youth to being old and regeneration. She can be looked at as one person or the whole of human kind, or the experience of one generation after another: it depends on different viewpoints, from inside to outside, from local to international.



Lifecycle002 Hui Zhu

We hope these digital imaginations might help enlighten, for some people, the reality of the genetic project. Do not say that it is death that gives the meaning to life - because this is true only if we have no knowledge to fight aging and no power to go against death.

06 Transformatory practices

The arts, innovation and commercial opportunities

Gavin Artz
Australian Network for Art and Technology

The arts, innovation and commercial opportunities?

The Australian Network for Art and Technology (ANAT) has been working with art, science and technology for 21 years. It has only been relatively recently that the innovation potential of the arts, particularly those working with technology, has been understood. Myths relating to artists not wishing to be commercial and the active marginalising of the arts in intellectual property (IP) development has meant that the arts are overlooked as a source for commercially viable IP. Through my work at ANAT I have experienced artists going through the patent process, rapid prototyping, engaging in scientific research and producing new applications in digital media. These old myths do not hold true. In this environment of innovation, models better suited to how artists work are needed. This paper argues that there is a much greater benefit to the arts, culture and artists through aligning the arts to research, innovation and entrepreneurial contexts, rather than in traditional cultural funding activities.

Scarcity and culture

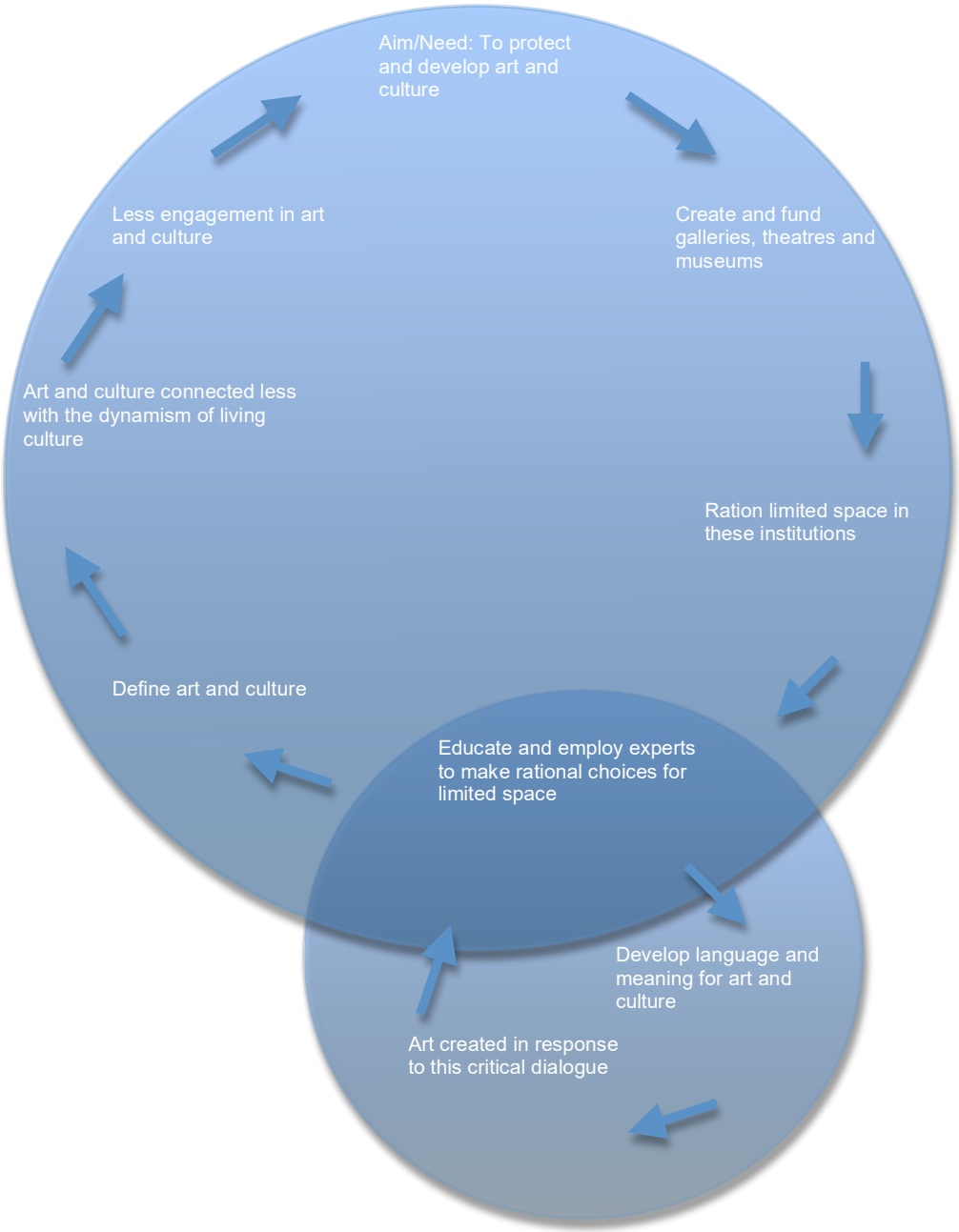
The arts have developed into a balancing loop system that can only exist through the marginalising of artists and through preventing the arts from being a part of our living culture. In the arts this marginalisation is very reverent, but marginalisation non-the less.

Acknowledging the diverse reasons for the founding of arts and cultural institutions, but focusing on the current use of these institutions, the starting point for a systems analysis (Kim, D. and Lannon-Kim 1994) of art and culture is society's efforts to protect, promote and profile art experiences. We have developed environments separate from our daily lives where these experiences are allowed to take place. If an art experience does not happen in these specialised environments, it becomes difficult to call it an art or cultural experience (Dickie 1974). These environments are

collections of our cultural history and as histories they are important, but they do not reflect on our living culture. The problem with living culture is that we do not notice it as something separate from us, yet art has become something separate from our daily life. Collections of our cultural history (i.e. museum pieces), continue to define for us what an art experience is and they have defined the art experience as one separate from our daily life.

This current revered marginalisation of artistic practice is reliant on economic principles of scarcity. There is a scarcity of gallery space and there is a scarcity of performance spaces because of an artificial rationing of the abundant resource of art and culture. In an attempt to promote and preserve arts and culture, society has forced itself into rationing arts and culture. To ration the scarce resource of venues in which to experience art and culture, experts need to be educated and employed to make justifiable choices in rationing. In the vein of Danto's (1964) analysis, experts need to develop a language and critical dialogue to have a rigorous process to justify rational choices for the use of scarce venues. The unintended consequence in this system is that if choices are based on this critical debate, then artists need to respond to this critical dialogue or they cannot be included in art and culture. Ultimately the venues created to promote, preserve and profile art and culture begin to define art and culture and a disconnect can arise between living culture and museum pieces; this is an effect of Beckers (1982) art worlds. Once this disconnect occurs art is less aligned to living culture and there is less engagement with art which reinforces the need to have institutions that preserve, promote and present art and culture and the system perpetuates itself (Figure 1). Any improvements or developments in this stable system have only come from non-systemic variation (Deming 1986). In the arts this is usually in the form of crisis heroism; the heroic artist, or art director. This though is a symptom of the problem and not the much needed solution.

Figure 1.



Abundance in a living culture

The balanced loop system of current arts and cultural funding perpetuates a system that will not improve. Putting more funding into the established system only removes the arts from living culture further and makes a citizen's daily life all the poorer. In the digital era there is an opportunity for the artificial scarcity to be disrupted. The media arts have an opportunity to utilise the abundance models (Anderson 2006) coming from the digital media industry to be a part of the living culture.

In the digital world there is a capacity to have a direct, unmediated, relationship with customers, culture and citizens. An individual does not have to choose how to ration the limited wall space in a gallery, or ration the compositions that will be played in a venue, or the ones that will make it to a CD/DVD. People can have a direct relationship with the work; it all can be made available.

The Long Tail (Anderson, 2006) economic theory is that the Internet has changed the 80/20 rule. The 80/20 rule is based on Perato's concepts, which in business tend to mean that 80% of your business comes from 20% of your customers. In a world of scarcity you focus on the 20% that gives you the 80% of your business. The Long Tail suggests that the Internet has given business the potential to economically access to the 80% of customers that have not been seen as cost effective in the past. This is because there are 197 million broadband connections worldwide, a figure that is growing rapidly (OECD, 2006) and which allows for niche markets to form around the ability to search for and acquire obscure products is therefore also growing. The cost of having these products available is negligible, so they can all be accessible.

Artists working in digital media can produce a game one day, artwork the next. In the digital world they all become interesting creative experiences that everyone can take part in. Some may not see them as art, but this is the key to a direct relationship with living culture. In this model there is the opportunity to use freemium, marketing or donation models to generate revenue that can support a creative freedom beyond art worlds. These works may never make it to a gallery, but because they do not fit the gallery mode and cannot be sold in the traditional art market then there was little chance that they were going to end up there anyway.

Innovation

If the arts are allowed to be a part of our living culture and not merely confined to art worlds then the barriers to integrating it with all aspects of society are reduced. Look at the arts freed from the balanced loop system constraints and it appears to be something that is much more aligned with innovation and research than it has been allowed to be.

Innovation case study

Julian Stadon is a media artist working in augmented reality who uses Second Life as a research tool. He has created code for making his work possible in second life. Currently he has developed a way of placing scans of internal organs into avatars. This Ancillary IP can be easily adapted to aid health practitioners using Second Life as a simulation tool. (Stadon 2009)

The language of innovation is built around the continuum between invention and innovation. In the art and science fields there is a focus on invention, but progressively there is a mandate from universities and research institutions driven by government polices to innovate. Innovation is the practical application of this research and is inherently commercial as practical applications resolve problems unlike pure inventions.

The significant division of HASS (Humanities, Arts and Social Sciences) and STEM (Science, Technology, Engineering and Medical) sectors have made innovation harder; dividing the cultural and political from the technical and scientific. Demanding innovation from a focused specialist in science or creative industries is counter productive, blunting the creative drive that makes these people valuable in the first place. Interdisciplinary research is where innovation can occur. ANAT has developed a successful model for interdisciplinary research between the arts and sciences and has placed artists in research facilities for the past decade. Commercial contracting of a portal into a scientific research environment by creative practitioners as scientific amateur has been the key to this. Both parties bring IP to the relationship and the contract carves up any potential IP created. Each party can benefit financially as well as professionally from the arrangement. The capacity to draw innovation from these art science collaborations relies heavily on artist's inventions being aimed at impacting their audience; people in a culture.

Art Science case study

Leah Heiss participated in an ANAT Art Science residency with Nanotechnology Victoria (NanoVic). NanoVic had invented a way of delivering medication through the skin. This invention only became an innovation when the creative practitioner was able express it as a relationship with humanity and culture. This expression was in

the form of wearable technology that gives the wearer the potential to have a different relationship with their illness. (ANAT 2009)

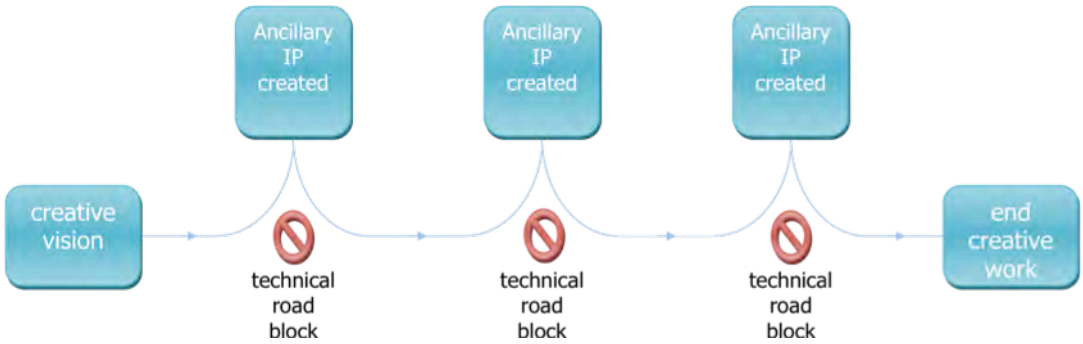
> I wanted to explore how you can augment personal artefacts like a ring or necklace with therapeutic qualities. Some people might want to keep their medical condition private. But on the other hand people might become proud to wear something that symbolizes the fact that they have this condition and that is not ugly. - Leah Heiss. (O'Dwyer 2008)

The technology inspired the artwork and the artwork created an innovation from the scientific invention.

Ancillary IPs

To release innovation from creative practitioners, by making them innovate, or become entrepreneurs is naive and damaging. While I argue that the work of artists is more aligned with research and innovation models, there needs to be a greater sophistication in the approaches for people working from a centre of creative vision. The reason these creative practitioners are useful in an innovation process is because of their personal creative drive and to force that drive to ends other than a personal vision destroys the very incentive to be creative. Ancillary IPs is a concept that focuses on the ongoing harvesting of IP that arises from creative practise. Ancillary IPs occur when, in the course of a practitioner pursuing their vision of a final work, they encounter difficulties (technical road blocks) that require the development of a technology, a device, process or code (Figure 2) (Artz 2008). In these tools that are developed to ensure the end creative work comes to fruition is where commercial possibilities arise.

Figure 2



There is an in-built resolution of a real problem in the Ancillary IPs. This halfway line between innovation and invention means there is a higher chance of finding like applications beyond the creative work, making for a very efficient research and development model for innovation. One of the key difficulties with working in this context is that trusted commercial partnerships need to be developed. These are intended to be long-term relationships where commercialisation partners return again and again to review and commercialise Ancillary IPs.

The concept of Ancillary IP's has five key attributes for success (Artz, 2009):

1. *Invention and Innovation:* Because Ancillary IPs are created to resolve a real problem they are closer to innovation than pure invention. There is far greater potential to find like problems than from pure invention.

2. *Commercial Partnerships:* There are no expectations that creative practitioners involved in the Ancillary IPs model will have business skills. While it is ideal that a level of knowledge is developed to ensure appropriate choices are made, the Ancillary IP's model is more focused on commercial partnerships.

3. *Personal Benefit:* There is an expectation that the creator of the Ancillary IPs will derive an ongoing and direct benefit from commercial applications. This is a part of the commercial partnership that allows for ongoing IP to be created.

4. *Personal Vision:* Ancillary IPs relies on the personal vision of the creative practitioner. Their value is in this vision and everything is to be done to allow them to focus on the end vision.

5. *Process:* Because of its importance the personal vision cannot be curbed to commercial ends. Commercial opportunities come from overcoming roadblocks, not the end result of creative work.

Vision

The vision is a practical one; to place artists at the centre culture and the economy. There is a great deal of innovation that is ignored because it comes from the arts.

There is also a great deal of creative energy that is expended in hospitality and other industries, by artists trying to support art and culture. No economy can afford to let such sources of innovation go unnoticed and unutilised. No economy can afford to keep blunting their creative culture and economies need to work with and harness this creativity, invest in it and benefit from it. Investment needs to be real investment where the gain is financial returns not just a cultural benefit; an entrepreneurial mind is needed. New models can be applied to arts and culture where artists can have a direct finical benefit from the IP they create. A commercial approach to art can prevent the marginalisation of art and bring art into our living culture while at the same time bringing it into the centre of the economy.

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Collaboration and development of an Artist's Toolkit

Kevin Badni

Introduction

Jo Fairfax is a successful sculptor who has an established international reputation for his public artwork and in particular his holography work. He was awarded a Nesta fellowship to advance his aspiration of creating an increasingly emotional response to his artworks through the use of VR technology. A key attraction to Fairfax was the appeal of being immersed within an artwork. Fairfax did not want to make a virtual sculpture but rather an art environment that was the work itself, he referred to it as 'being inside a 3D moving Pollock or Rothko' (Fairfax 2007).

Working practices

Fairfax spent the first month of the project visiting VR centres and talking to as many experts as possible. From this initial research Fairfax was acutely aware that he needed a mentor to guide him through the numerous VR technologies and, more importantly, to provide him a way of mastering the tools as one of his main goals was to work autonomously. This desire to be autonomous was a unique challenge and different from other well known VR artists who use specialist programmers, sonic architects and animators to help create their VR environments. In his search for a mentor Fairfax contacted Pera, a Leicestershire based company that had the first commercial VR centre in the UK. Pera had a number of experienced VR designers that were willing to act as mentors. However their approach was based on a highly technical programming foundation. Their proposal for progressing the project involved a substantial amount of programming work, as well as the need to educate Fairfax about the significant number of constraints that exist within the construction of VR applications. Even though Fairfax was prepared to put in the time and effort to learn how to create a VR application, the highly constrained and formulaic nature proposed did not fill him with confidence or, more importantly, excitement which he originally had at the outset of the project idea. Fairfax (2007) reflected on these meetings saying that he found it both inspiring and daunting, where it seemed a long way away for him to be able to make anything in VR.

This reflection raises the question of how artists' working practices differ from those of VR designers?

VR designers have to work within very constrained environments due to the nature of the graphics and processing hardware. They also work to specifications determined before a project has begun. As a sculptor Fairfax liked to work in a much more open and unrestricted way. The whole idea of the project was to create a 'dreamlike' state, having all the proposed restrictions in place did not lie comfortably with this ethos. He also had difficulty putting across his vision of what he wanted to create from an aesthetic viewpoint and also just as important was the way he wanted work - in an unrestricted creative manor. These issues of communication, and different working practice between artists and other professionals has been reviewed by Yair, Press and Tomes (2001: 377-394) who state that despite the obvious benefits of collaboration including the flow of knowledge from one discipline to another, it is uncommon due to the differences in cultural and working practices causing complications. For collaboration to work it is dependent on the artist and the professional’s willingness to both accept new working and thinking processes.

Continuing his search, Fairfax was put in contact with the author who had previously managed the VR department at Pera and was experienced in VR application designing. At the first meeting it became clear that Fairfax's knowledge of VR was purely from a visual context, it also became clear that Fairfax desired to work intuitively with the VR software rather than be slave to it. The author questioned Fairfax about his usual working practices and he described his creative process as being very free and random, when working with digital art. There was no single working process that he undertook, as most projects were different in their nature, however all his projects did involve a lot of experimentation before honing the final product.

After much discussion it was proposed that the most agreeable route was for Fairfax to capitalise on his existing skillset of aesthetic sensibilities and avoid the constraining programming route as much as possible, so as not to stifle his creative energies. The new proposal was to use a 3D graphical modelling package (which Fairfax was familiar with) and then import these models into a virtual world. This is not the usual approach of VR modellers, when a 3D model is created, adding complexity increases the levels of realism. Unfortunately increasing the complexity has a negative affect on the ability of the computer to render frames in real-time,

resulting in a negative effect on the visual performance which is essential within a VR environment and crucial to the dreamlike effect required by Fairfax. When this process was put into practice the fluidity became very important, so an aesthetic judgment by Fairfax was required to reduce the model complexity to an acceptable level using a trial and error process. The trial and error process has been shown by Dorst (2003) and Lawson (1997) to be used frequently to solve design problems where a gradual approach of trial and error is required, with emphasis switching from precision and calculation to ambiguity and imagination. During this trial and error process the 3D models had to be transferred and displayed within a VR environment. To reduce the cognitive load on Fairfax a simple visual VR authoring programme was chosen, where models could be simply imported and manoeuvred using simple controls. This software facilitated model positioning in a 3D space, but did not allow Fairfax to add features such as movement, sound, direction controls, or subtle aesthetic modifications. Ideally Fairfax wanted a bespoke package to be created that allowed him to be artistically free whilst making it simple enough for him to use without understanding the code behind the application.

Artist's Toolkit

Creating a brand new piece of software was impossible in the time allocated for the project. The proposed solution was to develop a bespoke Artist's Toolkit, which would act as a conduit between Fairfax's work/desires and the VR software, allowing different elements to be brought together. For the next six months regular meetings were arranged where the author introduced Fairfax to the different aspects of creating virtual reality applications. These regular meetings directed the progressive development of the Artist's Toolkit. The Toolkit developed into a number of discreet options, with adjustable variables that Fairfax could experiment with and then import into his virtual worlds.

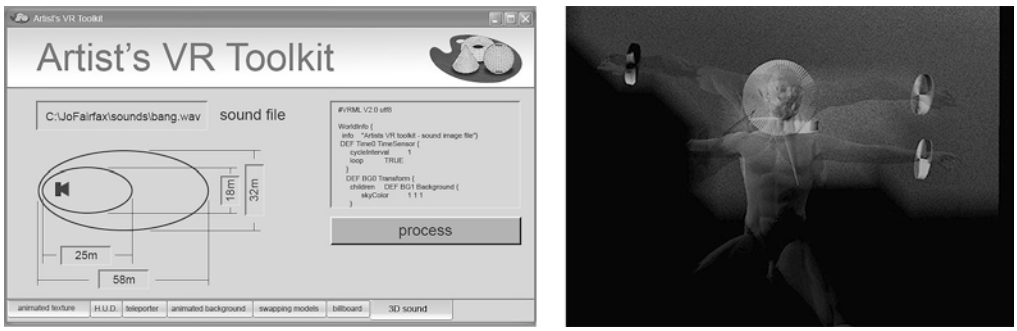

Figure 1. Artist's Toolkit and example of one of Fairfax's virtual worlds

After each meeting Fairfax would experiment with what had been covered in the meeting. In parallel to this he would frequently take what had been presented and explore new avenues he wanted to exploit and then return to the next meeting with a list of questions and requests as to what he wanted to create. The requests were often accompanied with sketches, imagery, video clips or models to help explain the desired goals. This working practice supports the findings of Getzels' and Csikzentmihalyi's (1976) study on how artists develop and solve problems. They stated that there were three ways artists explored problems; manipulation, unusualness and experimentation. Manipulation is where the artist wishes to find new problems or uncover the core of the problem rather than settle for ones presented to them. Unusualness describes their drive to source unusual perspectives from which to work; often the riskier options are more innovative. Experimentation is where the artist, through play or experimentation with the problem, idea or media, can identify new perspectives that may have gone unnoticed.

During these question and answer meetings the author frequently could not answer Fairfax's requests straight away, needing time to solve the problems. The author's working practices to solve these problems would not always be undertaken in a prescribed manor however, on reflection, the majority of time the working process initially started with was a few days of reflection which allowed time to go back to Fairfax if clarification was required. The design process would then involve three stages, firstly looking to see if there were any solutions already available. Frequently this avenue of research was unproductive, but could lead to new ways of approaching the problems. Secondly there would be long periods of experimentation, and testing, with a final stage of honing a proposed solution. Jones (1992) also models the design process in three phases: divergence, transformation and convergence, where the designer begins by undertaking a broad search for information, followed by a period of ideation and finally concludes with a more detailed focused activity to provide a realistic solution.

Even though the designer's process may have stages, both the designer's working processes and artist's working processes can both be imprecise in their nature. Lawson (1997) noted that the designer's process is complex and ill-defined, Lawson does not see designing or problem solving as being an exact process that can be broken down into specific areas, his theory is that design is a process in which the problem and solution emerge together.

The working practice of questions and answers allowed Fairfax to be unrestricted in what he wanted to create, negating any concerns about technical issues and only having restrictions applied if the author could not find a satisfactory solution. There are many restrictions or considerations to be undertaken when creating a VR world (Badni 2005: 215-225), however reflecting on the process Fairfax commented that presenting these restrictions at the beginning of the project would have been detrimental in affecting the freedom he felt, and would have had an adverse affect on the design of his worlds. Through the Q&A sessions a number of templates were created building up the Artist's Toolkit. These templates were developed along with Fairfax so his understanding of their application was relatively straightforward and allowing him to develop his worlds at his own pace without the constant intervention of the author.

Conclusion

The working relationship between Fairfax and the author has been very successful. The realisation at an early stage that a creative sculptor was unlikely to work in a pragmatic programming way and the efforts to allow Fairfax to remain creative in his working practices allowed him to produce some unique pieces of art generally unhindered by technical constraints.

Fairfax acknowledges that having a mentor was an essential part of his creative process. Dasgupta (1996) argued that creativity is knowledge driven and based on experiences applied in new ways, so creative methods may facilitate finding alternative ways of thinking but this may only be of use if there is a knowledge base on which to draw. The use of Q&A sessions allowed Fairfax to gain insight into the knowledge base of the author and that fed directly into his creative process. Fairfax (2007) reflected on the one-to-one sessions describing them as being an invaluable teaching aid allowing him to move forward tremendously and which he described as being a very powerful tool.

One reason why Fairfax and the author worked well together may be due to their similar working (creative) processes and despite there being many differences in general between a fine arts sculptor and a VR designer there are definite similarities between the two disciplines. This is backed up by (Dorst 2003; Lawson 1997) who state that artists and designers must work in a similar manner, and that the art

process would have much in common with design process since many similar talents are needed for both.

There have been a large number of different creative processes documented. They all appear to have one main theme in common, that of altering the way people think. This appears to be achieved by providing a safe environment, where ideas will not be criticized, which may go in some way to explaining why the one-to-one working relationship worked so well - allowing both Fairfax and the author space to experiment and move forward together with a good understanding of what the final goals to be achieved were.

The chosen method of working had some restrictions in what could be ultimately achieved. This was due to the working practice being developed to allow Fairfax to work to his strengths and aesthetic sensitivities, compared to developing a bespoke fully programmed VR application. This working practice was different from many artist-technologist collaborations. In general an artist will have some creative ideas. The technologists will then develop a system based on that idea to his best ability and show it to the artist. The artists would only then request some modifications or change some aspect - which the technologist would implement. With the Artist's Toolkit, Fairfax was able to develop and change his implementation without the technologist input thereby facilitating his own discovery and adjustment route and thus speeding up the creative process.

Ultimately the project would not have been successful without the hard work and dedication of Fairfax who was willing to experiment and learn whilst developing his own vision. The hard work required to create a new piece of artwork is recognised by Csikszentmihalyi (1998: 325-339) who comments that being creative is not a simple process since many novel and original solutions require the creator to invest much time and effort. Creativity is a process of trial and error in searching for new solutions by combining the known and discovering elements in many small tentative steps (Weisberg 1986; Wallberg 1988: 340-361).

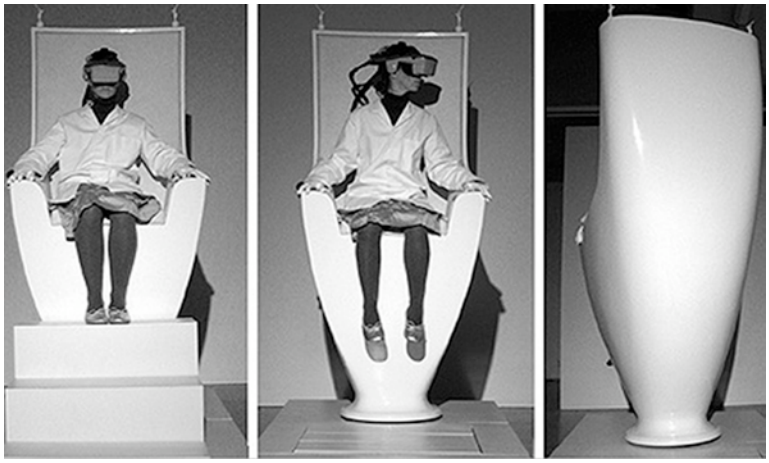

Figure 2. Participant viewing Fairfax's worlds through a tracked headset

The final artwork was displayed in Leicester City's Art Gallery with over 2000 people experiencing Fairfax's vision. There have been positive reviews in local and the national press, with the Guardian describing the work as 'allowing you to explore to the full, in the 3D virtual world of your own susceptible consciousness, his vision of everything as somehow bewilderingly wonderful.'

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Toward a process philosophy for digital aesthetics

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> The creativity of the world is the throbbing emotion of the past hurling itself into new transcendent fact. It is the flying dart of which Lucretius speaks, hurled beyond the bounds of the world.
>
> (Alfred North Whitehead, *Adventure of Ideas)*

When Whitehead writes about the creativity of the world he is not discussing human creativity. Rather he is directing our thoughts toward the actual creativity of every moment of the world. He is indicating that each instant in time – and everything that exists in that instant – is a new creation; the world is a process of continual becoming (Whitehead 1978: 18-22). So when Whitehead talks about the 'past hurling itself into new transcendent fact' (Whitehead 1967: 177), he is proposing that the transcendent fact, which, in his terms, is the becoming of the present moment, takes form as the past transfers information to the present. This is what Whitehead terms *prehension*, the present's grasping of information from the past in order to use this information in its own becoming. This is the essence of process and the way in which we may begin to think about a philosophy of the interactive event and, more generally, a process philosophy for digital aesthetics.

Interactive media art is marked by process. If we are to think of digital aesthetics we need to think of them in terms of aesthetic *events* rather than aesthetic objects and, in order to do this, we must move away from a tradition of aesthetics that positions the human subject and her conscious mind at the centre of experience. We instead need to move toward an aesthetic philosophy of the event. This can be achieved by tapping into various drifts of philosophy, most notably Whitehead's already mentioned thought of the early 20th century and Gilles Deleuze's more recent philosophy of the virtual. What I hope to propose in this paper is that we begin to think in terms of process rather than in terms of a knower/known or subject/object distinction. By providing these starting points, I thus try to move away from anthropocentrism and toward what Steven Shaviro would term Whitehead's 'pursuit

of univocity', or an object-oriented philosophy (Shaviro 2009: 27-28). This means that instead of investigating interaction as a 'user' who manipulates a machine I want to investigate this event as a commingling of many actants (Latour 2005). The digital image itself is produced by software processes and the constant flux of code; further, this interaction with digital systems involves a constant process by which a so-called 'user' comes into contact with various machinic occasions. It seems that in light of these processes it is impossible to maintain an aesthetic or media theory that pictures a self-contained and psychologised subject interacting with a static and inert object (Dusek 2006: 209). As Whitehead points out, an occasion of experience is not a passive observance of a mere welter of data (Whitehead 1967: 179). Rather experience comes into being through an active involvement in the events of the actual world.

Process as actualisation

We can think of process quite easily when exploring artworks like Martin Wattenberg and Marek Walczac's (mw2mw) *Thinking Machine* (2003). The work uses an artificial intelligence program to play chess with the participant. As the user and the machine enter into interaction, a 'map' of thousands of possible moves is created upon the computer's screen. The work represents to the user how a computerised chess player 'sees' the playing board as a field of energies in flux. In a Deleuzian sense the interface traces various lines of flight, one of which will be followed and become actual when the machine settles on the best strategy and moves its piece (Deleuze and Guattari 1987: 9).

Here we clearly see the link between process and the aesthetics of the digital. The digital image, whether static or in motion, is the result of continuous and ongoing computations (Broeckmann 2006: 197). It is an unstable stream of code, never attaining an eternal material existence without the constant flux of information and the actualisation of potential over time. In other words, software processes, as a set of non-visual occasions, give form to visual images. This type of thinking is the heart of Whitehead's process philosophy. For Whitehead there does not exist things, but only things in the making. The entire world of materiality is merely an outcome of process (Whitehead 1978: 78-79). It is this idea of 'things-in-the-making' rather than 'things' that is central to both Whitehead and Deleuze (Halewood 2005: 58).

In general, Deleuze describes process in terms of the *virtual* becoming *actual*; a process by which one potential occasion from a field of virtuality enters into actual existence (Deleuze 1994: 77-85). The field of potential however is not anything or everything but is rather constrained and emergent upon the system itself; it is potential that is immanent to the system. Pierre Levy sheds light on Deleuze's virtual with the example of the tree which is virtually present in the seed. The seed does not know what shape the tree will take. Rather the seed must actualise the tree as it enacts a process of negotiation between its internal potentialities and the environmental circumstances that it encounters (Levy 1998: 23-24). Deleuze's virtual – as the field of potential which provides the capacity for creativity to take place – is made literal by the lines of Wattenberg's *Thinking Machine,* lines which visually present the field of potential open to the machine.[1] From this field of potential one element will be made actual, and made known to us through our experience in the present moment (Deleuze 1993: 6-8). The computer enacts problem-solving processes and follows one line, actualising virtual potential (Deleuze 1985: 95-97).[2]

Both Deleuze and Whitehead think of the process of the actualisation of potential as the creative activity that drives the world (Whitehead 1967: 177-79) (Shaviro 2009: 17-19). For Whitehead, this act of becoming comes about through the remaking of what he terms *actual entities* or *actual occasions*. These are the final real things of the universe. They are the basis for being and where any philosophy must start; 'there is no going behind actual entities to find something more real' (Whitehead 1978: 18). An actual entity can be thought of as a single moment of experience. This single moment however is extremely complex, as it bears with it relationships to all the moments that occur before it and all the moments that occur after it, and it also bears a relationship to the other actual entities with which it is contemporary (Hosinski 1993: 21) (Whitehead 1978: 123-26). Importantly these entities are always in process. They are always *happening*; the entity is always an occasion (Whitehead 2007: 15). Thus all thought should be about process, not about substances. Importantly, this means that we cannot think of a self-contained psychologised subject, because the subject is merely a society of actual entities, a multiplicity of processes. Instead we must think about all the actants of the digital encounter on the

[1] I am using this work as a metaphor for the virtual. The lines are not literally virtual. This is simply because the virtual does not exist in any visual or actual form. However the lines make literal the idea of the actualisation of potential.

[2] The concept of the virtual is extremely complex and has been developed by many thinkers, namely Brian Massumi (Massumi 2002), Manuel DeLanda (DeLanda 2002) and Pierre Levy (Levy 1998), what I have described here is just one simple act of the virtual, that I use to inform my concept of process.

same level (Latour 2005). We need to begin seeing the becoming of the world, following Whitehead's process philosophy, as a fact, rather than confining it to the privileged realm of human beings and rational minds (Shaviro 2009: 18-20).

Rethinking the 'user'

This type of thinking has a direct impact upon the way we approach questions of interaction between a human and a machine. For instance looking at Peter Weibel's *Flic_Ka* (2007) and Jeffrey Shaw's *Web of Life* (2002) we can see that it is not so much a process of one user 'using' a machine but rather interaction is an ingression or coalescence of many user generated occasions and machine generated occasions. For instance, In *Flick_Ka,* Weibel sets up a photo-booth in the gallery. The photographs taken by the machine are displayed on screens in the gallery and also uploaded onto the Internet. There is no individual user here, rather the work is able to be accessed, interacted with and altered by various users over the Internet and in the gallery installation.

Flick_Ka is made up of a complex of processes operating in concert. The camera *prehends* the user, as information flows into its lens. The mechanical processes of the camera and the process of visualisation then initiate another occasion, as does the flux of software occasions and the work's distribution over a network. The artwork takes form as every actual occasion combines with every other contemporary occasion. User initiated processes, camera processes, software processes and network processes work through one another to actualise the work. Digital aesthetics here are a hybrid event, constituted by the commingling of contemporary occasions (Whitehead 1978: 246).

In Shaw's work, which is distributed over three gallery installations via the Internet, 3D abstract and organic patterns, along with archival footage are generated and assembled, based upon a series of handprints that are scanned into the machine. In *Web of Life*, any one participant adds to the history of the work and alters the aesthetics of all three sites. Once again, here there is no individual user; rather what is important to the aesthetics of the work is the ingression of multiple *user-occasions* from multiple sites over time.

Both works interact with a set of activities and processes initiated by multiple users across multiple sites. In this event there is no one enduring subject apprehending a

permanent object. Rather the 'subject' and 'object' are a multiplicity of processes, both involved in a hybrid event of interaction and *prehension*. As such both actants are conditioned by their involvement in this process, both the 'subject' and the 'object' are a new creation at every instant of interaction. As James Williams points out, 'observation is not so much "of" given facts, but an observation "with" changing processes' (Williams 2008: 82); following this, the aesthetic experience of interactive art is not something that happens to someone as they apprehend a staid object, but more like something that happens *with* them as they become invested in the digital encounter.

Using Whitehead allows me to think outside of the binary oppositions that divide the world into knower/known or subject/object relationships (Stengers 2008: 103). I am not interested in any notion of consciousness or a psychologised human 'user', rather, I am interested in a particular condition that takes place as user initiated processes work with machine initiated processes. It is the performative action associated with digital aesthetics, including interaction, which is important; these processes provide the condition for experience and knowledge to emerge (Stiegler 1998: 1). This is why I have begun to propose interaction with digital systems as the commingling of contemporary actual occasions, shifting emphasis from a conscious human user and instead focusing on the process of the encounter that precedes this conscious experience (Griffin 2007: 69).

Interaction and aesthetics

A central part of my argument is that user initiated occasions and machine occasions work through one another. We can see this particularly well in Dennis Del Favero's *Pentimento* (2002). Moving images are projected upon the walls of the installation space that narrate the events surrounding a murder in the Blue Mountains. These events are presented as fragments of narrative, triggered – rather uncontrollably – by a motion detection system, sensing the movement of a user in the room. The experience of the work is largely constituted by the feeling of not being able to make sense of the events of the narrative, but somehow still being able to experience their emotional intensity. The user becomes invested in the narrative, as she is responsible for generating the uncontrolled, disconnected, but highly affective images from the machine's database. She becomes connected, as a result of her investment in the interactive event, to both a large database of narrative information and the affective and relational consequences of this information.

In this work Del Favero does not aim to create secondary trauma for the viewer but rather to '… open up the lived experience of trauma in its temporal and spatial dimensions' (Bennett 2004: 79). The work is not a *representation* of trauma but is rather a *process*, which sets the conditions for trauma to be felt. Here the work brings the user into contact with the digital medium and also its traumatic content. Trauma is felt as the user experiences the discontinuous and turbulent dimensions of the narrative; trauma is *performed* rather than cognised as an aesthetic object.

Conclusion

In these works technology is no longer a tool with which the user connects to a specific reality or 'nature', the technology is now itself the reality or 'nature' that the user inhabits (Lister, Dovey et al. 2003: 90). The artwork is no longer an object to be apprehended by a 'subject', rather the artwork is an event in which the object and subject are both invested. Significant new media art is no longer concerned with the historical drive for artists to *re-present* something of reality. Rather, the digital artworks that I have investigated are involved in a process of creating a specific type of reality. This is a constructive, more than a decorative or expressive, process and is more in line with Whitehead's 'flying dart' of creativity (Ascott 1998) (Whitehead 1967: 177). Rather than seeking a re-presentation or re-mediation of reality in its aesthetic, significant new media forms create new processes, new sites of creativity, in which the aesthetic is performed before it is understood.

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Gay bombs: exploding, remapping topologies of queerness

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On January 15, 2005, *BBC News*' website featured an article entitled 'US military pondered love not war.'[1] This news brief publicly announced US Air Force research on the now supposedly defunct development of a 'gay bomb.'[2] Proposed in 1994 at the Wright Laboratory in Dayton, Ohio, the gay bomb is defined as an aphrodisiac chemical that 'would make enemy soldiers "sexually irresistible" to each other.'[3] Indeed, the gay bomb, which was designed to be a six-year development project costing $7.5 million, 'would provoke widespread homosexual behaviour among troops, causing what the military called a "distasteful but completely non-lethal" blow to morale.'[4] That the gay bomb would explode into immorality, detonating a public shaming upon its victims, pre-supposes rampant homophobia, for the act of homosexual sex in and of itself does not promise defeat or surrender. Yet, given the US military's conflation of gay (here, defined as homosexual sex) with weapon, it seems that the *military pondered war not love*. Indeed, the image chosen to accompany this text of a military aircraft dropping a multitude of missiles assures us that this bomb is a loveless act of sovereign dominance and destruction.

Perhaps more importantly than its allusive exegesis of the gay bomb, the *BBC News* article encapsulates all the contradictions that have come to be embodied within medial representations of this military proposal. As the BBC shifts between the use of 'gay bomb' and 'love bomb' freely, suggesting that these two descriptors are equally suitable for what the military has proposed, the conflation of the performance of a sexual act with 'love' confuses and displaces how 'gay' operates to signify 'bomb'. The production of love as a possible result of the gay bomb's detonation reads as a failure: the military wants homosexual sex to shame and disgrace. Still more perplexing is the BBC's use of citations, identifying 'gay bomb', 'love bomb', and 'sexually irresistible' in their text to be directly extracted from military documents. Yet, these quoted phrases do not derive from any source; functioning here as definitions, the citations present a conflicting gap between the military's sketchy textual explication of this

[1] BBC News America. "US Military Pondered Love Not War." BBC News, 2005. http://news.bbc.co.uk/2/hi/4174519.stm (accessed October 20, 2008).
[2] Ibid.
[3] Ibid.
[4] Ibid.

weapon as a 'strong aphrodisiac'[5] and BBC's rhetorical move to visualize this text within the materiality of a bomb. The BBC article and the military proposal network the homosexual within grids of relationality that connect gay, love, weapon, bomb, and explosion. In fact, this new topology of relations maps a genealogy of what has come to be known as the gay bomb in visual culture, dialectically located, I will argue, within a war bomb, bound by the military and media, and a queer bomb, manufactured by the labours of love outside heteronormativity. Unlike the BBC's implication, love and war here are found to explode in two very different ways.

While today medial representations of the gay bomb proliferate in popular culture on YouTube music videos, television shows, movie spoofs, and pornography, this contemporary union of homosexuality and bomb returns us to another type of gay bomb that has existed in queer culture, a bomb that does not use homosexuality as a weapon of shame but rather explodes *queer* life into the world. This queer bomb of the past unites homosexuals with the threat - or at the moment of - explosion. Historically, the homosexual has built a gay bomb but is now blown up by another.

This paper reads the 1994 US Air Force document 'Harassing, Annoying, and "Bad Guy" Identifying Chemicals' in which the military proposes the development of a chemical weapon to enact homosexual behaviour on combatants of war, through two visualizations of the gay bomb. These visualizations fall into two separate timeframes, divided by the release of the military document. First, I will discuss a current representation of the gay bomb: the gay bomb's 2008 appearance on the television show *30 Rock*. Next, I will turn to an older example of the queer bomb (or love bomb): the playful bomb-as-beach-ball in The Smith's 1986 music video *Ask*. I will ask how current formations of the gay bomb affect our readings and interpretations of these older visualizations that notably did not embody the words 'gay bomb' in their visuality and were not necessarily subordinated to military power. Specifically, how did the military document, which never mentions a 'gay bomb', produce an explosion of gay bombs in contemporary media, and in turn, how does this shape our reflections upon queer bombs?

The dialectic of the gay bomb, comprised of the war bomb and the queer bomb, poses a complex positionality of homosexual existence and agency, for before and after the US military proposal, the gay bomb aims toward different targets, and the directionalities of these aims are controlled by different forces. As I inquire into the ways the homosexual targets and is targeted, I will use a topological framework to analyze these networked grids of warfare within which the homosexual has become inextricably encrypted. A network topology is the mapping of elements in a network, including the physical connections between points and the

[5] US Air Force Wright Laboratory. "Harassing, Annoying, and 'Bad Guy' Identifying Chemicals." (Ohio: June 1994). http://www.sunshineproject.org/incapacitants/jnlwdpdf/wpafbchem.pdf (accessed October 14, 2008).

logistical flows of data between these nodes. I will employ such a topology to structure my analysis of the gay bomb. To think topologically[6], as suggested by Alex Galloway and Eugene Thacker, calls for interpreting the rules and relations structuring the diagrams of the war bomb and queer bomb, that is, the ways they each structure political conflict. The gay bomb topologically fuses, in a radical horizontality, to warfare, weaponry, and mass destruction as well as queer affect, community, and love. McKenzie Wark writes, 'Topology begins when the topical ceases to have autonomy, when the line along which communication flows closes the gap between map and territory.'[7] With this proclamation at hand, the gay bomb appears to us as the harbinger of topological weaponry, for the force and violence of the bomb encompasses the military blueprint and the boundless territory of visuality, each flattened together by the perpetuations of mass media.

Samuel Weber notes that each target is positioned to exploit an opportunity. If the bomb is always a target that aims to manipulate - as its opportunity - network topologies that are links between bodies, weapons, life, death, power, and subordination, I would like to conclude this paper with a consideration of the productive possibilities that the gay bomb might still have for LGBTIQ communities. If the queer bomb of the past internalizes an explosion predicated on the historically specific risks of HIV/AIDS, gay bashing, closetedness, and general societal exclusion, all of these threats still remain painfully present and unrelentingly intensified. Has this externalization of the gay bomb - a production outside of queerness and into the mainstream, within and beyond homosexuality - eclipsed the performative power the bomb once held? Or can the gay bomb explode once again, with the weight of its history, as a political tactic to unite those it embodies - as well as those it aims to destroy - in love?

Exceptionalism, or the gay bomb as war bomb

Puar defines US sexual exceptionalism as 'a narrative claiming the successful management of life in regard to a *people* [. . . as] national recognition and inclusion, here signalled as the annexation of homosexual jargon . . . contingent upon the segregation and disqualification of racial and sexual others from the national imaginary.'[8] This simultaneous inclusion/exclusion generates a homonormativity, fostered by nationalism, that expels non-normative homosexuality. Unique to this formation is that now 'an exceptional form of national heteronormativity is now joined by an exceptional form of national homonormativity, in other words, homonationalism.'[9] Today, the gay bomb, as the vision of homonationalism, a weapon of the state, includes the homosexual body while excluding this body's behaviour as a condition only fit for the enemy, never the nation.

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[6] Alexander R. Galloway and Eugene Thacker. *The Exploit: A Theory of Networks*. Minneapolis: University of Minnesota Press, 2007: 13.
[7] McKenzie Wark. *Gamer Theory*. Cambridge, MA: Harvard University Press, 2007: 56.
[8] Puar. *Terrorist Assemblages*, 2.
[9] Ibid.

The gay bomb makes its debut on *30 Rock,* a NBC primetime sitcom centred around the production of a sketch comedy show at 30 Rockefeller Plaza in New York City, on an episode titled 'Cooter', originally aired as the second season's finale on May 8, 2008.[10] While it juggles a variety of plot twists and turns, I would like to focus on the subplot concerning characters Jack Donaghy, played by Alec Baldwin, and Cooter Burger, Matthew Broderick's role. Both currently employed at a financially humbled Homeland Security, Jack and Cooter decide to manufacture the Gay Bomb, a top-secret Pentagon proposal, to get fired.
30 Rock's gay bomb, emblem of US sexual exceptionalism, satisfies Puar's exposition on homonationalism. While the show espouses a liberal rhetoric, the pathologization of homosexuality as a condition so shockable it would lead the military to expel its creators, reassures viewers that heterosexuality is reserved as the normative, nationalist position. Yet, this shock confuses because it is divergent: there is the double shock of excluding the homosexual as non-national enemy (manufacturing the gay bomb) and of including the homosexual in the nation (and thus, not developing the gay bomb). In this episode, however, the military opts for the former, and therefore, the nationalist homosexual is the one that exhibits no homosexual behaviour. It is through the absence of any such homosexual on *30 Rock*, that permits any homosexual to imagine existing as such - an impossibility. This phantom homosexual as ideal excludes nonnormative US homosexuality and all non-white, non-US persons as one unit - their behaviour is collectively targeted as the same.
We turn to Rey Chow's ruminations on the target: 'the truth of the continual targeting of the world as fundamental form of knowledge production is xenophobia, the inability to handle the otherness of the other beyond the orbit that is the bomber's own visual path.' To use homosexuality as the US military weapon always pointed at the other, produces a visual form of sexual exceptionalism. For those targeted, homosexuality delivers the sovereign force of war, always excluding as something less than nation, less than human.

Love, or the gay bomb as queer bomb

As current gay bombs in media emerge from the 1994 US Air Force text, the logic of militarism seems to solely permit the visualization of such a chemical as sovereign bomb. Yet, moving backwards in time, before 1994, reveals a different type of bond between homosexuality and bomb - a bomb implicated by war but fostering a type of political love. As the topology of the gay bomb stretches out, linking to its histories, what I have named the 'war bomb' (but what is called the 'gay bomb' in media), one network in the gay bomb's topology becomes mutually implicated with this older, unnamed bomb, what I will refer to as the 'queer bomb.' Importantly, the Air Force document and the war bomb locate and situate the 'queer bomb' for us - each an interface to shape meaning; they inflect and influence our readings and understandings. If the gay bomb is comprised of a war bomb and a queer bomb, the

[10] *"30 Rock" Cooter (200).* http://www.imdb.com/title/tt1001579/ (accessed December 3, 2008).

future of the gay bomb's impact is inconclusive. As I turn to consider the queer bomb in two works by filmmaker Derek Jarman, the 'No Future!' bombing in his 1977 film *Jubilee* and the bomb-as-beach-ball in The Smith's 1986 music video *Ask*, the queer bomb reveals an alternate explosive trajectory for the gay bomb.

To claim political love as the explosive potentiality of the queer bomb, I would like to briefly set out a sketch of what such a love could be, apart from love as we would (hetero)normally know it. As Michael Hardt has said, love as a political concept binds us to forms of reason that are not excluded from passions, that is, love in its types of reasoning extends beyond rationality yet holds us within a training or disciplining.[11] Hardt calls for a political love that refuses the separation of the personal and the political, operating as an open sociality and an affirmation of difference.[12] To call the queer bomb a bomb of political love implores a trepidatious set of skills - at once the ability to play into the logic of militarism but also the resisting to not lose oneself in such logics before one loses to love.

Derek Jarman returned to the theme of the queer bomb once again (the 'No Future!' bombing in the 1977 film *Jubilee* being his first) in the music video *Ask* that he directed for The Smiths in 1986. A joyful, euphoric video, *Ask* features a group of motley teens dancing in costume on the docks of a riverbank, playfully tossing a bomb about. Over this track, Morrissey croons in whimsical wisps of Brit Pop finesse, 'If it's not love then it's the bomb that will bring us together.'[13] Almost a decade apart from *Jubilee*, *Ask* marks the end of punk, the advent of new wave, and the continuing reign of Thatcherism and the AIDS pandemic. The pairing of Jarman with The Smiths - a gay activist filmmaker and an allusively homoerotic pop band notably attracting queer audiences - produces a queer bomb as embodied subjectivity, visually displayed within a parodic logic of warfare and heteronormativity. In *Ask*, the bomb is literally a black spherical bomb labelled 'BOMB'. Rather than the failed, externalized violence of *Jubilee*, the teens of *Ask* internalize the violence of their world - a continuous bombing of exclusion, unacceptance, and contagion - and externalize their affect within the logic of a different bomb, a queer bomb, that ignites a hopeful possibility of providing a present that will give way to a viable, sustainable future. As their lives struggle within the influence and control of the sovereign bombing of subjectivity, they are able to invert this target (their own precarious lives): the queer bomb is at once a bomb of refusal - the disavowal of sovereignty's absolute control ('love', specifically heteronormative love), but also a bomb of compassionate dismantling - an acceptance of an always impending dissolution of self by the sovereign ('bomb') and the joy to disregard that threat, living fully, bound by the shared affect of political love, in a suspended moment of destruction. For these teens, all that matters is that they have 'stopped worrying and learned to love the bomb.'

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[11] Michael Hardt. "About Love." European Graduate School Lecture Series (2007) http://www.youtube.com/view_play_list?p=D3501DB6E18F2A74 (accessed December 7, 2008).
[12] Ibid.
[13] The Smiths. *The Smiths: The Complete Picture*. Warner Brothers, 1992.

Toward an ethics of weaponized knowledge and affect

The topological violence of the gay bomb resides within the larger stratum of total global war and targeting. As its visions of war spider across the spectrums of networked media, it enacts an exceptional weaponization of knowledge and affect. A logic of humour as a logic of militarization, the gay bomb permits the inclusion of the sovereign's laugh while displacing all other affect as anathema. This laughter, resounding over the aged laughter of the queer bomb, denies the gay bomb's previous history of queer struggle and survival. Yet, the inextricability of the queer bomb from the gay bomb as war bomb offers the possibilities and potentialities of a democratic targeting, exploding the consumption and production of exceptional knowledge and affect.

Entrenched in violence, the gay bomb oscillates between the pathways of love and war, silently instigating the question of its efficacy as an ethical weapon once more. Can the gay bomb's tautology of targeting fracture into a form of political love? Hardt and Negri importantly note that the forces of democracy today find themselves 'in a context of violence that they cannot simply ignore or wish away.'[14] For them, forms of democratic violence 'can only defend society, not create it.'[15] Thus, in the persistent violence of the gay bomb, can we reformulate an ethical politics of destruction? Not an explosion of sovereignty but a new form of weaponization that opens to affects and knowledge of care and love. Or do the circuits of violence bound within the gay bomb forever encrypt it as the weapon reserved for the subsumption of homosexuality into the state of exception? Where is love to be located in the logic of sovereign destruction? Is the promise of the gay bomb's topology the locatability of a political diagram of love?

In 2001, during the US War on Terror, the US military dropped a bomb on Afghanistan that was tagged by a fellow soldier with the phrase, 'High Jack This Fags'. The military, in creating a very real gay bomb of war, fills the gap between their original plan of an aphrodisiac weapon and media's desire for this to be seen as a bomb. A self-reflexive hi-jacking of military and media, this de-faced bomb of terror offers a gesture toward the military's invigorated desire to fulfil the halted destruction that their blighted homosexual weapon wants to explode into the world. In turn, the media seizes the image of this bomb and proliferates yet another visuality of US sexual exceptionalism. Undoubtedly, the gay bomb will materialize in new and unforeseen ways as it travels, links out, expands within the networks of militarization, which extend into the social, political, and commercial. A project committed to the gay bomb of love must seek out the mutually implicated ethical limits of weaponization, homosexuality, and technologies of mass destruction (which are also technologies of seeing, perceiving, and

[14] Hardt and Negri. *Multitude,* 2005: 341.
[15] Ibid., 344.

disrupting). This project is both a queer labour of love and a democratic quest for the defence against sovereign destruction.

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Bridging the divide: emergent digital literacies and collaboration

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Collaboration: background

A collaborative research project was advertised in the UK press in May 2006 naming two participating institutions, proposing the title*: Visual Art Practices: Digital Literacies and the Construction of Identities in Northern Ireland*, and stating that the research topic proposed must be in some area of visual art practice in the space of education.

The Arts and Humanities Research Council (AHRC) for the United Kingdom offers collaborative awards in an attempt to bridge the research divide between academic and non-academic institutions, such as museums and media organisations, both commercial and public. As a knowledge transfer initiative it aims to generate fruitful research and knowledge in an area where synergies between potential partners exist but where benefits to the non-academic institution may not be apparent. Funding was secured in the scheme's second year by Interface*,* Centre for Research in Art Technologies and Design at the University of Ulster in Belfast, to develop a project with the Nerve Centre in Derry/Londonderry.

My own art practice had transformed in response to teaching fine art media and graphic arts - as digital technologies were introduced into art colleges in the early 1990's. A project exploring the stories of one globally dispersed family became the spur for a wider-angled 'multimedia' work in 2000. *Weird View* explored the family's wider social network in Lucan, Co. Dublin as a dual-screen, 'interactive narrative'[1]. It recounted the interlaced social histories of a terrace of houses, told by residents past and present, and shared with wider publics via art gallery, local town hall, and the

[1] Combining video, digital animation and QuickTime VR. Developed with Valentina Nisi.

web[2]. My research proposal outlined a collaboratively generated, multiple platform piece to be developed with young people at the Nerve Centre.

Participants

Interface's research explores participatory, dialogic and relational art practices: Kester, Bourriaud and indeed Bishop have produced key texts. While the term *interface* refers to areas across Northern Ireland where religious, social, cultural and political differences (dis)connect, between Protestants and Catholics / Loyalists and Nationalists, it further references the transdisciplinary nature of its research: negotiated across art and design discourses, practices and forms.

The Nerve Centre's origins were socially and community oriented, becoming a 'multimedia' centre where young people could make films, stop-frame Cine animations, and learn to play instruments. Over time it has become more digitally focused, and consequently a central player in the drive to embed creative digital media in the formal curriculum in Northern Ireland. It currently manages a number of initiatives, from Creative Learning Centres (CLCs), to the annual Foyle Film Festival. Through its CLCs it delivers digital media educational projects in-house and in schools, for pupils and teachers.

Negotiated research

The 'some area of art practice' situates the research in a relatively recent area of practice-led doctorates in visual culture. Practice, as central to the research inquiry, situates knowledge-production in its relevant professional context. Text-based to research-based output weighting is negotiated. An AHRC report outlined some of the practitioner/researcher's methodological challenges: projects which were too 'abstract', or too 'practical', or where the text took too 'reflective' an approach to personal art production, failing as a contribution to knowledge (Rust, Mottram and Till 2007).

In transdisciplinary practice-led research the text serves multiple purposes; as analytical interpretation of visual, non-linguistic modes of meaning making; as a

[2] http://www.weirview.com

translation to legitimise the research across constituent disciplinary areas; and crucially, in collaborative research, to engage in knowledge transfer dialogue.

Three months into the research a Nerve Centre funding proposal for an ambitious mobile film project was unsuccessful; my planned role disappeared. The next months were devoted to exploring potential projects. In September 2007 I was facilitated access to two schools participating in a wider project with the Nerve Centre involving the design, delivery and evaluation of digital media projects in six schools in Northern Ireland.

Research, says US art and education academic Elliot Eisner, is not about problem solving, but about coping with situations involving human relationships. He states that, for fruitful research outcomes, which elicit the required knowledge, a very open approach to research design is necessary, even saying that ‘anything goes’ (Eisner 2003: 55).

An adaptive and reflexive methodology was negotiated, affording me the agency to research, while offering the schools and participants digital skills teaching and my experience as art practitioner. Projects with the two schools involved tasks and output in accordance with the curriculum rubric of the MIA A level. Evolving slowly, the method afforded both micro and wider macro analysis over an academic year, loosely a form of media ethnography (see Born 2005). Research focused in on the tasks, evaluating students’ understanding and skills relating to the uses and effects of digital media technologies, but crucially, came also to consider those of the wider institutions. The research path was an ongoing negotiation between Eisner’s free approach, the institutional and curriculum constraints of the schools, and the research requirements of collaborative doctorial inquiry.

Why digital literacy?

In a contemporary media ecology where 'legacy media' are augmented and converging with those that are digital, participatory and 'spreadable' (Jenkins 2009) a 'palette’ of digital media literacies is deemed necessary for effective engagement and communication. The meaning-making resources potentially synthesised into digital texts include non-alphabetic, visual, durational and interactive. Crucially, digital *texts* are not discrete multiple-media messages but loose, dynamic, assemblages of symbolic codes, accrued from diverse sources (geographic, cultural, economic) and

disseminated for social, expressive, public and commercial uses. And in networked publics such as social media websites, ideas in the form of digital texts, "'get transformed, repurposed or distorted' (Ibid.). Cultural production, consumption and dissemination are changing at an extraordinary rate.

Henry Jenkins et al (2006) have outlined a three-part model of digital literacy: *access* relates broadly to what Jenkins calls the 'participation gap', having access and ability to employ tools for inclusion in a digital society; second, involves skills of *analysis* and interpretation; third, the '*ethics* challenge' relates to research, evaluation and an ability to anticipate the consequences of engaging. Other definitions add a fourth 'creative digital production' component (Livingstone 2003).

Private to public identity

The transitional period from childhood to adulthood is a time of great change. Physical, social and cultural transformation sees young people typically emerge from private into public life. This public/private transition is apparent in everyday practices of representation as private imagination and consciousness are materially represented and shared (Eisner 2002: 3). Digital networks and mobile telecoms media enable young people to generate and share digital texts in practices of identity play; their intensive use of the mobile phone over the last decade has seen its uses evolve from instrumental to social and increasingly expressive (Castells et al 2005); for example, as creative forms of 'textspeak' (Crystal 2008). But whereas text messages are typically communicated one-to-one, intimate, secretive and indecipherable to adults (Truss 2008), social media websites are public platforms on which young people experience social connectedness and explore identity. Their private to public transition here is amplified.

Northern Ireland: schools

The legacy of Northern Ireland's political history is a segregated school system divided largely by religion, with a small but increasing number of religiously integrated schools. Further segregation by academic ability measured through the '11 plus' transfers test took place until this year. Following Northern Ireland's ('Good Friday') Peace Agreement in 1999 and the (re)formation of the power-sharing Assembly, strategies were developed to foster economic and social transformation: creativity and education were central. A revised curriculum was designed to acknowledge the

impact of technology on the classroom. Additionally, a new A level *Moving Image Arts* (MIA), addresses the creative and digital media literacy shortcomings of the curriculum.

Corpus

The research practice took place over an academic year through active research in the two schools. One, a Catholic secondary school, situates MIA in the English department and is taught by an English teacher with media studies training. The second school, an Integrated College situates MIA in art.

Both schools were apparently happy for me to be involved, and I worked in the multiple role of researcher, participant, teacher and observer. The process enabled ongoing documentation of the research process through research diaries, documentation of student work, gathering of available classroom materials, including materials that I contributed and student responses to them. The research body also makes use of publicly available contextual materials relating to the schools, as well as educational, and where relevant, public and regulatory policy.

Flash intervention

MIA was conceived of with the objectives of art and design subject criteria; critical and creative abilities are tested through a 30 percent textual, 70 percent practical assessment weighting. An online exam of film clip analysis is designed to test the ability to 'demonstrate knowledge and understanding of film language, forms, conventions, purposes and meanings' (CCEA 2007). MIA has been conceived of, largely as a film studies course, with practical work facilitated through the employment of digital tools, and network technologies utilised for some course delivery such as the assessment processes.

Essentially the production-side of the MIA syllabus is open: subject matter is not prescribed, nor are the digital technologies used. The former proved fruitful for content and discourse analysis for the research theme of identity. The latter, enabled me to introduce an element of technical and conceptual intervention.

Macromedia Flash vector animation software became popular in the early-growth years of the web when tiny data files were required for networked dissemination. It

shares conceptual models with digital editing software (timeline, libraries, layers) while enabling levels of interactivity, from simple 'rollovers' to complex database driven environments with video streaming. Such tools have spawned huge growth of the animated moving image on the web, on mobile phones, as well as on television through title sequences, advertisements and indents. One of the schools, with the Nerve Centre, agreed to purchase Adobe Flash licenses; while its visual language was familiar, when combined with conventional video, it generates innovative forms of moving image language.

Flash was already utilised in schools, advocated as part of an alternative vocational Occupational Studies curriculum, but it was not widely used. Through its use, I created an intervention to research the spaces between the MIA discourses and practices of conventional film language, production processes and animation, and those in the subject area of art. This gave a sense of ownership over the research, while fitting with the school's experimental creative ethos. Crucially it exposed, to those students who elected to use it, a new range of digital processes, discourses and skills.

Art practice: communities and singulars

A *communities of practice* approach to research is productive in emergent or transdisciplinary areas of research. Groups with broadly common purpose come together to share and deepen knowledge through ongoing dialogue (Wenger 2004: 4). It refers perfectly to the research environment of the art classroom where teacher/practitioner, researcher/practitioner and student/practitioners worked together over the duration of the MIA qualification.

'Singulars' however are school subject areas with discourses that are self-reflexive, which privilege and reinforce established practices and rules; a legacy of the organisation of knowledge in the nineteenth century (Bernstein 2000: 9, in Addison 2003: 62). Through cultural *re*production, teachers preserve the status quo due to familiarity with arts testing regimes, while students see the art room as a place of refuge, separated off from more academic subjects: art's popularity lends itself to unchallenging 'celebratory' rather than more 'critical' teaching (Addison 2003: 64).

MIA's intervention as a new qualification interfaces with established discourses in art and media studies, while also referencing a 'creative industries' vocationalism. It

privileges film language, employs a digital production cycle inherited from more analogue processes, and discusses the production of ‘films’ albeit using digital video. The technical, conceptual and pedagogic convergences and disjunctions make for interesting analysis. But crucially MIA’s are also having a transformational effect on the subject's areas in which it is situated, as teachers embrace new forms of practice.

Another transformation is less positive. In 2006 content from the MIA specification was removed; ‘representation and audience’ was too challenging:

> Clearly the study of representation and audience has been extremely demanding for both teachers and students and it is hoped that the removal of these areas from the specification will enable candidates to focus upon the analysis of film language in live action fiction and animation (CEA 2005: 4).

Aren’t these the key competencies needed to participate purposefully and effectively in (a digital) society? A UK-wide sociological survey of young people states that 'Identities and positioning loomed large' in Northern Ireland (Henderson et al. 2007: 7), where ‘identity positions’ were typically ascribed or assumed by others. Issues of representation and ‘audience’ are central to the validation of meaning, realised as young people’s digital texts, but also in everyday life through day-to-day representational practices and communication, online, in school, on the street. How are ideas made public? How is meaning interpreted and given validation?[3] And while I have aimed to take a reflexive approach to the overall research process, I fully appreciate that these issues ‘loom large’ for me.

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The ephemeral body: aesthetics of the body in the new media arts of continental Southeast Asia

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New media arts[1] and body representation: an overview on Southeast Asia

Since the beginning of the ‘80s, new media have entered the artistic scenario of continental Southeast Asia (Thailand, Myanmar, Cambodia, Laos, Vietnam). New concepts and technologies, ideas, styles and values from global culture have started to interact and merge with specific traditional artistic meanings and expression of local culture[2].

From the very beginning of Southeast Asian civilization, the body has played a central role as a coherent and living expression of codified aesthetic, artistic and philosophic values. In visual and performing arts, use of the body and the dynamics of gesture are emblematic of the identity and transformation of socially-shared meanings. After a several decades of informal pictorial experimentation, owing to the influence of Western artistic movements (Poshyananda 1992), new media arts have given back to the body its primal role. Indeed, digital, video and performing arts - due to their specific ephemeral and transitory status - can be considered as some of the best media for representing the 'changing body', faithfully reflecting the dynamics of contemporary Southeast Asian metropolitan culture.

In new media arts, the body thus becomes the place where ancient philosophies and new stimulus from contemporary society meet, and where conflicts and desires find their visual expression. In any situation this newly represented body can be primarily

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[1] New media arts from Asia have particular characteristics and possibilities that distinguish them from Western media. A peculiar culture and language affect the way in which new media are employed by artists in countries throughout the region. In other words, the notion of what constitutes new media can take in social and cultural differences that correspond to the Southeast Asian artists’ own definition of the term (Silpasart 2007: 79). This is to say that here we use the term 'new media art' to refer to video-art, video-installation, performance, digital and manipulated photography, according to the use of the term by Thai artists and art critics.
[2] The first new media art works were shown in Thailand in 1985, at a *solo* exhibition in Bangkok entitled 'How to Explain Art to a Bangkok Cock' by Apinan Poshyananda.

conceived as an 'aesthetic body'. Aesthetic research, the pursuit of 'beauty' remains, indeed a distinguishing element in the visual landscape of Southeast Asia (Kraevskaia 2005: 37-38), an element continually interfacing with conceptual research, which represents the answer to more recent, and mainly Western-oriented aesthetic needs.

Among the countries of continental Southeast Asia that share the same philosophical background, the Thai reality stands out as one of the most representative and dynamic art scenes. Despite decades of social deconstruction and economic unrest, experimentation in new media arts is particularly interesting in Myanmar where the forced isolation of both population and culture have given rise to a very particular aesthetics (Naziree 2009: 3). Extremely marginal, in this context, is the artistic situation in Cambodia and Laos: mainly due to the lack of technology, most contemporary artists here continue to employ traditional media in contemporary art and new media are still at an embryonic stage[3].

The ephemeral body: body representation and Buddhist philosophy in new media arts

In looking at the influences that nourish Southeast Asian art, we should note the primal role of a religious and philosophical legacy. Since its origin, till the birth of modern art introducing non-religious elements, the classical and indigenous art of Southeast Asia has been a Buddhist Art (Phillips 1992). The body represented in sacred paintings and sculptures was the body of the Buddha, offering himself to the eyes of his devotees and followers. A body among other bodies, especially when the paintings' aim is to represent the most salient episodes of the Buddha's earthly life. *Theravada* - literally 'the Ancient Teaching' - is the oldest surviving Buddhist school, and the most conservative. Founded in India and derived directly from the Buddha's original teachings, for many centuries it has been the predominant religion in most of the countries of continental Southeast Asia, that is, in Thailand, Myanmar, Cambodia and Laos[4]. In Theravada Buddhism, the ultimate aspect of existence is represented by suffering (*dukkha*). The cause of this experience is rooted in the illusory idea of the individual 'self', conceived as a permanent reality, opposed and separated from the external world. But none of the five aggregates (*skhandha*) composing a living

[3] For these reasons, the paper will offer a sketch on what is running through the visual culture mainly in Thailand and Myanmar.
[4] In Vietnam, the dominant Buddhist school is Mahayana.

being – form, feeling, perception, mental formation, consciousness – can be identified as 'self'. This erroneous vision is the very origin of all illusory conceptions of reality and the basis of our 'grasping' (*tanha*) our body and our emotions. Indeed the body, like all phenomena, is impermanent. Direct understanding of impermanence (*anicca*), suffering (*dukkha*) and the concept of 'non-self (*anatta*) leads to freedom from worldly bonds and attachments, to the state which in *Pali* is termed *nibbana*, which literally means 'extinction'.

In a deeply Buddhist society, where artistic expression has historically manifested itself through devotional imagery, these concepts can be used as philosophical categories in understanding the aesthetics of body representation in ancient as well contemporary arts. Indeed the ritual gold and red colours, the bodies of the sacred images, and those of the Buddha do not disappear in the experimental research of new artistic languages. Although the new arts interface with international reality and employ the new media to create a global aesthetics, they are still inspired by traditional iconography and ancient philosophy. Especially in Thailand and Myanmar, Buddhism continues to persist as the fundamental element characterizing – in a more or less figurative way – the subjects and aesthetic reference for many contemporary artists**.** In this sense some of the most important Buddhist philosophical teachings are the key to reading many new media artworks.

The dancing bodies of heavenly beings, represented in traditional mural paintings, leave the walls of temples and palaces to appear as a virtual *mandala*[5] in the videos *Circle of Hope* and *Makhala and Ramasura* (*Figure 1*), by the Thai artist Sakarin Krue On. In its hypnotic turning, the *mandala* invites us to give ourselves up to the whirl and to perceive the illusion of what we commonly think of as real. The movement and colours of the dancing heavenly bodies make us feel lost in an artificial space in which the gods represented let us perceive the illusion of what we suppose to be real.

The concepts of illusion and impermanence are expressed by means of bodies walking on sand, in the Thai artist Amrit Chusuwan's video-installation *Being Sand* (*Figure 2*). The artwork is the artist's own interpretation and understanding of Buddhism and is inspired by the book, *Kham-sorn Khong Huang Po* (*The Zen*

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[5] A *mandala* "is a strongly symmetrical diagram, concentrated about a centre and generally divided into four quadrants of equal size. It is built up of concentric circles and squares possessing the same centre. Indeed, a great many mandalas are also aids to meditation, visualization and initiation" (Brauen 1997: 11).

Teaching of Huang Po), translated by Buddhadasa Bhikkhu, in which sand is used as a metaphor for explaining the mind. Sand – taking, changing and loosing its shape under the feet of walking bodies – offers us a perception of the transformation and impermanence of phenomena. All these transformations of reality are not involved in the deep nature of the mind which – beyond the illusion of phenomena – is characterized by emptiness (*sunnata*). As we read in the above mentioned book, the mind, like sand, feels nothing, no matter who steps on it, whether a king or a mangy dog.

The absent, and nevertheless present, body in the *bardo* condition[6] is the subject of the video-installation *In Between* by Kamol Phaosavasdi (*Figure 3*). The image of an infinite black hole becoming lighter and lighter represents the 'non-self' in its dancing – during the time between death and subsequent rebirth – in the shapeless space towards a womb, the first abode of the future body. The video is projected over bronze sculptures with different textures, each reflecting the diversity of various characters. To illustrate the issues of emptiness and transformation, Kamol chooses new media as a tool to express the artistic technique and Buddhism to give shape to the truth. Hence, the relationship between these aspects could be termed technospiritual art (Fongsmut 2005: 10).

The body, chained by the senses, is unable to transcend the illusion of a reality with which it identifies and from which it assimilates the poisons of the human condition: this is the body of Aye Ko, one of the most representative artists of Myanmar (*Figure 4*). His work is inspired by the Buddhist philosophical principle that all life is suffering:

> Even in an ideal, equal, prosperous and peaceful world, the endless *chakra*[7] of individual suffering will never stop turning; likewise the endless *chakra* of *samsara*...The only way to overcome this suffering is to let go and reach nirvana, the state of globalised nothingness. (Aye Ko 2006)

Finally, the body, now only a dead body, is the visual teaching recalling the concepts of the ephemeral, illusion, transformation and the ineluctable suffering of human

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[6] *Bardo* literally means “in-between” and refers to the 49 days between death and rebirth, in accordance with Tibetan Buddhist philosophy. Phaosavasdi’s work has, indeed, been inspired by the relations between birth and death as described in the *Bardo Thödol*, the text book stating the process of dissolution after death and the transformations of the individual consciousness before rebirth.

[7] *Chakra* literally means 'wheel'. In Buddhism the wheel’s swift motion represents the rapid spiritual transformation revealed in the Buddha’s teachings.

beings, in Araya Rasdjarmrearnsook's conversations with death (*Figure 5*). Paroxystically, here the body, in actual fact, seems to have reached its 'grade zero' - mere petrified matter, an inert body completely deprived of self.

From Buddhism to contemporary society: a controversial body

But the body is also an instrument representing a glance, through Buddhist philosophy, at contemporary society, where 'the new temples have become modern shopping malls' (Pettifor 2003: 14). In Chusuwan's *Silent Communication*, the artist's body stands in front of a golden Buddha body in silent conversation, wondering about the meaning of sacred teachings in the contemporary world (*Figure 6*). Thus, Buddhist philosophy does not concern only the religious context: as part of the daily life of people in deeply religious countries, it is a way of reading a rapidly changing contemporary society, and of representing it in artistic works.

Often, the body in art – as well as in our increasingly complex daily life – is thus an alien presence in a landscape that it does not recognize, a landscape that no longer belongs to it. In some contexts, this has its origin in the contradictions deriving from over-rapid economic and cultural growth. In other contexts, dramatic political situations make violence, poverty and absence of freedom a peculiar feature of daily life. The body then becomes a controversial presence in a world that gives it hospitality, but does not integrate it. The body becomes a polemical presence looking at the world around it with total disregard, irony, regret or mere impassivity. And the world around it is ill at ease, feeling the glance of this alien body, critically regarding the illusion of a society that apparently distributes wealth, but is in fact more and more illusory and cruel.

Pink Man, the emblematic character created by Thai artist Manit Sriwanichpoom, perfectly embodies the contrasts of a new 'globalized' society (*Figure 7*). His pink dinner jacket represents, for Thai people, typically Western wear, but not in a stylish way, as a symbol of the extraneousness and shabbiness of the needs of the contemporary society. Needs never placated, as shown by the empty shopping cart and the sad expression on his face. 'Buddhism teaches you to live in a very humble way, in a simple way. Now it is the opposite: everyone lives in a complicated manner and desires more and more' (Sriwanichpoom 2009). For these reasons, in the Thailand of shopping malls and fake wealth, the represented body is also a sick body, a compelled body, suffering for its stay in a world that it does not understand and of which it perceives the illusion and the vacuity, as in the Montri Toemsombat's artwork *Fake Me* (*Figure 8*).

In the Myanmar of badly concealed poverty and violence, sometimes the alienated body, on the contrary, tries to escape. It then becomes the body of desire. In the photographs by Phyu Mon, it is a body living in an ideal world characterised by a dreamlike atmosphere. It is the body running away from reality. It is the 'refugee body' – mostly a female body – living in wonderland, a land where wonder means the harmony of poetry and the peaceful landscape of what has been lost; that peaceful landscape where the law is harmony and Buddhism (*Figure 9*). This is just one more

example of how Thai and Burmese new media arts originally attempt to react to the globalizing and standardizing tendencies of most contemporary art. An aim constantly achieved thanks to an original re-elaboration of elements belonging to their ancestral philosophical heritage and to their traditional perception of the body, in the light of the complexity of the contemporary world.

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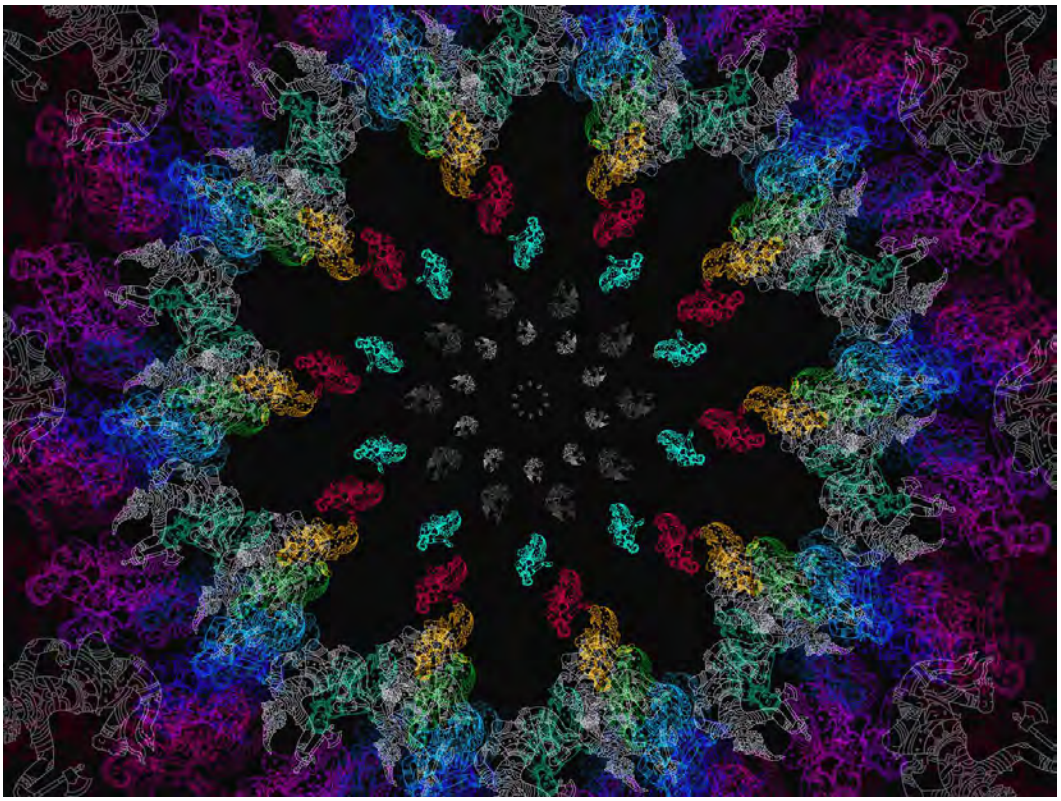

Fig. 1: Sakarin Krue-On, *Makhala and Ramasura,* 2003. Single-screen video animation, Courtesy of the artist.

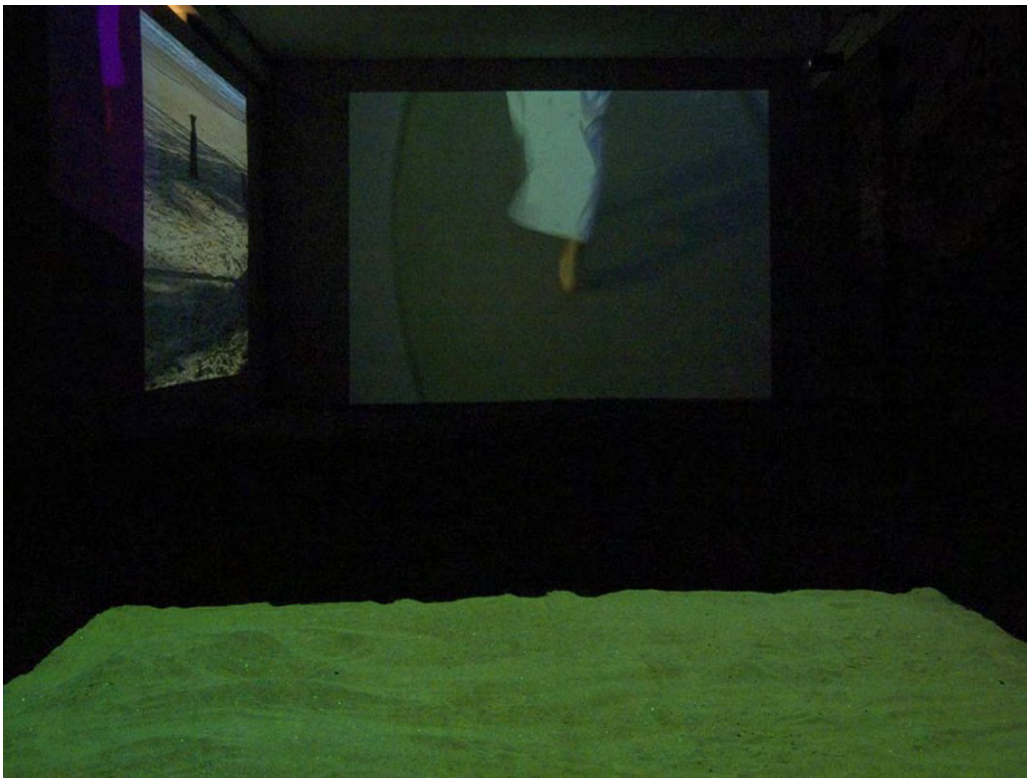

Fig. 2: Amrit Chusuwan, *Being Sand*, 2007. Video-installation in sand room. Courtesy of the artist.

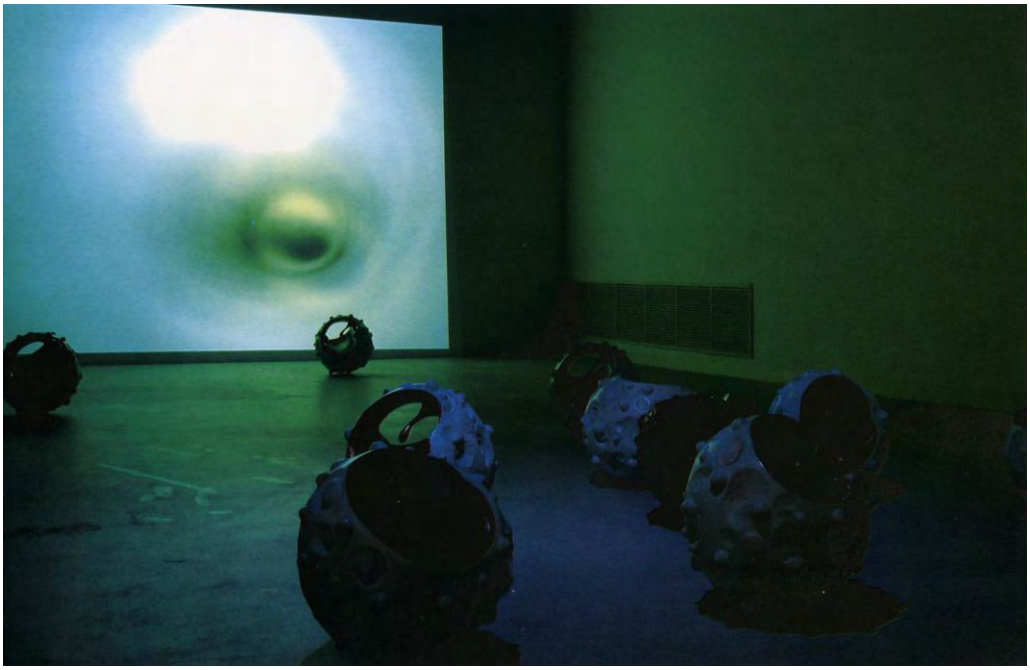

Fig. 3: Kamol Phaosavasdi, *In Between*, 2005. Video-installation. Courtesy of the artist.

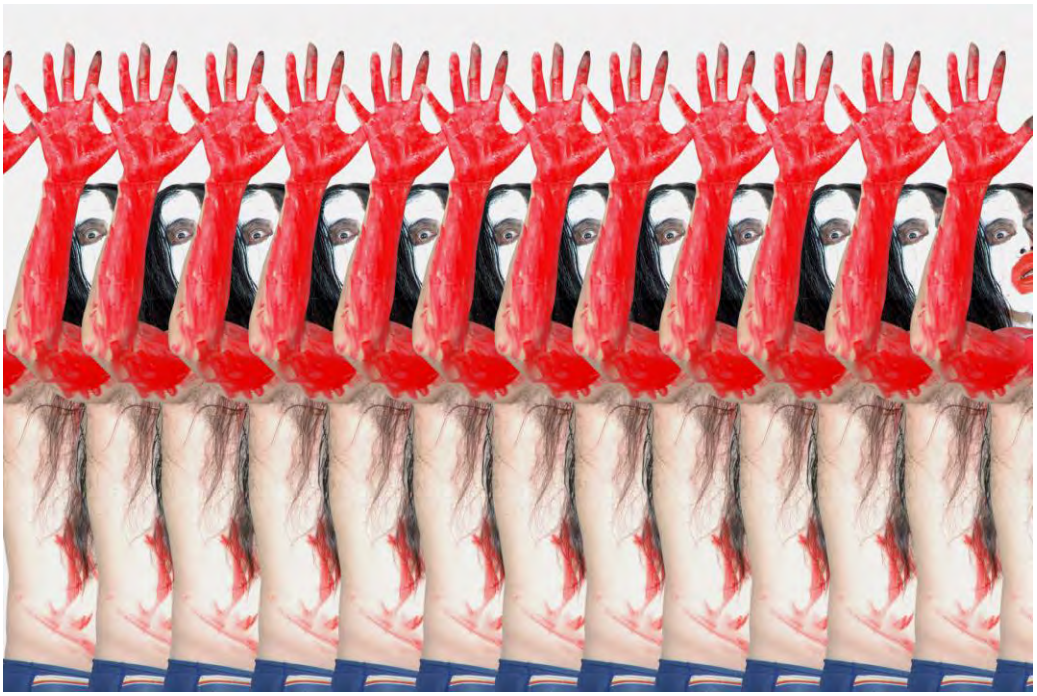

Fig. 4: Aye Ko, *Transfixed: Where am I?* 2008. Giclee print on archival paper, 90x136 cm. Courtesy of Thavibu Gallery, Bangkok.

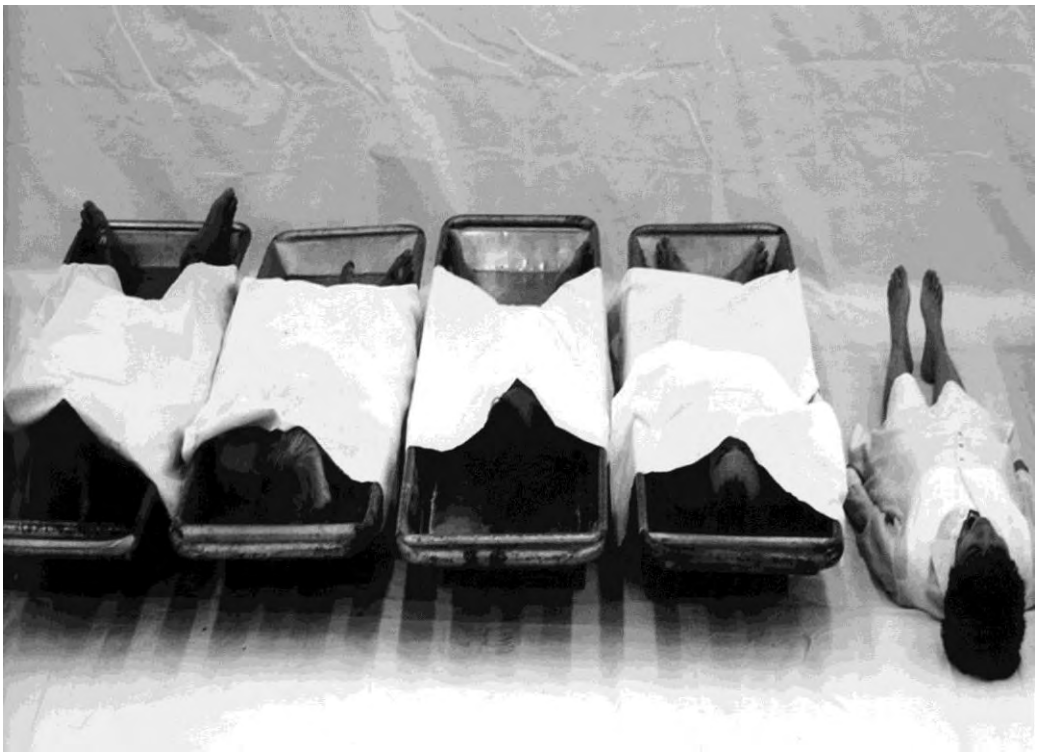

Fig. 5: Araya Rasdjarmrearnsook, *Conversation with Death on Life's First Street*, 2005. Video-installation. Courtesy of the artist.

Fig. 6: Amrit Chusuwan, *Silent Communication*, 2003. Video-installation. Courtesy of the artist.

Fig. 7: Manit Sriwanichpoom, *Pink Man in Paradise # 2 (Garuda Wisnu Kencana Cultural Park),* 2003. Pink Man performance: Sompong Thawee. C-print, 80x99 cm. Courtesy of the artist.

Fig. 8: Montri Toemsombat, *Fake Me*, 2002. Performance and installation. Courtesy of the artist.

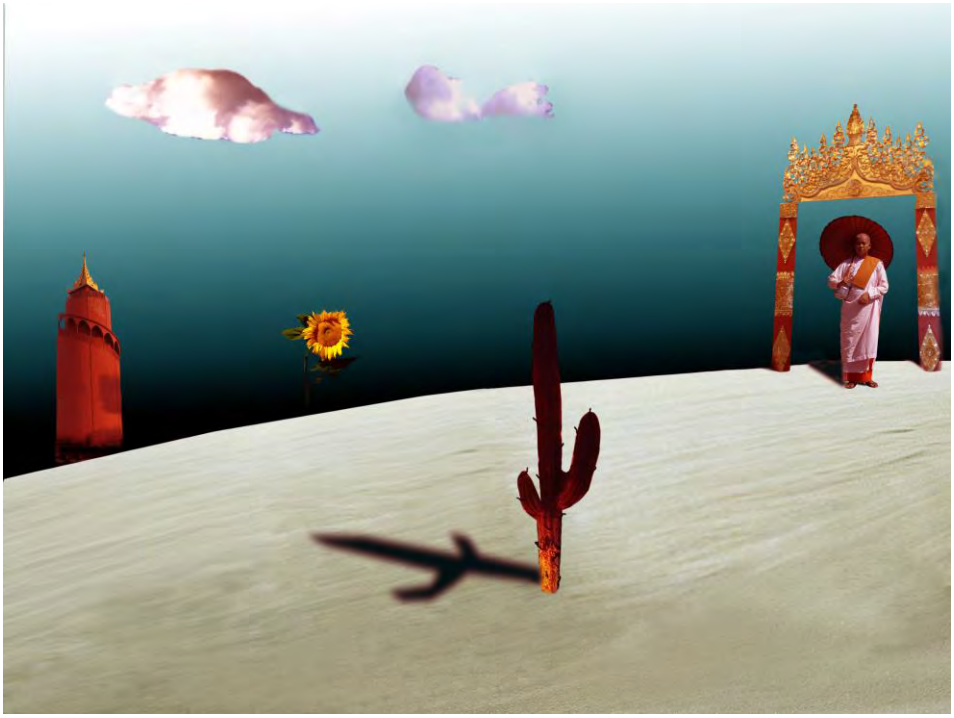

Fig. 9: Phyu Mon. *Hope (3)*, 2008. Lambda Print on archival paper, 60x91 cm. Courtesy of Thavibu Gallery, Bangkok.

Cross-discipline collaboration – don't care and don't want to know

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Abstract

This paper investigates cross discipline collaborative methodologies and protocols that are necessary for first time collaborators. Two situations are examined, one with first year undergraduate students that had never experienced cross discipline collaboration, who 'don't care and don't want to know' and the other with professionals from different disciplines. These were mostly face-to-face rather than online projects. What I am referring to when using the term cross discipline collaboration is collaboration across several disciplines working toward a common purpose: problems of common language - where not only are we unable to communicate across disciplines, but calling it something causes confusion.

In spite of this, cross discipline collaboration is a term often heard these days. *Filter Magazine* (Issue 68), was overflowing with encouraging words about collaboration. Quote: 'This process of collaboration is essential in our new world order. It is from collaboration and the cross fertilization of ideas that new discoveries will come'. Another quote from the same writer:

> 'So what do we do about it and how can we make a difference? Well, to borrow a term from science, one way of influencing change is to introduce a catalyst to the system, an enabler with an agenda for change. Such a catalyst paves the way, breaks through structural boundaries and brings groups and cultures together to design and pilot new ideas and programs'.

However unless participants are sufficiently skilled to launch and then sustain successful collaborations, then things can and do go wrong.

It is necessary to implement learning systems for our young people. Programs do exist in some countries and this paper gives some indication of ours.

Background

In 2004 I wrote and delivered a two-year program titled, 'Collaborative Art' to undergraduate students at Wellington Institute of Technology, New Zealand. As the students progressed through the programme, gaining experience and knowledge, they were encouraged to test and evaluate new, strange and unlikely collaborative methodologies as a means of discovering different ways to successfully traverse collaborative territories. These methods were then incorporated back into the program. Then in 2007 I wrote a three-year cross discipline collaborative programme, which was delivered at the beginning of 2008 and 2009. This is a core program, meaning all students are required to enrol in it.

Over and above the aims and learning outcomes of the course is one important objective; that is, for students to gain a worthwhile experience, to value that experience and have a desire to continue exploring cross discipline collaborative practice. In order to provide structure to the delivery of content, collaborative activity is broken into 3 practice arenas: Year one students examine participatory collaboration; year two examine industry based collaboration and year three focus on conceptually driven collaboration. While collaboration learning transfers easily across borders and can be communicated globally, there is also the necessity to adapt to local contexts. In my country, New Zealand / Aotearoa, the challenge is to engage with the *Treaty of Waitangi* which is an agreement signed in 1840 for the Maaori and pakeha (European) to work and live harmoniously together. 'It was a broad statement of principles upon which the British officials and Maaori chiefs made a political compact or covenant to found a nation state'. (New Zealand History Online).

First time student collaboration - examples

1. An assignment involving first year undergraduate students from Animation, Visual Art, Film and TV, Audio Engineering, Print, Packaging and Interior Design. They were required to research, develop and present a project based on the theme, 'Sustainable futures – employing Interventionist strategies for positive change'. This could be online, digital or a physical manifestation. One team produced a found object installation that commented on consumption and waste. Another made an animation about a bunch of wild animals that take over a city in order to retrieve their hunting grounds. The third team's final work was in the form of a presentation. They developed an idea about recycling, which was pitched to our city council.

2. Second year students were required to collaborate with staff from a local museum to produce a public exhibition. The idea, generated by students during a brainstorming session, was to create a fictional history that would raise questions about the way history is recorded. They proposed to display ‘artefacts found’ under a new and controversial bypass in Wellington. The museum approved the idea and assigned three staff. Public feedback to the exhibition was generally positive, with most enjoying the joke. Seeing their work in the public realm, and being able to compare their efforts to other displays in the museum, did much to raise the student’s self-esteem.

Observations

Safe, non-hierarchical learning environments are vital to success. Creating a common language is a double problem at 1st year because students have very little language about their own disciplines, let alone other disciplines. Resistance and investment are possibly the biggest problem that is usually reported at length in their evaluations. Creative icebreakers can help a lot. For instance, student teams were asked to create subtle inventions in the school environment. One team put a notice in the lift which said,’ to ensure smooth operation of this lift, optimise weight distribution by the following: if you are alone, stand in the middle; if you join someone who is standing in the middle, stand as close to them as possible. Distribute the weight from the centre out’. Randomised teams are preferable to letting students choose their own, but are tough for the students to adjust to. Teams formed from friends are no guarantee of success. Random teams can be a positive opportunity for students to expand their networks and learn new skills. Students benefit from collaboration with unknown individuals by gaining appreciation of other discipline / skills / creative processes and also increased knowledge about interpersonal skills.

Establishing communication and behavioural protocols are essential: in a workshop situation students create guidelines based on what they expect of each other. Student made comments such as, 'its annoying working with others but I learnt animation skills’; ‘I didn’t come to art school to learn to write’; ‘students from other disciplines have been giving me feedback on my other assignments’; ‘working without choice of team, I had to get to know them first - others had to explain their skills and interests’; 'once we got a good idea things picked up’; ’the process we went with was whatever was fun or made us laugh’. Students form new connections/

friendships; learn how someone else would approach the problem, gain awareness of other disciplines and get introduced to new skills.

First time professional collaboration examples

1. My first experience of cross discipline collaboration was in 1986. I joined a pre existing group called, ‘Clean water Campaign’. The group formed to make the Wellington City Council – where I live, put an end to raw sewage spilling in the sea by committing to the construction a quality sewage treatment plant. At that time I couldn’t see what use my skills as a painter would be within a group consisting of a lawyer, a Maaori activist and concerned locals. I also wanted to avoid doing mail drops, cold calling, licking stamps and ringing politicians.

By the end, we produced masses of posters, banners, billboards and an installation for the International Festival of the Arts titled, ‘Moa Point in the Key of P’. While it is impossible to judge the exact effect, the imagery played a significant part of informing the public about the issue, forcing the council to hold a public referendum, and when they ignored the results, pollution became the focus of the council elections. They lost and the new council committed to the construction of the plant, which is still seen as a high quality treatment centre.

2. ’Dressed to Kill – this town ain’t big enough for the two of us’, began when I was invited to submit a proposal to a touring show called, ‘Jewellery Out of Context’. I suggested it to a theatre designer whose work I liked and we began with random conversations about all sorts of things while writing the proposal. The conversation that stuck was one about our mothers and how they would make cowboy and soldier costumes on the sewing machine for us as kids. The concept that emerged from this was the interrogation of the relationships between jewellery and violence. The work involved sensor driven light boxes, sound and turntable displays as well as photographs and objects. It was exhibited in New Zealand, Australia, Canada and the Netherlands. We had agreed on one rule, ‘if it ain’t fun, don’t do it’. Due to the enjoyable process, we produced twice as much as we needed to fill the exhibition space.

3. ’EarThed’ began as a cross discipline workshop organised by a computer scientist for staff of my institution. The aim was to teach us how to employ pickaxes and micro servers in team based projects. After a technical skills workshop we broke off into

teams. Uncertainty and discomfort created a retreat to familiar hierarchical structures. Those staff who had experience of cross discipline projects immediately began to agitate for change – to deconstruct the structure and replace it with a more fluid process. Ructions destabilized some individuals but excited others. Working relationships unravelled, and reformed with new purpose. A chaotic research material gathering, followed by a construction phase took place. Due to other commitments, the artists in the group were unable to install the work, and it was left to an electrical engineer who asked, how shall I arrange this?' We replied, 'whatever you like', and he took that as permission to have some fun. Personally I was over the moon with what he did.

'An Intelligence for Cross-World Collaboration, Real and Virtual', came out of EarThed when we decided we wanted to work together again. Five professionals, including myself (art, VJ, computer science and electrical engineering) collaborated to address the question: can objects/events in Second Life affect/ infect first life? This work was presented at ISEA 2008. Four were able to meet face-to-face, the fifth communicated via Second Life.

During the process it became apparent that we were working with more than one concept. An idea about the ghost in the machine 'appeared' (metalogic - a mediating influence in the membrane between realities). As well, a 3D camera was introduced and a virtual nightclub, 'Temp'. So without any assistance, a dialogic process (that is, the integrity of everyone's input remains integral to the final work) was employed.
It was a very difficult process due to unreliability, poor time management, conflict and a lack of patience. Too much time passed before we got together - so we had to work under pressure. At a crucial time, one member's grandfather died and had to leave us for a week.

To give an indication of how difficult it was, the room in my house that we used to create the work was left untouched for seven and half months.

What can we conclude from these examples?

Collaborations begin for me when I become familiar with, and interested in, the work of another professionals. And how do they end? Mostly, they don't. When employing a dialogic process, they usually have after-lives, either as friendships or in future collaborations.

At the beginning of a project the collaborative environment may be inhabited by conditions of uncertainty, misunderstanding, under investment, marginality, instability, risk, blind alleys, dead ends and disorientation.

Then, on the point of collapse, the extraordinary appears. This is why, my co-collaboraters tell me, they want to work in a cross discipline team: it's the revealing of ideas and then observing the unpredictable and exciting journey the team takes them on. More understanding is required about the dynamics within this intersubjective space, especially as it opens up insights into the physiological and philosophical area where agency and responsibility meet other mental realities (such as memories and dreams).

Heidegger wrote, 'We understand the end of something all too easily in the negative sense as a completion, an end is the gathering into the most extreme possibilities'. Of all the projects I have been involved in, few have been easy. But I have learnt something quite profound from each and it has been the attractiveness of that learning, combined with a belief that we have to find ways of re-connecting and getting along, that make me come back for more.

Authorship has been an issue when money was involved. When working in the conceptual arena, where no money is involved, the issue is more about research outputs i.e. choosing an audience/destination for a cross discipline project that fits all professionals involved has been a problem. For example, when collaborating with a web designer his interest was very high in the beginning but waned when the project was destined for an art space.

It is interesting to think about collaborative processes as a model that could be applied to other situations, particularly if you think like I do that learning to work together and to get along is vital to our futures. In a recent *Guardian Weekly* there was an article about a survey carried out by the Joseph Rowntree Foundation, asking the British public to describe 'the social evils of today'. Quote, 'There seems to be a remarkable degree of consensus about a definition of today's social evils. Individualism is top of the list, closely linked to greed and the decline of community'.

Guidelines for creating successful collaborations:

1. Act with kindness. Create goodwill and try to maintain it throughout the project.
2. Bring out the best in others.
3. No conflict, even better - be nonreactive. Think before you act:

> 'George: we don't argue, but even if we did we wouldn't tell. We believe that the world is one big argument, and we think we at least should try to keep away from that.
> Gilbert: if we started to argue, everything would fall apart very fast. Because it is based on accepting the two, the view of two people together. If not, you are finished immediately. It wouldn't work. It wouldn't work.
> (Rosenblum 2004).

Whether or not it's a team of friends or individuals with the required skills, tension, stress, argument, conflict are likely to happen. Most advice suggests that conflict can be worked through, and the ship righted again. However I'm of the firm belief, that in collaborative teams a policy of no conflict is required. I have debated this with both colleges and students and while they find this policy somewhat extreme, they can see its merits. Some suggested 'keep calm' as an alternative. When conflict occurs, it usually leaves reside, no matter how much it is worked through. If the situation is dire, almost at boiling point, walk away. Its often the last thing I want do to, because my position and my intended reaction seem right. However, after a night's sleep, my take on the situation is invariably changed to something conciliatory.

4. If it ain't fun, don't do it i.e. find another way.
5. Prescience: find out what makes your co-collaborators tick.
6. Patience – collaboration slows everything down.

In conclusion, in the context of our contemporary world and the unstable future, cross discipline collaboration could prove to be an effective survivalist strategy when underpinned by patience, kindness, prescience and of course without conflict.

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Semantic cartography

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Abstract

> Once the whole social world is relocated inside its metrological chains, an immense new landscape jumps into view. If knowledge of the social is limited to the termite galleries in which we have been travelling, what do we know about what is outside? Not much. (Bruno Latour 2005).

Locative media has capitalized upon the use of Global Positioning Systems to provide an adequate level of accuracy to support individual navigation and connections to services within a given vicinity. However as we move from the 'Sat Nav' model that provided us with route planning, to more context specific information, we can see how the base map is becoming less useful.

In as equally transformative manner, social navigation technologies such as collaborative filtering and recommender systems have supported the ability for Internet users to pass on tips, hints and tags and have provided a highly social dimension to cyberspace. Whether you prefer semantic web, web 2.0 or neither, devices such as 'tag clouds' have provided 'bottom up' ways to classify and attribute meaning to web content and, as the authors would argue, perform the function of a map.

The paper cites a series of precedents from contemporary digital arts and media

which support social commentary upon place, as well as case studies from the author's own research and teaching experiences. An analysis of these case studies are used to support a discussion about the 'temporal' nature of tagging that the authors argue often disappears as Cartesian maps are used as the primary interface to describe a socio/spatial context. The authors look toward a practical framework for the representation of social information that sustains an integrated model of space and time.

The paper explores the characteristics of a digital art project developed by the authors that allows users to 'read' and 'write' to a geo-located tag cloud that is visible under their feet as they walk through urban and rural environments. Map Cloud replaces the geographic base map that accompanies applications such as Google Maps for smart phones, with words derived from users who post 'tags' for specific locations. The authors reflect upon the temporal flexibility of this type of base map and upon the 'semantic cartography' that is constructed as users correlate meaning with location.

Locative media

In 2003 a new term emerged in the media panorama to point out technologies and processes that promise to reconfigure our understanding and experiences of space and culture (Galloway, 2006), this term is *locative media*, defined as a 'test category'. The new terminology enlightens in the field of the media, in particular the mobile media, a shifting toward the hybrid of physical and digital communication space. Locative media is synonymous for the cultural and artistic production of location based services for the IT and marketing world. Both terms stress the relevance of location, context and context awareness in interaction design and in mass market products of communication.

Technologically speaking, locative media are enabled by global or local information and telecommunication systems such as GPS (Global Positioning System), GSM, bluetooth, wi-fi, rfid, etc. The aim of those technologies is to locate and track people, objects or digital information with a relative or absolute geographical position enabling 'new ways of engaging in the world and mapping its own domain' (Hemment, 2006), simultaneously linking the real and digital space, two dimensions in real time, transforming the perception of both domains. Nowadays mapping systems joined - in terms of diffusion and mass market - the location technologies.

Nicholas Nova (2004), in one of the first literature reviews on this subject, stated that two levels are at the basis of locative media: the physical environment and the human factor. The urban space of cities its cultures, histories, its everyday flows - places identified with latitude and longitude coordinates, on one side - on the other end, people with their emotions, thoughts, feelings, social interactions and so on. Contemporary artistic practices (geotagging, geoannotating, geocaching, gps drawing etc) explore and trigger these interactions revealing the urgency of new ways of approaching and understanding space and everyday experience in a hybrid ecosystem; the awareness between people and their environment (Shirvanee, 2006).

Elevating the discussion and experience over the layer of latitude and longitude coordinates are the next steps in which locative media are involved nowadays: reaffirming the relationship between art and everyday life (Mott, 1997); reconstructing social and cultural spaces (Wollensak, 2002); investigating the implication of new imaging and cartographies techniques on our sense of place (Wilson, 2002). In this sense the meme that has rapidly circulating among the community is really a 'test category' for the convergence of geographical and data space (Hemment, 2006).

Social navigation

Social navigation finds its roots within the technologies that defined the Internet and its history is complex because of the interpretation of these technologies (Dourish and Chalmers, 1994). For Benyon, Höök and Munro the definition and development of social navigation is a broad inquiry that embraces a wide array of projects, but most importantly focuses upon the ‘social’ opportunities that are gained through supporting collaborative navigation methods (Höök et al 2003).

In its most basic form social navigation on the Internet can be the listing of other people’s pages on your website. This process of posting navigation points for others to visit according to your own interests, represents an asynchronous and non-reciprocal form of navigation. Non-dynamic and updated only by the host, these links demonstrate the principle of indirect social navigation. Further developments include automated systems that follow rules according to users of sites and digital documents, their choice making procedures and building patterns that correlate with other users who may be navigating through similar information. The early development of these systems originated in filtering systems, as electronic mail was

the primary use of a computer network. Through the research dedicated to developing filtering systems Malone et al (1987) introduced the terms ‘cognitive filtering’, ‘social filtering’ and ‘economic filtering’, each process highlighting different priorities that were used to sort important emails from ones that could be ignored.

Semantic cartography foundations: a comparative appraisal of dn[T]3 and Tag Clouds

To date the synthesis of locative media and social navigation is limited to popularity; giving details for restaurants when using a mobile application such as Urban Spoon, or the traffic updates on Google Maps and the busyness of roads seen from online CCTV cameras that might encourage a user to change a route according to social activity. Social navigation in online spaces (pre-mobile) transformed the organisation and presentation of data from linear, editor controlled material that was fixed according to the needs of the distributor, to a dynamic, democratic, user affected ecology. As the Google base map has become a primary substrate for many forms of locative media, the fixed nature of the underlying Cartesian grid represents a similar straight jacket within which social and semantic connections are suppressed.

Through a series of art projects the authors have identified the Web 2.0 technology of Tag Clouds as beginning to offer both social navigation and geographic qualities. Tag Clouds can be understood to be a form of socio-spatial map.

1. dn[T]3 Live Social / Semantic mapping, Turin, 2007.

The dn[T]^3 (pronunciation: dnt cube) is a participatory interactive projection for public spaces using mobile phone thought that balances art, information design and social computing. The title dnt recalls the dna, where the T of tag substitutes the a of acid to deliberately state the relevance of the tag as the structure of a new social knowledge, emerging from the people (Figure 1).

Through a very simple interaction process, that collects tags via SMS text, the project means to show emerging knowledge pattern, revealing and visualising how people perceive the world. The project applies a folksonomies model typical of Internet to the real world, although, instead of describing digital assets and classifying websites, people are asked to contribute to the creation of a meta-knowledge about emotions, concepts, everyday object or situations, everyday social life, etc.

dn[T]^3 is designed as a semantic ecosystem, a memetic ecology, where the tag is like meme - evolving as a semantic unit according Darwinian theory. dn[T]^3 custom folksonomies engine, an inferential engine, analyzes and tracks each tag received as absolute frequency and relations frequency. In the dn[T]^3 visual world, the tag flows from small to big, from private to public, from personal to collective. The visual interface is a complex representation system, fetching and rendering data in a self-organizing diagram, a collective cosmology.

Figure 1. dn[T]3 Live Social / Semantic mapping, Turin, 2007.

2. Tag Clouds exhibited work ‘Notion / Notation’, University of Plymouth.

The ‘Tag Clouds’ artwork (University of Plymouth ‘Notion / Notation’ exhibition) involved asking all of the artists who were exhibiting in the show for a list of their browser bookmarks. Once collected, an account for each artist was made on del.icio.us and the common websites that it's database recognised from other users generated tags for each entry. As a result of this process a tag cloud was made for each artist, which was then posted onto a large wall. The resulting tag clouds provided an extraordinary insight into the interests that informed each of the artists, and became a reflexive map of the works that many of them exhibited around the show (Figure 2).

The piece Tag Clouds was an interesting demonstration of how social navigation technology provides a ‘map’ of creative processes. Placed in the context of an art exhibition - an architectural space consisting of artwork to lend it a sense of place -

each tag cloud was a semantic map of the pieces of work. When viewed together, all the tag clouds were a map of the show. As a conceptual strategy the work provided a highly reflexive guide to the show and in many cases corresponded well with their work. The Tag Clouds that were exhibited became social cartographies that described not only each exhibitor, but the architecture of the exhibition as a whole.

Figure 2. Tag Clouds exhibited work ‘Notion / Notation’, University of Plymouth, 2006.

Mobile trajectory

The use of the tags cloud as socio-spatial reflexive models represents an initial step in demonstrating live, socially manifested semantic cartographies. Both projects, dn[T][3] and Tag Clouds, had begun to demonstrate that it was possible to construct a limited, but nevertheless spatial framework that encapsulated socio-spatial systems without the use of Cartesian coordinate system based plans.

The authors' works demonstrate an opportunity for social navigation and spatial media to begin mixing the representational and cognitive models of an environment. The next step is to integrate this into the same experiential context as locative media.

Outline of Map Cloud

The Map Cloud model proposes a reformulation of digital cartography for mobile-locative media based on the situated semantic approach (McCullough, 2006): a social navigation system mixing folksonomies and refined semantic engine to reveal and to navigate in real time and in real space the mixed topography of our environment.

Map Cloud design strategies

Translate and merge the two models (Tag cloud - spatial, and dn[T]3 - semantic) into a mobile context in terms of media and navigation. Consider screen size and resolution, the semantic map visual model and contextual geographical data. Refine the semantic engine of the dn[T]3, tuning the relational inferential engine for a spatial context by means of social and cognitive filtering. Develop a dynamic navigation that is informed through social feedback and contextual semantics.

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Authored collaboration, choreographed reality

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There is something perversely appealing about a *Truman Show,* like fiction engineered around you: a false, but plausible reality in which the inconsequence of your actions invites you to attempt daring play. But in order to maintain such a world, you must remain trapped in it, suffer under its direction and pretend to believe it is real.

In this paper I will discuss three examples of participative works that are related in their dictatorial control and perceived captivity of their participants as well as by their blurring of traditional distinctions of art, reality and fiction. Tracing the emergence of this strain of participative works' from conceptual art, performative practices and relational aesthetics from the last century, as well as their relation to *noir* cinema from the late 1990's, I will tackle the ethics of these antagonistic experiences that deliberately blur distinctions of reality in public places. Central to this paper is my contention that these works do not generate adverse or enduring ontological confusion in participants, but instead, they encourage individuals to exercise critical judgment towards all mediated information. But first I will introduce the artists and works.

As part of their performance work *Kidnap*, in 1998, Blast Theory invited submissions from participants willing to be kidnapped from their daily lives. Months later, when many had forgotten their initial application, they were abducted and their incarceration broadcast online.

Tim Etchells' 2001 mobile phone based work *Surrender Control* involved participants receiving a series of escalating dares to their mobile phones. Beginning with flirtatiousness, temptations such as 'touch two people at once' and building over days to more perverse instructions such as, 'Steal something', recipients were challenged to consider what they would allow themselves to be dictated to do before taking back control.

In 2002 Robin Hely initiated *Neurocam* which has now purportedly grown splinter cells internationally. Enlisting online, participants are emailed a series of assignments; tasks and challenges to be undertaken in daily life, each assignment requiring further submission of personal autonomy towards the ultimate realisation of the experience.

Both tantalising and despotic, each of these controlling experiences is in fact collaboratively constructed by both the artists and the participants involved. Although their confrontational nature appears radically original, these works pick up concerns and values first raised by the Dadaists, ideas which can be found flowing and evolving through Conceptual Art, Fluxus, Situationaists, and which were reinvigorated by new technologies in the Relational Aesthetics of the 1990's. These are ideas that champion indeterminacy, challenge conventions of recognised artistic styles, blur distinctions between artist and audience, reality and art, and often achieve these ends by means of direct engagement between people and place. Contemporary works in this area have perhaps been best described by Daniel Palmer (Palmer 2008: 366) as being positioned between media arts, post-Duchampian irony and borrowing from a Marxist theorization of everyday life. Although continuing these ideas, the works I discuss here are not imbued with the optimistic values of Bourriaud's *Relational Aesthetics* or McLuhan's 'global village' as their forebears. Instead, they take on an antagonistic and sometimes cultish atmosphere of social revolt. In fact, if *Relational Aesthetics* can be distinguished as creating microtopias, (Bishop 2004: 54) these new works could equally be marked for their microdystopian atmosphere, inspired from the cinema of the late 1990's such as the *Matrix, The Truman Show, Fight Club* and *The Game*, all films in which apparent realities are uncertain.

The protagonists of David Fincher's films *The Game* (1998) and *Fight Club* (1999) are both trapped in imposed realities, first as minor cogs in banal consumer lives, then later, as central figures in alternate world conspiracies spinning wildly beyond their control. Although neither film was a box office hit, both triumphed commercially in DVD rentals. Their cult positions were wholly secured when cited as inspiration for the nascent field of pervasive games, interactive narrative's that employ technology but use the real world as a platform; *Fight Club* spawning flash numerous mob events such as the obvious *Pillow Fight Club*, and *The Game* being the often cited inspiration for the entire genre of Alternate Reality Games - experiences that blur the distinctions between game and life.

Within Alternate Reality Games, there are no avatars and no real distinction between the game world and the ‘real’ world as the games are delivered across a range of formats; mobile phones messages, letters, posters, with the Internet as the central binding medium. There is no realm of distance as players interact directly with characters in the game in the physical world, and as the protagonist in *The Game* discovers, it often becomes impossible to discern between events as reality or game. The immersive engagement of *Kidnap, Surrender Control* and *Neurocam* are all closely related to Pervasive and Alternate Reality Games in that the authenticity of the experience is heightened by both their setting in urban spaces, and by the presence of the participants’ body in the work. This phenomenological device as a tool for immersion in these domineering experiences can have compelling and life affecting results. Consider Blast Theory’s *Kidnap.*

In a paradoxical inversion of *The Matrix* and *The Truman Show* in which the protagonists reject their simulated lives over a much harsher, yet actual reality, participants of *Kidnap* rebuff actual reality opting for a harsher albeit more authentic illusion. *‘*A kidnap is a deeply traumatic experience’, Matt Adams of Blast Theory explains, ‘but it does give you time to reassess your life, and it can fundamentally alter your sense of self. Everyone comes out of a kidnap changed.’ *Kidnap* highlighted a desire for total immersion and submission, evidenced by the 300 individual applications received, each applicant paying 10 pounds to be abducted. Like *Fight Clubs’* 'Homework assignments' whereby members are instructed to stage public interventions against corporate culture, *Surrender Control* suggested enticing yet subversive acts to be carried out in public places, thereby challenging the social and commercial norms of these spaces, a socialist quality consistent with all of these works. While Etchells’ messages provided hints, not demands, the sinister cunning of *Surrender Control* lay in the inherent intimacy of the mobile, a location reserved (at the time of the work's presentation) for close acquaintances, and the messages had the delicate clout of passed love letters or whispers in the ear.

Conversely, *Neurocam* demands action for continued participation. It also demands secrecy. Its clandestine nature and guerilla tactics tie the works closely to *Fight Club* and the Pervasive and Alternate Reality Games the film has inspired. However *Neurocam’s* website denies comparison to Alternate Reality Games. It is difficult to discern if in doing so, it is reinforcing the TINAG (*This Is Not A Game*) principle inherent in Alternate Reality Games, a kind of ludic reverse psychology by which games deny their gameness in order to increase immersion in players minds. It is

revealing, therefore, that *Neurocam* also denies being a cult or religious experience thereby implicitly linking itself with each, and the immersive total worldview they present.

Concerns have been raised about the ethics of creative works that challenge the norms of shared social reality, equating them with everything from terrorism to the decadence of Reality TV (McGonigal 2003: 2). Indeed, some parallels and influences cannot be denied, as these forces are ever present in contemporary society and should not be ignored. There have also been recurring fears of such works triggering a cognitive dissonance in participants whereby they lose sight of real and unreal. But we must question the degree to which any genuine terror or ontological confusion occurs in the mind of participants. For such traumas to occur, participants must be legitimately, and in an extended way, deceived by the mimesis of the work as reality. I argue that even without the context of artistic work, mainstream understanding of reality is sophisticated enough to recognise these experiences as fictive play, but that in recognizing the play, people become more willing to engage. This is verified by Jane McGonigal's introduction of the concept of 'Performance of Belief'. (McGonigal 2003: 3) McGonigal purports that participants of Alternate Reality Games wilfully feign belief in the game's fiction in order to contribute to the fiction's construction, thus increasing their own immersion in it. This notion of Performance of Belief is similar to cinema's suspension of disbelief yet it is active, whereas the former is passive. However, both are wholly dependent on the participant's fundamental knowledge that the experience itself is fictional.

It is sound to suggest that Performance of Belief is at play in each of the works discussed here: while the artists offer an imposed structure of involvement, participants themselves generate their individual experience and the depth of their immersion, in full knowledge of the work's fiction. While each of these works may contain a degree of verisimilitude, they are meticulously fabricated constructs in which choice of participation and conventions of engagement are largely predetermined and agreed to. Therefore the appeal of *Kidnap* lies in the ability to be engrossed in the shock of abduction, the boredom of captivity and the romance of Stockholm Syndrome, all within the safe awareness of its fiction. Indeed each *Kidnap* participant was secured a prearranged safe word which, once spoken, would immediately cease the experience if they desired.

Aspects of performance and play are also apparent in the open-endedness of these works. Consider for example, the possibilities for interpretation of *Neurocam's* and *Surrender Control's* instructions, notwithstanding, the ability of participants to ignore the instructions altogether. This inherent optionality mark these works as fictions for, as Thomas de Zengotita asserts, the opposite of reality is not fictions or illusions, but options (Zengotita 2005: 52). The recognised truth of a real kidnap or dictatorship is that it is neither customised for, nor chosen by, you.

So what is the purpose of these works? Do they merely satisfy fetishes? And at what ethical cost? If we are to weight the ethics of presenting these works in public spaces, would that not require us to question all experiences and messages found in these locations from media journalism, political and religious statements and perhaps most importantly, omnipresent advertising? Should these messages also be scrutinized for any potential or actual ontological confusion they inspire? Like the Dadaist's rejection of logic as that which had led to the world war, these works reject the values that have favoured capital growth over social development. The nature of these works is that they seek to challenge conventional ethics and modes of interaction; their antagonistic delivery underscores a desire for us to submit to greater powers that have seen these forces of capital flourish.

Everyday reality is constructed and mediated, changing but constant. The artists behind these works can momentarily peel back the corners of our shared and assembled real, allowing us to question the motives of those who create it. These works invite audiences to critically engage with *all* reality, but neither the works nor artists themselves can topple the real. In fearing that they could, we misjudge both their agency and the aims.

One question remains unanswered; what is the effect of these works on non-participants, on those who witness a kidnap or are touched by strangers? Without the ability to participate or the knowledge of play, will bypassers take such actions and events for real? I will tackle this question of non-participant roles in the course of the next twelve months.

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Play Design: a collaborative design space based on digital game project

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Abstract

This lecture presents an 'open collaborative digital space' for the planning and good management of the stream of game design activities. This system design concept could be looked at as a shared toolkit among designers, researchers and artists that work with multimedia content and it aims to sustain the cogeneration of creative ideas for developing multimedia artefacts.

This software concept is the main contribution of my doctoral thesis in Industrial Design and Multimedia Communication at the *Politecnico di Milano* (Italy), which highlights the importance of the gameplay issue in interaction design. Gameplay design can dramatically improve the relationship between digital technologies and participatory culture and this practice suggests new directions where the benefits of collaborative design could be developed.

Introduction

Given the complexity of the interactive digital artefacts, the game design process could be an effective model to include a multitude of actors with diverse competencies and multiple intentions; at the same time digital games provide an opportunity for exploring more than just definitions and could be used by designers as a lens to understand the relationship between the role of digital systems and human play behaviours.

In this way the term *Play Design* is a necessary ambiguity in current design practices; it places the issue of game design between the sphere of real gameplay behaviours

and the sphere of mediated interactions. Play Design aims to extend the game metaphor beyond instrumental analogy, and to expose it as a teamwork ability to understand and organize complex, heterogeneous, dynamic realities of human interactions through digital systems.

As matter of fact, the world of interaction designers is linked to a large practice of experimentation in real and digital contexts and shows itself as a playground where practitioners - understanding systems and structures - embody methods and strategies that are fundamental to creative collaborative play. This argument demonstrates that designing and play are intensely interconnected activities; overlapping and complementary experiences are shaped by the instrumental and methodological evolution of creative design processes.

Motivation

Game design is relatively new term, the aim of involving mind, body and emotions through virtual worlds and making the mediated interaction more pleasant and seductive, is not new. The Hingham Institute Study Group on Space Warfare and their *Theory of Computer Toys* (Graetz 1981), the design philosophy of Ray and Charles Eames 'fascinated by play and pleasurable ways of learning' (Kirkham 1995: 146), and currently the William Gaver's *Ludic Design* (Gaver 2002) are paradigmatic cases that show the historical and cultural importance of play concept in design practice. I am referring to the multiple interpretation of gameplay as a process of mutual learning - where people and interaction technologies are profoundly intertwined - as an attitude, in which designers act and as a catalyst for design methods and co-operative tools.

Even if Interaction Design and Game Studies were born as interdisciplinary fields based on well-defined and organized practices, designers, during the design stage, are constantly involved in transforming and using tools and communication languages in a creative way. Thus tools and techniques depend on their consolidation in a long-term use and from the design and research focus of interest. This uncertain process is stressed in the traditional fixed design methods and shows several critical steps: first, the collaborative concept definition, especially in innovative projects where the design situation is unexplored; second, the monitoring of project evolution, multimedia artefacts are complex puzzles where by changing something will make something else move and transform the whole. The third point is

the possibility to reutilise materials and solutions: icons, images and gaming interfaces are part of our culture and they are a great reference library to understand the users' collective imagination and interaction habits.

Nevertheless, in this pluridisciplinary and fragmented research field, although traditional game design practice discloses itself as a fragile and strict process that follows the efficient logic of production, the emergent and experimental design practices show that the game goal or 'solution' is not only to achieve an object or software but to create synergetic actions among people through actual technologies. These projects, well known as mixed or pervasive games, serious games and independent games, amplify the possibility of interaction design among real, virtual and digital worlds and above all they reawaken the social interpretation of game as a public place of potential actions (Caillois 1981).

The experimental game design perspective includes design as not only instrumental but also as a thoughtful and structured combination of actions, choices and decisions that can significantly influence the way in which the participants interact and organize themselves. This elastic process of ideas and competence negotiation has to be developed in a positive and meaningful way.

Making visible the collaboration activity

All along, designing play activity is a seductive practice for interaction designers, but it’s also a complex and larger design culture. It is profoundly merged with motivation, abilities and contexts both of the players and of the teamwork. The human ludic attitude of interaction depends on physical, cognitive and social states and it’s hardly predictable and expected, indeed, people play games and digital systems in a personal way and share their experiences in unconventional places like blogs, forums and communities.

The traditional visual communication strategies aren’t appropriate for the interactive project representation in it's whole complexity, and it is necessary to find other ways for improving dialogues among actors. The project communication has to be a hypertextual project itself that works with movies, texts, tags, images and so on.
In order for a design activity to encompass all these reflections, we need to promote a breathing space towards a collaborative creation process. This perspective has to take into account the clarity of the communication openness and the project legibility.

For that reason I have focused the discussion about a development system that allows an appropriate time for design thinking in advance.

Nowadays the quality of overall working experience remains in the capacity of the team to enhance the uniqueness of the different perspectives brought by the participants and to construct a mutual shared language. To support this collaborative and tacit practice, an open digital system could allow us to share, reusing our creativity through visual and digital materials.

Play Design system

The purpose of the Play Design system isn't to push existent design instruments, but to allow the creative co-construction of methods and techniques during the design stage. For encouraging the dialogue between people, tools and understanding design situation, the system is shaped on the *design process formalization.* The design process considered, follows all the game design phases: from the abstract concept definition to the explicit development techniques.

All parts involved in the game design process can be used to stimulate creative thinking (Löwgren 2007), to augment and consolidate collaborative design methods and tools such as design situation framing, envisioning maps, visual conceptual landscapes and network structure understanding.

I have identified the critical steps of the process, mentioned before: visualizing ideas, the sketching process and the development process. These iterative loop phases could be supported by specific digital design tools, which participants could compose in relation to the specific design requirements. These modules allow framing ideas, sharing materials, and, to easily define and build the main properties of an interactive project.

The logic of composition follows the *pattern language*, pioneered in 1977 by Christopher Alexander (Alexander 1977). As well as architectural patterns clustering frequent design problems, likewise game patterns help in the analysis and building of interactive projects upon recurring game design arguments and activity. I suggest three kinds of patterns: construction elements, dynamics and relationships. As De Bono suggest 'the brain is not designed to think but to set up routine patterns of perception and behaviour and to make sure we do not deviate from these' (De Bono

1995: 12). Designing by patterns permits the organization of complex systems and focusing teamwork attentions.

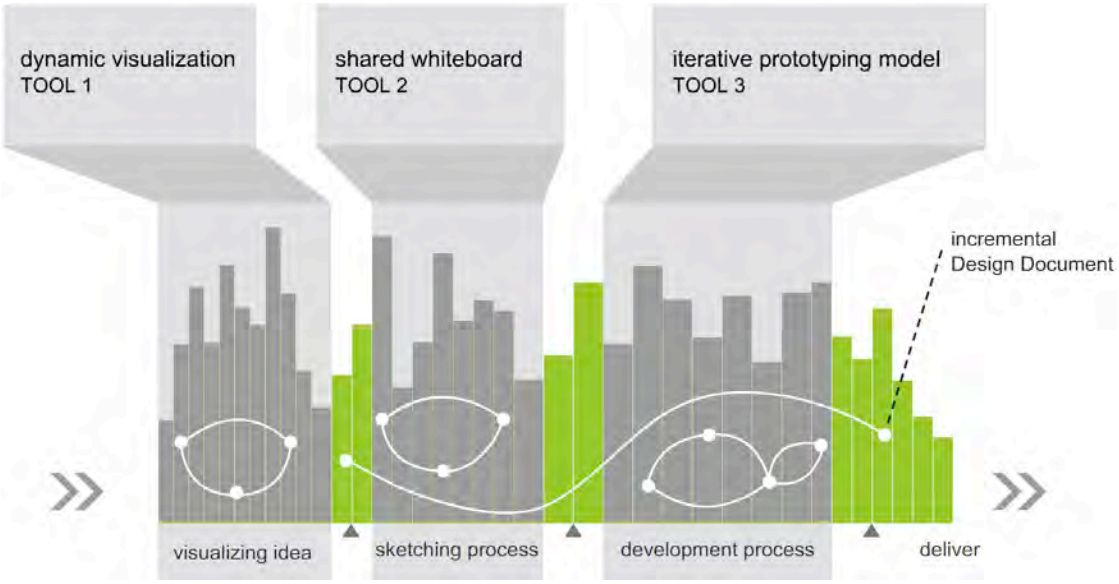

Figure 1. Archetypical game design pipeline composed by activity patterns. This image shows a possible design framework formalized in a sequential way. Each design process could be looked as unique consisted experience, managed by how participants match patterns and learn from each other.

To press on I will present three design tools of Play Design system. First a 'dynamic visualization interface' that permits brainstorming participants to connect project materials in narrative sequences in order to create a suggestive interface that allows connecting materials and identifies the preliminary project definition.

Like digital hypertext, this dynamic visualization tool permits authors to connect texts with links and other media and to construct a new approach to picture design space. The act of composition and juxtaposition of project elements over a virtual table, allows participants to generate a narrative assembly that starts a fruitful dialogue between physical and semiotic as a textual collage (Lunenfeld 2000: 160).

The second tool is a 'whiteboard interface' for supporting the collaborative sketching process during the preproduction phase. Unlike classic whiteboard, this tool permits the working team to upload drawings, sketches, diagrams and all that is useful to the collaborative project definition. Among the functions, this system should support individual techniques, for this reason it permits starting communication sessions

where authors can add critical virtual marks, and save the design history until the approval state.

The third tool is an 'iterative development model', just like an incremental project document editor that facilitates involved subjects, monitoring project development and testing. Designers, researchers and artists could implement several techniques of the player’s participation and observation, like Ethnography or User Centred Design, for this reason gameplay design process needs iterative authoring systems that enforce the design processes through collaboration demonstrated by wiki logic. An open system conceived like this, permits the reuse of objects and arguements which enrich the diverse design perspectives involved.

Conclusion and open points

The discovery of the work team's similarity with the players' shows the gameplay design practice as a privileged place where designers, researchers and artists can share visions and tools, envision scenarios for interacting and draw tactical collaborative action strategies.

My concept intends to foreshadow the Play Design notion as a way of supporting the collaborative imaginative process by digital systems and to suggest an alternative key to reach the wanted synergy between ludic research and open design practices for the design of interactive multimedia artefacts.

Today’s emergent experimental game design practices are early signals of a transformation process in creative activities and ludic interaction attitudes. The software concept discussed is a suggestion for playing with design tools that will reduce the rift between technical knowledge, hypertextual logic and human communication practices.

The open points of this research are: to sustain the research field interested in the relationship between play and design; to offer design tools suitable for the management of the interactive multimedia collaborative projects; and to share the contents of the project in order to reuse them according to research intentions. Future specific works on the Play Design digital system could help the collaborative teams in several ways: consolidating the co-operative design methods and

articulating the dynamic operative image of complex interactive projects as well as managing multiple design teamwork.

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Play as a driving force in the era of the social web

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Introduction

During the past few years we have found ourselves joining networks and becoming participants in interconnected worlds of the virtual sphere; we have been making friends, expressing thoughts, sharing moments; we have practiced exhibiting our selves and 'following' others; we have become contributors of today's news and shapers of tomorrow's trends. The emergence of the social web, commonly known as web 2.0, and its various social platforms have given us opportunities of communication, participation and social interaction that have brought enthusiasm and excitement but also questioning and concern. Promises have been followed by contradictions in environments such as YouTube, Facebook or del.icio.us where leisure became work, creativity became production and subjectivity turned into an object of surveillance. Haunted by the need of the continuous presence of our online self, we have formed temporary realities of intimacy, tension and control where we have chosen to situate ourselves. What attracts us all in these environments? How is the 'feed' being fed?

Aiming to examine the complexity and controversies of today's social platforms, this paper, which is part of a current PhD research, proposes to study play as a main driving force behind web 2.0 structures and interactions. Taking into consideration play as an activity performed within particular contexts as well as play as a notion and a tactic against constraints and impositions, the paper suggests that a new interpretation of the social media structures and the users' interrelations within them can be offered through play.

The Gamespace

Social networking can be considered as the latest expression of the phenomenon that Manuel Castells famously described in 1996 as the rise of the *Network Society*; a society that emerged by a coincidence or simultaneity of economic crises, technological innovations and formulations of new social values. Highlighting the importance of the transition from the Fordist to the postFordist period and the changes especially that it brought to work and everyday life, Castells explained how precarity and flexibilization of work emphasized individualisation and subjectivity. The new flexible networks that were created, were based on new forms of social organization. Fragmenting places but connecting distances, moving into the space of flows, the organization was built on diverse, multicultural and heterogeneous elements (Castells 1996, Stalder 2006). The new common territories that were formed were to be fed from the continuous interaction that allowed a space for people to 'negotiate, question, argue, contribute, feed each other with information' (Lovink 2007: 188).

Web 2.0, which made its appearance in the midst of this decade, came as the new promise for social interaction and communication. Responding to the needs of our fragmented world, it provided a public space, where users could participate, contribute and share. If the fear of the network society is the fear of not 'feeling at home' as Virno has expressed it, then the social media succeeded in working as shelters, as 'common spaces' where participants could feel again the lost sense of belonging (Virno 2004). Acting as shelters in the form of playground and a social factory at the same time (Scholz 2009), the new forms of networking came to imply controversial issues around leisure, work, creativity, production and consumption and to become a field of interest from different disciplines, such as sociology, media studies, cultural studies, information technology and art.

This paper, taking into consideration the interdisciplinary interest and study that continuously evolves, proposes to correlate the issues tackled with resources from the field of play theory and game studies. Acknowledging the significance of play in different time periods and social contexts and its interrelation with culture, as defined by scholars from Huizinga (1955) and Caillois (1958/2001) to Kane (2004) and Wark (2007), as well as the existence of certain attributes of play in the networked environments, research on this ground was considered interesting in terms of the results it could offer.

Aiming to observe social media as gamespaces, attention was paid to the following features that are currently being explored:

The existence of rules and constraints

How free are the users in the social media? Web 2.0 is supposed to offer a space open for interaction and sociality where users can act according to their will. However participants can only act within limitations that the networks define. One need only be reminded of the fact that in social networks users can upload videos only from certain collaborating networks, or, even more pertinent, 'friends' exist only within a particular community and should not be 'exported. Restrictions regarding participation exist and freedom cannot be doubted as 'deleting' your online presence is not allowed in certain platforms and 'idleness' is no longer permitted in virtual worlds. Do people realize these limitations and are they sceptical about them? As Bialski argues it is exactly this feeling of limitation and of a structured system that satisfies the participants (Bialski 2008), just like it would be in a game environment.

The encouragement of sociality and friendship

Sociality and friendship are the principal elements being promoted for the success of digital social networks of almost every kind. Making friends, tagging friends, sharing videos and links with them are the most common practices of the social web. But is this about a social or an antisocial network? Questions have arisen regarding what users really share (ibid) and how real is this sociality. Practices like counting friends and rating videos might exist to satisfy more the need for self-affirmation and competition among users, rather than the sociality they are referring to. Living in the era of attention economy, attention data and attention trust - where value is measured by the amount of time you spend on a person or an object - the success of each online persona is estimated by posts, friends and uploads (Lovink, 2008). An endless game is thus happening continuously in the social media territories and here, as Sutton Smith has noted in his *Ambiguity of Play*, competition and belonging imply two different but significant needs for the players; the need to empower oneself and the need to form one’s identity (Sutton Smith, 1997/2001).

The value of voluntary participation

Users participate and contribute in the social media because they wish to do so. Their creativity and their disposition to contribute content, thoughts and experiences is the very basis of today's web. Their interaction and participation however has formed a new kind of productivity as analysed by scholars and researchers of the field (Bialski 2008, Prada 2008). This productivity could be considered the most concrete and contemporary expression of what political philosophers such as Hardt (2008) and Lazzarato (2008) have described as affective and immaterial labour. Users today, being *prosumers* - consumers and producers at the same time - enjoy contributing to the networks with their thoughts and material while third parties can make a profit from this. Playfulness, sociality and participation turn into a commodity and this is often barely understood by the users themselves.

The relation to everyday life and real life identities

Are our web 2.0 friendships and our virtual identities real? Are the social networks separate from everyday life or do they form together the territories of our contemporary world? Examining the social networks as gamespaces, a question from the field of play is being re-addressed regarding the co-existence of two such worlds (Caillois, 1958: 44, 2001: 53). The theoretical field of play having examined the separation of games from reality on one hand and the situationistic breaking out of play into life on the other, now discusses the latest transformation of life into an endless game territory (Wark 2007). The reality today seems empty compared to the possibilities given in the virtual worlds (Castronova 2007: 30, 69). Realising this, many users in the social media are 'playing' with their real identity; they are taking up roles and using disguise as a tactic, liberating themselves from the real. At the same time others tend to reproduce their real identities as idealized with their contributions unable to escape common beliefs, tastes and prejudices. The question in this case is still open: are we talking about a possibilities world or a world of repetitions and reproductions?

Play tactics Vs play strategies

Examining the above issues related to user generated content of social media, and observing how structures are being formed by the providers of these platforms - a call for awareness and resistance becomes apparent. If activity is voluntary, is there a right for an exit? As Spehr writes while discussing networks, there must be a freedom to refuse to collaborate, an exit strategy. It should be possible for rules to be

rejected, questioned and negotiate (Spehr 2003). Exit is not about quitting but rather about a form of disobedience and resistance towards an exploitation of creativity by third parties (Lovink 2007; Virno 2007).

Or, to follow de Certeau's thought, it is about strategies and tactics: in the case of social media, strategies are to be found in the systems of orders imposed by companies, and tactics in the ways participants find to break through the system. Accordingly, in this research, if networks are seen as gamespaces, then the strategies of the companies form the game and define its rules, while the tactics applied by users aim to reverse the system, to question its formalisms and structures, to hack it. Reflecting the old conflict from play theory, between game and play, between ludus and paidia, users' tactics oppose strategies of a well assembled system - to open it up and play with it's form (Caillois 1955/2001: 13, Sutton Smith 1997/2001: 80).

Although in the case of social media, strategies and tactics tend look more and more alike, as companies follow users' actions and tend to assimilate them (Manovich 2008), users' playfulness and creativity can still distinguish themselves as forms of resistance. The play ethic, as Pat Kane puts it, has succeeded the Fordist work ethic and now in the complex era of networks, participants become players with actions based on communication, care and interaction (Kane 2004: 95 - 133). Playing with rules, rather than playing by rules, embracing affection, irony and humour - some participants use their creativity to reverse the structures of today's networks. Tagging, categorizing and voting, the common practices of social media users, turn into tools for questioning and resistance (Prada 2008).

In this context, a new form of artistic practice has evolved that, like the precedent net.art, does not condemn the web but rather invites users to comprehend how the systems of current social networks function. Artists aim to remind users of the right to disobedience which is crucial for the liberation of networking and its independence from modes of surveillance, control and exploitation.

Following acts of subversion, what Vaneigem defined as 'an all embracing reinsertion of things into play, an act whereby play grasps and reunites beings and things hitherto frozen solid in a hierarchy of fragments', artists use play today as a tactic and a new form of transformative creativity (Vaneigem 2001: 264).

Projects by media artist groups such as *Folded in* by the Personal Cinema and the Erasers who turned YouTube into a gamespace, the *Grand Theft Avatar* by the Second Front who set up as a performance a robbery of the Linden Treasury in Second Life, or *Google is Not the Map* by Liens Invisibles, a subversion on the Google maps, can be seen as tactics that invite users to be playful and critical, to cross borders and break rules.

As Kane points out important forms of resistance and practices can originate from play and care today because while play articulates our capacity to imagine the world, care enables us to wrap ourselves up in the emotions and sensitivities of others (Kane 2004: 171-5). These two elements could thus, actually liberate social relationships from being the commodity of our contemporary world.

Conclusion

Web 2.0's user generated content has brought contradictions and questions that are currently being discussed from an interdisciplinary community. This paper's aim was to analyse the distinctive features of the social media through the scope of play, presenting the ludic character of the social web and providing a new territory for answers. Participating, sharing, socialising, moving within constraints are elements common to the sphere of games. The field of game studies and play theory and the research conducted on players' behaviour might constitute a new ground for interpretation. Furthermore, studying the structures of the social media and the strategies applied by the companies, the call for critique becomes apparent. The tactics performed by users and certain artists can be seen as forms of resistance based on playfulness that remind users the right of disobedience and of using creativity as a tool for transformation. Play as an inherent element in humans and culture could re-address the social character of the web, escaping common norms, standards and exploitation by third parties.

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Drawing lessons for ants

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James Faure Walker Ant Postcard 1 2006 16" x 16" (40 cms x 40 cms) archival Epson print

Why ants? And why should they need drawing lessons? Let me try and explain.
We normally see ants from an aerial point of view, as lines of dots on a flattish plane. The connection with drawing - you may think - must be to do with laying trails of sugar: the paths they make in sand, a miniature Richard Long walking drawing seen from the sky; or perhaps SimAnt, Will Wright's predecessor of the Sims; or the 'marching ants' of the selection tool. But here I am speculating about drawing, about the clash of values between digital drawing and supposedly traditional methods.

What if we took this quite different perspective, the ant's point of view? What would ants' feel about the drawing process? Perhaps they follow unquestioningly a rigid dogma. Perhaps they don't think about it at all. I am not an ant expert. They may well be communicating something to each other that counts as drawing, but that we would fail to recognize as such. They may be immersed in their art history, their own personal mark making. But I doubt whether they would take any interest at all in our culture of life drawing. Observational drawing would not make much sense. They really do see the world differently.

So this paper is something of a thought experiment about viewpoints, and views about drawing. The worlds of drawing and new media have drifted apart. Drawings, in the form of lines drawn by pen-plotters, were shown at early ISEA exhibitions. I first exhibited in the ISEA exhibition at Groningen in 1990. The 'algorists' form the core of the Patric Prince collection of early computer art at the Victoria and Albert Museum. Ten, twenty years ago conversations at ISEA conferences were about emerging sub divisions - generative art, multimedia, interactivity, virtual reality, web art - and gradually 2D art got left behind. Would 'digital art' be a separatist movement, or would it be absorbed into the mainstream of contemporary art? With so few artists using computers, talk of the elite pioneers, a 'digital avant-garde' seemed to make sense. 'Object-based art' would wither away.

We could be now in a phase of mutual tolerance where several incompatible philosophies coalesce. There does not now appear to be much of a belief in digital art as a movement, yet alone as the portal to a future of virtual art, something quite different from 'art as we know it'. On the other side, attitudes opposed to technology have softened, though a colleague remarked that once you get recognized as a digital artist, you only get proper recognition when no one notices that the work is digital. There are still underlying divisions. If you are on an MA Digital Arts course you can be as unconscious as an ant of any past, whether it be Gothic Architecture, Victorian painting or the texts of post-modernism. Nor would you need to draw.

Likewise the ant, in this conjecture, would just be programmed to serve the whole community – a model sometimes proposed for the socially conscious artist attempting relational aesthetics. Is there evidence of obsolete art forms dropping out of sight? Not really, given the chatter on painting blogs. Painters have mobiles, websites, and produce inkjet editions. Could there actually be a drawing renaissance? The online drawing community does have a 'born again' new confidence: belief in drawing as a standalone art form; the Green agenda; antipathy towards techno art; the growth of collaborative and performance art drawing; educational reform; and intellectual muscle represented in the blossoming of drawing PhDs. 'Get Drawing' campaigns argue that it is the basis of visual thinking, the discipline that underlies every other art form. Drawing exhibitions are announced on Facebook. New media have not supplanted old media; they have served to enhance them. The types of drawing that find favour do reflect this particular ethos, with a preference for the organic over the artificial, the hand-woven over the synthetic, the primitive over the graphic.

You might argue that here is a case of the 'art instinct' breaking through the veneer of technology; just as the ants carry on indifferent to terrain - kitchen or sand dune, it is all the same - so humankind needs to make its mark on the cave regardless of the technology at hand. But if this were just instinct would you need to educate the artist, or train the ant? I wonder, by the way, what the phrase 'classically trained', applied to artists, actually means. Can a

draughtsman be ‘trained’? We also speak of drawing software that learns, and can be trained. This leads to the question of whether, or how a drawing method can be codified in a manual. In effect you read and then teach yourself by picking up the tricks of the trade. And how do drawing concepts and assumptions shape drawing software? Do software manuals take the same approach as how-to-draw manuals? Could you really learn to draw simply by following instructions, or by learning software? Have art schools been right in keeping computer graphics off the curriculum? For decades drawing manuals – called book academies - were banned from the Royal Academy. They threatened the authority of the professor. I have heard opponents of the art school studio system, where tutors teach the subject person to person, call it the ‘magic dust’ method. What they prefer is a more regulated system, not necessarily with shelves of technical manuals, but certainly with a shelf or two of art theory. They do not have an answer for how to integrate digital tools in the studio. Significantly, computer rooms in art schools have been dark, cramped, inhospitable and called ‘labs’.

I had been wondering how to write my own book on digital drawing. It was not going to be an instruction book; it was not going to be a survey; and somehow it would have to deal with these swirling questions. It is a fascinating but elusive subject, and inevitably the question of how and what to draw rises to the surface. Initially I planned to examine how the language of drawing had expanded the horizon, the new complexity, the reaches of scale, potential subjects - all way beyond what is possible with pencil and paper. Like many others I find the natural way to draw is through the line, pattern, shape, colour of Illustrator, Photoshop, and Painter. But the how-to books that accompany upgrades target the amateur artist market: portraits, landscapes and pets. They rarely mention abstraction. For their part the more sophisticated surveys of digital art simply skip over 2D digital art. It is easier to suggest digital art is a different species, without any art history in its DNA.

How to explore this missing link between drawing software and drawing thinking? The Drawing Research Network[1] is an online resource that represents the drawing community. Digital drawing does get the occasional mention, but as something outside its orbit, and the conversation soon drops off. When I gave a talk called ‘digital drawing: does it exist?’ at a DRN conference several people politely told me they would miss it because the subject did not interest them. Digital drawing may mean anything from sharing scanned drawings on the web to processing, to nothing at all, but as far as the drawing purist was concerned it was to be avoided. Purists believe that drawing must be natural and human, with deep foundations in the soul.

We draw from the human figure because we are human figures ourselves. Any book on digital drawing would be in trouble because computers, even laptops and mobiles, are not designed with observational drawing in mind - you could work from a photo or a scanned drawing, but that would negate the point. Instead you start from lines and shapes, the components of drawing, playing with the grammar, treating it as a musical structure, in the manner of Paul Klee.
For several years I taught on MA Drawing courses. This spectre of technology as ‘inhuman’ was deeply ingrained in the students’ minds, yet it had little basis in the actual history of drawing, that is to say in its tradition. The drawing aids advertised in the Studio magazines of the 1900s

1 http://www.drawing.org.uk/

demonstrate an enthusiasm for gadgetry – from the airbrush to the autolycus to specialized cameras[2]. The idea of what is modern and what is traditional switch around from decade to decade. The themes that define drawing today – the body, observation, natural process, performance – took second place to questions of technique. The point of view expressed in the drawing manual of the 1900 to 1920 period has little to say about being human, but quite a lot about botany and about drawing animals. A study of facial expressions takes as its subject a nun. A demonstration of delicate pencil shading features a battleship in the mist. The drawing from memory exercise is based on a 1900 fire engine. There is controversy about using a ruler to make a straight line, and whether it is better to work in a studio or in the open air. Those manuals could be myopic, at odds with new technologies and with 'modernist' thinking, but they do contain the occasional insight that is still valid today. They let you peer into a different drawing culture, and – of course - you could make a book just from their illustrations.

I had tackled the question of the overlap between computer graphics and painting in 'Painting the Digital River' published in 2006[3]. That book had been my way of exploring questions about digital painting. As a painter I had a vested interest in arguing for the integration of computer graphics. So the next book should be on digital drawing. Drawing is still the first step many of us take. I feel uneasy about the commercial logic of graphic packages, where you turn a photo into a water colour, make a line drawing through a filter, and take shortcuts so you never need to learn to draw. I feel uneasy about the contradictions in teaching drawing in schools, where 'drawing skill' means filling in the detail, and 'understanding' means ticking 'learning outcome' boxes. In a world of cameraphones and graphics software drawing, street scenes in a sketchbook cannot have much appeal to the inquisitive student. And yet many involved in art education who attempt to cultivate visual intelligence – analyzing the way an advert is made, a photo cropped - will argue that drawing what you see in front of you, with pencil and paper, remains the best and simplest way to acquire that expertise.

The ant is constantly mobile, expert at social networking, and would not be fixated on pencils and life drawing. The ant probably can get along fine without any need of drawing instruction. For the moment I cannot even contemplate a coherent course for our own human students. 'Digital' would not work in the book title. It would alienate the target readership. But a better understanding of the potential of digital tools might well liberate the way we draw - without in any way disregarding the past. It is just possible 'Drawing Lessons for Ants' might be viable, but again it might not reach its intended readers.

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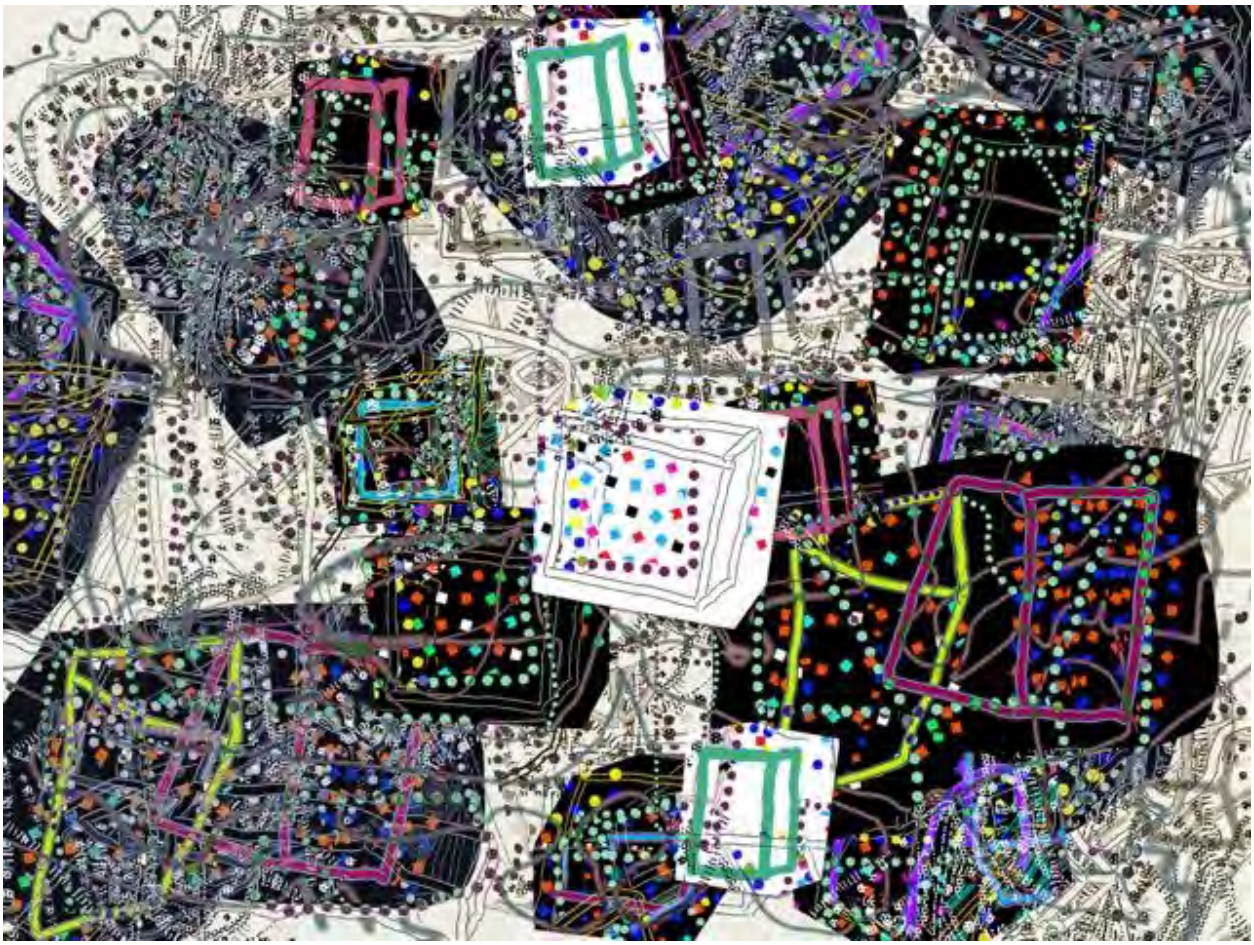
2 See Faure Walker, J, "Pride, Prejudice and the Pencil" in Garner, S, (ed.) *Writing on Drawing: Essays on Drawing Practice and Research*, Chicago University Press, 2009

3 Faure Walker, J, *Painting the Digital River: How an Artist Learned to Love the Computer*, Prentice Hall, 2006.



James Faure Walker Miniature Suite 2009 27” x 36” (69 cms x 92 cms) archival Epson print

Techno Viking: artist strategies for Web 2.0

Matthias Fritsch
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The Context

The *Techno Viking* project is an example of the reordering, re-editing and remaking of an 'original' video on the internet. The original video is in analogy with genes called a meme. As such, the original and its first clones, start to circulate within social networks, where the original mutates, competes with other originals and inherits. Becoming multiplied in this way, the original video becomes successful by reproducing itself, through various recycling techniques.

In this way the Techno Viking project questions the creation's origin of such an Internet hype. The popular result is not the beginning, but the original + n, after being altered and filtered several times through a chain of actions and reactions.

The potential of public attention that such clips raise, brings attention also to the role of such major companies as Google. Google, as the owner of YouTube, provides the basic technological structure not only to enable and control, but also to profit from such creations. If the creation is based on 'free' social information networks, the product is commercialized through a monopoly company. In this way the Techno Viking is a perfect example to illustrate such new ways of production and distribution within user generated networks.

The Techno Viking

The Techno Viking is a tall, muscular, charismatic, intimidating German man in his thirties, that danced in front of the camera at the Fuckparade in Berlin in 2000. The Fuckparade emerged as a reaction to the music restriction (e.g. the exclusion of other techno styles as Gabber, Speedcore, Hardcore Techno or Punk music) of the

Berlin Love Parade and its increasing commercialization, as well as a public demonstration against the shut down of the famous techno club 'Bunker', (which serves as a home for a private art collection today.)

The Techno Viking became famous firstly through the 'Kneecam' video. A girl with heavily blue dyed hair is dancing to the rough techno beats, while a rather unruly looking guy, crashes, unfriendly into her. That accident causes the Techno Viking to demonstrate his physical power. He snatches the guy's arms and pushes him back from where he came dancing from.

Pointing straight at another man, and dominating him with his fierce glance, the Techno Viking produces an aura of fear, which makes the man leave the situation. This incident enables the Techno Viking, finally, enough space to start dancing freely. His dance moves are wild and expressive but perfect in form. Soon he seems like the king of the street, even having fans serving as 'pop servants', supplying him with water bottles.

At YouTube the fascination with the Techno Viking is expressed in several statements. One of the most famous lines started to reappear with the countless remakes of the 'original' footage itself: 'The Techno Viking doesn't dance to the music, but the music dances to the Techno Viking'.

After a definition published by Mister Neutral on Feb 16, 2008, it rated 1151 up (love it), 24 down (hate it)
http://www.urbandictionary.com/define.php?term=Techno%20Viking%20
(Date: June 21st 2009)

The archive

The original 4 minute video 'Kneecam No.1' was discovered in 2007 by the YouTube community and posted by users in various other platforms. After being linked and discussed in different web sites and Internet forums, the footage got uploaded onto www.break.com, a big American media portal. On this website, with a clear male audience, the video had it's peak on September 28th 2007, when more than a million viewers looked at it in only one day. Yet, within the following 6 months, more than 10 million people were watching the video under its new name 'Techno Viking'. The new

name appeared together with the hundreds of remix versions and responses to the original video, when the fans of the original, started to imitate the video's dramaturgy, re-enacting it in their homes, at clubs or on the streets.

I was following these developments with great interest and researched the Internet history of the video. In this way I documented it's trajectory from it's original production until it became a popular Internet video multiplied by countless users. The archive of the Techno Viking now contains images, emails, blog and forum discussions, merchandising products and a selection of more than 100 categorized video responses. To give an inside view on the development of the video and to show recycling strategies at Web 2.0 I am presenting the archive in the form of installations and lectures.

Following is a selection of the most interesting video responses:

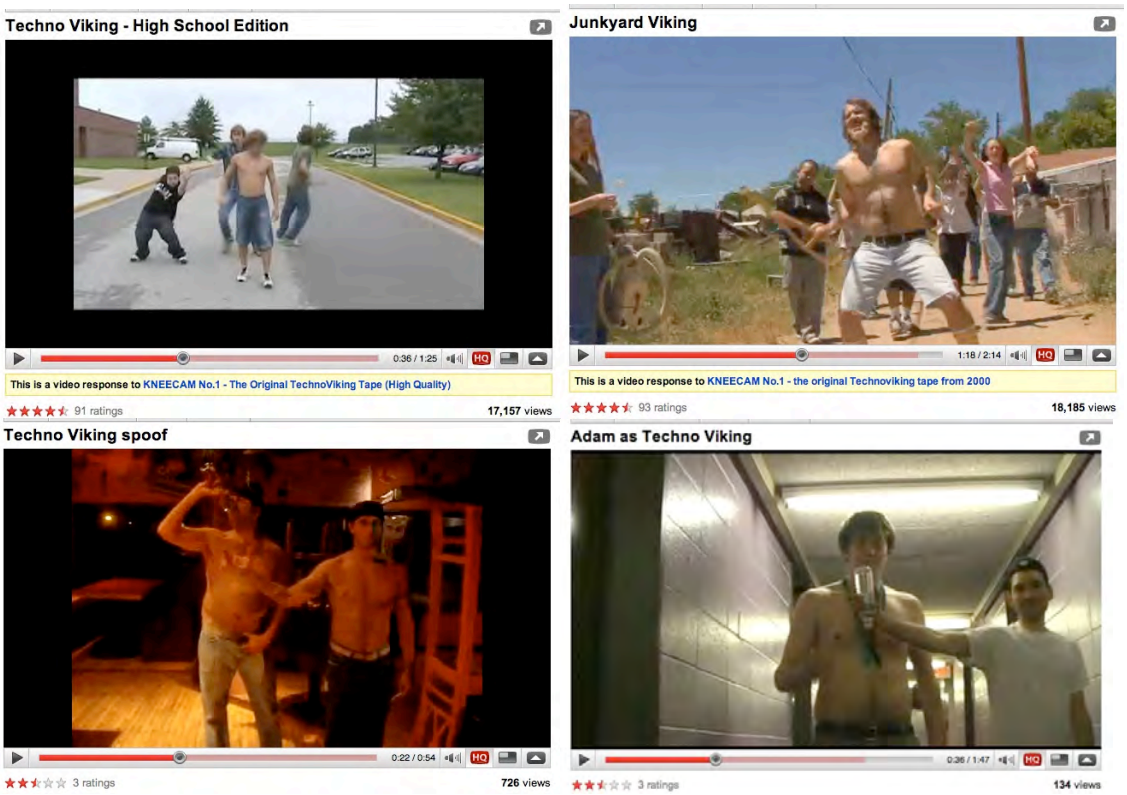
Shortly after the main hype, moderated clips like the one from 'Rocket Boom' were created to provide information about the new meme. A mixture of statistics, quotes and jokes make it easy to consume the semi documentation:

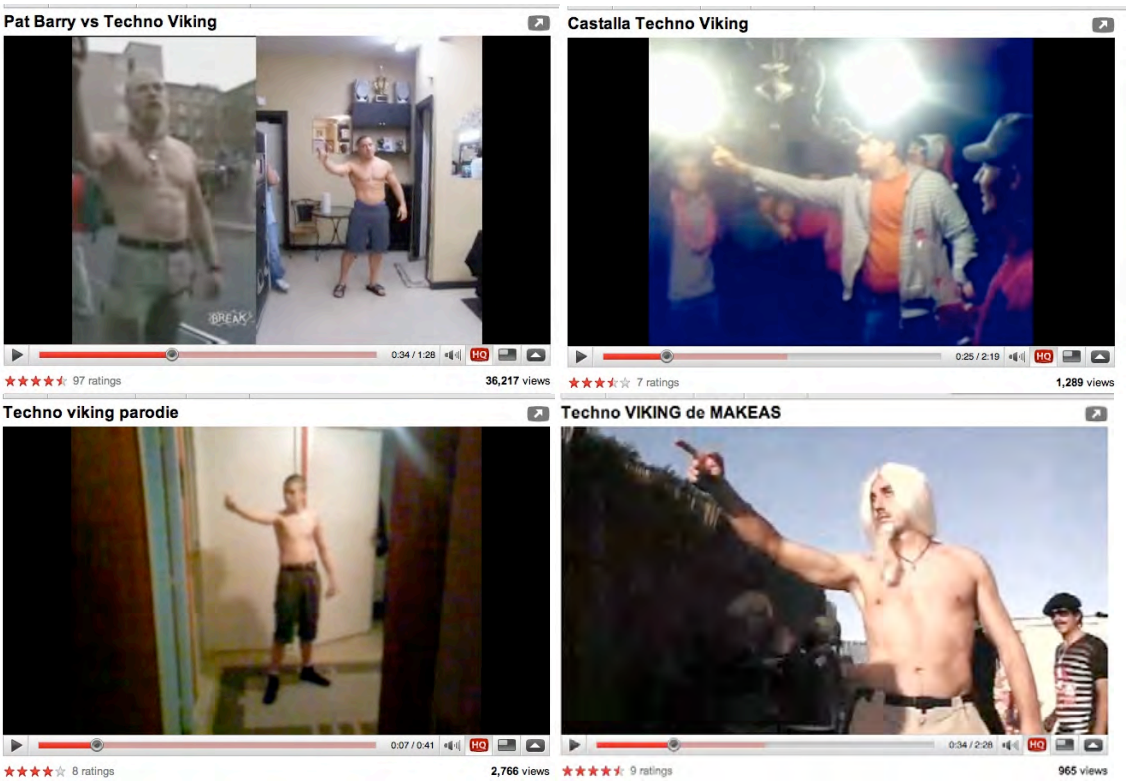
Another moderated clip from the Internet television channel 'Revision3' introduces 'rawcores' video response to the Techno Viking as a new cult video itself:

The captured version of Techno Viking from YouTube user 'rawcore' reached more than 4 million viewers on YouTube, www.break.com and other platforms

People's fascination with Techno Viking's dancing skills creates clips - as in the example from the 'AE Thesis Lab', where a group of students exercise the dancing technique.

But the most interesting genre of recycling memes is the recreation of the clip's dramaturgy by being re-enacted in private and public space all over the world.





Techno Viking even finds his way into the 3D worlds - like here - where the Techno Viking like character 'Mattias' from the shooter 'Mercenaries' was animated to the exact dance moves of the Meme.

The combination of one meme with another can raise the attention within the fan community and creates an overlapping mass to other Internet hypes. Here it is

throughout the use of Vernon Koekemoer and Chuck Norris in a 'Streetfighter' look-a-like clip…

... or in the collages with 'Little Indian Boy', or the main character of the cult movie '300'

From my experience with the Techno Viking phenomenon I developed the work 'Music from the Masses'. I started to publish silent movies on the Internet along with an open call for composers, musicians, sound designers and everybody else to create soundtracks accompanying the silent clip. The submitted contributions I published on the Internet in combination with the video as music clips. While the work is an open edition, it will not have an calculated end. It is possible to continue to add new compositions and variations. This generic model of recycling and resembling is producing a situation I call 'Youtube-Reality'. It is a reality where the setting of an original identity is in constant and uncontrollable aesthetic modification.

More information can be found on the artist's website
http://subrealic.net

All images are taken from the Technoviking Archive by Matthias Fritsch 2009
The clips can be found by name search on the website http://www.youtube.com

The nature of the experience: understanding the role of the audience in pervasive and locative artworks

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Mobile and portable computers are increasingly enabling interactive art experiences away from desktop PCs and gallery installations. Meanwhile locative technologies such as GPS seemingly allow for more immediate connections to be made between artworks and locations. Pervasive access to networks at increasingly disparate as well as specific locations would seem to present artists with ways of engaging audiences in new and previously unavailable ways.

Many artworks described or labelled as ‘interactive’ aim to engage their audiences by requiring or allowing for a level of participation. However, central to the character of works which employ pervasive and locative technologies, is the ‘active’ role of the audience in experiencing them. Audiences are typically expected to operate the devices employed, navigate to locations or to provide content, often of a personal nature, in order to participate.

Too often ‘participation’ or ‘interaction’ is seen as an end in itself. Post-modern theories of democracy and inclusion in the arts – and in particular the ‘death of the author’ (Barthes 1977) and Nicolas Bourriaud’s *Relational Aesthetics* (2002) – seemingly create a situation whereby all artworks are becoming more participatory without considering the quality of individual experiences. The term ‘interaction’ is frequently understood in literal terms, as operating or controlling a system, which, as Claire Bishop notes, sees the argument 'reflected back to artistic intentionality rather than issues of reception' (Bishop 2004: 62). Understanding the audience’s role in terms of their ‘interaction’ or ‘participation’ may simply reinforce existing relationships with interactive media rather than offering new or heightened levels of involvement. Whatever the level or nature of control offered by an interactive work there remains the issue of how active and willing the audience are in their participation. We can intend ‘interactive experiences’ which engage audiences but how can we account for the audience’s actual perception and understanding of their role? Importantly, how

can the audience's pre-existing attitudes and influences be accounted for and how might these shape their understanding of their role in an interactive artwork?

Constructing roles for the audience

To address the audience's perceptions of their role in pervasive and locative artworks an approach was developed as part of a practice-led doctoral study (Fry 2008) and this paper discusses several of its findings. The approach aimed to account for the role of the audience as it is conceived by the artist, modelled in the artwork and experienced by the audience. This involved the construction of artworks as critical models of the role of the audience accompanied by a set of questions that were put to the audience. Interviews with the audiences of the artworks enabled a comparison of my intentions for each work, with the audience's actual experience and perceptions of their role. This could also include previous experiences that may have shaped the works' reception. Several artworks were produced during the course of the investigation including the two discussed here, *The MAGIC RAY* (2009) and *Blank Map* (2009).

Figure 1. The MAGIC RAY viewed on a mobile phone.

The mobile phone based work *The MAGIC RAY* explores the influence of the audience's prior experiences of pervasive devices as well as their perceptions of the term 'interactive'. Visitors to *The MAGIC RAY* website are told that electromagnetic brain wave data is carried on the radio waves of mobile phone signals. The website claims this information allows *The MAGIC RAY* to provide a reading of the audience's character when they visit the site using their mobile phone. This is not the case, and the readings they receive are simply 'cold readings', statements that most people tend to identify with. A reading 'process' provides feedback that suggests their character is being read. However, 'interaction' in the work is essentially reduced to following a hyperlink on a mobile phone in order to receive a short randomly selected text. By limiting the audience's ability to control or alter the work, the aim was to address the audience's role in inferring 'interaction'. It was anticipated that this would come from cues provided by the work including the description of the system as 'interactive', the use of a mobile phone and their previous experiences of interactive devices/systems.

The MAGIC RAY aims to provide a highly choreographed experience where interaction is limited but nevertheless implied. In contrast, *Blank Map* looked to give the audience a high degree of control over their experience of the work. *Blank Map* does not employ any digital technology or devices but consists of a folded A4 sheet on which are printed a set of instructions. Anyone wishing to participate can download and print their own map from the *Blank Map* website. The instructions include a set of numbered tasks to be completed and then illustrated on the otherwise blank map. The tasks range from depicting specific journeys or places, such as the instruction to 'draw the view from a window', to showing on their map where they would rather be and an abstract thought. The fact that they are described as tasks suggests an intended approach to engaging with the work. It is made clear that these are suggestions for the audience. There is no requirement to complete the 'tasks' or to show the map to anyone and they are free to do with their map what ever they see fit.

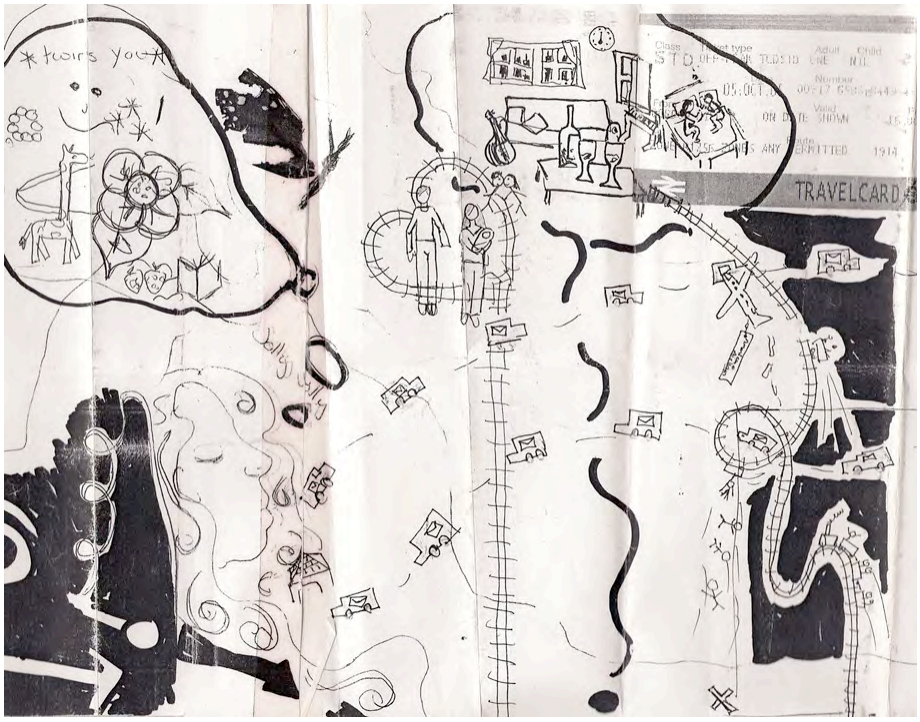

Figure 2. Detail of a *Blank Map*.

The audience has far more control over the work compared to *The MAGIC RAY*. The system's 'code' is not hidden but written in plain English in the form of instructions and tasks. The audience can manipulate the interface in any manner the physical paper allows, up to and including destroying the work itself. While a suggested or intended use is implied, it is the willingness and ability of the audience to act on this guiding influence that is of interest.

Neither works are suggested as ideal or new approaches to the role of the audience and do not represent opposites or extremes of a scale of interaction, participation or engagement. They do however represent two contrasting approaches; from *The MAGIC RAY's* emphasis on a fictional 'interactive' technology, with limited ability to affect the delivery and content of a choreographed experience, to the apparent freedom of control provided by *Blank Map's* more open structure.

Understanding the audience's role

Several key questions emerged while constructing the works including: How are audiences influenced by their attitudes to technology? What might suggest an artistic experience? How willing are audiences to be the 'active' consumers that theories of interaction and media consumption describe? What terms and points of reference do

the audience use to evaluate the work and how do these compare to my own success criteria? These questions were not put to the audience directly to prevent my own preoccupations dominating the discussions. Instead, the interviews were structured around a number of more general questions. These were introduced to provide the starting point for a series of detailed discussions in which the audience could raise their own issues.

A large amount of data was produced by twenty interviews, providing a range of interesting, individual and personal accounts of the audiences' experiences. There is not time here to discuss in any detail all the responses given. What emerged from the discussions of both works was the extent to which the audience were looking to understand the work, not only by drawing on their previous experiences, but also by actively trying to understand the role proposed and prescribed by the work.

For the audience of *The MAGIC RAY* the role of technology, as anticipated, was a key contextual factor. Some audiences described *The MAGIC RAY* as 'interactive' because it employed a mobile phone which was seen as an 'interactive device'. Those audiences who described themselves as being less technologically savvy often had difficulties in using *The MAGIC RAY*, with some declaring they were simply 'too old' to understand or participate in the work. Others who had used similar services or systems looked to make a judgement of the work based on its accuracy or articulated their pre-existing suspicion about the central premise. What became clear was that the prior experiences of the audience affected the way they approached the experience from the outset. This went beyond issues of technological proficiency and can be seen in their assessments of how successful their experience of the work had been. For those who did not believe the system to be genuine, success was often described as the fact that it 'made them smile', having identified *The MAGIC RAY* to be a spoof or parody of an interactive system. Those who had doubts about the system being genuine were forced to question the system's veracity and this was commonly seen as a success of the work since it had 'made them think'. For those who believed it to be a real character reading system, the apparent accuracy was an indication of success. There were others who were disappointed by the work partly because of its inaccuracy but also because they had clear expectations of what the work would deliver which were not met. What the diversity of responses show is that the audience's pre-existing expectations and attitudes affected the way they described and perceived their participation.

Where discussions of *The MAGIC RAY* were often focused on previous experiences and expectations, including those of technology and devices, *Blank Map* forced the audience to address more fundamental issues relating to the very nature and level of their involvement. These discussions revealed a set of underlying ‘contextualising questions’ with which the audience tried to establish what the purpose of the work was, how they could participate or interact with it and the nature of their role.

An unanticipated issue raised during the interviews for *Blank Map* was the way in which the audience felt limited by their confidence in their own creative abilities. Many of the audience described an intimidation at being asked to ‘draw’ or be what they termed ‘creative’. Where *Blank Map* can be seen as an ‘open work’ (Eco 1989), the audience looked for ways to close down their experience in order to establish and understand their role in it. This involved them trying to anticipate what I might be expecting as an ideal use/experience of the work, or limiting their participation to what they felt was safely within their own capabilities. For some it was simply too ‘open’, providing insufficient guidance as to how exactly they should engage with the work. For others it was only ‘part open’ in that either they felt unable to complete tasks such as ‘draw the view from a window’ or were worried they would misinterpret what was being asked. In other words it was only ‘open’ to them as far as they perceived and understood what was expected of them. It would seem that my intention to allow for and facilitate participation or interaction was limited by the audience’s ability to perceive the limits of their own potential for participation and interaction.

The *Blank Map* audience were given a suggestion of how they might participate in the experience. They were not given an indication of why they might do this beyond the opportunity to experience and participate in an artwork. While the majority of the interviewees described enjoyment in completing the tasks or otherwise using their map, they were generally reluctant to see this as an artistic activity since they did not see themselves as artists. Several felt their maps were not of a sufficient standard to be ‘exhibited’ let alone described as artworks. There was a common assumption that there was a correct way of engaging with the work and I was frequently asked during the interviews whether they had used it correctly. When told them that there was no right way this often disappointed the audience, several of which wanted me to assess or judge their efforts. Not all of those interviewed felt constrained by a lack of ability and instead described an enjoyment. This also included some who felt liberated by being ‘given permission to be creative’. That they looked to me to validate their

activity and efforts is an interesting inversion of what could be seen as typical roles of artist/artwork and audience. That is to say that audiences are often seen to complete works through their active participation, generating meaning or significance. The audience of *Blank Map*, however, largely felt they could only successfully participate if they were able to do so in a manner prescribed by the work.

Conclusions

Whatever the role created or intended, contextualisation can be seen as a key role of the audience. This sees the audience looking to act on the role created for them by/in the work, but also sees the audience looking to assimilate the experience with their existing understanding of the perceived nature of the experience. This activity centres around the following considerations:

- How the work is categorised (What is it? What do I call it? – a game, art or a system).
- The perceived ability to control the work (How do I get it? How does it work?).
- And their role in experiencing what they have perceived it to be (What is my place in it? Am I experiencing correctly?).

These contextualising questions were addressed indirectly during the interviews, typically manifesting themselves as issues of skill levels, age, etc. However the audience addresses the questions their answers can be seen to significantly impact the audience's understanding of their role.

By acknowledging the importance of the audience's understanding of the nature of the experience, artworks can look to expand and challenge existing preconceptions. An advantage of this approach is that it does not treat the issues surrounding the role of the audience as ones of literacy or skill levels. Instead it asks audiences to employ their own reading schemes. It is not possible to intend to produce new or engaging experiences without acknowledging that what constitutes an engaging experience for an audience relies on their pre-existing contexts. The limits of the audience's experience need not place limits on the artwork. Artworks can look to work with the perceived limits by challenging audiences to re-address their pre-existing understandings and create new relationships with artworks. In this way it may be possible for them to create their own new and heightened experiences.

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Lazarillo GPS

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Introduction

Lazarillo is a common word in Spanish, used to describe people who act as guides for disable people. The word originates from the story, 'El Lazarillo de Tormes' about a blind man called Tormes who was always followed and guided by Lázaro, a young boy and from which the word Lazarillo appeared. This project, as the title announces, is part of a prototype which rebuilds the guide figure for wheelchair users with a GPS - as if it were the 'Lazarillo'.

What was our thinking?

To begin with, it is best to give some definitions to help understand our thinking in the project.

Tourism means travel for recreational, leisure or business purposes. The World Tourism Organization defines tourists as people who 'travel to and stay in places outside their usual environment for more than twenty-four (24) hours and not more than one consecutive year for leisure, business and other purposes not related to the exercise of an activity remunerated from within the place visited'.

Around the world, there are thousands of different types of tourism and *adjectival* tourism refers to the numerous niche or specialty travel forms of tourism that have emerged over the years - each with its own adjective. Many of these have come into common use by the tourism industry and academics. Others are emerging concepts that may or may not gain popular usage. Examples of the more common niche tourism markets include: *Culinary* tourism, *Dark* tourism, *Disaster* tourism, *Ecotourism, Heritage* tourism, *LGBT* tourism, *Medical* tourism, *Nautical* tourism *Sex* tourism, *Space* tourism, *War* tourism

Advantages and disadvantages of Accessible tourism

Accessible tourism is the ongoing endeavour to ensure tourist destinations, products and services are accessible to all people, regardless of their physical limitations, disabilities or age. It encompasses publicly and privately owned tourist locations where improvements not only benefit those with permanent physical disabilities, but also parents - pushing buggies, elderly travellers, people with temporary injuries, such as a broken leg, and their relatives, friends and other companions.

As of 2008, there are more than 50 million people with disabilities in Europe, and more than 600 million around the world. When expanded to include all potential beneficiaries of accessible tourism, as defined above, the number grows to some 130 million people in Europe alone.[1] In addition to the social benefits, the market represents an opportunity with new investment opportunities and new service requirements - rarely provided by the regular travel agencies, transport providers and other key players in the tourism sector.

Accessible tourism's specific needs and requirements

Specific problems found by the disabled tourist when booking a holiday include:

Inaccessible, or only partly accessible, web sites
Lack of accessible airport transfer
Lack of wheelchair accessible vehicles
Lack of well-adapted hotel rooms
Lack of professional staff capable of informing and advising about accessibility issues
Lack of reliable information about a specific attraction's level of accessibility (church, castle, exhibition, etc.)
Lack of accessible restaurants, bars, etc …
Lack of adapted toilets, in restaurants and other public places.
Inaccessible streets (cars parking etc)
Lack of disability equipment (wheelchairs, bath chairs, toilet raisers, electric

[1] According to ENAT - the European Network for Accessible Tourism, this includes:
Barrier-free destinations: infrastructure and facilities.
Transport: by air, land and sea, suitable for all users.
High quality services: delivered by trained staff.
Activities, exhibits, attractions: allowing participation in tourism for everyone.
Marketing, booking systems, Web sites & services: accessible for all (i.e. accessible information).

scooters).

Our solution

After analyzing this data, and seeing the wide range of needs within the accessible tourism industry, *LazarilloGPS* emerged. *LazarilloGPS* was a prototype project launched with the help of Media lab-Prado as an idea to develop accessible tourism for disabled people within urban contexts and the mapping of a city.

Last November, a project with wheelchair users and the use of GPS took place. We developed a web site to visualize tourism tours taken by wheelchair users around Madrid. The visualization showed their tracks on a map and also how users 'reviewed' specific things they found on their way, either good (e.g. places or bars they liked) or bad (locomotion problems they found). See http://lazarillo.medialab-prado.es/

The idea is that this site will promote tourism for wheelchair because it goes beyond what they are currently offered by tourism offices (typically 1-2 predefined tours), and, by combining the experience of many users, will provide useful information.

Background information - both inspiring and focusing our project include: *BarcelonaAccessible* (http://www.zexe.net/) where Antoni Abad, a Spanish artist makes a project with mobile phones to reveal the problems disabled people go through in their daily life. This project was much more about revealing a situation than giving solutions, and was only focussed on the negative aspects they experienced. *Accessible Madrid* (http://www.esmadrid.com/) is the tourist's office website which offers organized tours for wheelchair users. The website *Every Trail* (http://www.everytrail.com/) shows that there are fixed categories of subjective tourism, and conspicuously - no mention of wheelchair users.

We developed a project with a set of short-term objectives. This included collecting data from a few wheelchair users. The idea was to find wheelchair people at the tourist office, ask them to do a tour with us, and collect the data. Interview a few wheelchair users and get feedback about the project. Finally to design and develop a web site where data would be visualized.

A possible design for the website already existed (*Every Trail*) but we had to link our category *Wheelchair users* onto their site. However as our project continued to develop we decided to begin a new site where the first map drawn can be printed out.

The long term objectives include creating a community-oriented platform where wheelchair users have the ability to provide independent data about their tours to the system and share them with the others. A possibility would have been to connect to existing platforms that enable people to share information about tours (GPS tracks, pictures, comments) - see for example www.everytrail.com - and ask them to provide sections for wheelchair users. Another possibility would have been be to write a mobile phone application (along the lines of those provided by *Every Trail*) dedicated to collecting all data directly from the user and then upload them to the web site.

The data (status, where people come from) within the development of our project

The Data to be collected is, and was during the prototype:

GPS track logs of wheelchair users following touristic tracks in Madrid;
geo-located pictures taken by wheelchair users while following the route, together with free comments on good things they saw or that helped them, problems found, or something other; a vote (good or bad) given on the web regarding the place in the picture;
Symbols in colour code (red, green) to indicate the city sites every 10 meters in the touristic route.

The GPS tracks are visualized together on the same Google map with placeholders to access the geotagged pictures, comments and ratings. The placeholders will use colour-coding to show the rating (e.g. red = bad, green = good). Each track segment between two pictures will be coloured according to the changes in elevation (as logged by the GPS) to show if a track segment was plain (that means easy for wheelchair users) or not (e.g. it is steep). The user will also have the opportunity to visualize specific tracks in a separate map and download GPS tracks made by other users if they want to repeat a certain tour.

Besides this we created a whole 2D map with codes and reference symbols which can be observed in the web site - from which the wheelchair tourist can get an idea of the route before starting it. The plan is to focus on their needs as disabled people who might have problems when moving around the city travelling.

The first prototype

When making the prototype, we came across a wonderful group of people - the association *Debajo del Sombrero* (*Under the Hat*) who made us change some aspects during our analysis and experimentation. This association is an arts and psychology group of people who work with art therapy with disabled people in Spain. We worked with them when testing our prototype map, and came across two beautiful people - Carlos and Amanda. Carlos is a mentally disabled boy and Amanda his tutor. Carlos cannot speak so he communicates through a communication panel with which Amanda explains what he says with his eyes.

From the experience of working with them, our prototype shifted to a new dimension: we saw Carlos worked with a transparent plastic to communicate with his tutor, and so our new development -when printing the map - included the option to print maps in acetate or transparent plastic thus enabling people to communicate within their medium (i.e. acetate map, and communication panel). What we learnt when testing our digital/analogical map, was that although we had lots of ideas, it was not until people actually worked with them that we could observe their reactions.

Conclusion

This project of mapping the city in a touristic way for disable people was a challenge for me and for the group we worked with at Medialab, and fortunately it was a very strong theme to begin working from.

Coming from the fields of arts and tourism - as regards my background and studies - it was an amazing experience to be able to join artistic thinking with the planning of drawings of maps that will be useful to disabled people and may have a broad application within the tourism industry. We are beginning to build an art-electronic platform that will help solve some social problems.

The opportunity of presenting our work here at ISEA2009 is a perfect forum to open up and debate issues such as the importance of conscience in the electronic world with regard to disabled people.

Finally, my vision is to continue to work in the electronic field to make a live, active platform, with an easily downloadable GPS solution - so as to make the maps accessible for everybody. Future work would include the use of GPS applications on cell phones, thereby making things even more accessible.

Thank you.

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http://www.esmadrid.com/

http://www.everytrail.com/

http://www.visualcomplexity.com/

Through the dark room – an approximation between the movie theatre and VJing spaces

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Historical records suggest that movie exhibition was a very autonomous practice in the first years of Cinema. The simple fact that film reels were sold to the exhibitors, instead of rented (Machado 2002: 91), implies that the industry had a very different organization in the beginning of the last century. The act of moviegoing was constituted more as *going to the movies* than as *going to see a movie* – partly because the 'movie' itself only existed during its screening, as pure cinematographic experience. The owner of an exhibition venue had a great editorial control over its programme (Musser 2002: 17). The projectionist, in turn, could either use tricks of lighting or adjust the speed of the projector, in order to give or correct the meaning of the images (Richardson 2002: 75). The score, played in synchronicity with the film, was not truly part of the work, being just applied along its process of consumption (Aumont 2005: 45). Therefore, in as much as a movie could be replayed, it was never watched in the same way twice.

In 1963, Stan Brackage still referred to projection as *performance* – that is, a creative practice (1983: 350). Nevertheless, the development of the industry has undermined this possibility by establishing a commoditised dynamics of consumption, as technical and semiotic standards became increasingly necessary to guarantee the penetration of different works in different exhibition venues (and, nowadays, their circulation over a wide media ecology). Throughout this process, the once collateral *movie* became the nervous axis and economic pivot of the cinematographic institution. The *tableaux vivants* and the *travelogues* gave place to the millionaire *blockbuster*. Concurrently, the procedure of movie screening became gradually more *transparent*, so that as few interferences as possible affected film consumption as it was originally planned. As a result, the noisy *nickelodeon* and the opulent *movie palace* were replaced with the *shopping mall multiplex* – an excellence place of consumption, whose Spartan architecture favours an uninterrupted flow of public and products. As it is hard to separate causes from consequences in this complex history, we can but declare its outcome: that cinema's governing dynamics of consumption – the articulation

between exhibition venues and the moviegoing practice – has become a hyper-determined, crystallised operation.

This situation is called into question by the intrusion of the purported new media technologies into the traditional cinematographic structures. As its mechanisms of distribution and exhibition are fully translated into computational processes, cinema is about to become an eminently digital medium, as are many others. However, the established industry seems ready to oppose this transformation, and has chosen movie theatres as its last trench. Contrary to what is overly claimed,[1] this resistance is not based on pure aesthetical motives. The projection consultant Luiz de Luca states that digital projectors capable of rendering sufficiently high image quality, comparable to 35mm film, have existed for some time (2005: 21). Therefore, it seems that the main reasons why the industry has not adopted these technologies right away, dispensing film prints and saving distribution costs, are *operational*. To be commercially effective, the system needs uniform specifications, which the industry is actively engaged in defining since 2002. This process is headed by *Digital Cinema Initiatives* (DCI) a joint venture consisting of the seven biggest Hollywood studios (Ibid: 204). The DCI embodies the struggle of the industry to not lose control over the places around which cinematographic economy turns – the instances from which this economy can be defined: its dynamics of consumption. They do so by setting standards, which have the value of protocols of access to the circuit.

These regulating agents are mainly interested is maintaining their privileged position in the market. The digitization of the cinematographic circuit represents a serious threat to such configuration, since it would result in the large disposal of the present technological infrastructure, replacing it with a more open, dynamic and flexible framework. Digitised, a movie is just a pool of data, a high-quality matrix ready to leak from the authorised channels to informal ones. The digital screening room, for its part, is not logically different from a home theatre connected to the Internet. Therefore, these technologies place exhibition under the audience control, in the same manner DV camcorders and video editing software did with movie production.

Above and beyond the unrestrained proliferation of unreleased films, what seems to worry the cinematographic industry are the effects that such vulgarization of exhibition technologies might cause to moviegoing. For a long time, moviegoing has

[1] The aesthetical resistance to digital projection can be seen in news reports such as “Digital Projection Displeases Specialists,” published in the *Folha de São Paulo* newspaper in 29 Dec 2005.

been the unique dynamics of cinematographic consumption. Nowadays, although it coexists with many others forms – as films can be broadcasted through television, rented in DVDs and downloaded from the Internet, etc –, moviegoing retains a paramount significance. Because of its strategic position, the movie theatre still constitutes 'the first and most important retail venue' of the industry (ibid: 95). On the other hand, home video and image rights currently represent a higher profit to the producers than box office shares (ibid: 151) – in the same way that exhibitors earn more by selling concessions (popcorn and beverages) than tickets (ibid: 126). The result of this odd combination is that the architecture that fosters cinematographic experience becomes a hostage of its own ancillary economy. Film screening is turned into a publicity stunt to a series of accessory markets, and the theatre becomes something of a shop display (Friedberg 1994: 95), in relation to which all other channels are localised according to the system of *windows*.[2]

In this highly intertwined circuit, the particular potentials of each dynamics of consumption are nullified. Since a film must be managed through several media with as few adaptations as possible and not lose its commercial appeal, it cannot really adopt specific characteristics of any medium. Thus, with the standardization of moviegoing, all forms of cinematographic consumption are restricted – including moviegoing itself. By keeping strict control over the movie theatres, the industry is able to determine economic and aesthetical aspects of film consumption, as well as cinematographic production and language in general.

The complete digitization of the circuit threatens the industry because it dilutes this control, by making dynamics of consumption flexible to such extent that they are useless as a filter to production. Every movie could promote forms of exhibition that suited its own specific proposal, and still operate within cinema. We can see hints of this transformation, for example, in the feature films that have been simultaneously released in theatres, on DVD and on the Internet, such as *The Road to Guantanamo* (Michael Winterbottom, 2006). But its effects could be better testified by the *Tulse Luper Suitcases* (2005-) project, which director Peter Greenaway is making, in a concatenated and complimentary way, through different channels. Greenaway, a long-time explorer of multimedia possibilities, has even done some *Tulse Luper* VJ presentations.

[2] Processes of chronological, gradual authorizations, used to organize the exhibition of movies in different media (De Luca 197).

In that sense, de Luca proposes that digital movie theatres shall adopt a fluid architecture, capable of holding different audiovisual products, such as soccer matches and rock'n'roll concerts (2005: 232-233). However, we should suggest that the transformations provoked by the digitization of cinematographic dynamics of consumption are prone to go far beyond this level. New technologies are able to completely change the power balance between big media enterprises and the general public (Lasica 2005: 2). Networked film distribution could deteriorate release windows, wearing out the blockbuster's appeal of exclusivity. Digital projection could make film screening an ordinary business, at everyone's reach. Moviemakers could not depend on the multiplex structure anymore: they could define their own system of distribution, fitter to each of their works.

Moreover, digital projection modifies the very ontology of the cinematographic apparatus and image. The movie exists in a radically different way: it is no longer the manifestation of indexical records, but the effective creation of sound and image from an executable code, through real time algorithmic processing. As movie screens become interactive (Manovich 2001: 102), movie exhibition is no longer *playback* (reproduction): it turns into *rendering* (interpretation). Only the concurrent activity of the mechanism can translate code into bitmaps; frames; diegesis. In this process, the movie becomes susceptible to other interventions.

Digital projection is, therefore, an eminently *opaque* interface: the contrary of everything the movie theatre has evolved to be. While the projection runs, it calls upon the very moment of exhibition – the same duration that the anti-architecture of the multiplex tries to suppress. For that reason, digital screening also fosters the experience of real space, in spite of diegetic one. Digitised, the movie theatre recovers its dimensions, volumes and distances. What if it took on the full characteristics of new media spaces and became *navigable* (Ibid: 252)? With this hypothesis in mind, we could refer to *VJing spaces*. VJing consists of the exhibition of real time generated, edited or composed visuals, normally in the guise of projection. In VJing performances, images go straight from the editing stations to the screen. Sometimes, a camera feeds the system with scenes of the screening space itself, concentrating the whole chain of audiovisual production in this one event.

Historically related to practices such as *light shows* and *color music*, VJing became popular as a form of complement to musical presentations in nightclubs (Dekker 2005). In these venues, it established its autonomous circuit and operation:

projections that commonly take place in the dance floor of clubs and raves, using the ambient music as a basis for visual montage. According to Alexis, the likely VJ pioneer in Brazil, VJing is the *opposite* of silent cinema: 'we produce images over music'.[3] However, there is a big difference to be highlighted in such comparison. While the movie theatre is an architecture dedicated to capture the public attention and direct it to the movie, VJing spaces promote cognitive dispersion: projection is just one among several stimuli.

Negotiating with these conditions, VJing establishes a very unique dynamics of consumption, allowing for a peculiar relation between the public and image. Instead of trying to connect gaze and screen by the means of cinema situation, it leaves them free to find each other by themselves, in a new modality of *cinematographic exploration* (Jaeger 2006: 42). Reality and diegesis – man and machine – are absorbing each other. In VJing, we could state that not only the gaze, but also the mechanism, the space and even the audience are all in a *mobilised and virtual* state (Friedberg 1994: 2).

Since it is not still constrained by a consolidated symbolic system, neither has to conform to the expectations of a rigid market, this new medium seem like the perfect platform to investigate the dormant potentials of digital technologies for cinematographic consumption. In fact, it is precisely such exploration that gives VJing its substance: while the cinema projectionist must *preserve* the continuity of a pre-produced movie during its screening, repeated many times in the course of weeks, the VJ must *create* visual coherence every time anew, gathering disperse fragments. Therefore, it should comes as no surprise that the live audiovisual scene is rooted in all the technological possibilities that the cinematographic industry rejects: digital projection systems, online file sharing networks, generative media, sampling, remixing. For this reasons, it seems that a science of VJing cannot renounce the study of cinematographic projection, in as much as Cinema, the more digitised it becomes, cannot ignore the possibilities of VJing.

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The global data palette: massive databases and the reformation of content creation in film/video and music/sound art practice

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Introduction: the global data palette

For film/video and music/sound arts practice there is an emergent production reformation that represents a significant shift away from the intrinsic and fundamental restrictions of twentieth century models of time-based image and sound composition. After 100 years of incremental advancement, current moving image and sound production developments offer a radical shift not only in production technologies but also distribution and delivery systems, and what may prove most significant - aesthetic values and paradigms. Not only how we create, but how we acquire, own, store, and engage with visual and sonic materials is clearly changing. The global data palette proposes that time-based media artists will move away from the resource intensive aspects of content capture and redirect production emphasis to the post-production construction of projects by working primarily with existing content from massive databases. Such a shift places digital media creators in a substantially altered environment of creative practice, and offers greatly changed production, economics, and aesthetic engagements previously unavailable.

Several technological developments have initiated this reform, particularly access to means of production (cameras, computers, etc.) and access to means of distribution (the Internet). As access to means of production and distribution becomes ubiquitous, three emerging developments function as a critical subset in the transformation of production practices. These subset changes are: 1) the affordability of massive data storage; 2) the restructuring of data ownership; and 3) the malleability of data. Through these three developments in storage, ownership, and malleability, a fundamentally changed production model may be decisively enabled.

Affordability of massive data storage

Data palette production originates in the ability to affordably store, and quickly access, immense quantities of data on independent hard drives or RAID (Redundant Array of Inexpensive Disks) systems in one's studio. By creating massive libraries of time-based sound and image content, the artist/composer is able to create works without the necessity of capturing raw data materials.

The remarkable changes in storage capacities and costs over the last 30 years have created the necessary conditions for affordable massive data storage. In US dollars, $500 in 1989 would buy 20 megabytes of hard drive storage, $4,500 less than that amount of storage had cost eight years previous. Ten years later, in 1999, that $500 would buy 1000 times more storage: 20 gigabytes. Ten years after that, $500 in 2009 buys 250 times more storage than 1999: over 5000 gigabytes (five terabytes). The megabyte-per-dollar change in cost has been dramatic (Historical Notes 2008). For video and sound artists working back in 2000, the availability of eight gigabytes of storage felt remarkably empowering, while the notion of an affordable terabyte of storage seemed yet unimaginable. Today, that prized eight gigabytes that cost several hundred dollars in 2000 can be found on a $20 thumb drive that gets lost at the bottom of a handbag, while eight terabyte home RAID systems are readily affordable in near plug-and-play configurations.

Considering the rate of storage increase from 1999 to 2009 it can be loosely anticipated that in 2019, $500 might buy 1,250 terabytes (1.28 million gigabytes or 1.22 petabytes) of storage. While there is a slowing of the precipitous cost-per-megabyte decrease and a need for increases in performance to accompany capacity growth, today's storage costs and capacities strongly indicate that we will soon reach the point of being able to reasonably afford as much storage as needed. Through this affordable massive storage capacity the working artist can begin to assemble enough raw materials for years of work, minimising the need to go into the field or studio for content capture.

Though feasible to implement, such necessarily localised massive databases still have data-quantity limitations and represent a first wave conversion that is archaic on arrival. Instead, such a model simply moves storage towards a tremendously more expansive second wave database structure that connects a global network of individual databases. This second wave model of networked community databases

will assemble enough raw aesthetic data resources to provide filmmakers/composers with a lifetime of raw content to draw from, nearly eliminating the need for project-specific field or studio content capture. Such cloud computing, as Ramnath Chellappa has termed it (Chellappa 1997) would follow his paradigm wherein 'the boundaries of computing will be determined by economic rationale rather than technical limits.' This ever expanding, dynamic repository of real-time accessible uncompressed data will provide a global database of raw materials to be perpetually accessed, modified, culled, and reformed into distributable content.

Three readily apparent technological issues to be resolved in completing the data palette framework include: further increases in storage capacities and performance to accommodate fully uncompressed data; real-time data flow and exchange speeds for that data; and automated identification systems that allow for searching and sorting resources, with provisions for micro-payments to content generators. The exceptional logistics of cataloguing, tracking, identifying, and filtering such massive quantities of aesthetic data will require a semi-automated system that begins at the hardware level and is able to configure terms of ownership as well as content, and importantly, allow for access to all links in any chains of source files, whether raw, processed, or reconstituted.

Restructuring of ownership

To attain the quality and pervasiveness needed to be sufficient, these community databases require the support of redefined cultural and legal structures of ownership. Revised ownership paradigms need to allow for fair trade and use of raw and processed content materials based on community market valuations and authorial prerogative in an authentic free market environment. Despite some problematic limitations, licensing systems such as Creative Commons begin to move the culture and law of ownership and licensing in this needed direction. Particularly necessary and presently insufficient in the Creative Commons structure will be unimpeded access to the entire chain of source materials, whether raw or processed (Bell 2009). Access to such source files will enable micro-revenue distribution configurations for content uses that are technologically, legally, and culturally fair and reasonable. On-the-fly use and micro-payment revenue calculations can be balanced, allowing for multiple content generators to opt-in for participating in revenue sharing with creators of distributed works. For example, embedded ownership and licensing tags would allow a project to be constructed from several hundred or even thousand content

sources yet permit micro-payments based on market driven valuations. Commercial and public use can be defined under license or work for hire agreements that provide revenue distributions that are market driven and undistorted, forming a production-consumption exchange that exemplifies a functioning micro-mass market.

Malleability of data

Despite its material and aesthetic qualities, analogue technology suffered from a fixed rigidity of content - an 'embeddedness' and incompliancy of the content within the media. The exposing and developing of film or the laying of an analogue audio track resulted in a sequence of images or sounds with burdensome limits on post-production restructuring possibilities. Whether visual or sonic, these post-production limitations channelled creative emphasis towards the original 'take'. Once the take was completed, the primary evaluative consideration for audio was whether to keep or discard the take, and for film whether to use or not use the take, generally in its entirety. Thus a necessary pre-eminence was given to the capturing of raw materials with a corresponding de-emphasis on post-production interventions and processing. Conversely, working in digital media with uncompressed data, software and hardware tools enable a malleability of content - an 'unembedding' from the media - that dispatches with the need for idealised, overemphasised content capture, and instead moves principle production decidedly from the field to the post-production environment.

With improved processing tools and advanced artistic control over those tools, content capture remains foundational but loses its privilege. Data palette production allows content to be not only modified, but primarily constructed in post. The 'take' becomes informal, a simple process of gathering data, with the analogue ideal of a perfect take replaced by the digital ideal of a constructed take assembled from a variety of raw materials, allowing for a greater scope of possibilities in final content. Thus raw materials need only be adequate to function as a starting point of production, and of a high enough resolution to allow substantial processing and reconstruction. The capture of content no longer needs to be exact or literal. Through this increasing versatility and malleability of uncompressed data, a 'digital materiality' comes forth - a data physicality of sorts - allowing aesthetic data to fully function as a raw material, like iron-ore that can be alloyed and fabricated into myriad materials and shapes as directed. Just as a sculptor uses fundamental raw materials, so the

day nears when the video/sound artist simply requires only generally suitable raw (data) materials.

Such data-priori ordering has been inherent to the rap music genre since its inception, and commonly emerges in recent feature film productions where financial and human resources are concentrated in a late capitalist market-driven effort to advance tools, materials, and product. From motion capture to the body scanning of actors to the physical simulations of hair movement (Docter, Silverman 2001), tools and strategies of data-priori production then filter across to consumer-level applications.

Drawing from a global database of content, works can be constructed and processed using pre-set, pull-down, and configurable parameters to achieve desired content outcomes. This ability to extensively combine, redefine, and reshape raw data relocates the traditional roles of production, moving the task of content capture from its position of primacy to a subjugated role in the creative production process. Content capture then becomes something of a manual labour, a sort of 'field work' that can be outsourced to a globally market-driven labour force. This shift encourages ideas rather than production regimen to again move to the fore, and in a sense purifies artistic intent. Content previously moored in media - such as image focal point, depth of field, framing, and eventually even camera angle - becomes 'unfixed', so the director of a project will find it unnecessary, even constraining, to generate determinate raw imagery.

Aesthetic transformation

These developments enable an analogous aesthetic reformation in time-based arts for both creator and consumer. In all arts practices there exists an elemental relationship between the tools, materials, economics, and production processes that, interacting with culture, determines and directs the aesthetics of a form. The constricted - and by today’s standards acutely attenuated - practices of twentieth century film and music composition are painfully manifest in the dull redundancy of form and narrative that has resulted in a 'malaise of sameness' for the commercial film and music industries. Similar redundancies, familiarities, and excesses of self-referential ironies have settled upon time-based fine arts practices: found materials works have been bound by a rigorous indebtedness to source materials; avant-garde works have often been stymied by formalism; and so forth for various genres.

At the same time, technologically driven shifts in time-based media consumer behaviours have been phenomenal and well-documented, from on-demand content to iPods to the 'YouTubing' of distribution to mobile content delivery and more. Along with these and other changes in consumer and delivery conventions, user acceptance - and demand - for altered constitutions of content has initiated a generous allowance for a reformed aesthetic of time-based media.

An additional source of advancement is found in the hybridisation of animation and live-action imagery in major film productions such as Pixar's *Wall-E* and Columbia Picture's *Spiderman* series (Stanton 2008, Raimi 2002). While economically bound to narrow forms of narrative, these endeavours contribute tremendously to the technological changes that will eventually enable seamless data palette constructions. By current trends, it can be expected within the next 20 years that computer-generated animated films will successfully cross the uncanny valley and become visually indistinguishable from live-action cinema. Correspondingly, this capability of creating 'live-action animation' will be distributed to mass market tools. With those tools in hand and access to a massive global database, post-production ascendancy will be firmly established.

While the construction of 'seamless' distributable content assembled from a disparity of source materials will become achievable, more questionable is whether the culturally constructed valuation of the seamless - the cinematic 'real' - will persist. The 'invisible' edit and the ideal of 'realism' as admired by André Bazin (Bazin 1967: 1, 23-40) may yet be another casualty - if not already - of post-production predominance, to be as outmoded as the 'perfect' take. A relaxing of consumer expectancy with a reinterpretation of how time-based content threads and suggests its depictions, narratives, and constructions seems a more appropriate response to advanced visual and sonic remix forms. While the twentieth century aesthetic yet casts a shadow across early twenty-first century works, inevitably a new aesthetic takes shape that more accurately reflects contemporary lived experience and relationships between individuals and cultures.

Conclusion

Contained within the macro-revolution taking place in means of production and distribution, this paper has looked at an important three-part subset evolution of data storage, ownership, and malleability. The arrival of these technologically enabled

conditions provides a reformed structure and approach to the creation of time-based works and frees film/video and music/sound artists from the need for raw content generation. The data palette allows for a global community of fair and reciprocal content exchanges along with micro-revenue distribution in an authentic free market economy. As importantly, these changes in production encourage an attendant shift in aesthetics and a potentially dramatic reform of creative practice and cultural engagement distinct from the atrophied practices of twentieth century time-based arts. By alleviating production limitations, whether from an orthodoxy of tools, rigidity of media, or constricted ownership and distribution options, global data palette production avails to all genres an accessible production methodology. From there, new voices are allowed to emerge, and time-based arts practices are provided an environment in which to thrive.

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Moon Vehicle: creating new culture from the Chandrayaan Mission

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In October 2007 the Bangalore Space and Culture Symposium was held at the National Institute of Advanced Studies (NIAS) in Bangalore, which aimed to bring scientists and artists together to share their common interest[1]. There was an agreement at this symposium, at least amongst the art and culture section[2], that there should be projects pursued in relation to the upcoming launch of Chandrayaan-1, India's first moon mission.

'Moon Vehicle' became the project title and is a translation of the name Chandrayaan. At that time, Moon Vehicle was described as 'a method of transmitting the cultural and philosophical meanings of the moon in India's culture and will initiate a dialogue about the public perception of space exploration in an Indian context'. It is a vehicle for change, dialogue, happenings, creativity and learning.

In January 2008, I received an email, at my desk in Dun Laoghaire, where I was teaching at IADT on the Visual Arts Programme. I printed it out. It said could I come to India for a week to do a workshop for the project 'Moon Vehicle' at Srishti School. I've been there nearly a year now. Srishti is an independent art school, which I would describe as pursuing design ecologies, design for real situations where the student can make a difference, which might link design with systems of sustainability, compassion, economy or craft. The students' love working together, as do the staff and there's a great ability, very native to India, of following a flow, believing in its progress and using the natural responses of people to guide the creation of a product or situation.

Geetha Narayanan, the Founder and Director of Srishti has an innate sense of where to place people in the organisation so that teaching, making, flexibility, ideas and

1 http://cema.srishti.ac.in/space/
2 People from Srishti School of Art, Design and Technology and its Centre for Experimental Media Arts in Bangalore, The Arts Catalyst in the UK, the Leonardo network and the National Institute for Advanced Studies which hosted the Symposium.

external collaborations can all be generated and used in different aspects of the Srishti curriculum. I was asked to mentor the Moon Vehicle project and came to Srishti as an Artist-in-Residence at the Centre for Experimental Media Art. I'm there because I need people to work with. People have become my artistic medium. I'm not Indian and I need to work through and with other people, to learn the culture and be sensitive to what is wanted and needed; so the group flow and pattern of working collectively that I've now adopted was a very natural result of circumstances.

I was invited because I'd spent the previous few years researching satellite networks in Europe and North America, creating collaborative, participative events and had just finished a number of projects with children. During an Arts Council England International Fellowship at UC Berkeley Space Science Lab I was able to learn, close up, about the process and people of science satellites. Before that I was Artist-in-Residence at the University of British Columbia where I was mapping satellites to the campus and had a weekly radio show, 'The Satellite Investigations'. In the UK I worked on projects with The Arts Catalyst; one was a storytelling event at the UCL Mullard Space Science Lab, and others have been collaborative projects in schools - Mulberry School's 'Universe Gallery' is one.

Installation of the light box "Satellites to Measure the Time and Space of My Universe" in the "Universe Gallery", Mulberry School for Girls, London, UK

Here in Bangalore, I've been given the time to make a long-term project happen that forges new and lasting connections, which enable change. It is essentially an activism through art making and through gentle and persistent nudging.

Initial strategies

The first project of Moon Vehicle was the Microsoft Design Expo competition entry, the 'Bombatsat', a learning tool for 12 year-old children that allows messages to be recorded onto a toy-like Chandrayaan, after which children can hide the Bombatsat for others to find, listen to their messages and record more. The Design team presented this concept in Seattle in July 2008 and it was well received, with interest from Microsoft and ISRO in pursuing the idea.

I worked with five students at the very beginning of their project. Our first visit was to Rakesh Sharma, India's first astronaut. He said it was important for India to be part of the conversation of space exploration, but that ultimately going into space is about representing humanity and not a nation. We discovered that most of the mission operation was coming out of Bangalore itself and Chandrayaan was being built at Satellite Centre, on the road to the airport. The students went to visit and saw the spacecraft being put together in the clean room. No photos can be taken and as a foreigner I was not allowed in. They came back telling me about the security guards, the enthusiasm and laughter of the scientists they met and gave contradictory descriptions of the incomplete satellite being put together in the clean room[3]. On another ISRO visit we met Dr Jayati Dutta who had been put in charge of 'outreach'. She liked the sound of our project, but let us know that the position of outreach officer, as in many space science organisations, was not a particularly honourable or prestigious position. Outreach and education, interfacing with the public, was a new thing for ISRO and the formal programme has mainly been focused on the launch. Informally there is another story.

We put on a couple of workshops for children. Projecting the moon on the ground, cutting out a piece of paper and asking the children to paint. I can't remember what we asked then to paint. I remember being really surprised how many children can sit round the moon, the wonderful anarchy of noise and pleasure in destroying the whiteness with football pitches, monsters and Bollywood stars. I videoed and took pictures because the image was so beautiful. Children's hands and faces caught in the light at the edges of the moon.

3 http://www.aconnectiontoaremoteplace.net/?p=122

Children form Aditi School painting the moon

Right from the start, the Moon Vehicle project has been driven by conversations and experimental participative events. The fieldwork and face-to-face meetings with people across the city, together with the events that gather people to interact, are the architecture, the artistic form of the project. Our objective is to distribute the story of Chandrayaan into the culture of the city and that happens a little bit through every conversation. Gradually but constantly, things shift.

Grounding the moon

The image of the moon on the ground has been the visual focus of the project. A perspective altering exercise: we can look down on the moon and this helps us collect our thoughts about it. There is a ritual in Hindu culture in which a woman looks for the reflection of the moon in a bowl of water and then drinks, breaking a fast taken to honour her husband[4]. My mother use to live in a house called 'Silvermere', which is the path of silver across water between you and the moon at night. The moon on the ground, or as a reflection on water, is a poetics of connection.

The rooftops of Bangalore have also become a repeated motif to the project. '100 Days of CHN-01' was an event we held on the rooftop of the Centre for Experimental Media Art. We thought of it as a 'fairground' event where different activities would be

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[4] This is the ritual Karwa Chauth, which is performed with a number of local variations.

happening simultaneously and visitors could choose what to do and be involved in ways that suited them. We served food, so that it was a sociable event. We had a projection of the moon on the floor and asked people to sit on the moon and say what they would put on there to make it meaningful to them from a distance. People were able to pick up and play the guitar, a group of students staged a read through of a section of the Apollo scripts, there were drawings being made and the Visvesvaraya Industrial and Technological Museum came to do sky watching with their telescope.

Children playing guitar on the moon at '100 Days of CHN-01'

A second event, 'Moon Stories', was a public, participative event staged on the roof terrace of the Visevesvaraya Museum and in collaboration with them. Sunil Kumar, the Museum curator was interested in working with us because we ‘think differently’. The Museum and its staff are very much within the Technological and Engineering spheres and not familiar with creative approaches but they were happy to try out something new. The event was held on full moon night. We worked with the Museum staff to attach a camera to their telescope and fix this to a projector so that the projected image could be seen by a group of people instead of one at a time through the telescope.

V. Lekshmanan adjusting the camera fixed onto the telescope viewer

We then devised a way to suspend the projector so that the image fell on the roof top floor and we put mats and cushions around this live image of the moon so that people could gather around it and exchange their perspectives of stories, songs and knowledge of the moon. We invited people from different backgrounds, an ISRO scientist, a former NASA scientist, a writer, a psychologist and made it open for anyone to participate. Many people from the Museum were there, including the education team, security guards and workshop staff[5].

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5 A podcast of this event can be downloaded by subscribing through iTunes to http://www.aconnectiontoaremoteplace.net/world_tour/podcast_wt.xml

Shyama Narendranath, a scientists from ISRO, with her daughter talking about Chandrayaan's orbit round the moon

The educators

During the preparations for Moon Stories, while I was arranging mats and cushions in a circle around the projection, I noticed the Museum staff moving quantities of chairs into rows about twenty feet further back. The clash in expectations as to how people should participate in a public event was immense. For the Museum it was about presenting knowledge, for us it was about drawing out knowledge from the people who came along.

Besides encouraging ISRO to experiment with participative forms of distributing knowledge, we are trying to work with the space science educators of the city – at the Visvesvaraya Museum, the Jawaharlal Nehru Planetarium and the Institute of Astrophysics - to shift the way these people do their education, or at least give out other ideas. I felt that the messy informality of Moon Stories had probably been too radical a step to stage at the Museum and I had no idea for a long time of what anyone there thought about it. However, they said they would use the grounded image of the moon in their education programme and later I heard that they put on a forty eight hour sky watching event for which the education staff camped out on the roof and I thought that perhaps we had helped them come to that.

Children and stories

Next week the Summer School starts for children at Drishya Kallika Kendra, a school in a slum near to ISRO Satellite Centre where children speak mainly the local language of Kannada. I will be working with the dancer Anitha Sunthanam and language specialist Babita Harry to explore cultural stories of the moon and the new science stories of Chandrayaan, weaving investigative fieldwork, installation and movement together. They will visit ISRO Satellite Centre and the landscape with its vast, white receiving dishes, of the Indian Deep Space Network (IDSN). Amongst other things, I will ask the children to make portraits of the people they meet to see how technology is really lots of people. We will ask the children what they think of the Indian space programme and the relevance of space science and exploration to their lives. They can say if and how they want to pass on the stories they have learnt to their community. The memories and current debate for the moon and humans - can find ways to distribute through communities and the people at ISRO, who are local to this community of Byapanahalli - and will have a means to find out their responses and interpretations, by coming to visit the children in their school.

The shift in ISRO

At the time we put on the first event, '100 Days of CHN-01', I had been *reading The Little Prince* and there is a bit when he looks at the sky, where somewhere his home planet is and the flower he looked after and loved. He says, 'Les étoiles sont belles, á cause d'une fleur que l'on ne voit pas...', the stars are beautiful because of a flower one cannot see. I had hoped people would put on the moon something to make it have direct personal meaning for them, to give that meaningful connection to something distant, that the Little Prince described. Nobody brought anything. They only wanted the nothingness of it.

During our research time we went to ISTRAC to visit Dr Shivakumar. ISTRAC is the tracking wing of ISRO, tracking Chandrayaan. The five of us were a little intimidated in his office when he asked us if we were science students, well no we were artists, designers. So what would we want with scientific data? We felt our project was lost. Then he surprised us, he said that when he looked at the moon now, he knew his spacecraft was there and that looking at the moon had changed for him, and the people of the mission.

It had really happened, the meaning of the moon had changed for a group of people, it had a new poetics, and it had happened for scientists. They had transfigured their connection to the moon through technology, through instrumentation, orbital dynamics, liquid propulsion, radio telemetry, thermal blankets and circuit boards. Now the scientists of ISRO are talking with us. Not in a formal, institutionalised way, but case-by-case, as individuals. 'Thank you for giving us the opportunity to work with children', one of the scientists emailed, and there are plans for a ten-day public event - a collaboration between ISRO, the Planetarium, the Museum and us - the idea of

Sreekumar, Head of Space Astronomy and Instrumentation at Satellite Centre. Maybe we are doing something right with our process of casual, imaginative engagement. But I feel somehow it has nothing to do with us and the Moon Vehicle project, that it is something that is coming from within the organisation and we just happen to be here to help it come out. I think that the people who work at ISRO are transformed, moved and emotionally tied to their experience of launching a spacecraft that now is circling the moon. There is a surging wish to communicate to other people what they have done and how they feel about it, the pride of it all and the ineffable sublimity.

Net gain/net loss: the Googlization of new media art in the era of neoliberalism

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As Internet technology and access has improved exponentially over the past two decades, there has been a global influx of new media artists using the Internet as a primary venue for exhibiting, distributing, and collaboratively authoring digital artwork. Many new media artists have turned to the Internet and alternative copyright schemes in an effort to embrace open source media content and production while distancing themselves and their work from commercialization. These practices have resulted in the popular myth that the Internet exists as an autonomous venue for creative work that is uninhibited by government regulation, commercialization, private interests, and economic policy. Drawing on the context of neoliberal practices, this paper analyses the Internet search engine giant Google and its function as an inhibitor to the dissemination of noncommercial, open source new media art. Netlabels are specifically addressed as an exemplification of new media art that has become marginalized by the Internet search techniques developed and employed by Google, which often favour advertisers and revenue over autonomous authorship and the public interest.

Neoliberalism and Googlization

Robert McChesney defines neoliberalism as 'the policies and processes whereby a relative handful of private interests are permitted to control as much as possible of social life in order to maximize their personal profit' (1999: 7). One of the most illustrative and influential policies contributing to the decrease in the number of these private interests within the United States was the Telecommunications Act of 1996, which significantly deregulated the media industry and resulted in an era of major media consolidation and homogenization. McChesney argues that neoliberalism exists in opposition to noncommercial entities, which allows it to operate 'not only as an economic system, but as a political and cultural system as well (ibid: 9). In other words, as there become fewer privatized media companies, these companies work in

tandem with political forces to ensure that their interests are protected, thus preserving and reinforcing their grasp on the production and dissemination of culture. In a sense, this is the realization of what Adorno and Horkheimer refer to as the culture industry. They argue that, 'films, radio and magazines make up a system which is uniform as a whole and in every part', leading to a homogenized and standardized media industry that meets the entertainment desires of a large, generalized audience (1993: 1). Thus, instead of promoting public knowledge and discourse, the culture industry breeds imaginary needs in the mind of the mass audience or, more appropriately, in the mind of the consumer. Google's far reaching role in the ranking, categorization, and cataloguing of information on the Internet renders the company a new and powerful player in the culture industry, which raises important questions about who actually benefits from Google's services.

But why does Google deserve such scrutiny when there are so many competing search engines to choose from? In short, because Google continues to dominate the Internet search engine domain on a global scale, and the results returned by a Google search affect the *quality* of the experience of the average Internet user (Jarboe 2007). In other words, an Internet search conducted through Google will return results engineered specifically by Google and for Google. Considering that Google can potentially profit from sponsored search results and pay-per-click advertising, any artists' who makes their work available for free on the Internet must ask themselves whether Google is working for the good of the artist or the advertiser.

In a paper addressing the political economy of Internet search engines, Elizabeth Van Couvering compares Internet search engines to the 'large industrial players' of television and Hollywood, arguing that, besides functioning as search engines, the top four Internet companies (AOL, Yahoo!, Google, and Microsoft/MSN) also dominate Internet advertising and Internet culture (2004: 3). Since Van Couvering's paper was published, Google has emerged as the most used Internet search engine and Internet advertising now accounts for three-quarters of total U.S. ad revenue (Interactive Advertising Bureau). Google's purchase of YouTube further attests to the company's extended cultural reach. In fact, Google has been the top search engine since at least 2002 and will likely remain the most used search engine across the globe for the foreseeable future, especially considering that popular web browsers such as Safari and Firefox now embed an easily accessible Google search window into their interfaces (Interactive Advertising Bureau). This has ultimately

resulted in what has been termed the ‘Googlization’ of nearly every aspect of information available on the Internet.

But what exactly does the term Googlization mean and why did it surface? The term is most likely a combination of the words Google and ‘globalization,’ which came into popular use throughout the 1990s to describe the increasing connectedness of global economics, politics, communities, and cultures, due, in part, by the growth of Internet. Googlization, then, defines the dominance of Google over the cataloguing, distribution, and retrieval of information on the Internet. One of the earliest uses of the term came in 2003, when Alex Salkever referred to Googlization as the 'creeping' domination of Google over nearly all aspects of information on the Internet (2003: 1). A visit to the web site googlization.com brings up a single white page with bold type at the top, which asks the deceptively simple question, 'If I can’t be Googled, do I exist?' (Anonymous: 2008). This question is an obvious reference to Descartes’ famous statement 'I think, therefore I am', but it brings up important issues of individual identity and concepts of reality not unlike those raised by Lacan, who wrote 'I think where I am not, therefore I am where I do not think' (1977: 166). Of course the question posed on googlization.com might have just as easily been written as the statement 'I can be Googled, therefore I am', but it is a question that must be asked by any artist using the Internet to distribute their work for non-commercial purposes.

For artists striving to obtain a level of autonomy and freedom from the commoditization of their art, the Internet at first appears to be the ideal exhibition venue. However, one can deposit as much artwork as one wants into vast data bank that is the Internet, but if the work can’t be easily found using a search engine such as Google, there is virtually no audience to receive the work, which all but obliterates the purpose of using the Internet as an exhibition space and renders the work Googlized. Moreover, even if one’s artwork manages to percolate to the top of a Google search – a nearly impossible task – that work is presented within a context of advertising and commercialization, thus rendering the work a commodity and further devaluing the work of the artist.

Copyright

Another problem faced by new media artists working non-commercially is copyright. How does an artist retain authorship and control over their art once it is made available online, especially if the artist wishes to allow redistribution of the work or

derivative works to be made? Lawrence Lessig has frequently addressed the limitations imposed on artists by copyright law, arguing that the traditional means of controlling intellectual property are archaic and in need of revision, given what Manovich calls 'a valuable form of contemporary culture' created from 'the network-enabled process of collaboration, networking, and exchange' (2002: 2). In response to these perceived limitations, Lessig developed the first set of Creative Commons (CC) licenses, which were designed to offer artists an alternative to the restrictions of traditional copyright and afford them greater freedom to publish and distribute their work as they see fit. Traditional copyright assumes total control by the artist or author, hence barring anyone from legally expanding or sharing the work. While the concept of commons includes the idea that they are 'institutional spaces, in which we can practice a particular type of freedom', there is a tendency to think of these spaces as free markets, when in fact there exist 'structured relationships intended to elicit a particular datum – the comparative willingness and ability of agents to pay money for resource' (Benkler 2003: 6).

Labelling netlabels

Perhaps the most illustrative example of non-commercial, open source Internet culture and the Google gate-keeping effect comes in the form of independent online record labels (netlabels) and the music they catalogue and distribute. Ever since the Napster debacle, there has been a very serious fear in the music industry that peer-to-peer (P2P) file sharing will severely damage the profitability of traditional music publishing and distribution. There exists rampant paranoia in the music industry that any free exchange of music on the Internet will result in the economic downfall of the increasingly few major record labels. Perhaps one of the consequences of this paranoia is the lack of a specific audio or music search on the Google homepage, especially given the volume of takedown notices the RIAA has issued to YouTube since its purchase by Google. Moreover, legislation such as the Digital Millennium Copyright Act is a result of music industry lobbyists working with political forces to protect their private interests – not the interests of the public.

However, a careful analysis of the true function and intention of netlabels renders these industry fears unfounded. Bram Timmers notes that netlabels do not redistribute popular copyrighted music, thus setting them apart from the common conception of P2P file sharing networks like Napster and Kazaa that knowingly redistributed copyrighted material (2005: 8). Michel Bauwens further establishes this

difference when he writes 'P2P does not refer to all behavior or processes that takes place in distributed networks: P2P specifically designates those processes that aim to increase the most widespread participation by equipotential participants' (2005: 1). In other words, P2P is not only about illegal file sharing as defined by the music industry, it is the process of increased cultural communication.

According to Timmers, netlabels serve a large community of independent sound artists and musicians whose work is usually not distributed through conventional record labels, and he notes that every step of the process is executed using the Internet (2005: 9). Once an artist produces an audio work, it is uploaded to the netlabel's server and made available for download, effectively eliminating the need for recording studios, audio engineers, CD duplication services, distribution channels, and product marketing. The vast majority of netlabels have adopted CC licensing, which has fostered a high level of creative output and global artistic communication uninhibited by traditional music industry schemes and copyright (ibid: 13). So, perhaps the real fear of the major labels lies in the possibility that this type of production could leave many people in the industry jobless.

This mode of music production renders the process relatively inexpensive while allowing the artist to retain more artistic control of their creative work. Those artists who publish their work through netlabels often do so in defiance of the commercialization of major labels and give their work away for free. However, because of the difficulties in finding this music through a search engine like Google, netlabels rely heavily upon viral marketing to spread the word about the free availability of their productions, which renders the opportunity for an artist to make a living on their work virtually non-existent. Moreover, Google can potentially profit from netlabels anytime someone searches for netlabel music using Google, because advertisements and sponsored results are built into the search process. As such, even though netlabels generally develop their own websites using their own servers to host the content, they are still subject to the limitations of the Google search engine, and are thus rendered another Googlized entity on the Internet.

Conclusion

Google has established itself globally as the most visible and widely used Internet search engine, which has resulted in a process of Googlization that allows a single private company to control the access to and dissemination of publicly available

information and culture on the Internet. This has resulted in the commoditization of online new media art, whereby artists produce content on their own time using their own resources and make it available on the Internet for free. Google and its advertisers can potentially profit from this free content and thus devalue the role of the content originators, who are unlikely to receive compensation for the work they produce.

In the end, artists should be wary of using the Internet as a primary distribution channel, because companies like Google are profiting from free artwork and destroying the value of artists and the work they produce. Any artist wishing to achieve a truly noncommercial online existence must take careful steps to ensure that only the public and themselves profit – monetarily or culturally – from the work they produce, because Google will likely remain the most used Internet search engine in the foreseeable future.

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Avatar art: transformative outcomes of the *Advanced Identity Representation Project*

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Abstract

Once a fantasy of cyberpunk literature, digital avatars are now seamlessly integrated into popular culture. Yet, current avatars are quite limited in responding to real world issues of social identity injustice or construction of personal narratives. The author has initiated the Advanced Identity Representation (AIR) Project to develop transformative social identity representation systems that challenge disempowering norms and allow for creation of rich, imaginative, and dynamic ways for users to represent themselves. The AIR Project builds on a novel interdisciplinary framework that applies insights from imaginative computational discourse generation (Harrell 2007a, 2007b), cognitive categorization (Lakoff 1987; Santa Ana 2002), and science studies and sociological theories of classification (Bowker and Star 1999). Expanding on results published in (Harrell 2008a, 2008b, 2009), this paper presents a series of cultural productions that can be called 'Avatar Art', in which modular visual representations combine with back-end data structures and algorithmic generativity in order to make critical and expressive statements regarding identity construction themes including race, gender, community, marginality, exclusion, and power.

Introduction

Social identity computing technologies such as games, virtual worlds, and social networking sites provide infrastructures used to stage ourselves as fantastically imaginative avatars, yet they often hardcode limited, popular, naive, and often disempowering identity models. A goal in the works discussed below is the invention of avatar technologies for social critique. These technologies also can enable increased avatar customizability and agency for traditionally underserved and ill-represented groups. The author’s work and that of the Imagination, Computation and

Expression (ICE) Lab (Director, Harrell) moves beyond the notion of avatars as modular dolls, player characters, or even proxies for users to interact in a virtual world. They become templates for critical play and empowerment regarding social identity forms. The outcome is a new form of *avatar art* that stretches the definition of what an avatar is and what it is for. The key aspects of the theoretical framework informing a series of recent avatar artworks is summarized below, followed by a discussion of specific works and themes that they explore. A brief conclusion follows, articulating emergent observations and results from this body of work.

Theoretical framework

The AIR Project is a multi-year endeavour in the ICE Lab at the Georgia Institute of Technology that serves to develop theory and technology for users to represent complex, dynamic social identities in digital media such as virtual worlds, games, interactive narratives, and social networking sites; it is situated at the intersection of cognitive accounts of social identity construction, social classification infrastructures research, and digital media theory and technologies.

Cognitive categorization

The AIR Project draws on, in contrast to traditional and 'folk' theories of categorization, empirically-based cognitive science theory (Lakoff 1987) which asserts that categorization is a matter of both human experience and imagination. George Lakoff asserts that meaning is based upon human experience, consisting of embodied perception of the world, experience of motor activity, and shared cultural knowledge, and that meaning is constructed by imagination, including mapping concepts from one to another as in metaphor and metonymy, and dynamic construction of mental imagery. This view of categorization draws on a growing corpus including research from psychology, computer science, neuroscience, anthropology, in order to reveal a convergence of evidence disputing the traditional theory.

Important for the purposes here, Lakoff (1987) describes a metaphor-based account of how imaginative extensions of 'prototype effects' result in several phenomena of social identity categorization that have proven useful for inspiring the design of AIR Project avatar artworks including:

Representatives (prototypes): 'best example' members of categories
Stereotypes: normal, but often misleading, category expectations
Ideals: culturally valued categories even if not typically encountered
Salient Examples: memorable examples used to understand/create categories

The avatar artworks below often entail computationally modelling phenomena that define normative expectations and stigma (stereotypes, ideals, salient examples, etc.) within computational identity applications and enabling the possibility for critique and experimentation with identity models that compel users to move beyond disempowering expectations.

Sociology of classification

Research in classification from sociology and science studies, such as articulated by Bowker and Star (1999), has been influential in developing this series of avatar artworks. Toward accounting for the interaction between individuals' social identities and classification in different communities, special attention should be paid to their highlighted concepts of membership, naturalization, marginalization, and boundary objects. *Membership* is the experience of encountering objects and interactions native to particular communities and increasingly engaging in naturalized relationships with them. *Naturalization* refers to deepening familiarity with use and enactment involving such objects and interactions. The problem with enforced naturalization is that it always creates problems of marginalization. *Marginalization* can occur through exclusion or through multiple memberships in communities where an individual must switch frequently between interaction and object use protocols within each community, often with varying degrees of success. The type of marginalization discussed here refers to exclusion or difference from normative behaviours and/or dominant, privileged, and/or hegemonic communities. *Boundary objects* support communication between communities.

Avatar artworks

The following presents a series of avatar artworks and discussion of particular themes in categorization and classification that they address.

Loss, Undersea | Theme: affect-driven transformation

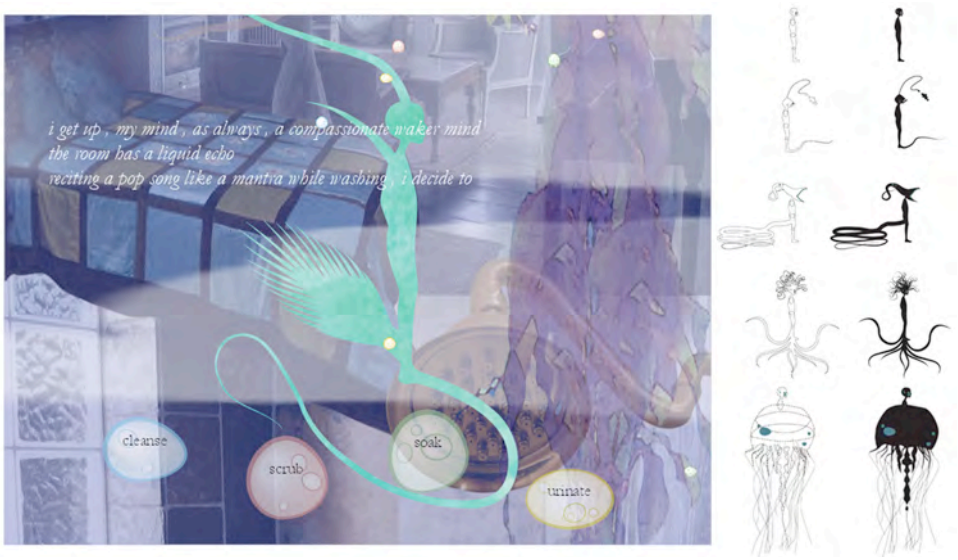

Figure 1. *Loss, Undersea* screenshot and example avatar transformations

Loss, Undersea is an interactive narrative/multimedia semantics project by the author in which a character moving through a standard workday encounters a world submerging into the depths – a double-scope story of banal life blended with a fantastic Atlantean metaphor. As a user selects emotion-driven actions for the character to perform, the character transforms – sea creature extensions protrude and calcify around her/him – and poetic text is generated narrating a loss of humanity and the human world.

Chameleonia: Shadow Play | Theme: affect-driven transformation

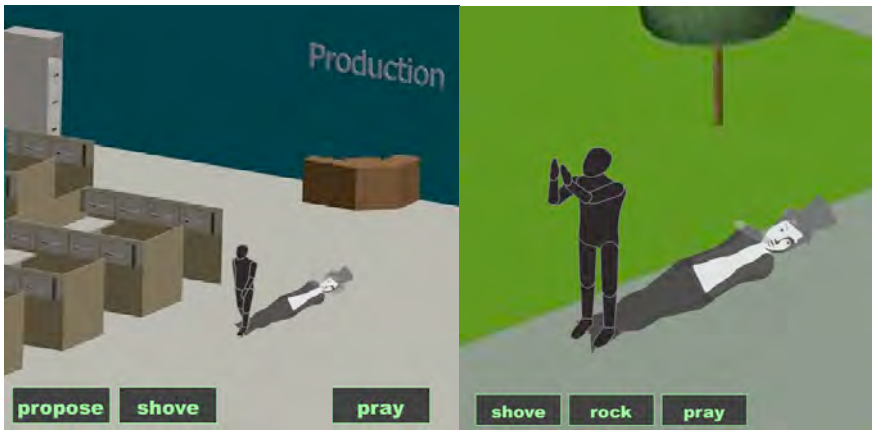

Figure 2. *Chameleonia: Shadow Play* screenshots

Chameleonia: Shadow Play (with Daniel Upton, Tonguc Sezen, and Donna Sammander) is a prototype critical identity politics game in which an avatar and its

shadow (performed and imagined selves) dynamically transform, along with the cinematic presentation of the scene, based on player selected gestures and the current location. In this game, a continuously walking player character changes in response to both gesture and context (e.g., suburban, corporate, park or urban scenes) while the character's shadow transforms differently in parallel. The player character represents the external (performed) self, while the shadow represents the socially-constructed and imagined self. The difference between the two illustrate a type of double-consciousness - Bowker and Star's concept of 'torqued identity', where one's self conception differs from the way society views her/him. (Bowker and Star 1999; Du Bois 1903) The shadow transforms according to a concept associated with the gesture, such as 'commerce' or 'aggression'. It may be represented as a bazooka-toting cowgirl/boy sipping a soft drink – at the next moment s/he may be represented as a gold chain and pocket-watch wearing tycoon with stock charts bursting from her/his top-hatted head. The game suggests how people become both naturalized and marginalized in communities and social contexts. One of the major ways in which humans naturalize within communities is by displaying contextually appropriate gestures.

Define Me | Theme: Torqued identity, classification by others, double consciousness

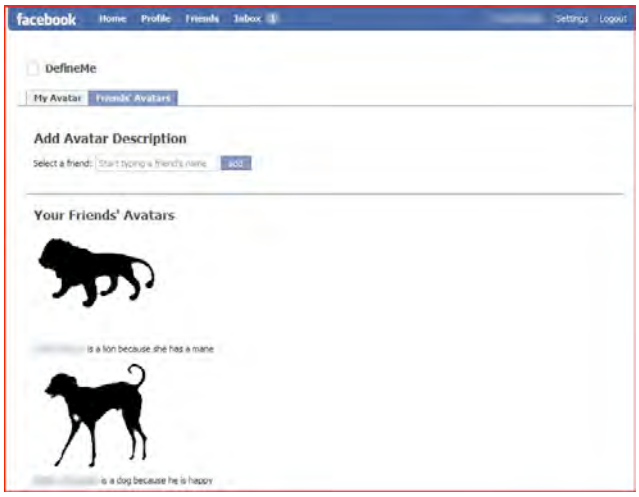

Figure 3. *DefineMe*: Chimera screenshot

The first AIR Project system constructed was a Facebook application entitled *DefineMe*, the first version of which is called *Chimera.* (Harrell, Upton, Medler and Zhu, 2009) Specifically, it implements aspects of Lakoff's metonymic idealized cognitive models for categorization to allow users to co-construct their own and others' avatars as boundary objects. (Lakoff 1987) The premise behind *DefineMe* is

to allow users to define each others' avatars using both commonplace and abstract metaphors. Users can append metadata to other peoples' profiles to drive dynamic generation of avatar images. The initial content domain consists of animal metaphors that can be mixed-and-matched algorithmically. Animal metaphors are potent entrenched metaphors for human personality (Turner 1996) (e.g., sneaky weasels or docile sheep), however this animal metaphor-based version is only an initial experiment. The model extends to more directly socially engaged categories such as social scenes, fashions, or movements.

Identity Share (Daniel Upton) | Theme: user generated classification

Figure 4. *Identity Share* screenshots

Identity Share is a social networking site for 'non-friends', and Daniel Upton's MS thesis project in Digital Media, developed using the same database system as *DefineMe*. (Harrell et al., 2009) The system allows for social networking by providing users with facilities to construct profiles, follow and comment upon other users, and

perform game-like tasks that encourage users to consider exploring both like and different profiles of others. *Identity Share* offers a novel means of self-representation based upon open-ended categories and tags. Standard profile models that typically include normative categories such as age, gender, location, and race are replaced with a customizable list, growing as categories are added.

Avatar Breeder (Daniel Upton and Jisun An) | Theme: racial classification systems

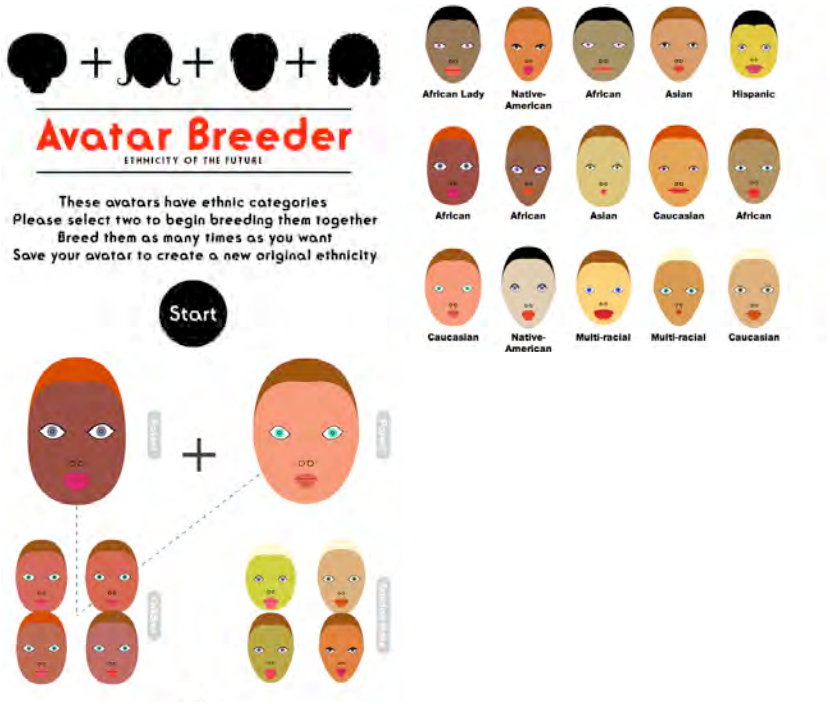

Figure 5. *Avatar Breeder* screenshots

Avatar Breeder is an algorithmically generative satirical artwork constructed by MS students Daniel Upton and Jisun An in a course taught by the author. The system is intended to undermine normative categories of identity encountered on bureaucratic forms and in everyday experience. In such discrete categorization systems, ethnic identities can be based on geography, nationality, ancestry, family, culture, religion, language, race or any combination of these. *Avatar Breeder* allows a user to breed avatars together to create new ethnic categories, labelled by users. The user is provided with an initial pool of avatars, each with a labelled ethnicity seeded with categories from a university admissions form.

Conclusion

Current avatar creation systems afford some possibilities unavailable in the real world, e.g. dynamic visual transformation, clear statistical modelling of ability, self-presentation as flat text, discrete and neat categories for people to put themselves into, embeddness within a literalized (instantiated via data-structuring) networks, and many other features that fall out from the characteristics of the computational medium. These transient and dynamic representations of self, exhibit what the author has termed the *polymorphic poetics* of the medium. (Harrell 2009) Yet, the loose fluidity of real world categories, embodied or gestural meaning, improvisational communication, affect, internal self-definition, and much more are missing. Furthermore, in digital environments issues such as stereotyping, prejudice, identity profiling, passing (as a privileged category member), and many other disempowering or contentious phenomena persist. Computational identity infrastructures may have been designed by computer scientists, programmers, and digital artists who may not have critically experienced, engaged, criticized, or considered such phenomena in creating systems. Much less often have they engaged the state of the art theory from social science and the humanities regarding social identity. The result has been attributes and characteristics then appear to be real world phenomena: canned gestures, statistics with labels like intelligence or dexterity, collections of photos, descriptive text fields, yet often have purely functional goals (e.g., statistics and abilities in games that serve only to manage resources like hit points), and the fields structured to represent characteristics like gender, occupation, friend status, and more to create structured ontologies of the world - quite different than in human lived and cognitive experience. Much less do these identities properly change over time or form coherent narratives. The Avatar Artworks above represents humble first steps in the AIR Project toward doing better.

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Hacking the borders of art and information: Jason Salavon and the art of anti-visualization

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Just as there is no self-evident solution to the problem of what is distinctly 'new' about new media, it has also proven difficult to identify the 'uniquely digital' aesthetic properties of computationally generated artifacts. Jeff Wall and Andreas Gursky, for example, use digital technology, but they are known primarily as 'photographers' rather than 'digital artists'. While Wall resists easy categorization by blending digital and analogue technologies, it is harder to discern why Gursky, whose images are conspicuously manipulated or mediated by digitality, would not fall into the broad category of digital art. I will leave open the question of whether a work is deemed 'digital' on a formal, ideological, or technological basis, but I call up the figures of Wall and Gursky as points of reference against which to consider a collection of images whose siren song lures us with promise of photographic pleasure, only to dash us against the jagged rocks of statistical averaging and data-driven patterns.

Jason Salavon, an artist and professor at the University of Chicago, combines his training in fine arts and computer science to create software-based works that blur the line between photography and information visualization. Salavon's 'data sets,' selected from the cluttered vaults of culturally communal material, have included every playboy centrefold between the years of 1988 and 1997, and state and county information collected by the US census bureau between 1790 and the year 2000. He designs and implements software processes that generate images whose overall shape and structural patterns derive from relationships, computed by the software, between discrete elements of the data that fall within the described parameters for the 'set.'

But rather than attempting to deliver pertinent information as straightforwardly as possible, the images rendered by Salavon's data-analysis software, depict the collapse of information that occurs when the isometric pressure exerted by layering data onto itself becomes too great for the image to maintain a clear distinction between signal and noise. His images are beautiful, fascinating and even hypnotic;

but they are quite a different beast from the charts and graphs one might find in science textbooks or on the pages of the *New York Times*. I read Salavon's art as a series of experiments that test the idea that one can never have too much information, and, that inquire into the artistic and semantic possibilities that emerge when information is pushed beyond its capacity to transmit data as a range of related but differentiated values.

Why visualize information? What does information visualization try to 'do' with data? Typically, the goal of information visualization is to give a perceptible shape, a way of making conceptual and phenomenological sense of a large and/or complex data set. Emerging as a formal discipline in the early 1980's, when scientists began to consider how to render abstract data more quickly and more easily legible at a glance, information visualization set itself the task of translating numerical data into graphical patterns that would reveal internal relationships between data elements as well as a carefully plotted topographical map of the informatic territory in question.

Most of the reviews of Salavon's work have emphasised his reframing of photographic practices, others point to formal similarities with painters Kenneth Noland or Giorgio Morandi, and still others discuss the latent commentary in his images about the mass distribution of sexual norms. However, none of them position him squarely within the field of information visualization (White, 2006). But inescapably, *because* he works with the vast accumulation of pop cultural records, and the way these records present themselves as a statistical database, his artwork must be viewed through the lens of data visualization. Not only does he gather his subjects from the vast bank of pop-cultural detritus, stored and found on the Internet, but he also asks, without anticipating a particular answer, how the nature of pictures might change when subjected to software-based processes. Thus, we experience the work not only as a meditation on the vastness, ubiquity, or mundanity of digital information, but also on what happens between the specificity of a single instance (the irreproducible, the particular) and its cultural replication (the generic, the popular).

In his 2005 series *Everything, All at Once*, Salavon filters each video frame of a cable television broadcast through a program that transforms the signals into concentric bands of colour that radiate outward to the edges of a wall-sized screen. The hypnotic, sensual rhythms of Salavon's pieces might seem to replicate the spectacular seduction of the televisual image. Or, they might simply re-inscribe

modernist theoretical valorisation of abstraction and pure opticality over academic mimesis. But Salavon's work resists such easy categorization by creating an irreducible play between multiple channels of information transmission. First, Salavon identifies his source material by synchronizing the abstract visual output with the unmodified soundtrack of the TV program. In the corner of the installation space, the unaltered broadcast is presented through the familiar channel of the TV monitor. Typically, the verisimilitude of a live-action video obscures the fact that this 'copy' of real life is merely the product of a delivery of a stream of informational bits that are meaningless without their reconstitution into a legible signal. By writing a program that places a filter between input and output, Salavon reveals the deeply mediated nature of recorded images and also radically undercuts the implied truth-value of televisual documentation.

The highly constructed documentary quality of reality TV and network news is evidence enough to obliterate the notion that television delivers information with minimal mediation. But Salavon's work performs the impossibility of a direct, unmediated link between sender, channel and receiver. The images filtered through his program are sensually captivating in and of themselves, but Salavon demonstrates that processing the same units of information through different mediating devices can produce a multiplicity of possible results. The magnetic pull of the colour bands radiating outwards on the wall-sized screen proves the potential for information to be viewed through an aesthetic rather than a merely utilitarian lens. What the viewer sees on the screen reveals the capacity of data transmission to exclude or conceal the fundamental mutability of the informatic signal.

As we see in the example of *Everything, All at Once,* Salavon immerses himself deeply in questions about information. What is a unit of information? What happens when an amalgamation of similar informational propositions or data sets reduces precise statistics to an ethereal fog of line and colour? Is the resulting image still 'informative,' and if so does the quality of available information change due to the artist's manipulation? Whereas a straightforward instance of information visualization - for example, a graphic in Al Gore's *An Inconvenient Truth* demonstrating the skyrocketing CO2 levels in the Earth's atmosphere since the 1970's - implicitly assigns aesthetics to a supplemental role by using aesthetics to enhance the utility of the visualization, Salavon self-consciously denies the viewer an experience of total mastery over social 'data.' He does not visualize numerical values, such as the cost of a real estate property, nor does he arrange his source material in a relational

manner, as a graph or a chart would. Instead, he manipulates and amalgamates *pictures.* Consequently, even if the process of amalgamation or the stripping down of signals to patterns obscures individuating features, leaving only generic outlines, the vestiges of particularity hover within the pictures, provoking a yearning for the familiarity of home in the uncanny muteness of colour and mottled texture.

In viewing *Everything, All at Once* we must remind ourselves that without the successful execution of the encoded instructions described by a program, digitized numerical data can never resolve into a picture. When the program stops running, the image is gone, without a trace. Because the visual manifestation of digital images is dependent on computational process, the ontology of the image is fundamentally unstable and dependent on real-time information processing. In other words, to appear at all, the image must be computed and rendered in real time, and will just as quickly disappear as soon as the machine is powered off. Although the computational origin of digital pictorialization is often effaced, just as it is in perspective drawing, Salavon's strategy of 'anti-visualization' - his actuation of the mutability of code and his methodical decomposition of indexical images - suggests that the aesthetic richness of digital images lies in their fragility and ghostliness. As opposed to the material solidity of painting and sculpture, the digital image is haunted by a strange mortality. In each instance, it is born, dies, and is reborn again, phoenix-like, not rising from its own ashes but from a machine-readable string of ones and zeros.

Salavon's exhibited works convey his obsession with what he calls 'the relationships between the whole and the part, the individual and the group.' Although the thematic content of his works varies widely, each work repeats a seemingly compulsive re-enactment of the translation of subjects and substance into statistical data**.** In *Every Playboy Centerfold*, a program written by Salavon compiles a point-by-point digital average of all Playboy centrefold foldouts from January 1988 to December 1997. The seductive poses of these soft-porn icons dissolve into what Salavon calls a 'shroudlike', indistinct form. Like a digital offspring of Duchamp's *Nude Descending a Staircase* and Rothko's *Red on Maroon*, the amalgamation of photographs in *Centerfold* allows a few mechanical angles and repeated abstract shapes surface from a deep, muddy background. In the area where flesh is most concentrated, a reddish, ovoid shape emerges, only to fade away again.

Even at the centre of the image this textural quality visually analogizes gestural brushstrokes, which would, if it were a painting, signify artistic style, but here it is only

a record of digital noise in the averaging process. The process of averaging would seem to eliminate variation and to depict the informatic world as a flattened, neutral plane of obdurate consistency. But instead, the human figure hovers just outside the limits of perception, and the image acquires a ghostly, pulsating dynamism.

If you see a somewhat tragic beauty in these images, you are not far off the mark; Salavon writes about his 1998 'self portrait' - *Flayed Figure, Male, 3158.75 Square Inches* - that the photographic deconstruction of the surface of his body into 12,000 half-inch squares and its subsequent reconstruction into a 'complete' image results in a 'contradictory self-portrait in which every intimate detail of my body is revealed and yet the clinical detachment of the generic pervades' (Salavon 1999). Both *Flayed Figure* and *Every Playboy Centerfold* obscure the informational substrate from which the works are configured. In an implicit parallel to the rhetoric of genetics and molecular biology, individual bits of data act as the basic code - the DNA - of Salavon's imagery, but the final product does not suggest that the reconstitution of these bits into visual form will reveal the essence of information, just as deciphering human DNA will not reveal the whole truth of what it means to be human. Indeed, Salavon has claimed that at some level his work seeks to 'nullify the individual': in *Centerfold*, 'as all individual characteristics and overt sexuality are subsumed, abstracted generalization becomes central' (Salavon 1999). Does Salavon's work, then, celebrate likeness over difference, or can it uncover difference within repetition, averaging, and abstraction? In fact, Salavon's apparent nullification of the individual through the processes of averaging and amalgamation ultimately preserves, rather than suppresses, the power of 'the part' to mark itself against the grey and brown hues of a data-mined, informatic landscape. Deviations haunt this landscape, and suffuse it with a much warmer light than we find in the precise, if airbrushed, outlines of playboy centrefolds.

Looking again at Salavon's art through the lens of information visualization, I propose that there is at least one statement we can make confidently about how the technological conditions of digitality productively limit the kinds of signification that digital images can produce: the existence of a digital artifact is governed by and predicated upon information processing. Computers are tools that process information at the levels of both input and output. Digital objects of any kind, then, are both composed of information and are fundamentally *about* information. If the objects and phenomena generated by a computer are comprised of information and speak in the language of information, we can assume readily enough that

computationally constructed images will communicate most successfully about information. But, what forms of meaning fall outside the limits of information? Moreover, how do we determine whether information has been communicated successfully or not?

The artistic intervention into data visualization practices staged by *Every Playboy Centerfold* activates our capacity to feel aesthetic pleasure and fascination in the *dissolution* of information that occurs, seemingly oxymoronically, at the point of informatic oversaturation. It is in this sense that Salavon's work can be labelled as 'anti-visualization' (Watz, 2005). Paradoxically, as the informational content of the data set increases, the putatively information-bearing image blurs into unrecognizability. Thus, Salavon's images challenge the idea that visualization always aims for clarity or revelation by depicting the de-resolution that occurs at the point of informational oversaturation. The field of noise generated by the amalgamation of centrefold photographs does not fail to communicate. Instead, it reconfigures the boundaries of information visualization to suggest that digital computation of data can create poetically resonant, sensuously rich images that use information as their medium but are not dependent on communicating a particular set of statistics for utilitarian ends.

Generative artist Marius Watz has commented that Salavon 'hints at profound hidden meaning, but ultimately obscures or ridicules it' (Watz 2005). The images created by his programs make visible the philosophical and aesthetic complexity of information. *Every Playboy Centerfold* not only evokes a continual stream of interpretive possibility, but its textures, its visual richness, and its mischievous play between high art formalism and cheap pornographic solicitation make a different kind of information available for sensuous apprehension.

If one of the most powerful attributes of successful art is its capacity to reveal the hidden, unthought, or concealed mechanisms of everyday objects and events, Salavon's adoption of information visualization for artistic ends offers the possibility of awakening viewers to unexpected interactions between abstract data and worldly phenomena. Even in their moments of failure or breakdown, his visualizations manifest the instability of information, or show the extent to which accuracy and breadth of communication is dependent on representational codes. Salavon's artistic appropriation of information visualization techniques reveals the instability and contingency of the notion of information itself. His artworks expose us at an intuitive

level to the fluidity of what counts as valid or important information, and ultimately triumph by calling into question the very stuff of which their foundations are built.

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Vasarely Redux: *Electroplastique* and the structure of digital aesthetics

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It is frequently assumed that as the technical capabilities of digital media expand, so too will immersive and mimetically naturalistic qualities in digital graphics. The 'conventions' of digital imagery have transmuted from the highly pixelated, discrete bitmapped graphics emblematized by Super Mario Brothers and Jodi into a smooth, perspectival illusionism that meets or even exceeds the resolution threshold of the human eye.

This trend towards illusionism has resulted in a tendency to obscure the architectonic properties of digital images, which begin life as one of a few basic shapes - circles, squares, and lines. But as the frenzy for digital naturalism licenses the concealment of the undergirdings of digital figures, a competing form of code-based, generative abstraction has emerged to succeed the proto-computational formalisms of artists such as Victor Vasarely and Sol LeWitt. This paper will take an example of this generative abstraction as its primary case study. Marius Watz's 2005 homage to Victor Vasarely entitled *Electroplastique #1* translates Vasarely's algorithmic visual language into computational generative code. Well in advance of bitmapping technology Vasarely infused his works with a distinct computational 'look' by conceptualizing the image as a field of discrete values arranged within and conditioned upon the structure of the grid. Surprisingly, however, little has been done in the disciplines of art history or media studies to evaluate the extent to which Vasarely's method predicts the possibilities and limitations of encoded computational plasticity.

While both Watz and Vasarely mobilize elemental modular structures in their art, what makes them stand apart from other modernist abstractionists is their subjection of these structures to the activating effects of code and algorithm. The dialogue imaginatively enacted between Vasarely and Watz - the former employing analogue tools to explore the still-gestating notion of digital systems, the latter pushing digital visual language further into the domain of self-generating computational abstraction -

lays bare the conceptual and visual qualities of digital materiality and initiates the question of what we might learn by bringing the underlying structural principles of digital images back to a visible surface.

Known as the father of Op Art, Vasarely developed, over the course of his artistic career (beginning in the 1929 and continuing until his death in 1997), an optical aesthetic deeply influenced by scientific and technological innovations of the 20th century. Trained in early adulthood as a scientist, Vasarely dropped out of medical school in Budapest to pursue a career in fine art and graphic design but continued to investigate the natural and physical sciences as well as cybernetics and technology. His artistic aims were driven in part by his aspiration to understand relativity and quantum mechanics, and through his reading of Einstein, Bohr, Heisenberg, and Wiener he determined that it could be possible to make 'scientific models visually comprehensible' by offering these models 'plastic equivalents' (Morgan 2004: 18). It is my contention that Vasarely, who reportedly never touched a computer in his life, produced images that bear a morphological resemblance to computer art because his creative process set into motion an exploration of the possibilities generated and limitations imposed by the application of procedural logic (what might be known now as the logic of programming) to image-making. Despite the fact that they are not themselves produced with the technological aid of a computer, Vasarely's graphics rehearse presciently the graphical indexes of computation that become common in the 1980's. But these graphics also do more than merely metaphorise computation; Vasarely articulates a theory of plasticity distinct from the 'already known' in its imagination of matter, form, and structure in digital terms. 'As I work, I reduce all the data of my creations to invariables, so that I might retrieve identical values at the moment of re-creation' (Vasarely 1979: 11). For Vasarely, expressing the possible relationships between discrete elements or units unlocks the possibility of seeing through new eyes the structural and architectonic principles that configure world, universe, and even social organization. His obsession with a cybernetics-influenced pancomputationalism manifests in his formulation of a series of notational schemata, including a decimal-based scale of colour-form permutations and several instantiations of a 'plastic alphabet.' This alphabet notates discrete, articulate, and interchangeable elements out of which, often through algorithmic processes, an image or a visual field is constructed.

Conceived as an alphabet of basic elements or building blocks, possessing their own structural limitations that in turn govern the array of possible outcomes for the image,

Vasarely's system, initially titled 'planetary folklore' and ultimately named the *alphabet plastique*, was the product of a career-long goal to compose a formal language of pure, irreducible units of shape and colour upon whose principles would develop a universally legible (because based on a systematic program) and infinitely permutable visual program. His description of the grammatical rules for this visual system resonates with early computers in its evocation of punch-card coding, reproducibility, efficiency, discrete, interchangeable units (a necessary property of notational systems), automation, and expandable-compressible scalability.
In 1959, Vasarely linked art and the applied technical sciences, pointing to the fact that as scientists are building electronic chess-playing 'brains,' artists are also engaging in their own assays with the possibility of a new visuality governed by binary code. 'For quite a long time now, one branch of the plastic arts has been working on plastic language that can be encoded as a binary system' (ibid: 15). What is most notable in Vasarely's vision of a stored-memory archive is his nascent conceptualization of what would be the material, phenomenologically experiential 'body' of electronic processing, paradoxically attained through the explosion of human scale in the vastness of the electronic archive. It is to this end that Vasarely's art is valuable to humanism: in its very exposure of the inhuman qualities of a machine-computable informatic universe.

If the value of artwork has traditionally resided in the excellence of materials, their technical perfection, and artist's mastery of the hand, today it lies in an awareness of the possibility of '*re-creation, multiplication*, and *expansion*' (ibid: 14). A mode of artwork that emerges from these principles already begins to align with the evolutionary algorithms set into motion by the computational generative art I will explore later in this discussion. Vasarely in using these terms is not merely championing mechanical reproduction, but the inauguration of a replicatory, multiple, ever-expanding model of art. 'Only works endowed with great informative strength shall victoriously withstand depreciation caused by mechanical transposition' (ibid: 14). He envisions not a machine that transposes the art of yesterday into a cheap, easily circulated form of today, but rather the machine that at the outset produces multiples, expanding algorithms, and notational systems whose coded machine-language can be exchanged, appropriated, read and rewritten. Originality and uniqueness are no longer to be sealed and safeguarded but made available to diffusion, translation, and mutation. *To cause to make* is to build a machine that will carry out the act of making; to cause to make is to start a process that will continue to change and to build on itself even with the removal from the picture of the artist's

hand. The mark is no longer a conductor of genius but one switch in a living, dynamically changing circuit.

Although it is not strictly computational, Vasarely's experimentation with the basic units of form facilitates understanding of why digital images look the way they do. By exposing the architectonic construction of modular forms, his work reveals the steps of digital construction, and shows how digital graphic output - the characteristics of the image made visible on a screen, on a continuum from mimetic lifelikeness to geometric abstraction - will vary dramatically as the image moves through various levels of processing. Vasarely envisioned his art as a program that, due to its notational characteristics, could be 'computed' by both viewers and future artists who would produce their own works using his alphabet. These new instances of existing works would not be merely reproductions in the sense that they would allow for sometimes minute, sometimes more macroscopic changes to the originary framework or motivating concept behind the piece. In this sense, then, Vasarely builds into his practice at the outset the possibility of appropriation and refiguration that we see realized in *Electroplastique.*

Thus far, my thread of analysis has been about a model of image-production that looks computational without using computers. Now, I want to extend that thread into an examination of a particular branch of contemporary digital picture-making. I want to see how Watz's 2005 appropriation or 'remix' of Vasarely's aesthetic expands upon Vasarely's ideas through the introduction of computational processing and generative code. With Watz' work we are no longer simply seeing computational and programmatic metaphors, but rather the execution of commands via generative code, which leads us to ask: what new information or phenomenal experience is yielded by the appropriation of Vasarely's aesthetic into a computationally coded medium? *ElectroPlastique* #1, a 'temporal composition' built with the programming languages Processing and Java, was created for the electronic arts festival *Territoires électroniques*, held at the *Fondation Vasarely* in Aix-en-Provence in 2005. Over a duration of five minutes, an uncannily organic landscape of abstract moving images blooms and decays across four screens, accompanied by an electronic soundtrack composed by James Welburn. Taking as his inspiration the work of Op-Art progenitor Vasarely, Watz's *Electroplastique* pays tribute to Vasarely's intricate, transformational abstract landscapes whose contours are dictated by a grammatical alphabet of geometrical, modular forms. According to Watz's description of the work, 'in *Electroplastique #1* a regular grid is deformed and then used as the basis of

a series of organic abstract systems that evolve over time (5 minutes). Due to the panoramic format of the 4-screen projection, the impression is much like a landscape. In the end the grid is exploded and disappears, hinting at a non-Cartesian vector space' (Watz 2005).

Electroplastique is not a programmatic application of Vasarely's plastic alphabet, but rather an exploration of the fundamental principles of his visual universe. Just as Vasarely's Op-Art canvases might be said to create a kind of virtual space by destabilizing the viewer's normative spatial orientation, or his/her smooth integration into her surrounding environment, Watz sought to build a fictional digital space with its own physical properties and parameters. But this fictional space would be, for Watz, kinetic instead of static, in order to test how the system would develop within its parameters if given the added dimensions of time and movement. Beginning with the grid, the original form of computational graphic space, Watz's composition progressively distorts that perfect originary order, not destroying it but subjecting it to a slow, ongoing series of permutations from the perfectly flat, ordered grid to a more curvilinear organic form, which represents a different concept of the nature of order. Thus, we have to think about Watz's project not only as a computational transfer of Vasarelian optical schemas into a computational, kinetic form, but as a test case of what experiential dimensions can be added by the dynamic visualization of growth, change, and decay.

Watz creatively and professionally identifies with a group of artist-programmers who utilize the productive constraints of software to produce algorithmically evolving code-based abstractions that they call 'generative art'. Put very simply, a work of generative art comes into being when an artist defines a set of rules that set into motion a process or series of processes resulting in a complete work of art. Generative art is a term that applies to a strategy of image-making rather than to a particular style or genre, and does not necessarily rely on electronic computation for its success[1]. Most often, however, it describes a computer-based trend in software art in which randomness is built into a chain of executable coded commands to introduce unpredictable results into the 'final' work of art. Influenced by the conceptual, algorithmic practices of artists such as Sol LeWitt, Victor Vasarely, the Algorists, Jean TInguely, Jean-Pierre Hébert, Manfred Mohr, and Roman Verostko, generative artists are deeply invested in the questions of 1) how code and

[1] For a more thoroughgoing discussion of the definition of generative art, refer to Philip Galanter's paper "What is Generative Art? Complexity Theory as a Context for Art Theory." (2003).

algorithmic proceduralism can shape the final outcome of artworks and 2) whether code bears a specific materiality that imprints itself on the face of the artwork. In short, Watz and other generative artists take principles of structure and form as their central conceptual and aesthetic material.

Some reservations about the historicization of generative art have led Watz to comment that '[u]ncritical use of the term [generative] risks conflating artists from different periods and assuming that their artistic interests are the same, when in fact the contexts in which they produce their works are very different' (Watz 2006). Nevertheless, Watz in *Electroplastique* creates a necessary and explicit link to Vasarely's earlier formal investigations by performing a series of formal permutations of Vasarely's basic elements of structure, and suggesting ultimately that his optical surfaces contain a latent multidimensionality that reveals itself when the structure is subjected to stretching and compression both spatially and durationally. In other words, while Vasarely's optical constructions can gesture towards spatial play and dynamism, there is also a sense in which their kinetic energy becomes frozen or dormant on the canvas, forcing the viewer's attention to the frozenness of Vasarely's formalism rather than its dynamic potentiality. Rewriting Vasarely's interest in kineticism into the context of generative code, Watz adds actual instead of virtual duration and dynamism to the image. In so doing, he echoes Vasarely's fascination with the optical possibilities in kineticism, which he believed could supply the activating element that would 'engender a humanistic and philosophical concept of the plastic arts' by encouraging a conceptual, technological, aesthetic realm that placed mutation at the centre of thought and experience (Diehl 1972: 44).

Marius Watz's appropriation, alteration, and intensification of Vasarely's 'software', transforms Vasarely's creation of something 'like software' or 'like a program', into the technological phenomenon - a computationally executable, binary machine language - that Vasarely can only imagine and describe. The incorporation of generative change and the replacement of intention with algorithm make this art even less humanistic than Vasarely's but more about the form, movement, and actions of an anti-humanistic, perhaps even vitalist organic force. We are dealing with a paradoxical organicity here, precisely because the works are generated by a computational language and epistemology within an enclosed computational universe. The unfurling of branchlike structures, the growth and decay of forms does not, contrary to discourses surrounding artificial life, need to mimic biological life to evoke poetic associations with biological processes. We might anthropomorphize

computational output, or even invent associations between computational and biological processes that we write into the code, but there is nevertheless a sense of the alien, of synthetic artificiality to the graphic output of computational processes that makes them seem too smooth and our interactions too frictionless.

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Professional capital and informal justice systems

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Keywords: Africa, Rwanda, informal justice system, arbitration, mediation, dispute resolution, Abunzi, Web 2.0, wiki, e-development, social networking, ICT, infrastructure.

Abstract

We present the *Griotphone*, a system with wiki-like functionality that is accessed and interacted with by phone. This technology could serve as a networking tool that would strengthen informal justice systems by facilitating discussion around best practice and establishing an archive of decisions. These objectives are important as many informal justice systems, such as the Abunzi system in Rwanda, lack an archive of decisions and a forum for informal justice actors to discuss their profession. This technology would facilitate information sharing between informal and formal justice systems. This system aims to increase transparency and accountability in informal justice systems. This technology strives to enable informal justice actors to more quickly resolve cases, which would in turn ease tensions in communities and support reconciliation in developing areas of the world.

> If you never leave your village you think your ideas are the best ones.
> (Anonymous Abunzi, West Province, Rwanda)

1. Introduction

1.1 Background

In September and October of 2008 we met with informal justice actors called Abunzi, in Rubavu District, East Province and Kirehe District, West Province in Rwanda. When meeting with them we found that they repeatedly expressed a need for a network on which to discuss best practice. It was from these meetings that we set out to create a technology to connect the Abunzi. Researching and developing a technology for the Abunzi inspired us to think more globally about informal justice systems and how they could be assisted through technology. The Griotphone is our first attempt at addressing a need in the informal justice sector. This paper is a description of the Griotphone, a proposed technological system, not yet implemented, that would be a professional network through which the Abunzi in Rwanda could discuss best practices. It is our hope that this technology would prove useful in other informal justice systems, as well.

1.2 Informal justice in sub-Saharan Africa

> When most sub-Saharan African countries became independent in the 1960s, the majority of African citizens were resolving their disputes using traditional and informal justice forums. Despite their popularity, these forums were regarded as obstacles to development. It was thought that as Africa modernized they would eventually die out. This did not occur. Informal and traditional modes of settling disputes have remained as widespread as ever. [1]

Informal justice systems play an important role in sub-Saharan Africa where they are often the only access people have to justice. They have remained strong partly due to people's preference for them and partly because formal justice systems have not had the capacity for the volume of cases. *Penal Reform International* suggests that in rural areas people are more likely to prefer informal justice systems: 'They are accessible to rural people in that their proceedings are carried out in the local

language, within walking distance, with simple procedures which do not require the services of a lawyer, and without the delays associated with the formal system.' [1] Additionally, cost and nature of penalties associated with formal courts were mentioned as reasons people find this form of justice preferable.

Sub-Saharan Africans' preference for informal justice is also due to it's involvement of the participation of the entire community:

> They are highly participatory giving the victim, the offender, and the community as a whole, a real voice in finding a hopefully lasting solution to the conflict. Furthermore, they assist in educating all members of the community as to the rules to be followed, the circumstances which may lead to them being broken, and how ensuing conflict may be peacefully resolved. [1]

It is also suggested that consensus and reconciliation, as opposed to 'retribution,' associated with 'Western-style justice,' are preferred results, 'In most cases, the type of justice they offer – based on reconciliation, compensation, restoration and rehabilitation – is more appropriate to people living in close-knit (multiplex) communities who must rely on continued social and economic cooperation with their neighbours.' [1] Informal justice works because of 'social pressure,' it's being 'voluntary,' it's ability to 'restore social harmony,' and it's being 'participatory.' [1] Taking these characteristics into account we have developed a technological approach in keeping with the way informal justice systems work.

1.3 The Abunzi System, Rwanda

Abunzi in Kinyarwandan means to bring two people together. The Abunzi system in Rwanda is an informal justice system at the village-level based on a traditional form of justice. There are about 32,400 Abunzi divided amongst the 2,150 cells, or villages, nationwide. Every two years each village elects fifteen new Abunzi who comprise a committee. They process 70% of the civil cases in the country. Their objective is to unite two parties who have a disagreement. Depending on the case they will either play the role of mediator or arbitrator.

Land disputes constitute 60% of the cases brought to the Abunzi. An Abunzi we interviewed in Gacuba District stated, 'when people came back after the 1994

genocide land was a huge problem... Abunzi help with order and rehabilitating the country.' The importance of the Abunzi system is evinced in how it assists in moving the country away from the ethnic tensions that resulted in the 1994 genocide.

Rwanda's Vision 2020, in which it lays out it's future goals, explains that the government's biggest goal for the country is to move it from an agricultural to a knowledge-based economy. The eGovernment project aims to assist with this goal by providing Internet access to all levels of government except the Abunzi and Gacaca judicial systems. Considering how important the Abunzi are to the judicial process in Rwanda we propose a technology that will further assist in moving the country towards this economic goal.

1.4 Abunzi professional needs

We found that Abunzi typically have a hand-written archive of the arbitrated decisions. Furthermore, they do not have access to how other Abunzi around the country make decisions when faced with similar disputes. The Abunzi we spoke with felt that a network on which to discuss best practices would supply them with the knowledge to more quickly make decisions. They expressed a desire to do a better job more quickly and efficiently. They stated that they do not always have access to enough information regarding laws or knowledge of the myriad ways similar cases have been solved in other parts of the country, partly because of their limited training. They expressed a desire to learn about what other Abunzi in other parts of Rwanda were working on and how they solved cases as a way to more quickly come to a decision. Currently the only way Abunzi learn about how Abunzi in other towns solve problems is to travel to nearby towns and speak with them. They expressed a desire for a nationwide dialogue with their peers about the challenges and types of cases they face. They lamented their inability to travel to meet with other Abunzi. They said they would enjoy participating in such a dialogue and that they would learn a great deal from their peers. They also mentioned a desire to have increased communications with the government so that they better understand the laws that govern them.

The Abunzi we spoke with expressed a need for a professional network so as to access the wealth of knowledge and expertise of all 32,400 Abunzi. Professional networks are an invaluable and commonly utilized professional tool that people all over the world benefit from. Without access to the Internet the Abunzi cannot take

advantage of Web 2.0 applications, wikis, blogs and networking tools like LinkedIn. To address these concerns we are developing a technology that would equip Abunzi around Rwanda with a database of best practices that would allow them to begin a dialogue around their profession.

1.5 Technological Background

Many people in professional settings around the world now take advantage of Web 2.0 applications, wikis and blogs. However, the Internet does not go everywhere, including most parts of Rwanda, and results in large groups of impoverished people who are not served by such advances. Due to limited availability and prohibitive cost, only 1% of Rwandans use the Internet [2]. To compound this problem illiteracy further limits those with access to the Internet. Users living in countries where oral traditions are strong are not usually included in a target audience because online content is typically textual. The Griotphone aspires to address the professional needs of Abunzi with a technological solution in step with their limited access to resources, and compatible with future migration to web-based technology.

2. Objectives

The primary objectives of the Griotphone are the following:
1. Build technologies that connect disadvantaged communities to emerging telecommunications infrastructures
2. Increase access to justice
3. Strengthen informal justice systems
4. Facilitate information sharing among informal justice actors
5. Facilitate information sharing between the informal and formal justice systems
6. Facilitate more efficient and transparent informal justice systems
7. Create archives of decisions made in informal justice systems
8. Generate awareness around oral societies' technological needs

3. Technology description

The Griotphone is a proposed database technology that would store audio recordings of Abunzi decisions. It would provide record, playback, tagging and commenting functionalities akin to those found on wikis. It would be accessible by phone and Internet and would enable the ranking of decisions made by Abunzi. After two

disputing parties arrive at a decision a recording could be made. The recording would need to encompass a verbal summary of the dispute and the decision. Abunzi and the formal justice system would each need to play a vital role in the database.

3.1 Database interfaces: phone & Internet

The Griotphone would be accessible by phone because our primary user, the Abunzi, have greater access to phone than to Internet. In the near-term the phone-based interface will be the primary emphasis of the project. The technology would also be available online for participants with access to Internet such as those in government. The Internet interface would provide for a smooth transition to an online setting once an Internet infrastructure is in place in Rwanda. The process would involve:

Core phone functionality
To interact with the technology users would listen to verbal prompts on the phone and respond orally or by touching the numbered keypad.

Record a decision
Users could call into the database to record a verbal summary of a decision made for a dispute. After making the recording it could be tagged with related categories.

Rank decisions
To establish best practices we propose a system whereby the Abunzi would contribute to the database by ranking a certain number of recordings each month. Abunzi could make comments on others' decisions. This form of commenting on others' voice posts is comparable to the commenting capabilities on blogs and wikis where users may respond to a post. As the recordings are ranked, the highest ranked recordings would emerge as best practice examples.

Listen to best practice recordings
If Abunzi call into the database to listen to best practices they would listen to a selection of recordings that represent best practice for a particular type of case. Users could sort the recordings by type of dispute or by level of government, such as district or sector. Abunzi could rank a recording, leave voice comments about decisions and listen to others' comments. A key feature of the system would be the fact that it is oral, which would allow everyone, including Abunzi who are not able to read and write, to submit decisions to the database.

4. Decentralization and participation

The Griotphone would give Abunzi a tool similar to what one might find in blogs and wikis, but on the phone; a platform with which they are already familiar. It would place the responsibility of participation in their hands. According to Tapscott and Williams:

> … the participation revolution now underway opens up new possibilities for billions of people to play active roles in their workplaces, communities, national democracies, and the global economy at large. This has profound social benefits, including the opportunity to make governments more accountable and lift millions of people out of poverty. [3].

By bringing participation to the fore, the Abunzi will play a key role in the establishment of best practices for the informal justice system in Rwanda. The participatory nature of the Griotphone compliments the participatory nature of informal justice systems. This technology is a unique solution to the lack of a quick means to discuss professional challenges, a dilemma many working in the developing world face.

In his May 2009 TED Talk, Clay Shirky described the breakthroughs achieved through online social networking tools as the 'largest increase in expressive communication in human history' [4]. While this explosion of human communication has served to connect millions of people globally, large portions of the world's populations, particularly those in rural and impoverished areas, have been excluded from the fruits of those tools. Shirky goes on to explain that 'Media is less and less often about crafting a single message to be consumed by individuals. It is more and more often a way of creating an environment for convening and supporting groups' [4]. The Griotphone would establish just this type of environment for a group of people whose professional networking needs have not yet been addressed. Shirky uses the term 'social capital' in reference to the investment participants make in social networking environments like Facebook and Twitter [4]. We would like to extend this concept to the professional realm where investment into this type of environment could bring together collective knowledge, build professional capital and expertise and build capacity in communities in Rwanda.

Giving the Abunzi access to such a technology will promote the development of important content, 'The growing accessibility of information technologies puts the

tools required to collaborate, create value, and compete at everybody's fingertips. This liberates people to participate in innovation and wealth creation within every sector of the economy' [3]. Out of such a discussion could evolve better informed decision-making.

The Griotphone would contribute to Rwanda's *National Decentralization Policy* by facilitating communication between local and central government and by moving some of the responsibility of determining best practice out to the Abunzi. This theme of decentralization is also embedded in the Griotphone system of participation whereby Abunzi contribute to content and moderate it, 'a new form of horizontal organization is emerging that rivals the hierarchical firm in its capacity to create information-based products and services, and in some cases, physical things' [3].

5. Expected Impact

When asked about the usefulness of the Griotphone one Abunzi we met with felt that such a technology would promote:
1. 'Responsibility'
2. 'Transparency'
3. 'Transmission of their decisions'
4. 'Regulate the Abunzi system'
5. 'Provide a better more efficient service'
6. 'Abunzi can correct errors in the community with this tool'
7. '[Abunzi] can more quickly make a decision'

With the Griotphone, the Abunzi could become more knowledgeable about ways to solve cases they face. The technology would allow the Abunzi to make quicker decisions and process more cases per week. People would more quickly move forward with their lives, which would lead to a reduction in poverty. The Abunzi would provide a better level of service to their communities. The oral nature of the database addresses potential barriers to entry caused by a lack of literacy. The Griotphone would provide the 32,400 Abunzi with training in a new technology that would build capacity in their profession, as well as in their communities.

6. Conclusions

The Griotphone could offer the Abunzi a professional network, information sharing, a decision archive and greater accountability and transparency. Increased access to

information through information communication technologies better position disadvantaged communities with the benefits of the information age and everything it has to offer. We hope that this technology will assist Abunzi in virtually travelling to other villages to listen and debate their profession with their colleagues.

Our proposed technological solution is based on the notion that working at the community level might help bring two people together, which could in turn bring reconciliation to communities where informal justice is key to the social fabric. Informal justice actors like the Abunzi have an expertise and understanding of the challenges their fellow citizens face. They have a wealth of knowledge to offer their fellow citizens, their governments, and the world. In post-conflict countries their work assists in moving people away from conflict by offering a forum for reconciliation. For these reasons informal justice actors should be given the means to share and archive their knowledge.

We imagine the Griotphone, if successfully implemented, could be used or built upon for dispute resolution and other informal justice settings in oral societies. We are geared towards building technologies that address specific professional needs and serve communities that are overlooked by investors. We seek to bridge these communities to emerging technological infrastructures with the intent of giving people in those communities the tools to improve their quality of life.

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ZooMorph – enabling interspecies collaboration

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In this paper, I use my software-art project ZooMorph[1] (in progress) as a starting point for briefly discussing innovative collaborative models, anthropocentrism and anthropomorphism and conflicting epistemological paradigms in art, science and non-western traditions.

ZooMorph

ZooMorph consists of image and video filters that create simulations of how a large selection of non-human animals see; generating pictures that help us experience the world through the eyes of another species. The filters are used in PhotoShop and video software such as Final Cut Pro, in an online Flickr based interface, and as an augmented reality application in smart phones such as the iPhone. When a ZooMorph filter is applied to an image it changes its hue, sharpness, brightness, contrast and other aspects, to provide an estimation of what the selected species see. Several aspects of vision are simulated including colour vision, light sensitivity and acuity. The project wants to make its users/audience acutely aware and respectful of the ever-presence of a multitude of parallel experiences of the world.

New collaborative methods – species collaboration

The project is utilising a fairly new type of collaborative structure, and more importantly, it was conceived of as a result of what these types of collaborations have taught us. It is a software tool, joining people in a large-scale collaboration, functioning as art in a similar ways to projects such as *Carnivore*[2] by RSG or *Processing*[3] (if the whole enterprise is considered an art project in itself) and my own

[1] http://zoomorph.org
[2] http://r-s-g.org/carnivore/
[3] http://processing.org

project the *Infome Imager*[4]. These are all examples of what I like to call 'species collaborations' – non-explicit collaborations that are typically non-hierarchical, to some degree self-organising, in which we participate more or less unintentionally. Other examples of such collaborations are collaborative information filtering a la amazon.com, open-source software development, and of course the Internet itself.

In *species collaborations* it is not our individual contributions that matters but what we can all accomplish together. The focus is shifting away from the individual to us as a collective, as a species. In fact, a serendipitous effect of the technologies we are developing might be that we start to re-evaluate our self assigned centre-position in the universe, realising that we are just one species amongst many, with no more right to run the world than any other. We might be witnessing the beginning of the end of the anthropocentric era.

Interspecies collaboration

A couple of years ago my work with *species collaborations* led me to seriously question the human on top paradigm and one day the words 'Interspecies Collaboration' popped into my head. Every time I turned on the news there seemed to be a story about animals of different species helping each other out: there was news about pets helping their humans out of accidents, such as the beautiful story about the hundred year old tortoise who 'adopted' a baby hippo orphaned in the 2004 tsunami[5], and endless accounts of interspecies nursing. There is an overwhelming amount of anecdotal evidence for interspecies altruism and new scientific research is starting to corroborate those anecdotes: a current study with chimpanzee toddlers indicates that they *do* harbour something akin to interspecies altruism (Warneken and Tomasello 2006: 1301-1303). Could this willingness to support each other across the species barrier be formalised into collaborations? Could we be working on scientific or artistic projects *together* with other species? The gain could be tremendous. Imagine what we could learn about the world by experiencing it with or through a completely different species.

I started to explore *interspecies collaboration* with my students in the Art Department at University of California Santa Barbara. One of the first questions that came up was: how can we collaborate with someone whose intention and agenda is not

[4] http://infome.net
[5] In the news: http://news.bbc.co.uk/1/hi/world/africa/4152447.stm (last checked June 2009)

known? How do we conduct artistic research together with someone whose experiences, sensations and knowledge cannot be understood? However, as the many successful examples of *species collaborations* have shown us, sharing a common agenda is not important for a successful collaboration. Nor does one have to know or understand the intention of ones collaborators. The more important question is: what are the mechanisms that make such non-explicit collaborations possible? And, how can we utilise them for *interspecies collaborations*? One option is to set up a structure, a rule system, like an Internet protocol such as IP or HTTP, that allows people to create parts that generates a seamless, yet heterogeneous, whole (such as the Internet or the Web). Another is to set up an environment where two or more different 'Umwelten' are overlapped. 'Umwelt' is a German word used by the biologist Jakob von Uexküll (1864 -1944) to signify the specific physical, emotional and semiotic environment an individual (of any species) live in and through. One can think of the *Umwelten* as grids, which when overlapped create an interference pattern – that is, a new set of shapes not part of any of the separate *Umwelten* but something that is created through the co-existence of the two. In these collaborations the participants are not following a common protocol, but rather developing a protocol together as they go along.

Examples of such collaborations are more difficult to recognise than the protocol kind. One student, Laura Hyatt, re-contextualised walking her dog as art. Her *Umwelt* included knowledge of the artists Richard Long's walking as art and the *derives* of the Situationists, and she experienced her walks through a filter created by that knowledge. The dog, Dru, sees and experiences the walk from his dog perspective, enjoying the smells of other animals, pondering, picking up a stick and the enjoyment of being close with his favourite person. Through the overlap of these two different *Umwelten* slowly something started to emerge. There are outward signs of this change, the walks became longer and maybe Dru is taking on the lead more often. But the most important change is difficult to quantify, it is in the interpersonal protocol that emerges between the two of them. Something experienced only by them, but potentially transmitted through the photographs Laura took during the walks.

What do you see?

While non-explicit collaborations offers a way of working together with others without understanding them or knowing their intention, it became obvious in my classes that some degree of insight into the *Umwelten* of our collaborators is helpful. Being visual

artists, a question that often arose in class was: how do they see? And I started to look at the animals around me wondering the same thing. After 'Googling' things such as 'animal vision simulator' for a couple of hours I realised that there were no such things (at least accessible for laypeople), and that I would have to make it myself. So I started to research what is known, and what can be known, about animal vision from a scientific perspective.

Let us deal with the elephant in the middle of the room right away; how would it in any way be possible to experience how another animal see? Actually the elephant might be more of a lion, Ludwig Wittgenstein's lion to be more precise, lurking in the room. Wittgenstein's famous statement 'If a lion could talk, we could not understand him' (Wittgenstein 1953: 223) is often quoted to summarize a commonly held sentiment; non-human animals are so profoundly different from us that every attempt to understand their experience is futile, a physical and philosophical impossibility (even if they told us about it in plain English!). But the question is: are we that different? And what do we have to gain and/or lose from maintaining that there is such a difference?

Anthropodenial

Anthropomorphism – assigning/acknowledging shared characteristics in humans and animals, is a term uttered with disdain in scientific contexts. It is seen as error of sentimentality that makes (objective) research impossible. But this resistance to acknowledge non-human animals as persons, with feelings and needs, is quite puzzling.

There is a great paradox in the scientific relationship to anthropomorphism. It goes like this: research on animals is possible/ethical because we are *not* similar; they do not experience the pain, anxiety, stress that we do. Meanwhile, research with / on animals is useful since we can infer things about *us*, humans, from the research we make on animals. It works because we *are* similar.

To open up a discussion about the anthropomorphic taboo of science, the ethologist Frans de Waal (Professor of Primate Behaviour at the Emory University in Atlanta, GA), introduces the term anthropodenial, he writes:

> I propose 'anthropodenial' for the a priori rejection of shared characteristics between humans and animals when in fact they may exist. Those who are in anthropodenial try to build a brick wall between themselves and other animals. They carry on the tradition of French philosopher René Descartes, who declared that while humans possessed souls, animals were mere machines. Inspired by the pervasive human-animal dualism of the Judeo-Christian tradition, this view has no parallel in other religions or cultures. (2001: 69)

The term *Anthropomorphism* was originally used in Judeo Christian theology as a condemnation of assigning human features to gods, an act of pagan blasphemy (Daston and Mitman 2005: 2). It is ironic that the Judeo-Christian belief system is allowed to dictate how science sees non-human animals. As Elliot Sober argues, from an evolutionary perspective it is actually more reasonable to assume that similar behaviour in species with a common heritage stems from similar reasons. In the terminology of evolutionary biology it is a more 'parsimonious' assumption (Sober 2005: 85).

ZooMorph makes the assumption that similarities in morphology and/or behaviour is a sign of a similarity in sensation. And by acknowledging these similarities we have a ground to stand on for exploring potentially profound differences in our experience of the world. The lion *can* speak and it is interesting and important to listen, exactly because we don't understand what he is saying.

Overlapping magisteria

There is a vast amount of research being done on animal vision. Scientists study their colour perception, acuity light sensitivity and other aspects using devices such as electroretinograms[6], behavioural studies, dissection and genetics. Still, there seems to be a reluctance to use this knowledge to create simulations. It is not that they don't think they know how animals see. Rather, simulating how someone sees implicates a someone, a subject who does the seeing, and in the anthropodenying framework of science, that is difficult to grapple with. I believe that vision researchers are aware of this problem, one scientist told me that making these simulations was worthwhile as an art project, but not as a scientific endeavour. And that makes

[6] Light of different wavelengths is sent into the eye and the reflection thereof reveals the colour sensitivity of the cone pigments on the retina.

sense; artists are trained to investigate subjective experiences systematically and with the same rigour as the scientists explore what they believe to be an objective reality.

In response to scientists' struggle with subjectivity, I decided to expand the scope of the project to include non-scientific experts on animals' subjective experiences. De Waal mentions how the western Judeo-Christian conception of animals has no parallel in other cultures. In shamanic cultures, historical and contemporary, the concept of personhood does not end with humans. All animals are persons, with a soul and a full range of complex emotions and sensations. Within this paradigm the idea of a simulation claiming that an animal sees this or that, is not far fetched. Many shamanistic traditions involve practices in which the shaman becomes an animal in order to see the world through their eyes and teach the tribe what he/she learns about the world. The transition from human to animal takes place in trance states induced by dancing, drumming or hallucinogenic plants (Eliade 1972). ZooMorph will also consult with (telepathic) animal communicators who can ask animals how they see and people who say they can intuit what animals' experience (such as the autistic author Temple Grandin).

Through the addition of these non-scientific methods, the project very consciously enters into a discussion about the fundamental differences between two worldviews and epistemologies, the scientific and the (for lack of a better term) spiritual. It wants to find a way to seamlessly incorporate these two streams of knowledge, and make them speak together. Stephen Jay Gould tries to solve the conflict between scientific and religious/spiritual conceptions of the world with the idea of *Nonoverlapping Magisteria* (NOMA) (Gould 1997: 16-22), stating that religion and science are not teachings of the same kind, that they do not speak about the same things and are thus not in conflict. This position seems to make sense, primarily because it helps people and cultures with contradictory commitments and views to coexist. However, religion and science might not in reality deal with different 'magisteria', and if we pretend they do, we miss out on an opportunity for each of them to expand and metamorphose.

ZooMorph is utilising methods from two very different paradigms for a specific research goal – understanding how animals see – while examining and discussing the inherent discrepancy between these methods. It is doing so not by analysing and comparing them but by forcing them to overlap. This is not an easy task. From a

scientist's point of view, ZooMorph is applying scientific research too literary, it is claiming too much, and it is bypassing the anthropodenying impulse of the scientists. And at the same time ZooMorph is attempting to capture and quantify the experience of connection and personhood of shamanistic practitioners and animal communicators, and one could argue that by doing so it is diluting and dishonouring their methods, maybe to the point where they become useless. The project creates a head-on clash of two profoundly different world-views. However artists don't shy away from messy and irreverent explorations. More importantly, art is inherently investigating the very methods it is using (which might be the core purpose of art as research). Having a built-in methodological conflict as a starting point creates a very fruitful foundation to work from.

Conclusion

ZooMorph is taking advantage of a specific moment in time when our technologies have serendipitously removed us from our self-proclaimed centre-position in the world. The Internet and the web have led the way for new non-explicit ways to collaborate, allowing us to invite our non-human fellows to work and learn together. Using the knowledge and methodologies from science, traditional/spiritual practices and art, ZooMorph is a tool conceived to further these interspecies collaborations. It wants to make us aware of, and facilitate, an intellectual, emotional and spiritual partnership with the species around us in the quest for a sustainable environment for all of us to thrive within.

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Understanding interactive media art based on Qi philosophy in traditional Orientalism

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Introduction

Current interactive media art frees itself from a singular meaning of art and univocal communication: it becomes a combination of various characters and materials. Audience with passive attitude has been changed into active participants through new ways of communication and plurivocal messages, and the endless interaction between audience and artwork transforms art into sensuous and vivid living creatures. To understand these new phenomena in interactive art, new aesthetic consideration has been attempted, and sometimes the first step has been found in a Buddhistic, horizontal outlook on the world and also Taoism, especially in the thinking of post-structuralism. However, as a matter of fact, it's difficult to find concrete examples of discussion based on such oriental values. Therefore, in this paper, I try to discuss interactive art with oriental terms and thought, to offer a better understanding of media art, which has been woven with uncertainty principles and contingency. The purpose of this study is to provide an opportunity for us to understand aesthetic meanings of interactive art - in a new way - through an oriental traditional aesthetic matrix.

The necessity of a new angle for interactive art

When the art is considered continuous with a computer system or structure, it is sensed by the whole body. The artwork demands an entire sensuous and physical act from the audience. Also the audience is making the artworks operate by seeing,

listening and touching them. Current interactive media art have changed into art as experience that induces the audience's physical act to complete artwork. This aesthetic - of participant and multi-connectible - has become an essential characteristics in the art of today. Roy Ascott views the interaction between a human and computer as having a profound effect on an aesthetics of today where artists have to include collective and interactive aspects within the artistic experiences. The meaning creation by multi-interaction has becoming an issue in art and this has to be included in the aesthetics. This demands a fresh analysis of interactive art.

The art of a change and relation

In this paper, I hypothesize that interactive media art is a relational art acquiring a vital power by a mutual-understanding with the audience. Interactive art has a specific technique in mutual-understanding, and the aesthetic meaning is produced by this technique. In Chinese literature, an essential meaning of mutual-understanding is to connect(通) waterways after acceptableness(疏). The oriental concept of mutual-understanding preceding a discussion about acceptableness before connection, offers a pertinent theoretical hint to understanding a system of behaviourism in interactive art. Zhungzi speculated mutual-understanding with the Other, emphasizes that you have to first forsake your burden so that you can obtain a mental light to cross a deep abyss between I and the other. If you do not follow Zhuangzi's process, you will maintain a heavy condition so that you might be in danger of falling into the abyss. To empty things means to move out of a fixed and selfish category. An emptied identification of one's own is not about oneself being steadfast, but an interrelation between others. The world of interactive art can be strange and new for an audience. With the audience as 'the other' it may appreciate some interactive artworks through a deconstruction of a familiar world and an acceptance of a new one. However, the audience in the interactive world might be interested but also have fear of the unknown. To reduce the difference between the audience and the artwork is a primary mission of interactive art. In short, a principal of interaction - which itself can produce an aesthetic meaning - can be elucidated by a logic of mutual-understanding along with 'the concept of empty'. After achieving a concept of empty, we can prepare a philosophical foundation - that interactive art is the art of change and relationship. An oriental phenomenon characteristic in the 'concept of empty' can be the root of a viewpoint. A concept of empty goes by the name of 'Voidness'(空) or 'Emptiness'(虛) in traditional Orientalism, and Emptiness is

not fixed, but is involves an opening of, and connecting with others. This view of Emptiness, means something is not a fixed substance, rather it keeps itself maintained through change; it continuously gets tangled up with other things. We can imagine calling 'Emptiness' the philosophy of change and relation because Emptiness becomes the driving force to continuous change through an endless flow. Like emptiness, interactive art can also be considered as having a philosophy of change and relation, because it has a transformational process through a continuous mutual-understanding with the audience.

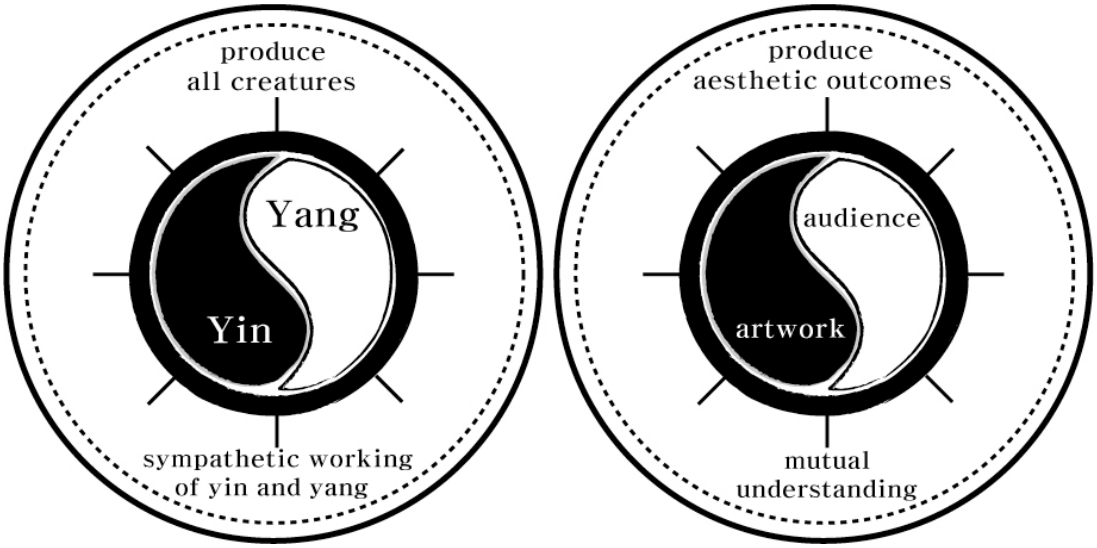
The lifelike art

Interactive art does not dream of becoming a substantial aesthetic appreciation. The new of interactive art, is to express a vitality in and of itself by mutual-underatanding with the audience. In other words, the audiences' life is brought into the inside the interactive art, and so the art changes - like a vivid organism. Thus if interactive art has an aesthetic experience through interpenetration among the self, and the world of events, it can embody a vivid aesthetics. Herein lies the original link with an oriental traditional aesthetics matrix. In a traditional orientalism, it is thought the world is an organic being and a natural phenomena is a flow of life moving. This worldview of vitalism is the essence of a 'vivid aesthetics' in oriental art. Oriental art expresses and shapes an emotion from life as considered a remarkable phenomenon: in other words expressing a feeling of vitality at all times. The bottom line is - a vivid aesthetics is not an art expressing just living things - we have to understand that a vivid aesthetics presents a mind of the *whole universe*. Interactive art is a continual process, and it produces aesthetic outcomes constantly, by beings within their own world. Thus we can consider interactive art from a new angle. This research offers an opportunity to gain a fresh understanding in interactive art in terms of organization and relation.

The analogical consideration for a structure of a relationship

In interactive art, the audience as a participant is interchanging with the artwork and they are weaving aesthetic outcomes. The audience and an artwork are the same textile: it is made up by endless weave - in the sense that the characteristic of relationship is crossed by an influence from each other. The universe of interactive art is a transformational place - weaving multifarious possibilities - and it is not linear, but has uncertain principles and contingency. This universe is not a form that is

vertical and rankles, but a formation that is horizontal and relational. We can understand that an internal principal of interactive art, generating a relational net, is similar in an intrinsic connectivity to that of the Oriental's universe. In Orientalism, the discussion about relationship is connected directly with the thought of Qi(氣). Qi has been understood as an original matter of all things, which means that all things can be reduced to Qi. Qi is both a generator and principal of generation, and it fills up the universe with itself so that all things are the same. Qi splits across the cosmic dual forces in yin(陰) and yang(陽), and all creatures are produced by the specific process where forces are complicated, being opposed and sympathizing with each other. The universe of Qi in producing all things by a sympathetic working of yin and yang, is similar to the world of interactive art in terms of producing aesthetic outcomes by a mutual-understanding between audience and artwork. An interactive artwork is in a continual process of weaving outcomes through interchanges with the audience. There is only 'one' (entity) as whole thing, and, a flow of network. Similarly, the universe of Qi has only 'one' of Qi - weaving all creatures and is a principal of creation by a motion-change of Qi.



Comparing ‘sympathetic working of yin and yang’ with ‘mutual-understanding’ in interactive art

This oriental worldview is to have an organic and monistic characteristic - because the universe is entangled - like an organic net in Qi philosophy. In this monistic world, it is not conscious of the Other as a substance against self, but connects to unify self and the other. Interactive art is not an individual gathering. Interactive art is monistic

because it is based on mutual-understanding and it is an organic art to express an *aliveness* through being a continuous, never ending transformation.

Conclusion

There are many studies in interactive art that have tried to make clear inter-actional structures and develop a theory on method and experience by the audience. We believe that we cannot find the aesthetic meaning until an internal principal of the art - constructed by its own method - is explained. There are a number of theories on aesthetics of interactive art, but arguably there needs to be a radical new approach for a better understanding of interactive art. I have attempted here to analyze interactive art as *mutual-understanding and harmony*, which overcome the division of audience and artwork.

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Before the reset: transformative practice of interactive media art

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In computer-based interactive media art, the artwork should be practiced in the installation: the show and the interaction establish and expand its meaning and interpretation, including discourses through and on technology.[1] This makes the artwork alive and viable as a transformative practice of aesthetic object and experience.

For a long time, people have talked about art as alive: in the practice of art making, the artist has surely felt that art is indeed alive. When the artist makes an artwork, s/he does not always know what the result will be and often the artwork gives an idea back to him/her during the making process. Here, ‘contingency’ is an appropriate word for expressing the phenomenon. Contingency means the artwork is alive and responsive. With today's computer-based artwork, the artist usually depends on the collaborator - an engineer or a programmer - to complete the system. The artist does not fully understand the system, and does not need to. However when the artist is simultaneously the programmer, - which happens more and more frequently these days - the contingency does not work effectively. When the artist knows too much

[1] This work was supported by the Korean Research Foundation Grant funded by the Korean Government (MOEHRD) (KRF-2007-321-G00006).

about the system s/he does not allow 'a bug' to work, because it is not recognised: the artist wants to make the system perfect, and ignores and discards the contingent fault or bug within the work. If instead s/he allows the artwork go its own way, it could prove productive. This letting-go by the artist could be a new and viable venue for computer-based interactive media artwork.

By using computer vision and graphics technology Dongho Kim's *Mirror 2* looks like a mirror but it remembers only still objects and space [2]. Moving viewers are shown in the distance and they disappear gradually as they approach the mirror. The major functional element is for the viewer in front of the mirror is to appear and disappear depending on his/her distance from it. A major problem with this work is that still objects and space should remain when the system resets - with the still objects and space being a kind of background for the moving viewers. Each time the show begins the artist has to reset the system without any moving features. On one particular opening day, after the artist had set up and reset the system, a gallery attendant accidentally turned on one of the lights, and temporarily set in the room, bouquets of flowers sent by sponsors and supporters, he then turned the light off. This meant the background space was changed. The result was that when the viewer sees him/herself in the mirror from distance and approaches the mirror, the viewer disappears gradually, then the light is turned on, and bouquets of flowers appear gradually and ghostly: the past returns when a viewer tries to see him/herself closely in the mirror. We can ask - which experience is better: a background without any change, or a background that brings back the past? This work questions traditional art practice and notions of what art might be.

Art historical relevance: minimal and maximal

The framed painting hanging on the wall of a gallery has been the traditional form of installation for over 500 years. The image shows us its denotative meaning, and the viewers make efforts to discover its connotative meanings. Whether the viewer moves his body or eyes in front of the paining, it does not answer or respond: the viewer is eager to know about the painting through articles, texts etc., while the work stands there silently. Painting and other traditional aesthetic objects have been located in the firm and simple relationship of the artist, artwork and viewer for a long time. Art historical research focuses on what the painting tells us, how the painting is

[2] Dongho Kim, 'Mirror 2', 29 inch LCD monitor, CPU, webcam, in house software, 2008.

composed and who the artist is. Simply put, the painting does not care what the viewer sees, how it is understood, nor who the viewer is.[3] It is not fitting to relate new media art with traditional artistic notions.

During the 1900s, the form and content of artworks have changed dramatically, and they seem to have overcome traditional materiality. In Minimalism, artworks minimise their hidden meanings and connotations and depend upon the viewers' experience to interpret. This is the goal of Minimalism - the maximisation of the viewer's experience rather than the artist's intention or message. *Primary Structure* was an exhibition held in the Jewish museum, New York, 1966. Extremely simplified sculptures were shown and the exhibition is regarded as triggering Minimalism. *The Art of the Real* in the Museum of Modern Art, New York, 1968 escaped from the traditional way of exhibiting. It highlighted 'the brutally unframed character of the work in its abandonment of any sculptural pedestal in order to share the real space of its viewer.' The viewer could walk through objects and structures of the work, and even sit on the artwork. The major aim was to make the viewer experience the artwork by being within its space, and for the viewer to complete the work by their presence. The artwork was no longer an aesthetic object the viewer beheld. Although Minimalism began with sculpture, these artworks were made of industrial products, such as wood or acrylic panels, that could be made by anyone. For example Dan Flavin's work is composed of fluorescent light bulbs that can be purchased in any hardware store. At this point in time, Minimalists seem to proclaim. 'If you like it, make it. If you want to invest in it, buy it.' The Minimalists' slogan woke us up: a reconsideration of the art world - artists, galleries, museums and even art schools. Minimalism moved the aesthetic object to the centre of the viewer's experience.[4]

Transformation of artistic practice: the technologist and the artist

Through the practice of the Minimalists, interactivity between the artwork and the viewer shifted from passivity to participation of the viewer. The effect of this development could be said to lessen the artist's influence in the artwork. However digital media based interactive artworks are promoted in artistic and commercial venues, and role and status of the artist needs to be reconsidered. Through the practices of media art, the traditional attachment of the artist to the artwork

[3] Joonsung Yoon and Jaehwa Kim, 'The Interactive Artwork as the Aesthetic Object: Aesthetic Technology Converging Technological Applications and Aesthetic Discourses,' S. Göbel, R. Malkewitz, and I. Iurgel, eds., *TIDSE 2006, LNCS 4326* (Springer-Verlag: Berlin, Heidelberg, 2006) 116-126.
[4] Ibid.

diminishes. Instead, the location of the artist seems to be replaced by the system, or the collaborative work of artist and technologist, and the authority of the interactive media artist has yet to find its own voice.

The Minimalists' use of commodities and industrial products have already shifted creative production to the creative definition or use, for example, Damien Hirst's artistic practice using Rachel Howard's assistance with his factory system.[5] Digital media based interactive art is not in fact so different from the context it emanates from, but there is today a new role for the emerging technologist. However there are some problems in this (new) media arts field. Artists with young practices may not have the financial resources that established artists have to hire assistants or technical staff. Another problem can be the technologist - interested in the creative challenge of making a new systems - might not be content with a small fee, and perhaps overly interested with the rights of the artwork i.e. who the work belongs to. Furthermore in a collaboration where there is a computer scientist or programming technician involved, it can be very difficult to understand each other, and subsequently reaching the goals of an artwork. Another problem can be the artist is simply not interested in, or does not know much about, the technology. Furthermore when the work is shown in an art venue, the authority usually remains within the artist's territory, with the technologist as merely 'staff': sometimes interactive media artwork has been presented as a form of the artists with 'technical support'. Some of these problems are being overcome through the use of open source software and an interdisciplinary education. Without knowledge of the system, the artist cannot do other than compromise and minimize the idea. Even though there are some collaborating artists (such as Gilbert and George) the real need for inter-disciplinary collaborative work has been exacerbated by the huge growth of interactive media art and today the inspiration for a new artwork need come from the artist but from technologists, digital media researchers, computer scientists etc.

The transformative practice, aesthetic technology

With interactive media artworks, the activity of creation reveals a somewhat different atmosphere from the conventional and traditional experience and the most distinctive

[5] Nigel Reynolds, 'Charles Saatchi Could Have Bought Four Davids for the Price of Tracey Emin's Bed,' *The Daily Telegraph*, 7 January 2006. This kind of story always recalls the school system of the art world, such as Rembrandt School.

element is the source of the artistic idea.[6] Artistic subject, theme, content, motivation, etc. usually stem from the artist's mind. With new media art, usable technologies are often found by the artist, who then develops or adds his/her ideas based upon the technology, then further adjusts the artistic idea and the technology. Characteristically the social and cultural phenomena of the new technology become the environment, the topic, the theme and the venue of a new media artwork.

The interactive media artwork, *Mirror 2* is based on these elements. The fundamental technological explanation is a simple division of moving and still imagery. These two factors are computational differences. Here the set up defines the initial still shot from the webcam - the still image, and after the set up, the moving things in front of the webcam become the moving image. In the software developed by the artist, the moving image is controlled i.e. the more the moving factor approaches the webcam, the more the factor fades out. This work did not originally stem from the conceptual dichotomy of appearing/disappearing, or distance/nearness, but from the differentiation of the background and foreground in graphics - a genre of computer science. Interestingly the artist is not trained traditionally i.e. in art per se, but is a computer scientist who specializes in computer graphics, in particular, real-time rendering. The question we posed earlier: which version is better - the one with a background without any change, or a background which brings back the past? is, interestingly, a traditional artistic question - which speaks to contingency in art making and the belief in the viable life an artwork can have.

Arguably interactive media art could take away the traditional joy in art making and art appreciation, but also it can transform our senses and experiment with the seemingly firm canons in art. From the Avant-garde to Minimalism these transformative practices seem quite tame by today's standards, but in fact these practices were extremely revolutionary in the time: they transformed aesthetic objects, aesthetic experiences, and, aesthetic subjects. Contemporary technologies and technologists are transforming these aesthetic elements again, and we might add 'aesthetic technology' to the discourse of art.

[6] Hyunkyoung Cho and Joonsung Yoon, 'Performative Art; The Politics of The Doubleness,' Leonardo 42:3 (Cambridge: MIT P., 2009) 282-283. Here, it is asserted that the instrumental definition of technology is wrong.

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From instrument to interactive spectacle: transformations of participatory culture

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New media art, or digital media art, is characterized first and foremost by qualities deriving from its digital foundation. Some of them, such as multimediality or virtuality, can be used to describe all of its instances. Others, such as telematicity, hypertextuality or interactivity, which are only characteristic for certain media (albeit, arguably, those most representative for current artistic practice), appear, as a result, only in certain areas of digital art. The network of interrelations between all the aforementioned attributes defines the internal dynamics of new media art and determines the interrelations between its miscellaneous varieties.

Interactive art is a singular phenomenon in the area of digital creativity: it is cross-border, cross-generic, cross-medial. After all, its defining attribute – interactivity – can be found in various domains of digital practice: in CD-ROM / DVD-ROM art, hypermedia installations, net art or virtual reality art. This means, therefore, that interactive creativity combines characteristics of diverse arts involving interactive digital media. Certain theoretical approaches identify its instances also beyond the domain of new media. Together with its characteristic definition disparity (arising from the multiplicity and diversity of research perspectives interested in it), as well as the numerous terminological aporiae related to it, the aforesaid wealth and diversity regarding the occurrence of correlated phenomena imparts to the category of interactivity a quality of vagueness, openness, perhaps even hybridity, whereas the interactive art defined by it assumes a scope that is far from precise, as well as obtaining an equally heterogeneous character.

Reflection on interactive art, and particularly reflection which tends towards theoretical resolutions concerning the understanding of interactivity in the domain of artistic practice, analyzing the circumstances of its occurrence as well as its variations, is always primarily determined by the manner in which one defines the relations between its foundational aspects: the social and technical, on the one hand, and the artistic – variously embedded in the former two – on the other. I am

convinced that those aspects, their hierarchy and interrelations, are particularly important, possibly essential, for determining the significance of the category of interactivity in art. By granting priority (greater significance) to one of the former aspects while defining artistic interactivity, we are in fact determining the perspective from which to view the issue.

The first of the aforementioned aspects – the social one – situates the reflection on interactive art in the context of social process analysis, deriving artistic interactivity from and characterizing it through the general category of social interaction. The second aspect – the technical one – introduces the context of IT and communications, emphasizing the relation between the human and the machine, the computer, the complex cybernetic systems. Lastly, the third, artistic aspect – depending on the treatment of the two previous aspects and interrelated with them, as well as confronted with the system of the institution of art – determines the set of qualities characterizing interactive art and defines its history.

It is not my intention to privilege either of them. It seems more beneficial, both for an accurate description of the history of interactive art thus far and for an analysis/interpretation of particular realizations, to propose a model in which artistic interactivity is shaped by the coexistence of both indicated aspects. After all, since the very beginning of the history of interactive art, invariably, realizations have appeared in which one or the other aspect is dominant, or – no less frequently – works in which these two aspects are variously interrelated. Therefore, their interrelations determine all dimensions and cross-sections of the interactive art territory, and it is in this manner that interactive art ought to be perceived. Combining all those perspectives within one model allows one to discern not only the dynamics of transformations which interactive art undergoes, but also the dynamics of its duration. In this way, history can be viewed as several histories and particular works can be analyzed as positioned in a network of paradigmatic references.

The traditional work of art is regarded as a finished whole, its various dimensions permanently integrated. In an interactive work, however, these dimensions are severed from one another, and, moreover, at least some of them lose their finality, obtaining in return the status of a process, a series of ephemeral events, a potentiality of many diverse states. Nevertheless, the dissociated and liberated dimensions do not achieve full autonomy, or even a restricted independence, because all the dimensions, levels or elements of the work exist in a network relationship.

I postulate a distinction of two levels within the organization of an interactive artwork:

(1) The artwork as 'dispositive'

(2) The artwork produced by recipients/interactors.

The first level – roughly speaking the product of the artist – I described as the context for the second level, where I perceived the work proper: a product of the recipient's interaction and, simultaneously, the object of his or her productive/receptive experience. The duality of the recipient's interactive attitude, thus defined, is also well represented by the term '(v)user', offered as a name for the new role of the (former) recipient by Miroslaw Rogala and Bill Seaman. My approach, rather than present the structure of the work, focuses on the field of interactive communication. A multi-level interactive work is thus inscribed into a broader, dynamic communicative context, which results in revealing the processual character of the work. In this model, interaction occurs between the interactor and the network – comprising the interface, hardware, software and the material (data) –, which I term the 'dispositive'. Therefore, let us reiterate the amended formula: interaction transpires between the interactor and the dispositive. The interaction between the recipient and the dispositive executes the artwork. With regard to certain works, in which the dispositive represents the artist, constructing a balance between the freedom of interaction and their systematic restrictions (Umberto Eco would see this as a balance between the intention of the work and the intention of the recipient), yet another factor comes into play – the implied artist. In this case, the term 'implied' denotes the artist's submission to the interactor, who establishes the artist's position and role as a result of a particular, individual interpretation of the interactive process experienced by himself or herself. As for interactive works in which the artist's position is not established (implied), we are instead faced with diffuse (shared) authorship.

I wish now to present *an open typology of interactive works*. An outcome of reflection on the history of interactive art thus far, shows that it lays claims neither to systematicity nor to definiteness. Each type is associated with a particular repertoire of interactive strategies and leads to particular range of experiences. If it should so happen – as it often does in interactive art – that the work becomes equated with the interaction, and the latter is, at the same time, the only form (dictated by the logic of

interactivity) in which the work may be experienced, then the relationship between the three categories is of paramount importance. I wish to emphasize that certain qualities which help to characterize particular types are also frequently encountered in works belonging to other categories, where they do not have however, a defining role, i.e. they do not determine the work's affiliation with a given group. For example, variously understood instrumentality or game structure are features, which occur in interactive works almost invariably.

1. The instrument artwork

Works of this type do not offer an experience of a previously established form; what is more, they do not even offer an experience of navigating a structure, which is hypertextual (and hence, in a way, established as preceding the experience ontologically). The nature of the experience is totally executive. The interface allows a series of determined activities, performed in order to realize one of the very numerous possible outputs, as exemplified in *Telegarden* (a 1995 telerobotic installation authored by Ken Goldberg and Joseph Santarromana), *Portrait No. 1* (Luc Courchesne's 1990 work, which allows the recipient to hold a conversation with a digital partner), *Sinking Feeling* (2001, Ken Feingold) or *Piano as an Image Medium* (a 1995 example of audiovisual performance, authored by Toshio Iwai).

2. The game artwork

This type of work invites the recipient to an experience structured like a game (not infrequently, such works employ processed versions of games already available on the market). The participants have at their disposal the rules, gear and a fixed location. The space of the game is often virtual reality, as, for instance, in Feng Mengbo's *Ah_Q – A Mirror of Death* (2003), or, perhaps even more interestingly, a network of cross-border relations is activated, and the game develops in spaces between various worlds. An example of the latter may be *Can You See Me Now?* (2001), a collaboration between the Blast Theory group and the Mixed Reality Lab (University of Nottingham), a work situated between the virtuality of the Internet and the materiality of the real world. Works like these, exploiting mixed reality as game space, appeared at the very beginning of the history of interactive art, as evidenced in *Psychic Space*, the work by Myron W. Krueger.

3. The archive artwork

Works belonging to this category offer structures of data organized into a lucid database structure as the space of the experience. The experience assumes the form of exploring the territory of the database with the help of a map, supplied by the work. Therefore, in this case, the structure of the experience's virtual space does not determine the work's significant quality (or value). This function is performed first and foremost by the material gathered in the archive, and also, to a lesser extent, by the relations shaped within the material by the user's navigational choices. The type may be exemplified by George Legrady's CD-ROM work entitled *An Anecdoted Archive from the Cold War* (1994) or Agnes Hegedus *Things Spoken* (1998). Occasionally a work of this category will offer the interactor an opportunity to enrich the archival resources, as in the case of Antonio Muntadas' *The File Room* (1994 -), a realization involving gallery space and the Internet, or another piece by George Legrady Pockets full of Memories (2001).

4. The labyrinth artwork

In case of the labyrinth work's hypertextual structure the interactor does not possess the knowledge of the experience's virtual construction. What is more, this construction may alter in the course of the experience (the so-called 'dynamic mapping'), rendering the obtained knowledge useless. An example of such a devious realization is Miroslaw Rogala's interactive environment *Lovers Leap* (1995). Since the recipient is ignorant of the space in which the experience occurs, the very exploration of this space and the induced emotions and sensations (as well as intellectual behaviour), such as astonishment, unease, a sense of being lost mixed with a sense of challenge, the decisions and actions such as seeking, analyzing, etc., become essential attributes of the work. This type of work is particularly popular among interactive artists, the upshot of which is the staggering number of works offering the labyrinthine experience. Other possible examples might be Jeffrey Shaw's *Legible City* (1988-1991) and Grahame Weinbren's *Sonata* (1991-1993).

5. The rhizome artwork

Works belonging to this group represent one of the most remarkable forms of interactive art. While sharing numerous traits with the previous type, work-rhizomes

differ primarily in that they develop in the course of, and as a result of, the interactive experience. Additionally, they employ miscellaneous strategies; they may retain a memory of its initial shape (which means that the interactors are able to experience both the original form of the work and the phases of its transformation; such is the case with Piotr Wyrzykowski's installation *The Gallery of Polish Kings*, 1993), or they accept permanent mutability (e.g. Douglas Davis' *The World's First Collaborative Sentence*, 1994–). Works of this type are mostly encountered on the Internet, the architecture of which is particularly conducive to rhizome work projects. While the structure of the labyrinth artwork, and game artwork is hypertextual in character, archive artwork is related to the database, and the instrument work seen from this perspective, can be characterized as a generator of textuality, then, employing Espen Aarseth's concept, I shall describe the structure of the rhizome work as cybertextual.

6. The system artwork

We deal hear with artworks which discard interaction with humans, what is a confusing aspect for everyone who wants to see interactive art as engaging interactive communication between artwork and its user. As seen, for instance, in Steve Heimbecker's 2004 work entitled *POD (Wind Array Cascade Machine)*, these projects develop their interactive dynamics by building system structures which function solely in technological contexts. Sometimes they may use data provided by users, as in the Ben Rubin and Mark Hansen installation *Listening Post* (2002), or Paul De Marinis piece *The Messenger* (1998 / revised 2005). In other cases the artwork is open to interactors' contributions but at the same time lets them know that it is not welcomed, as for instance in the David Rokeby installation *n-Cha(n)t* (2001). I name the interactivity characteristic for this type of the artwork as internal. It creates a dialogue among active elements of the construction of the dispositive.

7. The net artwork

In this group I would see such artistic strategies, which engage different forms of places and activities, in many cases independent (to some extent), many of them even non-interactive, composing together a net of events interconnected into a sort of artistic action, or campaign. Locative media art is a field many examples of such artwork come from. I may indicate for instance, Michelle Teran's installation/performance *Buscando Al Sr. Goodbar* (2009). GPS artworks compose

an important part of this territory, as well as projects connecting real spaces with virtual components of Second Life, as is the case of Paul Sermon's *Liberate Your Avatar* (2007). The type of interactivity I recognize as characteristic for all these works is somehow related to the form of interactivity Eric Zimmerman called meta-interactivity.

8. The spectacle artwork.

This type was quite typical for the very early stage of development of interactive art when its territory resembled a battlefield between, on the one hand, the traditional notion of art, wishing to serve the audience a spectacle composed in full accordance with the previously formed idea of its visual structure (resulting from a traditionally understood creative process), and, on the other, the notion of interactive art, where the creative process preceding the experience of the work finds its extension in the process of creative reception. The early responsive artworks often took the interactive spectacle form. Nowadays we encounter quite often versions of this strategy, connecting interactive limited activity with spectacular effects: possibly the result of the art establishment institutions' slow process of making new media art accommodate the realities of art system. A recent example of such an artwork which may serve is Yoko Ishi and Hiroshi Homura's piece *It's fire, you can touch it* (2007). Another example comes from some interactive artworks involving the Internet, dividing their audience into two parts. One, smaller group of active participants is engaged in the production of spectacle for the second, much larger group. An is Rafael Lozano-Hemmer's *Vectorial Elevation* (2000).

The suggested typology of interactive artworks is – as previously stated – a proposition of preliminary nature. Subsequent discoveries may result from the development of new tendencies in this field of artistic creativity, or even from a more rigorous scrutiny of the existing achievement. To conclude, I wish to add that a very significant tendency at the moment is type-crossing (nowadays numerous works appear along the type borderlines).

Mapping the Mind: collaborative creativity as alternative transformative practice

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Since 1990 in her book *The Creative Mind* Margaret Boden notes the existence of three types of creativity: combinational, exploratory and transformative creativity. Her main concern is to understand the origins and formation of creative ideas, within the context of discovery. The 'idea' the author refers to, could be taken as a structure to satisfy a style of thought or a solution for that style. According to Boden the solution and the style are associated with the conceptual space (system generator - genesis / training - which maintains a given area and defines a certain set of possibilities) thus, the greater the knowledge about the conceptual space, the greater the chances of obtaining better creative solutions.

Mihaly Csikszentmihalyi (1996), also points to creativity as the result of the interaction of a system composed of three elements: a culture (which contains symbolic rules), a person (which brings new features within the symbolic field) and a panel of experts (who recognize and validate the innovation).

What is the creative process?

According to the Encyclopaedia Britannica[1] creativity is 'the ability to make or otherwise bring into existence something new, whether a new solution to the problem, a new method or device, or a new artistic object or form.' According to this definition we may assume that the creator is the one that creates (makes) or has created; and t create is to give existence.

Nevertheless, the concept of creativity raises a number of controversial issues

[1] Encyclopedia Britannica (on.line - http://www.britannica.com/EBchecked/topic/142249/creativity)

(Boden 1996). How may creativity be understood? Why do we consider something as being creative, and conversely something as not creative? Is the creative process the same in the arts and sciences, and is originality in these forms fundamentally different? Can creativity be measured? Can we compare two original ideas to show that one is more creative than other? On the assumption that creativity can be recognized, how can you explain how it happens?

According to Csikszentmihalyi (1996), creativity cannot be understood only by looking at the people who make it happen. Just as the dolphin jumping from the waters of the River Tagus passes unnoticed if there is nobody there to see it, ideas, and creativity fade unless there is an audience receptive to register them and implement them. Furthermore without guidance, a framework and an audiences there is no reliable way of deciding whether the expectations of a creative person are valid. Thus, according to this view, creativity results from the interaction of a system composed of three elements: a culture (which contains symbolic rules), a person (which brings new features within the symbolic field) and a panel of experts (which recognize and validate the innovation). For an idea to become creative, a product or a discovery to occur, these three elements (symbolic rules, subjective symbols, validation) are needed.

Thus, to understand creativity it is not enough to analyse the creative individual, their contribution, while necessary and important, is only one link in a chain, a phase in a process. Saying that Guglielmo Marconi invented the radio is a convenient simplification - the invention of Marconi's would have been inconceivable without the

knowledge a priori, without the intellectual and social network that stimulated his thoughts, and without the social mechanisms that recognized and released his innovations.

Creativity -H and creativity-P

To understand why these changes do not happen automatically, it is necessary to consider the background for creativity to occur. Change requires effort and traditions. For example, procedures need to be learned before being modified. A musician needs to learn a musical tradition - it's written guidelines on how the instruments are played - before thinking about a new composition.

Boden (1998) distinguishes two senses of creativity which she explains is not a special property confined to the elite, rather, it is a feature of human intelligence in general: creativity is based on capabilities within day-to-day life - such as association of ideas, memory, perception, analogical thinking - in a search for a space for structured and self representation. Secondly creativity involves not only the cognitive dimension - the generation of new ideas - but also motivation and emotion, and is closely linked to the cultural context and factors of personality.

The ability to produce innovations of the first type, is the psychological creativity, or creativity-P, and the second is historical creativity, or creativity-H. P-creativity is the most fundamental concept, of which H-creativity is a particular case.

Boden argues that since creativity is the investigation and transformation of conceptual spaces, the mechanism of creation must be a sort of automatic search, through and between, conceptual spaces. A generative system defines a certain range of possibilities. These structures are located in a conceptual space whose limits, contours, and pathways can be mapped, explored, and transformed in various ways (Boden 1995: 2-3).

What is this approach (Boden's model) embedding? Is being creative in a specific field to gather as much knowledge about the domain as possible? Is awareness, attention and motivation considered as the formal concepts of creativity? Is transformative creativity what we as artists are searching for, namely a means to transcend a conceptual space? How may this be articulated in a co-authored situation? Is collaborative creativity a practice of transformation because one is exposed to processes that seem absurd, aimless, or shocking?

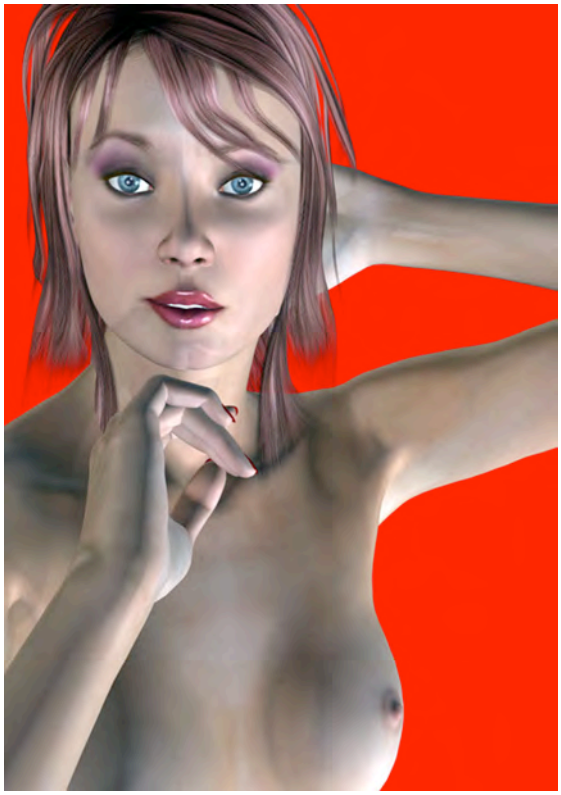
Where we as visual artists might feel reflected in Boden's (1991) approach is in her focus on the generation of creative ideas, not on validation. She emphasises the context of discovery, not evaluation. While admitting that the criterion of validation can be part of the creative process, his primary focus is on *how* the ideas come to exist in people's minds.

Gilles Deleuze and Félix Guattari (1987: 21) used the term 'rhizome' to describe theory and research that allows for multiple, non-hierarchical entry and exit points in data representation and interpretation. In *A Thousand Plateaus,* (ibid) they opposed an arborescent conception of knowledge, one which worked with dualist categories and binary choices. What we consider creative resonates with Gilles Deleuze's mediatory space between discursive and non-discursive functions:

> The rhizome is an acentered, nonhierarchical, nonsignifying system without a General and without an organizing memory or central automation, defined solely by a circulation of states. (1987: 23).

For Deleuze and Guattari 'to map' means to form a relation between the discursive and the non-discursive and we titled this presentation *Mapping the Mind* to evoke the cartographic principle of the rhizome[2]. Becoming (for us a constant negotiation) Deleuze, asserts 'has only middle' - the emphasis is on the process and not the object, and this underlies the mediatory quality of our production:

> … the middle is not an average; it is fast motion, it is the absolute speed of movement. A becoming is neither one nor two; ... it is the in-between, the borderline of flight or descent running perpendicular to both (ibid: 293).



On being creative one is 'not consciously experiencing and passing through the line of flight; on the contrary something [is] passing through you' (Deleuze 1995: 141), and this experience is that of becoming other - via multiplicity, diversity and destruction of identity (ibid: 44). This happens through acknowledging borderlines, differences and repetitions.

[2] The rhizome is characterized by six principles – connectivity; heterogeneity; multiplicity; signifying rupture; cartography and decalcomania – simultaneously interacting.

Three types of creativity

According to Boden, there are three main ways to generate creativity. Each of the three results in surprises, but only one, the third, can lead to 'shock' which accompanies an act, a really innovative idea or product. Therefore, the universally recognized creative individuals are more often associated with the third type, although all include some examples of creativity-H.

Combinational creativity

The first type involves new, and unlikely, combinations of familiar ideas. Examples include poetry and analogy, where two or more related ideas, in innovative ways, share a coherent conceptual structure.

Exploratory creativity

The second and third types are closely linked, and are more similar to each other than the first. The second type, exploratory creativity, involves the generation of new ideas for the holding of structured conceptual spaces. This often results in structures, or 'ideas' that are not only new, but unexpected and recognized as meeting the assumptions of the style of thought to which they relate.

Transformative creativity

The third type involves the transformation of one or more dimensions of space, so that new structures that could not have happened before can be generated.

The second and third types, or modes of creativity mingle. The distinction between a change of view and a transformation is to some extent a matter of trial, but the more well defined space, the clearer a distinction can be manifested.

As artists we inherit a style of thought in terms of our culture, but we work to find the limits and use the full potential of our field. Sometimes the known conceptual space is transformed, through removing or adding one or more dimension. These transformations enable the generation of ideas that were, with respect to that space, previously unattainable. The surprise that accompanies such ideas, previously

impossible, is much greater than the surprise caused by mere improbability, no matter how unexpected they might be. If the changes are extreme, the relationship between the old and new space will not be immediately apparent. In such cases, new structures will be unintelligible, and probably rejected.

In our opinion Boden's model of transformative creativity remains a little vague and does not acknowledges the importance of the selection and framing of contexts (departing from motivation and attention). This is possibly due to the difficulty of approaching the richness of human associative memory and the difficulty of identifying human values and expressing them in a computational form.

Conceptual spaces

With respect to the usual mental process in art (more than an act of combination), how can one 'impossible' idea be considered more surprising, more creative than others? How can creativity possibly happen? Boden (1990, 2004) introduces the notion of conceptual space:

> Conceptual spaces are structured styles of thought. They are normally picked up from one's own culture or peer group, but are occasionally borrowed from other cultures. In either case, they are already there: they aren't originated by one individual mind. They include ways of writing prose or poetry; styles of sculpture, painting or music; theories in chemistry or biology; fashions in

> couture or choreography, nouvelle cuisine and good old meat and two veg – in short, any disciplined way of thinking that is familiar to (and valued by) a certain social group. (2004: 4)

Conceptual space maintains a given domain and defines a set of possibilities. The organising dimensions of a conceptual space are the principles that unify and give structure to a particular field of thought. The boundaries, contours, trajectories and structure of a conceptual space can be mapped by their mental representations: moves in chess, molecular structures, and melodies of jazz, for example. These mental maps can be used, not necessarily consciously, to explore and change the spaces involved. Sometimes the conceptual space involves a repetitive process, moving from one point to another, eventually reaching an area where something should happen. This explanation is expected to clarify how repetition can lead to new ideas (difference). Thus, the operation of becoming is a kind of conceptual creativity. However the operation of a conceptual space is one thing, the processing is another: what exactly is a conceptual space?

Conceptual space can be described as mental maps, which are - like outlines of thought - thinking that explores the search space of solutions, as for example in a game of chess or during a jazz improvisation - activities which have certain rules known and well delineated (Boden 1995: 85). Thus, these mental maps are similar, metaphorically, to the Klondike maps of gold mines[3], as Boden calls it - 'spaces of Klondike' (1995: 85). However there is no reliable rule that says to the person who searches for gold s/he will find, or indeed mine, the most productive site.

As visual artists and researchers we might be considered a rare category of people, a creative elite, and sometimes what we do is misunderstood and under valuated. The challenge of art practice as research involves actions which, as Sullivan describes, 'both create and critique new knowledge and has the capacity to transform human understanding' (2005)

[3] In 1896, on the banks of the Klondike River in Canada, the gold veins were discovered, which later would be targets of a 'gold rush'. This region is formed by the meeting between the Klondike and Yukon rivers, site of the first camp of miners from the Klondike mines, where you can find the most profitable veins of gold. (Perkins, 1999 [1994]: 128). Thus, as the land is exploited in the search for a shaft or clues leading to a gold mine, the map of the area of Klondike was designed. When a gold mine was found - like an untapped area of thought, this can lead the person to evaluate whether this particular mine has adequate gold, or whether it is necessary to look for another mine, bearing in mind that this could mean a long search in other valleys and hills for more productive mines (thought)

When considering art practice and collaborative research, creativity becomes a tool for change, a mediating process to a larger self-awareness. This path from chaos of the senses to experience, meaning and self-awareness is an opportunity for transformation.

In *Mapping the Mind*, we propose a cartographic perspective on arts practice as research, one that enables a re-conceptualization of the creative process with all its various characteristics that includes it's paradoxes, the unconscious, the materials, the experience and the collective socio-cultural frame.

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Same old story: media art in East Asia

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Art and *art*

Japanese critic, former vice director and chief curator of InterCommunication Centre (ICC), Keiji Nakamura, lamented the degeneration of the term '*bi-jyu-tsu*' which consist of two Chinese characters 'beauty' and 'skill' at the millennium in his essay on media art (2004: 156-157). He sighed with great regret that we could not help using the term '*ah-to*' which means 'art' in Japanese Katakana character, generally used for direct use of a foreign language, instead of the term '*bi-jyu-tsu*'. What he felt shame for was, however, not the obsoleteness of a certain terminology, but the fact that there is no more clear difference between '*bi-jyu-tsu*' and '*non-bi-jyu-tsu*', a piece of artwork as a creative interpretation of the reality and the reality itself, which was very crucial for his generation born in the early 20th century. The result is, a blind equalization of all factors in a society, including politics and the need to depend on another terminology to reflect a very uncomfortable change in the nature of art.

Besides Japanese, Korean, Chinese, Taiwanese and Vietnamese share the same terminology of 'beauty' and 'skill', or sometimes 'craft/talent', and 'skill' in Chinese character is a translation of 'art', however each pronunciation and social context may differ. This means that they also share the same problem to some degree, the degeneration of the terminology. It is often said that the concept of art today has been imported from the West to the East quite recently, and the terminology for translation has been chosen or invented to meet the need to express the foreign concept, in which they redefine their own history of art as a counter-part of Western art. Since that time, they have lived with this dissatisfactory terminology crowning their existing concepts in history with new ideas. (Birnbaum, 1997, 118)

Contemporary art and media *art*

The concept of art, even in English, has changed dramatically in the various movements resonating with history during the 20th century, especially contemporary art since the World War II. Although there are some viewpoints tracing the origin or root of media art from earlier times, which is still controversial and ambiguous term, media art is regarded to practically belong to 20th century in this paper.

There are many different points of view on defining and categorizing media art in the relation to contemporary art. These views may vary among different media artists with disparate backgrounds, or even among artworks of a single artist. Moreover, these artists and artworks can be continuously reinterpreted in other contexts by people who have diverse viewpoints. Some might despise this problem as nothing more than a temporary terminology doomed to undergo ceaseless changes. Yet, it is undeniable that the terminology is indeed crucial for defining artists' identity within art history, and placing his/her artworks into communities by exhibiting them in museums, galleries, art markets and other institutions including fields of education. Sometimes, to define oneself not as just an artist, but as a media artist, means to restrict one's art to a limited number of exhibition venues and specific contexts with undesirable prejudice.

In general, various artistic expressions which by manipulating and experimenting with media technology tend to be categorized as 'media art' works, although there are certainly other various trendy ways to call them, such as modifying them with a prefix of certain mediums or defining them with the characteristics of a certain age. In its most positive definition, media art is basically presumed to provide a creative artistic vision for technology, to push the boundaries between art and technology.

In many cases, nevertheless, technologies applied to artworks tended to be expensive tools for individuals who can afford to use them, which is the way conventional tools are used. Media art has held the spotlight particularly for its interactivity. Despite that, many interactive artworks never interact with audience, the audience reacts to them as programmed. In the worst collaborations between art and technology introduced in the context of media art, one can see many artistically designed demonstrations of cutting-edge technology and poor artworks made by subcontractors - artworks that are only, and overwhelmingly, technical. These are

some of the reasons why, media art, which could have made a new epoch in art history, is often categorized as a rather minor genre in the field of contemporary art.

Media art and media *arts*

Coming back to the adaptation of the notion ‘art’ in the cultural sphere of Chinese character, one can easily expect an even more chaotic situation in language when it comes to media art. The real problem here resides in possible political implications: Nakamura warned of the fundamentally political nature of media art being used as tool for agitation and/or providing a rosy view of electronic society, just like the advertisement industry (2004: 158-159).

In the case of Japan, one finds very complicated nuances and different layers of meaning of 'art' and 'media art'. The Agency for Cultural Affairs in Japan has held an international festival ‘Japan Media Arts Festival’ annually for the last 12 years, which has contributed to the growth of this field and, most importantly, the general understanding by the public. ‘Media arts’ here is different from the term ‘media art’ used in general and when it is written in Japanese it is written as ‘*me-di-a-ge-i-jyu-tsu*’ which is a combination of katakana and Chinese character meaning ‘craft/talent’ and ‘skill’, a common word for general art. It includes entertainment, manga, and animation along with art. In the publication of 10th anniversary of this festival, titled *The Expressive Power of Japan*, one can ironically find an art and technology movement and Japanese avant-garde artists in 1960s - equally packaged and listed by years with the most public culture under the name of ‘media arts’ (2007). This shows a national cultural strategy towards the concept and terminology of media art.

Until recent days, media art histories have had a tendency to be led mainly by those artists from Western societies, and Japan, perhaps, has been the only exception in Asia until the 1990s. One cannot avoid encountering the expression of ‘catching up with’ in most material describing media art in Asia - reminding us of the relationship between economic development and media art. One example is the preface of the exhibition ‘Cyber Asia: media art in the near future’ at Hiroshima (Komatsuzaki 2003: 14-15). In an article titled ‘Asian media artist to watch’ in art quarterly magazine ARTiT, Alex Adriaansens of V2 listed only Japanese artists for they 'have established themselves as very important global players in these fields and have become an orientation point for many Asian countries such as China that are rapidly picking up this thread in the arts', whereas Gunalan Nadarajan listed artists 'with the obvious

omission of Japanese and Korean, partly in deference to the outstanding work that has already been done in highlighting them' (2005: 79-81). What worries us is whether the same problem surrounding media art is likely to be repeated as other countries in Asia ‘catches up with’ Japan. Yet, is this preposition really true?
It is partly right and partly wrong.

Media *art* in east Asia

Now the City of Yokohama is holding a big festival, celebrating the 150th anniversary of the *Opening the Gate to the Black Ship*. This is somewhat understandable because Japan is known as the country in Asia succeeding in modernization relatively earlier than other neighbouring countries and it joined the World Powers in the first half of 20th century. The process of modernization shaped the notion of art, even that of ‘Japanese art’, as a part of defining Japan’s identity as a modern ‘nation’. Yet, according to art historian Doushin Satoh, the process making ‘the modern’ was not fully completed until the mid 20th century (1996, 12-29). For example, the National odern art museum opened in early 1950s.

‘Science/Technology/Japan’ has been both a conscious and unconscious motto throughout the last century in Japan, first with the Black ship and then with the atomic bomb. The national enthusiasm toward Osaka EXPO in 1970 can be explained as the compound result of public desire for a wealthy and strong country and national development strategy (Sociologist Shunya Yoshimi and art critic Noi Sawaragi have respectively published influential books on this theme in 2005). After the dramatic economic development of a so-called bubble economy in 1980s, technology in the context of art began to reflect the extraordinary enthusiasm and positivism toward the new era, the age of a strong country aided by science and technology. This utopian image of art and technology could be grounded on the fact that military use of technology was basically prohibited in Japan, unlike the case in the U.S.A. This social atmosphere strongly influenced the opening of ICC in 1997 and its 10-year-pre-projects.

One can note a very similar situation happening in South Korea. In the 90s, there was a famous though not entirely glorious catchphrase in the advertisement of a national telephone company aiming at popularization of Internet, which was, 'we were left behind in the wave of modernization, but we should keep up with the wave of globalization.' A few years after intensive investment at the national level, the

catchphrase realized that statistically, Korea was developing at the fastest rate and had the most wide-spread Internet. Seoul, the capitol of South Korea, began to hold an international media art biennale since 2000 and media art has been celebrated with the rise of globalization in the information age. Nevertheless, the media art scene only developed in Korea since 2000 and shows very different characteristics from those of Japan. This has been discussed at the symposium of an exhibition 'Extended Senses: the presence of media art in Japan and Korea' held at ICC and gallery Loop in 2008. Locality does matter in this context because art cannot be independent from the history and culture of a certain society, which shape an artist's identity as an individual along with the influence on the content and context of artworks.

The thinking of one of the curators of the Seoul International Media Art Biennale 2004 is worth reconsidering here. He said that media art manipulating post industrial communication media as a medium of expression should more actively interact with the social, political and cultural waves - for art has always appealed to the specific historical language of certain times. With innovatory technologies which are literally state-of-the-art, what kind of artistic expressions can be pursued? How can media art mediate between people in the community? During the last century, these questions including terminology have been repeated and repeated, but have not been fully explored enough, especially in Asia. This paper is, after all, another same old story: yet, it challenges us to make it new.

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Exploring the experience in everyday pedestrian routes: watch for 'routinised' pedestrians

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MSc Design for Interaction

1. Introduction

In order to reach their daily destinations many people walk along the same pedestrian paths. Perhaps, at first, they gave this daily 'journey' their whole attention, but after a while they don't actively notice it unless something out of the ordinary interrupts it (Wrights and Sites, 1997). With time this everyday path can become over-familiar, an almost invisible part of the routine, where individuals walk around isolated in their own thoughts, trying to separate themselves from surrounding noises and visual information. Many people make use of these ‘in between’ moments of isolation for daydreaming, whereas others try to find ways of making them less 'boring'. What causes these changes in people’s behaviour towards their surroundings? From studies of Environmental Psychology it is a proven fact that the environment, and therefore environmental stimulation, has an essential impact on people's psychology (De Young, R. 1999).

1.1. Context definition

The environment that this project focused on is found in the urban pedestrian paths, along which people move daily as well as the spaces comprised by these daily routes. These were defined as the pedestrians’ *passing environments*. Many people enjoy walking as a leisure activity. A solitary walk to think, or in pairs to talk, can be very relaxing. Furthermore, there are times when people have no other option, other than walking, in order to arrive on time to their daily destinations. In all cases they are considered to be pedestrians. However, this project did not deal with the entire crowd of pedestrians, but rather a specific group of pedestrians for whom, walking daily from an origin point (ex, house) to a destination point (ex, work), has already become a part of their routine. Throughout this paper, these people will be referred as r*outinised pedestrians*.

1.2. Project's goal

The project's goal was to design an interaction in order to enhance the *routinised pedestrians'* experience in their daily *passing environments* as well as to research this interaction's effects by means of experiential prototypes.

1.3. Approach

In order to reach the goal a 'research through and for design' method was followed. Accordingly, this project consisted of both research and design, carried out so as to constantly support each other. The research was conducted by 2) initially the literature and then 2) through a number of *routinised pedestrians'* experiences. Using the information obtained from the research, many ideas were generated, concepts were created and a final design was further developed into a set of experiential prototypes. Finally, using these prototypes, a user experience testing was conducted. In *research through and for design* experiential prototypes play a major role. They can be close to product (experiences), and can play the role of stimuli in formal experiments (Stappers, n.d.). In this way the intended interaction and the experience with the designed artefact can be tested using the prototype in a close-to-reality way: 'In view of the method's objectives, design research must have an eye for the full experience of the user. This experience not only covers the often studied perceptual-motor and cognitive skills of the user, but also emotional reactions'. Thus, exploring the *routinised pedestrians'* experience within their everyday *passing environments* implied the exploration of all parameters on which this experience depended.

2. User experience research (exploring the experience)

In order to identify the unspoken needs of *routinised pedestrians*, their full experience was explored. For that, user experience research followed the literature research through which the participants reported information about their contextual experiences. The research was conducted by means of informal interviews and video documentaries of the participants' casual routes.

2.1. Method

Twelve *routinized pedestrians* participated in the research, six women and six men. The participants' experience along their daily routes was researched. These routes

were located in seven different cities around the world: Delft, Rotterdam, Barcelona, London, Athens, Shanghai and Mulhouse.

The user experience research was divided in two parts. First, the participants got acquainted with the project through open interviews and were asked to draw a quick sketch of their everyday route (mental map). In the second part of the research the participants were given a camera and were asked to make a documentary of their everyday route with the only condition being to think out loud. The video documentaries were an attempt to reveal the everyday perception of the pedestrians and to catch the fleeting perceptions along a path.

2.2. Conclusions

As expected, the way that the environment was experienced by the participants depended on a range of parameters such as different individual personalities and physical characteristics of the route (fixed parameters), as well as others such as weather conditions, distractions and the pedestrians' general state (variables). The relevant parameters were combined based on their underlying nature in the following nine general issues: alternative paths, unexpected events, environmental stimulation, isolation' physical obstacles, pedestrian’s state, visibility, mobility and social interactions.

From a closer study of the results, it appeared that the above issues affect the *routinised pedestrians’ experience* in three distinct ways concerning the pedestrians’: routine alterations, spatiotemporal perception and direction of their attention.

3. Identifying the unspoken needs

At this point it was time to set the guidelines in order to reach the project's goal; to enhance people's experience in their everyday passing environments. How could this enhancement be achieved? Based on the conclusions of the user experience research and the background information from the literature research, three possible directions were identified in order to enhance the walking experience of *routinised pedestrians*:

Breaking the pedestrians' routine.
Encouraging awareness of the surroundings.

Supporting thinking and reflection.

4. Reconstructing the experience

What the user experience research did, was basically break apart experiences of individual *routinised pedestrians* in order to analyse and understand them and eventually identify the issues that affected these experiences. At this stage there was a need to re-contextualise the sensible into design hypotheses. It had to be decided whether one main motive or hypothesis would be followed or if 'ideal' routes would be re-composed and serve as the basis for design. In order to proceed with the creativity part, possible experiences were reconstructed by putting everything back together through the use of personas and scenarios.

Using the three directions which were formulated, three potential members of the *routinised pedestrians* group, Sara, Scott and Melissa, were represented in the form of personas. Combining these personas with the research results helped to compose three experience scenarios.

5. Reflip (enhancing the experience)

Three sets of requirements and interaction guidelines were formulated next, using as starting points, the outcomes from both the research and the creative session. Keeping in mind the above, many ideas were generated aiming to enhance the experiences illustrated by the three scenarios.

The final concept generated after the evaluation of the three previous concepts was *Reflip.* The concept of Reflip involves a series of similar artefacts installed along pedestrian routes. Reflip follows mechanical 'routes', inspired by the first home movie machines. Three experiential prototypes were constructed and installed in different locations.

6. User experience testing

In order to evaluate the concept on an experiential basis, a second user experience research was set up and performed. The effects of the intended interaction, and consequently the enhanced experience, were tested in a close-to-reality way using the experiential prototypes. The developed artefacts were placed in different

locations of common pedestrian paths and were tested for four days with several *routinised pedestrians*.

Different research methods were used in order to: 1) obtain 'rich' information about the effect of ReFlip on the entire contextual experience and 2) obtain numerous records for a more objective evaluation of the experience considering the interaction with *Reflip*.

6.1. Method

The prototypes were installed in different locations and were tested for four days. The user experience testing was performed on two levels: First the qualitative method ‘commented walk’ was used in order to study the effect along the entire route. This was done on an individual level, with a single participant each time. The testing depended on the participants' unforced reactions and comments. The commented walks were followed by on-site observations and short interviews with a wider audience in order to get more information about the way that the installations were perceived and experienced.

On the commented walks were two of the pedestrians who also participated on the user experience research. During the quantitative observational method that followed approximately fifty people experienced the prototype.

6.2. Conclusions

Based on the evaluation, it was concluded that the experience of *routinised pedestrians* with *Reflip* can enhance the overall experience in their everyday passing environments. Interacting with Reflip breaks the routine within these settings. Reflip does not disturb the passers-by who choose not to participate in the interaction. Instead, it allows them to benefit from other people's interaction. Whether interacting with it or not, Reflip catches the attention of all passers-by. Heightening the pedestrians' attention voluntarily enriches their experience and at the same time promotes thinking and awareness of the surrounding environment.

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The use of artifacts as critical media aesthetics

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In 1961 Foucault wrote in the *First Preface to Histoire de la folie,* that the modern man and the madman no longer communicate; there is no longer a common language connecting the two; there is only silence. According to Foucault, the language of psychiatry, which is a monologue of reason *on* madness, was able to establish itself only on the basis of such a silence:

> […] the constitution of madness as mental illness, at the end of the eighteenth century, affords the evidence of a broken dialogue, posits the separation as already acquired, and thrusts into oblivion all those imperfect words, without a fixed syntax, and a little stammered, through which the exchange of madness and reason took place.[1]

Foucault stated that reason is the cultural standard against which everything is measured up. Everything that falls outside of this standard falls inside what he describes as a *void*. Yet this void constitutes culture as much as everything that culture itself is made up from. Foucault concluded that therefore, there can be no reason without madness. He set out to write an archaeology of the silence that exists between the man of reason and the man of madness, because interrogating what is outside a culture is to question a divide that constitutes a meaning in itself.[2]

An encounter with a madman is not the same as an encounter with a man that speaks another language; there is not *just* another syntax or semantics. Instead the madman's actions are perceived as invalid; they consist of *unaccepted* sounds, *not legitimate* information or what is *not* a message. A definition almost analogous to noise, which is often scrutinised as an undesirable, unwanted and unordered disturbance or addition to a signal of useful data. This negative definition of noise has, like madness, also a positive consequence. It helps us to define its opposite, the

[1] Foucault, M. "*First Preface to Histoire de la folie à l'âge classique*" (1961). trans. A. Toscano, *Pli*, no. 13, (2002): 1-10, 2
[2] Foucault, 2002: 3

world of meaning, the norm, regulation, goodness, beauty and so on.[3]

There is no unequivocal definition of noise, because in the end, what is noise and what is not noise, is a social matter. Even so, I would like to start by making a formal categorisation of noise, following Claude Shannon and Warren Weaver's communication model. The reason for choosing this model is to establish a difference between the transfer of meaning and information, which is necessary to overcome the many paradoxes inherent to noise. Certainly this model has been criticized for not considering the non-linear and social aspects of human communication, but it fits with the idea of digital communication as 'non-discriminatory' in regards to the content.[4] This provisional categorisation can help to understand art that makes use of *critical media aesthetics*.

The myth of perfect communication

Shannon and Weaver's model for communication consists of five basic steps; the transmission of information starts at the *information source*, which produces the message. A *transmitter* that encodes the messages in signals suitable for transmission, sends the signals through a *channel*; the medium used to transmit the signal from the sender to the receiver. The receiver *decodes* or reconstructs the message from the signal. The final element of the model is the *destination*, the person or machine for whom the message is intended or where the message arrives. The model 'information source-> transmitter-> channel-> receiver-> destination' that Shannon constructed also includes an arrow inserting noise, which is a sixth, dysfunctional factor.[5] Shannon and Weaver describe noise as any interference with the original message travelling through the linear channel; it is a measure of entropy (the disorder of a system at a given time).

In Shannon's communication model, information is not only obfuscated by noise, it is also dependent upon it for understanding. Without noise, either encoded within the original message (semantic) or present from sources outside the channel (physical), there could not be a functioning channel. Noise corrupts the transparency of the medium, and serves to contextualize information; Shannon and Weaver conclude

[3] Hegarty, Paul. *Noise/Music: A History*. London and New York: Continuum, 2007: 5
[4] Lessig, Lawrence. *Code and other laws of cyberspace*. New York: Basic Books, 1999.
[5] Shannon, Claude Elwood, and Warren Weaver. "The mathematical theory of communication." *Bell System Technical Journal*, vol. 27 (1948): 379-423, 623–656.

that information needs noise to be transmitted.[6]

An art of artefacts

While the communication process as described by Shannon is reasonably deterministic, this static notion is undermined by the overall addition of noise, particularly during the encoding / decoding steps (often in the form of compression), feedback and when the messages is 'corrupted' whilst in transmission (for instance due to glitches). These three interruptions involve their own technical specificities and appearances; they are the fingerprints of the medium. These medium-specific aesthetics are also often described as artifacts that obscure the original information. Accordingly, we can say that every medium has a particular set of artifacts.

The word artifact stems from the Latin words *ars* and *facere*, which put together means as much as 'artificially made', or 'made by human practice'. In traditional media theory, the term artifact refers mostly to an inaccurate, unwanted effects resulting from a (not perfectly working) technology. Attempts to use these artifacts as creative tools can be seen throughout art history and popular culture. In for instance *A COLOUR BOX* (1935), Len Lye explored the technology of film by painting and scratching the celluloid. He changed artifacts from unwanted, unaccepted and ignored noise, into tools that convey meaning. Put differently, by relaying agency and intentionality, these artifacts are no longer understood as noise originating in information theory, but are elevated to objects that find their meaning within humanities or social sciences. In the coming paragraphs I will describe two different artifacts; namely compression, and glitch to make this point clear.

Compression: infinitely pliable yet holding shape

In the attempts to make communication faster and more transparent, immediacy has become a keyword in the digital era. As a result, the transfer of information within the communication process has also been forced to change. With the help of code condensers (compressions) files are encoded into fewer bits, to arrive faster at their destination. These compressions reorganise the relations between sounds and images by scaling, reordering, decomposing.[7] With the help of a taxonomy or

[6] Ballard, Susan. "Information, Noise and et al." *M/C Journal,* vol. 10, no. 5 (2007). <http://journal.media-culture.org.au/0710/02-ballard.php> 1 May 2009.
[7] Mackenzie, Adrien. "Codecs." In: Matthew Fuller, ed. *Software Studies*. Massachusetts: MIT Press, 2008: 48-55,

language, compressions convert a piece of information back into a representation and in doing so, they re-visualise the obscured.

While from the start the development of new audio and video technologies were focussing on the improvement of sonic quality, by for instance the reduction of noise, recent developments have led to a reversal of this trend. Compression has become almost ubiquitous, whereas the original (RAW or WAV) recording is mostly absent and relatively obese, especially in the realms of digital music, photography and cinema. New data compression technologies, such as the mp3 data format have made it possible to distribute music easily, but in lower quality than the CD. While some artists believe that compression of their work harms it, by essentially chopping away pieces of information, other artists and theorists feel that compression is a necessary part of the character of the digital canvas. In the *Plugin Manifesto* (2004) Kronschnabl and Tomas Rawlings instruct the reader to use codecs and compression creatively; the user should investigate his tools and explore what he can do with these technologies in creative terms.[8] While the camera and the celluloid defined the film in cinema, technologies like codecs and compression artifacts will define the material of the digital work.

An example of this exploitation can be found in the music released by the label 20kbps, which is dedicated to low compression music releases. The label advertises the extreme low of 20kbps instead of the common qualities of at least 128 kbps.[9] Artists on this label give agency to the artifacts created by compression.

In video, compression artifacts are often recognizable as blocks or mosaic effects. The RyBN audiovisual-art collective from France makes use of such artifacts. Their *MONOCHROME* (2008) performance takes place in total darkness and consists of only black sequences extracted from various Divx movies. The saturation parameter (colour intensity) of the black video channel is linked to the sound master-volume. During the performance, the saturation becomes higher when the volume is turned up. This makes several blocks of pixels emerge from the previously black screen, acquiring its form and colour from the Divx compression codec.[10]

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[8] Kronschnabl, Ana, and Thomas Rawlings. Plug in Turn on: A Guide to Internet Filmmaking. London: Marion Boyars Publishers Ltd., 2004.
[9] The music label 20kbps can be found here: <http://20kbps.sofapause.ch/> 1 May 2009.
[10] monochromatiq. “MONOCHROME.” INCIDENT.NET | MONOCHROME | TUBE:MONOCHROME | RYBN.ORG.
<http://www.incident.net/hors/monochrome/tube-monochrome/> 1 May 2009.

Glitch: the tipping point of failure

Whereas communication theorists are known to search for the possibility to create the ultimate, noise-free and hi-fi channel, in reality this Holy Grail is not as valuable as they hope. The excessive imposition of rules and protocols necessary for such a channel, can lead to a boring, monotonous and repetitive invention: a product with no variation, deviation or surprise. As Ernst Gombrich declared: 'however we analyse the difference between the regular and the irregular, we must ultimately be able to account for the most basic fact of aesthetic experience, the fact that delight lies somewhere between boredom and confusion.'[11]

Defining what a glitch is, is if possible even harder than defining noise. The histories of the word glitch are many and differ per dictionary. According to The American Heritage® Dictionary of the English Language, the term glitch stems from a writing of NASA astronaut John Glenn, dated from 1962, and since then evolved into wider usage: 'Literally, a glitch is a spike or change in voltage in an electrical current. […] Since then *glitch* has passed beyond technical use and now covers a wide variety of malfunctions and mishaps.'[12] It seems that over the past few years the word glitch has been demoted into a figure of speech, a metaphor for all kinds of accidents involving anything erroneous.

A glitch is the most enchanting and puzzling artifact of all that reveals itself as a perceived accident, chaos, or a laceration that gives us a glimpse of a normally obfuscated machine language. Rather than creating the illusion of a transparent interface to information, the machine reveals itself. The user witnesses rags of the process through which the message is transmitted and altered by the interface. Here, the machine reminds the user of its existence. But even though the glitch or unexplainable accident can never be understood, it can still roughly be encircled. Glitches rely on the assumption of a ‘normal’ mode of operation. They take place on the border of a system, but appear not to follow the rules, the language or syntax of that system. They reside on the border of sense and nonsense, break and ‘natural’ flow, convention and the collapse thereof.

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[11] Gombrich, Ernst Hans Josef. *The Sense of Order: A Study in the Psychology of Decorative Art.* London: Phaidon Press, 1984: 9

[12] "glitch." The American Heritage® Dictionary of the English Language, Fourth Edition. Houghton Mifflin Company, 2004. <http://dictionary.reference.com/browse/glitch> 27 December 2008.

A glitch is often used as a synonym for bug, but there is an essential difference between the two. Whereas bugs can be described in detail, through bug or problem reports, a glitch is that which is unknown and cannot be explained. The term glitch is generally used to describe a short-lived fault in a system, or a break from a flow within a system, which was designed to work as *a coherent entity* and to follow it's set of objectives. This means that when a certain occurrence is described as a glitch, there is also a claim about the expectations of this system, most importantly its purpose, or set of objectives.

Although the glitch can take place strictly within the computational system, the majority of artifacts that are referred to as ‘glitch art’, are not purely computational, but spawned by a synthesis of different actors. These actors include the protocols built into the machines’ hard and software, the input that makes these protocols behave in a particular way, and finally the system of reception, governed by the beliefs and expectations of the user, who cannot make sense of the outcome. This is where we can diverse between glitch art that emphasizes the procedural and glitch art that finds a point of gravitation in outcome or design.

Isn’t it nice when things just (don’t) work?

Just like Foucault stated, that there can be no reason without madness, flow cannot be understood without its interruption, noise without order, transparency without artifacts or glitch without a presumed function. Interruptions of the flow of our daily life make us aware of its existence and the omnipresent constructedness; it forces us to change our routines for making meaning.

The void that is inherent to both madness and artifacts, is not only used as a lack of meaning, but also as a means to move away from the traditional discourse around code, and to open it up, to understand the politics of technology. Through a void of meaning, artists can voice a critique towards the genre, interface of a medium and the expectations of the user or viewer. The glitch generates a new state, a system I would call ‘Noise-speak’ (as opposed to George Orwell's Newspeak). However, once understood as a new language or alternative way of representation, the essence of it's glitch-being is vanished. The glitch is no longer an art of rejection, but something that is recognized as a new form (of art). As an exoskeleton of progress, the art of artifacts does not just take place on a surface; it is the very form of a new mode. The choice to accept an artifact, to welcome it as an aesthetic form, means to accept

change and to welcome a new dialectic.

The glitch transforms and redefines the normal, static aesthetics of the conventional artwork into a form of unstable utterance of counter aesthetics, a theory of destructive generativity or a *critical media aesthetic*s; critical not only because the medium is in a critical state (a ruined, unwanted, not recognized, accidental and sometimes even horrendous state), but also because it offers an opportunity to voice a critique on the conventions of the medium. Through critical media aesthetics, failure has obtained a place in the narrative of evolution.

Studying glitch (art) is a frustrating endeavour because when I describe and define it, the glitch might lose all its charm. For academic comprehension it is necessary, but glitch studies requires attention to that which is outside statistics and solid models, maybe even beyond the reasoning that permeates knowledge production at large. Therefore I want to conclude by underlining the importance of practical experiments in critical media aesthetics since it cannot (yet) be captured by rigid theory. We need to embrace madness.

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Fabrique: shaping experiential landscape

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Introduction

Do we perceive landscape through visual abstraction or participate in its manifestation as a living system? Do we experience it as detached spectators or through affective charge? Does landscape represent a crystallised form or one of many states within a system of interaction? Unfolding the processes of inhabiting landscape constituted the initial conceptual frame of *Fabrique*. The intention was to create a living landscape, an organism in the place of the picturesque, visual landscape. To reinvent landscape as an experience, involves engaging people as both actors and spectators in a bi-directional relationship. Also, finally, to explore systems' potential to allow for emergent relationships rather than imposed ones. Through the development of the project these quests became more pragmatic, addressing issues of affect and participation, the formation of spatial and algorithmic systems, and, the use of physical objects to create hybrid interfaces.

Initial idea and design

Fabrique is conceived both as a system and a spatial formation. An open, yet deterministic system is designed combining; an algorithm embedded in the software, sensors registering the visitors' bodily engagement with the environment and actuators producing changes in the spatial relationships. People's response is then fed back into the system and propagates further events. The core function is the positive feedback loop. The system tries to sustain itself by favouring actions that ensure its survival. And it presupposes collaboration between the visitors in order to complete its cycle of events - a key aspect of the system (as will be discussed later). In space, *Fabrique* takes the form of a kinetic installation consisting of three expanded bike chains hanging from the ceiling in a three by three-metre grid, each of the chains are connected to three motors. The chains serve as the responsive organisms of this environment or as the mechanical plants of the garden. The

interface devices are three watering cans symbolising the acts of watering and gardening. On the floor there are nine small pots on a three by three-metre grid, filled with soil to indicate areas for watering. By virtually watering over one of them the corresponding motor starts to move, activating part of the one organism. By watering over three consecutive pots, the rest of the organism starts to move, according to a programmed movement. However, only when all of the watering cans are used are the three organisms synchronised in their movement - choreographically. The continuous act of watering also results in activating lights on the other watering cans, implying the continuation of the interaction, but does not spread the movement in the rest of the organisms, unless all watering cans are being used.

More specifically, a microcontroller is embedded inside each can, together with an RFID tagging system and a tilt sensor, while another microcontroller on the ceiling is responsible for moving the three plants. Three systems work in conjunction. First, the RFID reader reads tags placed inside the pots identifying which pot corresponds to the motor. Second, the tilt sensor (a type of switch that turns on or off according to the tilting of an object) activates the recognised motor - only when the can is used for watering (and therefore tilted) and not when it remains still on the floor. When both systems are on, i.e. the can is tilted and the tag is recognised, the motor system on the ceiling is activated. The microcontroller on the ceiling receives a signal to move the respective motor in a pre-programmed way, and activates an LED light on the other watering cans. When all the cans are being used this microcontroller receives a signal to synchronise the motors in a certain motion pattern. The third system, which sends and receives data between the microcontrollers in the cans and on the ceiling, is based on a wireless network using Xbee radio antennas.

Development process

Moving from designing the system of interaction, to implementing different types of technology and visualising the environment - has created a cycle of processes, shaping the work in different ways. Switching between those processes has become a feedback process in itself, requiring adapting to different perspectives via different fields of knowledge.

Participation and the affect

In terms of the interaction design, engagement through participation has been one of the main concerns. Participation is seen as a bi-directional relationship between the visitor and the environment. Engagement occurs through affect, which is then fed back into the system through emotive reaction.

Brian Massumi refers to the present as a state where the affect manifests:

> The present's boundary condition, to borrow a phrase from science, is never a closed door. It is an open threshold - a threshold of potential. You are only in the present in passing. () Affect is the passing of that threshold, seen from the point of view of the change in capacity. The affect and the feeling of the transition are not two different things. () The experience of a change, an affect-being affected, is doubled by an experience of the experience. This gives the body's movements a kind of depth that stays with it across all its transitions - accumulating in memory, in habit, in reflex, in desire, in tendency. Emotion is the way the depth of that on-going experience registers personally in a given moment. (Massumi, 2002: 3)

Massumi refers to the present as an expanded moment created by affect, a transitional state where the potential of the next step manifests. In this moment, engagement with space occurs intensely, as we enable ourselves to open up to potential shifts in our bodily capacity: opening up is followed by sensing and observing the affect. To observe the affect means to double our experience with emotion, according to Massumi. Our experience is fed back into our system leaving a print in the form of a knowledgeable sensation. And with small transitions we move to the next step, and our consequent understanding of it.

In *Fabrique* there is an attempt to enact affective relationships between visitors and space, in order for visual landscapes to manifest as emotive states within the overall experience. When people walk inside the space they feel inclined to discover the causal relations between the watering cans, the hanging sculptures and themselves. By exploring different choices, i.e. watering over different pots they observe recurring patterns in the sculpture movements and associate those with their own actions. This process also involves challenging the system as a game, by trying out all possible ways of interaction. After learning how the interaction works, visitors engage, on the one hand by orchestrating their actions and allowing the system's feedback to guide them to the next step, and on the other, through emotional response to the notion of

a garden. Eventually they immerse into the playful garden narrative and its virtual character.

The role of other visitors becomes significant as it intensifies engagement with the narrative and the completion of feedback relationships. The interpretation of the garden as a stage for human interaction is explained through the shifts between the visitors from performers to viewers and *vice versa*. While someone waters the pots, he/she performs while people watch and observe the system. The garden becomes a living visual landscape for those who watch, and an experiential space for those who participate. Moreover, the participation of three people in the installation allows for the garden to manifest as whole, engaging people in a co-dependent relationship and producing a collective immersive experience.

Mediums and symbolism

The hardware and software of the system are equally interesting in the way it has been devised and implemented, but also in terms of the connotations and symbolisms it brings to the piece.

The algorithm was designed to provide functionality, through predicting, simulating and structuring actions in a modular way. Passing on to the sensors of the system, there was a particular interest in using locative media, such as the RFID system in combination with the tilt sensor to ensure spatial specificity. Spatial specificity is quite significant in that it allows recognition of the causal relationships between the installation parts and people. Also, in my personal view, dealing with physical presence in a specific place holds interest in that it enables the exploration of seemingly immediate relationships through mediated processes.

That being said, embedding an RFID system and wireless technology into the watering cans served to deliberately subvert the real objects into icons, by adding digital properties to the physical object. It doesn’t contain water, but it sounds like it does. It doesn’t change weight after watering, nor does it need to be refilled, but it nurtures a plant. The idea was to denote that physicality forms a construct in itself: our relationship to physical processes is already mediated through symbols, which can still hold their meaning after being injected with virtual functions. In this respect, watering cans play the role of a hybrid interface, but also hold the garden symbolism.

Apart from the cans, bike parts are also used in a symbolic way, representing the mechanical; the technical, rather than the natural. However, they also serve as plants if seen through the prism of the interaction with pots and watering cans. The suggestion was that non-organic, mechanical forms *can* become the garden, without visual references to nature e.g. using organic forms, or plants growing from the ground up.

***Fabrique*s**

With references to mechanical landscapes, hybrid interfaces, and the staging of affective relationships, the project turned towards paradigms in the history of landscape design.

According to John Dixon Hunt (Hunt, 2004), *Fabrique* is the French term for 'landscape architecture' first appearing in landscape painting in the Renaissance to describe small buildings added in the scenery - as seen in paintings by Claude Lorrain and Nicolas Poussin among others. In this iconographic context *Fabrique* signified the manmade, the fabricated within the natural - necessary in the painting to mark the anthropocentric aspect of landscape and its stylistic approach e.g. classical, baroque, romanticist, etc.

Moving from landscape painting to landscape design, narrative acquired a spatial dimension. A scenario was required in order to engage the visitor in acting out potential narratives. Narrative was staged in the gardens through the manipulation of movements and views, the selection of plants and topographical elements, and especially in the *Fabriques* where human interaction was intensified. From iconographic symbols in landscape painting, *Fabriques* turned into structures for staging human interaction (ranging from ruinous temples to obelisk sculptures, pergolas, objects trouvés and fountains). According to Hunt:

> () the role of these buildings – whether genuine ruins or fabrications – was to suggest a train of thought or some 'action' appropriate to the visitors who were involving themselves in these sites. (Hunt 2004: 84)

Conclusion

Through the Renaissance, gardens have been conceived as participatory environments based on narrative and the affect. On the one hand landscape painting has taught us about systematic organisation of vision and conceptual abstraction to stage the picturesque, but on the other hand, gardens have always formed dynamical systems based on narrative and cognitive engagement. *Fabrique* attempts to generate this train of thought mentioned by Hunt, as a loose narrative. This will allow people to compose their own by participating in the garden's processes. Whether a machine, a team game, a performance directed by the visitors, or a garden which needs attendance, *Fabrique* constitutes the realisation of a system. Thus, narrative and engagement within this system become more important than visual representation. The question is whether *Fabrique*, as a devised construct is able to engender a sense of collectivity and stewardship to the visitors through its procedural, systemic approach.

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The art of mobility: how transdisciplinary artists' projects are testing the boundaries of mobile media design

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> Locative media emerged over the last half decade as a response to the de-corporealized, screen-based experience of net art, claiming the world beyond either gallery or computer screen as its territory. Initially coined as a title for a workshop hosted by RIXC, an electronic art and media center in Latvia during 2002, the term is derived from the 'locative' noun case in the Latvian language, which indicates location and vaguely corresponds to the English prepositions 'in', 'on', 'at', and 'by'.[1]

Abstract

This paper will examine and critically align a number of projects using mobile and pervasive technologies, which have challenged the design and delivery of mobile services from around the world, as documented on the author's weblog and forthcoming book *Mobile Audience*. The examined range of artist's work in locative media also raises key questions on the underlying conceptual frameworks necessary for an effective locative experience.

Keywords: locative, pervasive, media, art, design

[1] Tuters, Marc and Varnelis, Kazys, "Beyond Locative Media" http://networkedpublics.org/locative_media/beyond_locative_media accessed 12/03/08

Space and place

Screen cultures to date have been dominated both by narrative and by its modes of framing. Dispersed modes of interaction raise a series of questions about emergent new media art forms, particularly in relation to an audience's changing modes of participation and reception. The convergence of mobile technologies and pervasive computing methods are creating a world where information-rich layers can be mapped directly onto urban topologies. This opens up a series of interrogations around changing concepts of space and place and new perceptions of urban space for a wide range of traditional disciplines from art and architecture to cultural studies. The blurring of the boundaries between physical and virtual demands a new theory-base to explain our changing concepts of the 'real', and, with the growth of hybrid environments, the concomitant changes in sociability and communication patterns.

The nature of audience interaction is responding to a socio-cultural dynamic that, although yet far from being quantified, demonstrates both a desire for a greater degree of 'participation' (evidenced in popular broadcast television e.g. Big Brother and its interactive outlets) and in the meteoric expansion of social networking on sites such as MySpace and Facebook. Where both these participatory and networking imperatives meet with pervasive media, an emergent art practice is developing, which is pushing at the boundaries of these technologies.

What therefore is the potential for the emergence new visual and auditory languages and strategies of narrative in the new paradigm of locative and pervasive media? Analysing and redefining the emergent visual and auditory languages required to enable the realisation of effective interactive narrative and art forms in urban and site-specific environments is a huge challenge. But only through such an understanding of the new and radical forms of experiment, can we attempt to map changes in sociability and communication patterns and new forms of collaboration.

How can this extension of interactive technology from fixed installation to real urban geographies radically alter the modes of audience participation and reception? If the physical space overlaps the space of diegesis, can this emergent space for art and performance create new perceptions of space and place in an audience? We appear to need a redefinition of the concept of physical space (including hybrid environments), since through such technologies a new perception of urban space is emerging which is not visual, but conceptual.

Much reflection on Locative media art has been premature, for as Drew Hemment observes:

> It is too early to offer a topology of locative media arts, however, or to tie the field down with strict definitions or borders. While artists such as Masaki Fujihata (JP), Teri Rueb (CN) and Stefan Schemat (DE) have been producing work in this area for many years, more widely there have been only a handful of fully realised locative art works, with many projects remaining in the beta-stage, if not still on the drawing board. We have not yet reached the point at which the technology disappears - all too often the tendency is to focus on the technology and tools rather than the art or content.[2]

The waters have been further muddied by the convenient way in which artists' projects have often aligned with the consumer research interests of the mobile phone companies, where yesterday's locative project becomes tomorrow's 'killer app':

Mike Liebhold of the Institute for the Future (IFF) regards 'geohackers, locative media artists, and psychogeographers' as key players in developing the 'geospatial web', where the web becomes tagged with geospatial information, a development that he sees as having 'enormous unharvested business opportunities', and believes that this context-aware computing 'will emerge as the third great wave of modern digital technology'.[3]

Locative artworks, based on digital mobile technologies are a relatively new phenomenon. Yet art practice based on site-specific works and nomadic strategies is not just old, but ancient. Locative Art, by its very nature, trespasses into the realm of Public Art, but by its interaction with the public, transforms our notions of site-specific and ambulant practices, defined over the last three decades by artists such as Richard Long, Hamish Fulton, Vito Acconci and Sophie Calle. The history of located and nomadic art is a very long one indeed - stretching back beyond Robert Smithson and Richard Long to Aboriginal Songlines and spatialised religious rituals. I pose here the question whether, by similarly rooting locative practice in

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[2] see http://www.drewhemment.com/2004/locative_arts.html

[3] Quoted in "Beyond Locative Media" by Marc Tuters and Kazys Varnelis. See also "The Geospatial Web: A Call to Action - What We Still Need to Build for an Insanely Cool Open Geospatial Web" by Mike Liebhold, Senior Researcher, The Institute for the Future < http://lists.burri.to/pipermail/geowanking/2005-May/001536.html> (accessed 12/03/08)

profound cultural and psychological structures, locative work can gain greater artistic resonance. Respect for place and space has long gone from our social uses of location-based technologies and may only be reclaimed by artists.

While the tagging of urban space is a process enabled by the commercial concerns of big software players such as Microsoft and Google, it will probably only be when that process meets the next generation of GPS enabled mobiles that the really interesting art works will begin to emerge, possibly on individual issues of sustainable lifestyles - as in Katherine Moriwaki's *Inside Outside* pollution-sensing handbag.[4] Social uses of technology are always beyond prediction. Christian Nold for example has definitely found a new way to exploit the personal context of the technology with his emotion mapping and bio-sensing in relation to location.[5] I am sure such hybridity combined with the collective construction and augmentation of site-specific knowledge through wiki-like interfaces is an evolving future for locative art.

Which bring me to a further question relating to the art itself. Much of what is named 'Locative Art' is not really art, but rather games-based work or spatial documentary or simply advanced toolsets that happen to use this technology. I think the potential is there, but art has a different function to these uses and when it is truly present you can smell and see it from afar. This brings us back to my earlier question about the pleasures and modes of user experience and how we can distinguish these from other media art forms or genres of work?

[4] http://www.kakirine.com/ (accessed 12/03/08)
[5] http://www.biomapping.net/ (accessed 12/03/08)

Figure 1. GPS tracking of referee's movements in a match (Jeff Knight, DMU)

In defining the pleasures of the medium the *Mobile Bristol* project made an attempt to identify these through a seminar series in 2005, where for example, it was discovered that the accidental overlapping of ambient environmental sound and augmented sound with in a locative work created delicious ambiguity and extra resonance for an audience.[6] What is needed most I think is to understand both the social context of these new artworks and the pleasures of their reception and use. These are dependent on haptic and spatial senses such as *proprioception*, which are little understood by artists.

A gendered form

The political and economic shape of society ultimately forms contemporary modes of narrative. The contradictory pressures of neo-liberal economics, which drive the growth of personalised and peer-to-peer media and the interpenetration of workspace and private space, also seem to offer a unique opportunity to break Mulvey's determinist 'male' control of narrative vision, which dominated narrative in

[6] http://www.mobilebristol.co.uk/NewSeminarsLanguage.html (accessed 12/03/08)

the 19th and 20th centuries, and, to promote a more de-centred and subtle mapping.[7]

Feminist critics have often raised alternative strategies to break the negatives of a culture of male 'control'. Not surprisingly, some interesting female locative practice explores precisely this area. Teri Rueb's *Drift* [8], for example, tied a sound landscape to the movements of the tide on a north European beach. The installation covered a 2 km x 2 km region on the Wadden sea that is filled with areas of interactive sound. The piece creates a space of flows consisting of sounds and words that travel like particles on simulated air and water currents loosely based on actual oceanographic and meteorological data. The audience had either to give itself up to the primal cycles of nature or risk terminal confusion and data loss.

Performance or game-play?

Mobile devices already appear performative in their nature, with public space interpenetrating our private concerns, so that any conversation has its willing or unwilling eavesdroppers. Add to this the potential for social interaction, crudely demonstrated by *Flashmobs,* and in more sophisticated ways by mobile gaming, you have a case of new technology creating adaptive social behaviours, which contain strong performative elements:

> The mobile games industry has long been the poor relation of the PC and console markets, but a combination of new technology, services and investment is fuelling optimism that mainstream adoption is not too far off. Ask anyone to name a mobile phone game and the most common response will be Snake or Tetris. And while the classic Russian puzzler is the world's most played and downloaded mobile game it is not an accurate reflection of the industry.[9]

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[7] Mulvey, Laura Visual and "Other Pleasures" (Theories of Representation and Difference)
[8] http://www.terirueb.net/drift/index.html (accessed 12/03/08)
[9] "How mobile got its game on" by Darren Waters
Technology editor, BBC News website, San Francisco
http://news.bbc.co.uk/1/hi/technology/7254123.stm (accessed 12/03/08)

Far more demanding games are already being played using mobile technologies such as *Catchbob* [10] and Blast Theory's *Uncle Roy All Around You,* which combine Internet and mobile technologies, where the city and the Internet were regarded as related stages on which we play, regardless of the specific context. Steve Benford of Nottingham University now talks of 'seamful' media where players have learnt to exploit GPS 'shadows' (where tall buildings block satellite triangulation) to their own advantage during game play, describing how such unforeseen effects of the technology encouraged new kinds of movement through the city.[11]

The failure of such works is often in terms of misapplied contextual practice: I once tested Valentina Niisi's *Media Portrait of the Liberties* in Dublin before the demise of MIT's Eurolab.[12] We had gone about a block when the local youths began stoning us. The technology was certainly impressive, but this new form of public art was alien even to the children of the collective contributors to the artwork. When participating in Blast Theory's *Uncle Roy All Around You*, I reflected on how the game's format had reduced the richness of the city to a few textual clues and a dangerous process of frantic searching, with users crossing roads with even less awareness than the average iPod listener.

Spatial annotation

Spatial annotation has emerged in the last three years as a major Internet phenomenon, particularly with the growth of Google Maps and social photosharing sites such as Flickr. In spatial annotation projects like *Yellow Arrow* [13] and *Neighbornode* [14] and in my own *Starshed* [15] (Fig. 2) for *Electric Pavilion*, cities are increasingly being treated as surfaces on which individuals can inscribe annotation, and which will ultimately become repositories of collective memory. Such story-telling projects allow for new social and cultural readings of space, allowing private narratives to become public and subject to reinterpretation.

[10] http://craftwww.epfl.ch/research/catchbob/
[11] "Performing Space" Arts and Humanities Research Council Seminar at Norttingham Trent University, February 2008
[12] http://www.valentinanisi.com/liberties.html (accessed 12/03/08)
[13] http://yellowarrow.net/index2.php (accessed 12/03/08)
[14] http://www.neighbornode.net/ (accessed 12/03/08)
[15] http://www.electricpavilion.org/content/roots/starshed/index.html (accessed 12/03/08)

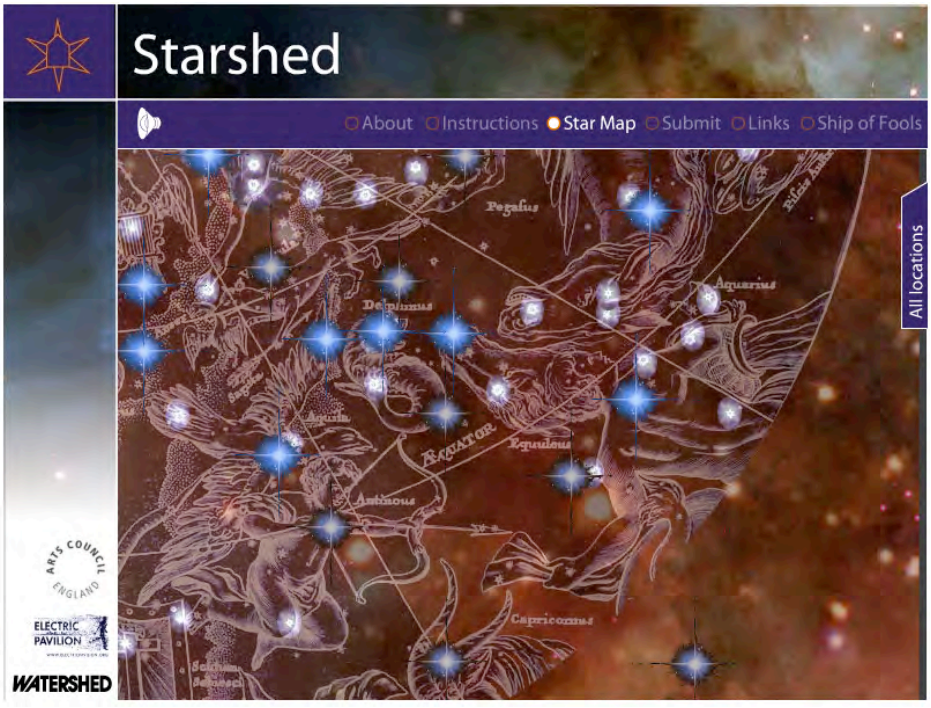

Figure 2. *Starshed* (Martin Rieser / SOF)

Satnav systems tend to reduce our world to roads between A and B. The specific tagging potential of the locative can certainly overlay this reductive idea of space with all the richness of personal experience, but that depends on the framework provided and the context set by the artist, and in many projects this is so loosely drawn that we simply achieve a kind of public palimpsest.

In their project *34n 118w*, Jeffrey Knowlton, Naomi Spellman, and Jeremy Hight had users take Tablet PCs with Global Positioning Devices and headphones onto a former railway yard in downtown Los Angeles. As participants walked around the site, they could hear fictional statements recounting the history of the place. To quote Hight:

> The story world becomes one of juxtaposition, of overlap, of layers appearing and falling away. Place becomes a multi-tiered and malleable concept.[16]

There are other contemporary narratives resonant with the reinforcement of site and story. *Riot1831!* from Mobile Bristol depicted the Bristol Riots of 1831.[17] This first

[16] http://34n118w.net/ (accessed 12/03/08)
[17] See: http://www.cs.bris.ac.uk/Publications/Papers/2000261.pdf.

GPS-enabled locative drama was an immersive and powerful experience, engaging with the immediate spaces of history, mapped onto a Georgian square where the original events took place.

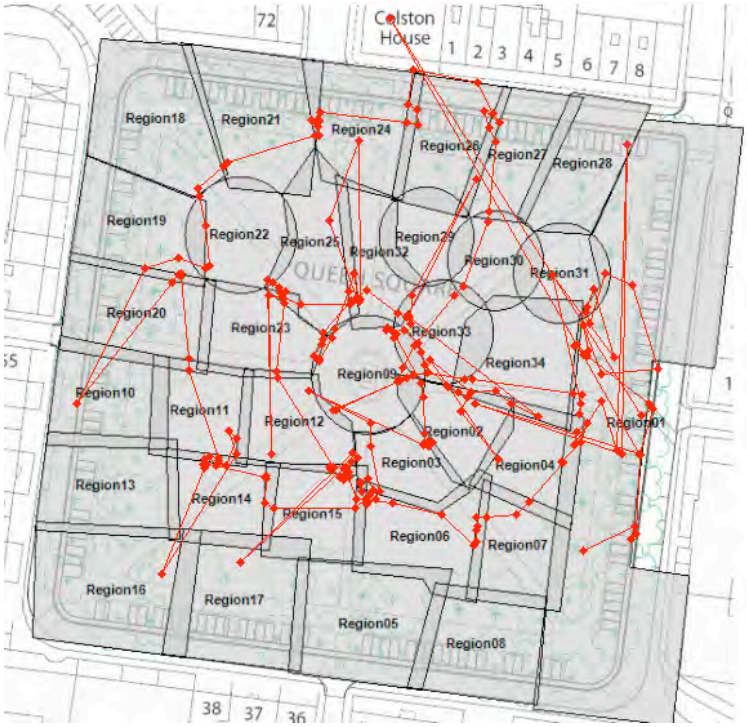

Figure 3. *Riot!:* user tracks in Queens Square showing audio zones

Figure 4. *Riot!* users in the Square

At first sight it seems contradictory that such engaging locative works tend to deal with an historical past rather than the lived present. After all, Paul Virilio identified new media as promoting the change from considered diegesis to continuous and automatic present, the user creating the narratives both as subject and object; the visual subject becoming transferred to a technical effect, which forms a sort of 'pan-cinema', turning our most ordinary acts into movie action. However where these locative works succeed, they seem to overlap the user's enactment of a continuous present with the user's immediate perception of a contiguous past.

The ever increasing technologising and enclosure of urban and public spaces is a phenomenon associated with the growth of 'Herzian' Space and what Mark Augé[18] has termed the growth of 'no place' (the anonymous motorway or mall). Stephen Graham points to how:

> … places [are] becoming increasingly constructed through consumer decisions which, in turn, are influenced through the … surveillance, and sorting, of cities.[19]

Such cities, increasingly 'sorted' through the software and networking, point to a related political question about the embedding of previous relations of power, class and ownership in the new infrastructures, and, whether this perpetuates ancient divisions or raises further questions related to the potential for community and individual empowerment.

Mapping as critique

Apart from the arguments that the technology is intrusive and very commercial and is being 'sold' to us via arts projects, there are those about the role of Situationist ideology in locative media (something about which I am personally deeply sceptical, mainly because so few artworks succeed in the 'Detournment' of the original movement). The GPS mapping practice of modern psychogeographers, (see http://www.gpsdrawing.com and http://socialfiction.org) are seemingly related to the

[18] 3 Augé, Marc, *Non-Places: Introduction to an anthropology of supermodernity*, Verso, 1995
[19] S. Graham, "The Software-Sorted City: Rethinking the 'Digital Divide'", in S. Graham (ed.), *The Cybercities Reader*, London: Routledge, 2004: 324-331.

writings of Guy Debord and his practice of the 'Dérive' [20], but in reality seldom appear to achieve anything identifiably subversive. To quote one cultural critic:

> Locative media is: Psychogeography without the critique. Algorithmic psychogeography, the term used by http://socialfiction.org to describe their rule-based derives through the city, is not just a development, but actually a fundamental reversal of the critical use of this Situationist tool. [21]

The 'Dérive' or 'drift' was a method for subversion; of remapping the world with 'uncontrolled' clarity, for identifying the secret flows of money and power below the surface of the city. However, one strategy Debord does cite: 'the introduction of alterations such as more or less arbitrarily transposing maps of two different regions', has been successfully adapted in several locative works. Jen Southern and Jen Hamilton in *Distance Made Good* [22] used parallel mirrored journeys on two continents; in *Shadows from Another Place* [23] Paula Levine creates a hybrid space between Baghdad and San Francisco composed of the superimposition of their city centres. A mapping of the initial US attack on Baghdad is superimposed upon downtown San Francisco. The longitude and latitude of each bombsite is marked in San Francisco using a GPS device. C5 in *The Other Path* [24] set out on a month long Great Wall trek, starting in the northwest desert of China and following the Wall eastward to where it runs to the edge of the Yellow Sea. GPS data collected during

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[20] "The Dérive (with its flow of acts, its gestures, its strolls, its encounters) was to the totality exactly what psychoanalysis (in the best sense) is to language. Let yourself go with the flow of words, says the psychoanalyst. He listens, until the moment when he rejects or modifies (one could say detourns) a word, an expression or a definition. The dérive is certainly a technique, almost a therapeutic one. But just as analysis unaccompanied with anything else is almost always contraindicated, so continual dériving is dangerous to the extent that the individual, having gone too far (not without bases, but...) without defenses, is threatened with explosion, dissolution, dissociation, disintegration. And thence the relapse into what is termed 'ordinary life,' that is to say, in reality, into 'petrified life.' In this regard I now repudiate my Formulary's propaganda for a continuous dérive. It could be continuous like the poker game in Las Vegas, but only for a certain period, limited to a weekend for some people, to a week as a good average; a month is really pushing it. In1953-1954 we dérived for three or four months straight. That's the extreme limit. It's a miracle it didn't kill us" (Ivan Chtcheglov, excerpt from a 1963 letter to Michèle Bernstein and Guy Debord, reprinted in Internationale Situationniste #9, p. 38).

[21] Saul Albert <www.twenteenthcentury.com> (message dated Tue Apr 27 2004)

[22] Jen Southern and Jen Hamilton "Unfeasible Symmetry" Artists Newsletter Magazine (October 2003) article on Distance Made Good shown at The Gallery, Stratford-upon-Avon, UK. July 2002 http://www.theportable.tv/dmg/index.html (accessed 12/03/08)

[23] Paula Levine, *Shadows from Another Place* (2003)
Levine builds upon this link, creating Hybrid space between Baghdad and San Francisco composed of the transposition of Baghdad and San Francisco.

[24] C5: The Other Path (April 2004) <http://www.c5corp.com/projects/otherpath/index.shtml>

this trek was used to develop a pattern matching search procedure for locating the most similar data model in the most similar terrain in California.

Mark Tuters has perceptively identified how such annotation and tracing fits into the legacy of Situationism, which Locative Media has claimed as a philosophical base from its inception:

> Roughly, these two types of locative media, Annotative and Tracing, correspond to two archetypal poles winding their way through late 20th century art, critical art and phenomenology, perhaps otherwise figured as the twin Situationist practices of detournement and the derive. [25]

Situationism in Locative media resists easy definition, but may best be represented says Tuters, by one of Deleuze and Guattari's maps which distinguish between annotation and tracing:

> The map is open, connectable in all its dimensions, and capable of being dismantled; it is reversible, and susceptible to constant modification. It can be torn, reversed, adapted to montages of every kind, taken in hand by an individual, a group or a social formation. It can be drawn on a wall, conceived of as a work of art, constructed as a political action or as a meditation ... Contrary to a tracing, which always returns to the 'same', a map has multiple Entrances. [26]

Blast Theory, a locative media group composed of several London-based avant-garde theatre artists have gained renown for projects such as *Can You See Me Now* (2001), *Uncle Roy All Around You* (2003), and *I Like Frank* (2004), in which they used location-aware mobile mapping devices to coordinate interactions of audience and performers in both real and virtual space. *Uncle Roy All Around You* is one of the most lauded recent locative works, yet it appears an uneasy mix of performance and game, its full narrative only accessible to those who successfully complete their quest. The real and virtual sit in an uncomfortable relationship with the environment, which is only valued as a source of directional clues - and any

[25] "Beyond Locative Media" by Marc Tuters and Kazys Varnelis

[26] G. Deleuze and F. Guattari, *On the Line*, New York: Semiotext(e), 1983: 25-26.

casual bystander remains largely mystified and excluded. The charge levelled at Blast Theory at a conference was that of complacently and uncritically adapting new practice for the games industry, thus unwittingly acting as fashionable agents for intrusive and suspect technologies. For the flip side of ubiquitous communication and augmented location is the ability to track the audience: so a whiff of the totalitarian always haunts the liberating potential of the technologies. Matt Adams has rebutted this critique in interview, pointing to the collaborative co-dependency explored by the work. [27]

Their performances and installations have been supported through corporate sponsorship, public arts funding, and through a six-year collaboration with the Mixed Reality Laboratory at the University of Nottingham. The group's own web site claims:

> Blast Theory has a history of working with corporate clients to deliver innovative marketing strategies, 'thereby creating' commercial projects that draw global audiences to compelling, high adrenaline interactive experiences. The team of artists and scientists has worked with blue chip clients in the television, apparel and telecoms sectors to launch products, build profile, inspire staff and engage customers.

An early locative project, which epitomized its emergent qualities was *MILK*, winner of a Golden Nica at Ars Electronica. With *MILK*, the artists, Esther Polak and Leva Auzina, used GPS to trace routes to create a form of landscape art for a network society. *MILK* was based, in part, on a project by Polak and the Waag Society, *Real Time Amsterdam*, in which GPS transponders mapped cyclists in Amsterdam on their traffic routes by the aggregation of their travel measured over a period of weeks. *MILK* suggested a god-like vision of locative technologies that allowed the tracking of freighted foodstuffs. In this case with heavy irony, since the dairy-rich Netherlands import their milk from Latvia making visible the contradictions and excess of a networked society.

The increasing importance of maps in defining space within these projects should not blind us to the fact that mapping is not a neutral process, but always has been a highly selective and subjective one, in which can be embedded various (invisible)

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[27] See Rieser, Martin *The Mobile Audience*, Rodopi, 2009

ideological assumptions. Many GPS mapping projects tend to forget this and even revel in the act of remapping without context.

Media artist Coco Fusco also launched a headlong attack on new media practices associated with networks and mapping, declaring:

> It is as if more than four decades of postmodern critique of the Cartesian subject had suddenly evaporated … In the name of a politics of global connectedness, artists and activists too often substitute an abstract 'connectedness' for any real engagement with people in other places or even in their own locale.[28]

Exploration of tangible objects

We are entering into a society based on ubiquitous networked objects or Bruce Sterling's *Spimes.*[29] Soon, objects will be the most frequent users of the Internet, as fridge talks to oven and RFID tags note the progress of stock to central computers. But what the ITU has termed the 'Internet of Things' means far more than just tracked objects, as Tuters observes:

> Things' are controversial assemblages of entangled issues, and not simply objects sitting apart from our political passions. The entanglements of things and politics engage activists, artists, politicians, and intellectuals. To assemble this parliament, rhetoric is not enough and nor is eloquence; it requires the use of all the technologies, especially information technology, and the possibility for the arts to re-present anew what are the common stakes.

The pervasive and context aware object will partner a far more physical engagement with mobile devices. The Wii has fermented a revolution in indoor gaming. Devices such as those of the US firm Gesturetek, has developed software to use a phone's camera to interpret how the phone is being moved; translating gestures into action

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[28] Coco Fusco, "Questioning the Frame: Thoughts about maps and spatial logic in the global present" http://www.inthesetimes.com/article/1750/ (accessed 12/03/08)

[29] "Ascendancies: The Best of Bruce Sterling by Bruce Sterling" (Author), Jonathan Strahan (Editor) and also http://www.wordspy.com/words/spime.asp (accessed 12/03/08)

and will promote the use of body actions in street level mobile gaming, but as John Vincent, president and founder of the firm, said:

> Being able to do natural movements, not just hand but also full body movement is the way forward.

The technology is embedded in phones released by NTT Docomo in Japan and allows gamers to move the phone, forward and backward, shake it, and roll the device to control action on the screen. [30]

Surveillance and sousveillance [31]

In a C-Theory article entitled 'Operational Media'[32] Jordan Crandall spoke of the 'resurgence of temporal and locational specificity witnessed in new surveillance and location-aware navigational technologies' and Stephen Graham has warned of the invisibility of such tools and the embedding of discriminatory and selective process in such things as network server logic. Steve Mann caught on to this process very early in 1998 and labelled its subversion as 'Souveillance' or ‘Surveilling the Surveillers’. Specifically he refers to Reflectionism as being especially related to 'detournement': the tactic of appropriating tools of social controllers and resituating these tools in a disorienting manner.

Fears of surveillance are undoubtedly real and relate to the imperative of the State in an age of counter-terrorism, to quote Manovitch 'to make the map equal the territory'. Of course this technology is a double-edged sword, but then it is also made democratic by its distributive nature and is now in many hands. Artists who have questioned the vulnerability of the individual to tracking include Drew Hemment through his *Loca* project,[33] and Jonah Brucker Cohen with his *WiFi Hog* [34] has challenged the enclosure of *Hertzian* space.

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[30] How mobile got its game on By Darren Waters Technology editor, BBC News website, San Francisco http://news.bbc.co.uk/1/hi/technology/7254123.stm (accessed 12/03/08)

[31] Steve Mann, Jason Nolan and Barry Wellman, "Sousveillance: Inventing and Using Wearable Computing Devices for Data Collection in Surveillance Environments" in *Surveillance & Society* 1(3): 331-355 http://www.surveillance-and-society.org

[32] Crandall , Jacob 'Operational Media' CTheory Articles: a148 Date Published: 1/6/2005 http://www.ctheory.net/articles.aspx?id=441

[33] See http://leoalmanac.org/gallery/locative/loca/index.htm (accessed 12/03/08)

In the face of new enclosures of public electronic space, through surveillance and border control, biometrics and consumer tracking technologies, as Crandell puts it:

> The challenge is not only to endeavor to understand this operational construct, but to understand the forms of opposition to it that are emerging in the globalized world. For the operational is only one 'window' onto reality. There are other orientations that counter it, and for which, by its very nature, it is unable to account. It is powerless to envision terms of engagement that do not operate according to its logics. It can only assign them to the realm of the barbaric or irrational: that which lies outside of its license on reason.[35]

The compromised publics can choose to respond through collective action, violence or the through the 'reflective' intelligence.

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[34] See: http://www.coin-operated.com/projects/wifihog.html (accessed 12/03/08)
[35] Ibid CTheory

KinoPuzzle: grasping realities through tangible tabletop documentaries

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Introduction

Computationally enhanced tabletops featuring tangible objects for participant interaction hold promise for the creation of new forms of media, including documentaries and stories constructed by individuals or small groups in distributed or face-to-face settings. Many computer-aided storytelling systems feature either algorithms to arrange story elements automatically or, story structures to guide authors in presenting their tales. In contrast, the *KinoPuzzle* system affords a high degree of freedom for authors in constructing tabletop experiences and for participants in exploring multi-viewpoint narratives. This format for story-telling combines the representational depth and flexibility of the digital database with the expressive power of the collage surface, offering advantages in terms of open-ended dialogic juxtapositions and the collaborative exploration of reality-based material. The inspiration for the *KinoPuzzle* system comes from the fields of social and ethnographic documentary-making and conceptual lenses from ethnography and ethnomethodology. The values embedded in these approaches to recording life are reflected in the code, data structures (or lack therefore), and visual strategies of the system. The primary goal of the system is to enable authors and readers flexibility to explore, interpret, and reinterpret multiple viewpoints within differing contexts. Our adoption of the collage tradition for organizing the display and interaction of visual and tangible content provides an open-ended framework for the composition and

manipulation of viewpoints and stories. Collage as a spatial representational form may be better suited to the presenting the conflicting 'actualities' that are the subject of contemporary documentaries than narratives presented in sequence based on traditional story structures in the Aristotelian tradition.

Influences

A number of applications in recent years have focused on the advantages of the tabletop and tangible computing form factors for the support of group story-telling (Shen 2002: 324-333; Mazalek 2003: 105-109; Stock 2008: 1583-1592). Properties of tabletop systems include large display surfaces, synchronous manipulation of content by two or more individuals, and the ability to couple multimedia content with meta-data for processing. The latter in particular enables tagging, sorting, filtering, and sequencing of content. This has been explored previously in traditional GUI platforms and other TUI and tabletop interfaces seeking to exploit the procedural advantages of computational media for reality-based stories. (Davenport 1995: 381-389; Davenport 1996: 441- 442; Mazalek 2003: 150-153). These applications combine the use of meta-data attached to content elements, such as sound, pictures, and motion video, with rule-based engines to automate either the clustering of content for visual display, as in the presentation of multiple viewpoints, or the sequencing of content play-out.

The work of the MIT Interactive Cinema and Media Fabrics Group, led by Glorianna Davenport, contributes significantly to the development of *KinoPuzzle*. Influences in particular are systems from this group designed to enable multiple authors to collaborate in the construction of media works through tangible interfaces that increase ease-of-sharing of individual and group perspectives. *Tangible Viewpoints* is the most closely related, as it enables multiple participants to contribute video clips about their experiences, which are ordered by the system according to where and when the clips were generated, and also the assignment of the clips to a 'character' for the purpose of telling stories. Users of the system access a resulting database of clips on a tabletop interface using 'character' tokens that trigger the querying, display, and further processing of the clips *(*Mazalek 2003: 153-160*).* However, *Tangible Viewpoints* combines a set of rules for moving story action forward with the use of a spreading activation network model for the manipulation of meta-data, ostensibly to create more meaningful sequences, whereas *KinoPuzzle* purposely uses a minimal

rule set for generating new scenes and a meta-data scheme built on hand-authored themes and relationships.

KinoPuzzle departs from the technical approaches of rule-based story systems because its rhetorical goals are different. In order to create a tool that offers the maximum flexibility for the interpretation and experiencing of mediated realities, including realities in conflict, we have analysed social and ethnographic documentary works and also practices from the social sciences, ethnography and ethnomethodology. An objective of all these practices is to reduce observer bias in documenting and understanding situations from the points-of-view of those involved in situations. Ethnographic filmmakers such as Jean Rouch promoted the capture of events directly by participants as a form of cultural self-determination, and direct cinema filmmakers, such as D.A. Pennebaker and Richard Leacock, recorded events with as little interference as possible in order to reduce interpretive influences. Ethnomethodology in particular seeks to represent realities in ways that offer the highest degree of fidelity possible to the lived experiences of participants by focusing on the interpretive procedures used by people in particular settings, including the analysis of conversation.

KinoPuzzle embeds the values of minimal interpretation in its system by eschewing reliance on rules or structures derived from culturally specific narratives. Instead, it offers a simple and flexible meta-data structure to support the open-ended thematic coding of content generated from any situation to minimise constraints on users in the construction of meaning from the 'text' of any event. Thus, while less reliant on harnessing the power of computing to automate authoring, *KinoPuzzle* affords authors greater flexibility in using computational media to *present* the complexities of real situations, in which multiple viewpoints and differing versions of stories may be in play and also in conflict.

To match this underlying representational flexibility for coding meaning into content in the form of meta-data, we selected the metaphor of, and visual style of, collage for the *KinoPuzzle* interface, as seen in Figure 1. Collage works well for presenting what can be seen and underlying interpretations, as it is a spatial representation that plays on the tensions of surface and depth. As Greenberg noted 'The abiding effect is of a constant shuttling between surface and depth, in which the depicted flatness is "infected" by the undepicted.' (Greenberg 1961: 70-83).

Figure 1. A *KinoPuzzle* composition showing persons interviewed and context

A rich tradition of collage techniques and purposes can be found in the fine art canon, from the juxtaposition of unlikely elements to disrupt traditional visual practices or to satirise institutions, to arrangements supporting or critiquing ideological positions, or to amplify cultural trends and themes, with many works featuring diverse visual styles. Adding computational elements to traditionally static collage works in order to increase their expressive power is a key strategy of *KinoPuzzle*.

Implementation

Interface and story engine

The *KinoPuzzle* interface is a collage of irregular 'pieces', visual images that can take either digital or tangible form, or both, on a tabletop surface. Participants manipulate *KinoPuzzle* collages by placing on the table surface tangible copies of the digital pieces and tools that act upon the digital pieces. At present, the tangibles are exact size photo replicates of the digital pieces rendered in acrylic, as seen in Figure 1 or three-dimensional objects as seen in Figure 2.

Figure 2. As *KinoPuzzle* tangibles are brought together, video clips are triggered on the table surface

All pieces, digital or tangible, are linked through meta-data to a set of underlying motion picture, still image, and audio materials. The system uses this meta-data not only to associate the collage pieces with media-rich content, but also to generate visual feedback on the collage surface. For example, pieces may be attracted or repelled by other pieces, suggesting to interactors the relationships between the collage elements, for example, an attraction or repulsion between two persons' viewpoints. Thus the *KinoPuzzle* system invites participants to 'solve' or make some sense of collage compositions through the rearrangement of its pieces and media content play out.

KinoPuzzle's software modules make use of Java XML-handling libraries. The meta-data schema contained in XML files can be easily understood by people who are not technically oriented. Both the collage pieces and the underlying media (content) to be associated with the collage pieces have a meta-data file. Collage piece meta-data elements include information regarding size and positioning of the piece for use by a collage manager module, and key information such as the scene number to which the piece belongs and its associated underlying media objects. The key meta-data element in the media (content) XML file is *theme*; every media element has one or more themes. A separate XML file is used by the author to designate the relationships between these themes; the simplest type of relationship is an association, which must be coded as an attraction, a repulsion, or a null relationship. The story engine contains modules for reading the XML meta-data, accepting multi-touch input, managing the collage in real-time based on the themes triggered and

their relationships, and the ordering and playing out of media content based on themes triggered and temporal position of the media content within a sequence. Processes within the system track whether or not particular media has been played and the extent to which media within a scene has been played, and provide a mechanism for changing scenes. (A scene is a collage, its collage pieces, underlying media and meta-data.) Visual feedback is provided to users to support interaction via tangibles: if the tangible copy of a digital piece has been placed on the table, the program 'fades' the digital piece and aligns it with the tangible copy. To ensure that the video clips are presented at the proper viewing angle for participants using the system at any side of the table, the system tracks the rotation angle of pieces, allowing participants to use pieces to rotate the angle of the video play-out to their best view.

Hardware and Display

KinoPuzzle currently runs on a modified version of the *reacTIVision* system. This system offers a library of unique visual markers one can affix to the base of tangible objects, such as the acrylic puzzle pieces mentioned above (Kaltenbrunner 2007: 69-74). A camera underneath the table surface reads the markers, their angle of rotation, and position, making use of diffused illumination (DI) from infrared lamps against an opaque acrylic surface. To improve the accuracy of the system in reading user input by way of tangible objects, there are IR filters on both the camera used for computer vision and the projector which sends content to the tabletop through a series of mirrors. The dimensions of our current table are roughly 3 x 4 feet, with the marker sizes at 2-3 inches. This allows us to create puzzle pieces that fit easily within human grasp.

Current and future work

While we intend to produce original works for this experimental media format, our current project remediates a social issue documentary on nuclear weapons manufacturing, featuring a compilation of archival footage. For the 'starter' collage interface, we composed an arrangement of digital and tangible collage pieces using visual elements from key film frames. We chose a range of images, some iconic - such as an atom bomb blast, a towering nuclear reactor, hands within a glove box, a dripping waste pipe – and others metaphoric - an armed guard and a steaming stream (e.g. suggesting secrets.) We associated these pieces with underlying film

material and created meta-data, setting up a dynamic interplay among the content as viewers interact with the collage. Thus, when brought together, the nuclear physicist-turned-peace activist is repelled by the former U.S. Secretary of Energy. When the likenesses of these two persons are brought near one another on the interface, their opposing viewpoints, in the form of linked film clips from the documentary, are played. While juxtapositions of viewpoints are common in documentaries, *KinoPuzzle* enables participants to explore viewpoints and uncover relationships on their own, versus passive, reception.

Initial participant feedback at periodic demonstrations during development in our lab has been positive. People are intrigued by the idea of discovering relationships in the content by bringing different pieces together. They express delight at the highly visual nature of the *KinoPuzzle* interface and its lack of text. We also found that as people used the system, if they were explicitly told it was a puzzle to solve, they adopted different behaviours towards the interface. In short, they became more deliberate in their use of the tangibles to reveal relationships between pieces and in the underlying content. However, several people have commented that it could be difficult to interpret relationships if the collage became overly complicated, and also that they are uncertain if novices to such a system would know how to begin using it. This initial feedback suggests the need for a set of tools in addition to the tangibles currently offered (primarily tangible copies of the digital collage elements) that people could place on the surface to offer clues and support for interacting with the collages. Our current plans are to expand our existing application with content and conduct testing to formally document feedback and inform the design of the tools suggested by our initial demonstrations. Secondly, we are very interested in the applicability of this format for different types of documentary genres, and whether or not this format increases in the interactors a sense of engagement with the issues presented, a critical reception of viewpoints, and most importantly, an interest in contributing viewpoints and stories, perhaps in the form of annotations, to the base of content. Obviously, the level of engagement is likely to be directly tied to whether or not participants fundamentally perceive the content as relevant to them. We also anticipate comparing the use of this system in generating original content from small groups against more traditional methods of generation, such as documentary video making, in terms of the richness and volume of the dialogue and the sharing of multiple viewpoints.

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Critical Dressing: creative wearables and tactical practice

Susan Elizabeth Ryan

This paper considers the work of artists and activists who, since the 1990s, have worked with dress as survival mechanism and social tool. The result is a 'body of records' of performable and technological wearable practices that have resisted categorical branding. Some of the work is designed for the gallery or runway, but other pieces are presented, performed, or simply worn on the street. The latter contribute to a notion of the counter-public sphere similar to that described by Oskar Negt and Alexander Kluge: a space to generate fantasy and consciousness outside of structures and regimens of appropriated existence, what the authors call 'frameworks of valorization'. (Negt and Kluge 34)

In the 1990s, Lucy Orta became prominent among artists who formulate clothing the body as a critical, social, and ethical practice within an ambient culture of fear. I call such work critical garment discourse (abbreviated as CGD), a term I propose to mean work in the form of fashion or clothing that concerns not just the body but notions of dress - and dress, not just as historically viewed or normatively considered, but as experienced, situated, and empowered as a medium capable of significant social commentary.

Typically, certainly within scholarly histories of creative media, fashion and dress, have been trivialized as products of commodity culture unworthy of serious analysis. However, increasing numbers of researchers are studying garment history and theory, and some argue, as philosopher Gilles Lipovetsky does, that, far from being reducible to materialistic incentives for the growth of market economies, notions about what we put on our bodies inform the very infrastructure of advanced democratic society. He writes:

> We have reached the era of *consummate fashion*, the extension of the fashion process to broader and broader spheres of collective life. Fashion is not so much a particular peripheral sector, now, as a general form at work in society as a whole. Everyone is more or less immersed in fashion, more or less everywhere . . . . (Lipovetsky 1994: 131)

For Lipovetsky this is not a bad thing: fashion is a quintessential element in the lives of individuals functioning in modern societies. And by consummate fashion Lipovetsky means a vast and complex cultural knowledge of dress and what it represents in the modern era that we bring to bear, wittingly or unwittingly, every time we clothe ourselves. For Lipovetsky, fashion/dress substitutes for old structures of class. It focuses our lives in the present, and it allows us to respond in a performative way to a variety of stresses and to rapid cultural change.

Extreme environmental conditions constitute just one form of stress that has long influenced the discourse of dress, an influence that technology has driven forward. Stylish heated coats appeared on runways in the 1930s, and today new garments proposed for extreme environments like outer space are becoming a lot more fashionable. Designers from Mike Webb in the 1960s to Orta, later, have produced inventively armored or wired-up attire that protects against inclement circumstances and forms nomadic lodging. Such trends project visions of mobile populations that can move out and hunker down, and fears of unpredictable environmental and political challenges that keep populations on the run. This clothing discourse is a function of fluid subjectivities.

Numerous authors have portrayed the notion of postmodern selfhood under adverse circumstances as an interactive, ongoing process, much along the lines of Deleuze and Guattari's concept of nomadology, the deterritorializing and reterritorializing cycle of the body-without-organs engaged in multiple social entanglements and lines of flight. Relevant also is Bruno Latour's definition of society, 'not as a special domain, a specific realm, or a particular sort of thing, but only as a very peculiar movement of re-association and reassembling'. (Latour 2005: 7) Recently renewed interest in behavioural, corporeal, and subjective processes have helped generate wearables that multiply and perform embodied powers and protect nomadic bodies in action.

Lucy Orta was trained in fashion and, in response to the First Gulf War, she began to work outside the studio to investigate how, in the words of Nicolas Bourriaud’s relational aesthetics, 'art was about working well within social reality, not just about finding a means of representing reality'. (Bourriaud 8) She began piecing outfits together at the Salvation Army which were shown in the streets of Paris during Fashion Week, positioned in direct counterpoint to that dominant institution

associated with beauty, wealth, and privilege. Then, Orta created *Refuge Wear*. Though her collectivist garb has hung bodyless in museums and galleries, it has also been worn, and to greater effect, on mobile bodies in interventions around the globe. Orta's pieces succeed not because their imagery is new, but because it is recognizable. It references our physical vulnerability and need for support. Some allusions for Orta's pieces are space and hazmat suits and 'clean room' attire, garments familiar from mass media—cinema and television sci-fi—from the *Star Trek* EV suits of the 1960s to the quarantine suits crucial to the plots of the *X-Files*. But Orta's garments also point to the political performance of bodies in the counter-public sphere.

The discourse here is characterized by the deployment of clothing as corporeal experience, collective process, and visual aesthetic, particularly an aesthetic grounded in paradox. Claire Bishop writes of how the aesthetic 'signals an ability to think contradiction: the productive contradiction of art's relationship to social change'. Collaborative social practices are 'characterized by the paradox of belief in art's autonomy *and* . . . the promise of a better world to come . . . the aesthetic doesn't need to be sacrificed at the altar of social change because it always already contains this ameliorative promise'. (Bishop 2009: 249)

Thinking about wearables in general routinely involves criss-crossing genres from commerce to counter-culture, just as fashion draws from the street and vice versa. Perhaps, CGD belongs to another 'expanded field' (to use Rosalind Krauss's term) of wearable phenomena—some of it is art, some activism, some both, and some neither. My diagram, which is a work in progress, uses the semiological square not to transcribe this discussion into structuralist terms but simply to visualize a larger field of wearable practices, in which the boundaries between terms are porous rather than fixed (the square is 'heuristic because of its unusual combination of structure and flexibility', writes Katherine Hayles (1999: 248). Orta's work helps focus the 'Art' sector of this system, but keep in mind that it is more a direction than a zone.

Much of the square's upper half would conform to what Gregory Sholette has termed the 'Dark Matter of the Art World'—work so embedded in reality that is off of art radar. This realm of CDG includes garment-based political activities occasioned by regional and global threats: for example, projects by the Barcelona anti-globalization collective Las Agencias, or Italy's Yabasta and Tute Bianche (White Overalls or White Monkeys). (Sholette 2004) 'If, as Foucault wrote, the body is the object of the power's

micro-physics', reflects Sergio Zulin, one of the organizers of the latter group, 'if all social and political control exercises its mastery of the body, if the market economy has converted the body into merchandise, the 'white monkeys' [Tute Bianche] have called for a 'rebellion of bodies' against world power.' (Cuevas, 2000) Tute Bianche in action wear hazmat attire—white, in contrast to the police's black riot suits—and pad themselves to keep their bodies safe.

We can appreciate the complexity of protest dress if we look at the August 2000 anti-IMF/World Bank actions in Prague, for example. Jeffrey S. Juris, a participant in the events, writes of a complex and highly aestheticized display involving color themes and dress patterns that reflected an overall strategy of zones and levels of resistance: the Blue March representing high-risk militant action (incorporating hard-core protestors called the Black Bloc), the Yellow March representing low risk and nonviolence, and the Pink and Pink and Silver Marches representing mobile and decentralized actions that brought together militancy and play, with participants wearing the most extravagant costumes and creating a feeling of carnival. (Juris 2008: 123-24)

The garb of the hard-core Black Bloc, scattered throughout the demonstrations, was a severe version of the hooded sweatshirt and black pants popular throughout countless countercultural contexts in recent decades. It informed the popular 'fashionable' British line of hooded jackets by Vexed Generation. Then the Centre for Practical Magic recast the look as *The Ultimate Jacket* (2003), produced within a more traditional art or gallery context.

But in Prague, the extended display created a rich visual discourse of bodies, a 'compelling image event' as Juris calls it. (ibid: 145) Alan Sekula distinguishes this new type of mass mobilization from the simpler street theatre of the 1970s in three ways:

> 1. Unified opposition to the global diffusion of a largely intangible corporate capitalism;
> 2. the … carnivalesque nature of much of this protest; and
> 3. a connection between actual bodies in space and the disembodied realm of cyber space.' (Sekula, in Sholette 3)

Gregory Sholette adds a fourth characteristic, the elevated visibility of creative forms of expression. Here, as always, dress elevates, and further articulates and aestheticizes such visibility. The intentionality of this is made clear by Las Agencias' *Prêt A Revolter* (a play on *prêt à porter*, or, ready-to-wear), a line of colorful coveralls with huge hidden pockets for protesters' gear.

Spin-offs from these ideas of counter-cultural display run the gamut from Orta's aesthetic seriousness to random creations of activists or designers in a diversity of contexts. Ralph Borland's *Suited for Subversion*, done at the Bezalel Academy of Art and Design in Jerusalem in 2003, also foregrounds carnival and the activist as clown within a political circus. Borland's lurid red vinyl, polyurethane-filled shell is designed to protect the wearer from police batons. It has a powerful speaker in the chest capable of amplifying slogans, or the wearer's own heartbeat (underscoring her vulnerability in a menacing sort of way). Borland was interested in merging the 'pink, the black, and the white' types of protest and (like Orta) promoting vulnerability as a tool: imagine a group of them projecting thunderous heartbeats, as he writes: 'a percussive soundtrack rousing people around them . . . simultaneously powerful and strong, and vulnerable, revealing, transparent'. (Borland)

This idea of carnival as characterized by a particular practice of dress in the public sphere recalls Mikhail Bakhtin's notion of the grotesque body, for Bakhtin a basis for carnival, as a 'figure of unruly biological and social change'. (Bakhtin 1968: 317) For the Russian critic, the rebel of the medieval world relied on primary body functions—eating, drinking, defecating—at religious holidays to initiate carnival and create a zone where rules were suspended. In a related way but in another historical epoch, the postmodern protester who exists in Lipovetsky's society of consummate fashion utilizes the notion of wearable display in more complex and symbolic ways. Borland's character exaggerates the body as an internal organ, with beating heart and pumping blood. Also reminiscent of Bakhtin's analysis is the notion of carnival itself as a counter-spectacle subverting a concurrent dominant one: a religious holiday in Rabelais' time, a global capitalist summit in our own.

The image of the protectively garbed artist-clown projecting a counter-public spectacle recurs with the Yes Men's *Management Leisure Suit* (2001) and Halliburton *SurvivaBall* (2006), both designed by Sal Salamone. (In the former they are fraudulent corporate representatives at a WTO conference in Tempere, Finland, and the latter at a Halliburton 'Catasrophic Loss' conference in Florida.) Both are like

satirical versions of Orta's *Refuge Wear* but bring social carnival from the street into the corporate conference room in order to infiltrate dominant media scenarios. Through grotesque bodily display, the Yes Men bring the counter-public sphere into media space.

Bakhtin locates the core of the grotesque body below the belt, in its bowels and its contact with the ground, where it plays out the downward direction. (Bakhtin 370) Deleuze and Guattari, on the other hand, write not of a corporeal plunge but of haptic reversal, and of nomads 'entertaining tactile relations among themselves'. (Deleuze and Guattari 493) Both ideas—the base of the body and its mobilised localness, bring me finally to footwear, specifically, shoes that are both fanciful and deadly serious, intended to provoke discussion, and that circulate the ideas of carnival as personal performance and nomadology as individual survival. Judi Werthein's *Brinco XTrainer Shoes* (2005) are sharp, athletic shoes for refugees, specifically those who enter the United States from Mexico. In this case, XTrainer is a metaphor for border crosser, and Brinco roughly means 'skip'. Compartments in the shoes contain a range of practical devices like maps of covert routes, flashlights, and painkillers. The artist passed them out at shelters near the Mexican-American border. Similar to the Brincos are the Aphrodite Project's *Platforms* (2006), flashy shoes for sex workers that also have storage compartments (in this case for keys or condoms), but sport a control panel that can sound an alarm or send an emergency signal that locates the wearer via GPS.

Lipovetsky links the growth of ethical themes in society to the discourse of democracy that has expanded in part because of the ability of dress to articulate, demonstrate, and hopefully help negotiate differences (1994: 131). For our critical footwear, as for the more visible dress of the global protests, it is the vulnerability of the body and its articulation through dress that draw the appropriation of social space into a dynamic dialectic between the exposed and the empowered.

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Fig. 1.(Above and Below)) Lucy Orta, Nexus Architecture x 50: Intervention Köln 2001.

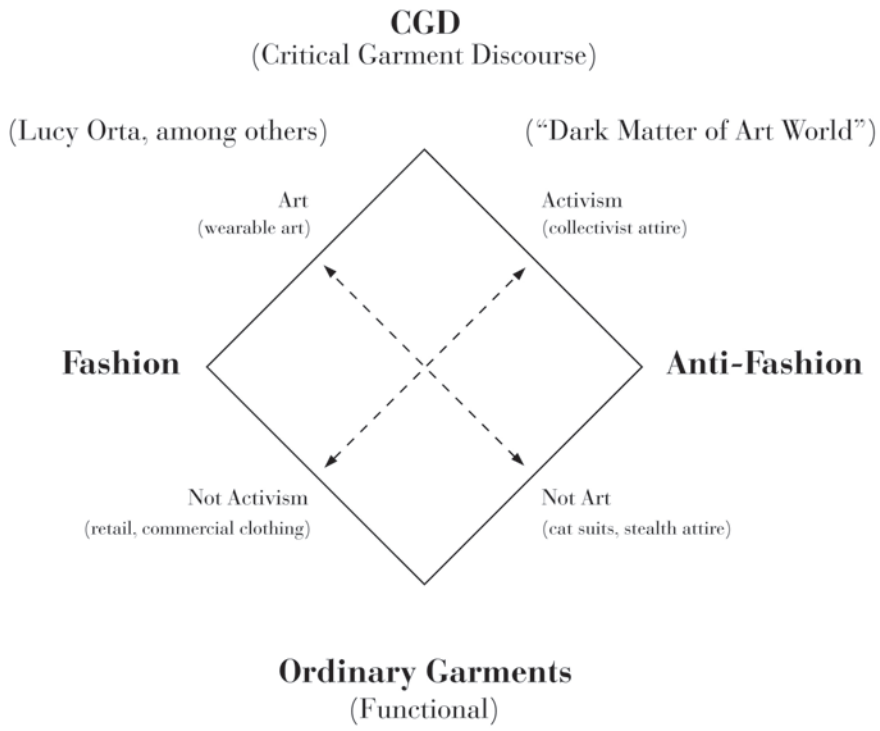

Fig. 2) Diagram of Dress Showing Critical Garment Discourse (CDG). The Author. Fig 3) Borland

Exploring the 'transitional' in interactive 3D virtual environments

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Introduction

This study and its works aim to highlight the significance and place of a number of postmodern ideologies in the evaluation of today's interactive 3D virtual environments (I3DVEs). They notably focus on the ideas of Deleuze concerning the correlation between elements, time, and space, which in these settings are ever changing and linked to, and determined by, the user's movements and actions. In addition, the ephemeral aspect of components and shapes, and the pledge for lightness, transparency, and instantaneity are analyzed through a Bachelardian lens, to describe the passage from a culture of objects to that of instability and flow.

In a transitory environment such as an interactive virtual world, the 'transient' derives from the capture of 'appropriate instants' (Buci-Glucksmann 2003: 25). Every moment is different, replaceable, repeatable, or could simply be ignored. The interval and passage from viewpoint to viewpoint and from shape to shape are of significant importance, and what is seen and felt has more to do with energy than with form. I3DVEs deal with ephemeral spaces between points. They result in deformation, dematerialisation, appearance, and disappearance of entities. They entail a constant change in scenery, perspective, mass and quantity.

Between time and space

Superimposing the space of the mind on that of a physical room, Bachelard discovers a new, virtual and fluent space that originates within the imagination and extends to infinity (Bachelard 1957: 61). The geometry of this space transcends those of the physical world and employs time and memories in a non-linear, unenclosed fashion. On the contrary, it spreads them in a multitude of orientations and at various intervals. It's a cognitive space that enfolds the body as much as it is enfolded by it (ibid: 19). This description implies an ethereal feeling that could only be experienced through active involvement of the mind and body in an immaterial space: a space that has the potential to stretch in a rhizomatic way and be explored

in every direction, or more specifically, an I3DVE. But since interactivity and 3D virtual environments weren't an option at the time of Bachelard's writings, to visualize such an ephemeral space, artists had to make use of their available contemporary techniques, consisting of 2D imagery and motion picture. Artists could only count on the cerebral participation of the viewers to fill the gap between their own intentions and the recipients' perceptions. As Edmond Couchot explains in his most recent book, in traditional forms of visual expression, the visualisation time succeeds the creation time (Couchot 2007: 10). In other words, by examining the artwork, the viewer creates a mental space of imagination in which the final acts of perception and interpretation take place. In a non-linear interactive artwork, on the other hand, the visualisation becomes part of the creational process and, to a certain degree, these two times coincide. On the one hand, during the course of its conception, the developer of the work predicts and calculates the effects of the participation of the viewer, and on the other hand, the viewer can modify the artwork in more or less unpredictable manners and therefore form her own individual experience of the inherent attributes of the work. Although the manipulation of time is a capacity shared among various interactive practices, what sets aside the interaction in a 3D virtual environment is the added ability of real-time modification of space. Interaction in a 3D space brings an important new level of engagement, which is the sense of corporal implication. At any given moment, the viewer can position herself freely in space and look at the scene, generated in real-time, based on her actions and movements, and from the angle of view of her choice. She can participate in the materialisation and disappearance of each transitory scene; she potentially has various degrees of freedom in manipulating objects at her will. In an I3DVE, the additional possibility of managing the space emphasises the element of unpredictability and separates even more the exertion of the user from that of the creator.

Couchot describes the 'virtual' as a form of energy that can emerge in a sensible way from human-machine interaction (Couchot 2007: 201). In the context of an I3DVE, the energy he refers to could be interpreted as the coalescence of time and space brought to us through an interface catalyst, where the past and the present coexist with each other. If the past consists of the development phase of the application, the present would be the interaction time, both of which affecting to various extents the visual outcome of the work. This interpretation of the present, with its transitional characteristics, provides a different denotation of time and space for each viewer who is immersed in an endless source of energy, where all entities are provisional and ever changing. In that sense, the 'transitional' becomes an art form that captures the

'immediate', and arbitrarily modifies its trajectory in a 3D space. This intermediary art form, as Deleuze would say, is not about bringing out some privileged moments in time, but about presenting the common instant (Deleuze 1983: 13). In parallel, its goal is not to represent specific locations but to let the viewer choose from any subjective point in space. The time and the space that we experience within an I3DVE are not similar to those of the real world. They can be expanded or condensed, broken into segments, reversed, or even reset. More importantly, our experience of time and space can be repeated endlessly, each time resulting in a new situation.

Artworks

Throughout the history of modern arts and especially since the advent of postmodernism in the mid twentieth century, numerous artists have attempted to put into practice perceptions of transitions, and to represent the 'in-betweens'. Many have worked in the junction between figuration and abstraction, among whom Francis Bacon, who has specifically investigated the notion of deforming the human forms. My recent body of works[1] entitled *Appended – After Francis Bacon* is inspired by his paintings, and consists of three separate but conceptually correlated I3DVEs. They allow interactive manipulation of human body shapes, in order to visualize the alterations assigned to them in real time and under unlimited number of angles. Starting with fairly figurative 3D forms, human bodies or body parts are gradually distorted and converted into abstract shapes. This gradual modification process creates an emblematic middle space of uncertainty, in which the viewer tackles with what could be considered the 'semi-abstract' phase of the work. An environment in which profiles are neither identifiable as human figures nor are they fully unrecognizable yet. An environment of instability, where objects, time, and space can be modified constantly by the viewer, and where the transitory aspect of elements puts the accent more on the intrinsic energies residing in the work than the forms.

Commenting on Bacon’s paintings, Deleuze describes 'deformation' as the central ingredient of his work and the main constituent of his act of painting. He explains that the alterations of the figures are the result of applied forces, and that in his work, materialised energy has a more imperative status than shapes (Deleuze 2002: 59-63). In my current works, I tried to embrace the same principle, while updating the

[1] Available at: http://www.salsali.com/appended

efforts undertaken by Bacon. I imagined what he could have done to his many portraits and human bodies would he have had access to the new interactive technologies. I started with his level of distortion and added to it by overstressing the twisting, wrapping, bending, buckling, bulging, and folding of the shapes, letting them intersect, and allowing viewers to move to any point in space, creating the visual compositions of their choice. The shift from macrocosm to microcosm while traversing all in-between stages in the process, as well as the possibility of moving, crossing, and altering the shapes, highlight the concept brought up by Deleuze and Guattari (1980) stating that elements do not pre-exist on their own but rather coexist in their reciprocal relationships.

Conclusion

For many years, artists attempted to eliminate the breach between artworks and viewers, and to draw them - at least psychologically - inside the work of art. To introduce the sensation of participation, they used various means of representation, including realism and illusionism. Deleuze debates that some filmmakers created this feeling by integrating the sense of identification into their works: when viewers identify themselves with the characters in the movie, they can mentally take part in the progress of the events. Some others did the opposite: to implicate the viewers, they reversed the positions of the actor and the spectator. They took away from the actor the responsibility of being in charge of the situation and confronted her to some unpredictable circumstances. By doing so, they made the viewer wonder about how to resolve a certain problem or to overcome a given dilemma, and therefore placed her at the same echelon of the actor - inside the movie (Deleuze 1985: 9-10). But despite the chosen strategy and due to the lack of appropriate tools, the final works were always deficient of a true sense of immersion and couldn’t totally eradicate what Arthur Danto calls 'the psychic distance' (Danto 1983) between the work of art and the viewer.

Today, virtual reality systems and I3DVEs initiate yet a new level of sophistication in creating the sensations of user involvement and immersion. In the former, the use of head mounted displays and data suits create the impression of bodily engagement to its highest extent. In the latter, the capabilities to interact with 3D objects and navigate in a 3D space considerably amplify the sense of viewer participation. At the same time, these methods alter the traditional descriptions of time and space and

add to them the extra dimensions of unpredictability and 'intervals.' The time, the space and often the incorporated shapes in an I3DVE are not strictly defined by the creator of the application - given that the user can modify them explicitly. Therefore, the act of visual communication looses its traditional definition and finds new connotations. The visual message doesn't take a unidirectional course anymore, and its structural elements consisting of engendered time, space, and shapes are continuously subject to reform, decomposition, and re-composition, and to borrow Bachelard's terms, 'what persists is constantly regenerated' (Bachelard 1931: 83). The receiver of the visual message can apprehend its true signification only by thoroughly investigating the 3D space, creating/recreating her own path, and manipulating the objects, at her own pace. The setting of the work can vary considerably for each user who can independently appropriate the work and decide about its visual outcome. In short, while an I3DVE still finds its purpose in the intention of its author, the existence, motion, direction, continuation, and shape of its inherent elements, including time, space, and objects are volatile, transitory, and dependent on users' interactions.

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Aureole: communicating and evoking a poetic scientific phenomena

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Abstract

The Aurora (known as Borealis in the North, and Australis in the South) is one of the most magnificent, and mysterious natural phenomena. Those who have witnessed it claim it is a sublime experience. We are interested in how such an awe inspiring spectacle can be conveyed through an artwork - how is it communicated and what is the impact on an exhibition audience? Our interdisciplinary international team attempts to investigate these questions. This paper is focused on our exploration to create a poetic environment comprising a tactile and technological sculpture, a soundscape, and real-time kinetic text – collectively forming an installation called *Aureole*.

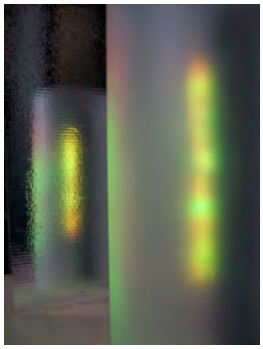
Conceptual introduction

The Aurora is an enigmatic natural phenomena produced by electrically charged sub-atomic particles emitted by the sun and sent soaring into the ionosphere by solar winds. The streaming particles are captured by the earth's magnetic field and as they cascade down into the atmosphere they collide with gas molecules to produce the emission of radiation that glows in various colours. *The Aureole* installation combines physicality, technology, visual, sonic and textual components – and aims to evoke a poetic experience inspired by the Aurora Borealis. The seemingly simple use of digital and analogue technology in *Aureole*, attempts to engage its audience – so that they become immersed collaborative participants and, atypically, form a dialogue with the visuals and sonics experienced that is subtle and gentle. Meanwhile, the whole centre of attention is the wonder of the real aurora. Two of the team members have a longstanding background working in the northern regions, and a significant motivation for the work is that the team feel deeply touched by personal experiences of the aurora, together with a common interest in exploring art/science/form connections. In terms of the targeted ISEA theme, we are particularly interested in the contradictions, confrontations and symbiosis of art and science – and by its very nature, this installation (and the process of its creation) provide useful sources for discussion and analysis. Also of interest is to consider the *Aureole* 'effect' on an exhibition audience – especially when most visitors will not have witnessed a real aurora. *Aureole* attempts to demonstrate alternative dimensions to a spectacular real life experience. The real life Aurora is outside the scope of human control, therefore the installation inverts this main characteristic, whereby the visitors have some control over what they see and what they hear of the spectacle. The aim was to challenge the prevailing approach of *mediating* the Aurora experience, and attempt to *evoke* the experience itself through an interactive installation that *refers to* but doesn't simulate the Aurora. The choice of the term 'aureole' (which relates more to the sun than specifically to an aurora) adds to the attempt to slightly shift thoughts away from any kind of one dimensional aurora simulation.

The collaborative aspect

Aureole, formed part of the experimental e-MobiLArt (European Mobile Lab for Interactive Media Artists) project. An important aspect of *Aureole* concerns the interdisciplinary collaborative process from research, through development and finally

to exhibition at the 2nd Thessaloniki Biennale in Greece. The *Aureole* group, together with a team of international consultants, share diverse cultural backgrounds, varied professional experiences and distant geographical locations. All of this provides very important richness but also some pragmatic complexities. In the development process we investigated scientific and cultural references, including the rich aurora mythology spanning thousands of years, and explored related art and science projects.



Figures1 and 2. Model and close up-view of the installation.

Figure 3. Studio shoot

Installation design: materials and methods

Aureole consists of a semi-enclosed space, where darkly painted walls surround a centrally located cylinder-like column. On entering the space, the spectacle of the moving lights inside the suspended cylinder is initiated through the physical movement of the viewer/visitor. There is also an evolving soundscape, and a textual element where a computer monitor displays selected real time words and phrases. The first actual tests of the cylinder and its technology were conducted in the kitchen.hu medialab, Budapest. That's where we discovered that the visual effects we were seeking are best presented by LEDs in an opaque cylinder. The installation was developed as a portable design, which can easily be transported and facilitates mobility. The cylindrical centrepiece actually consists of an outer and an inner part and is 200cm in height. The outer part is built of a semi translucent foil, measuring 80cm in diameter. The inner tube 18cm in diameter serves as carrier for 9 rows of LED RGB lights. Developing a method for the interactive part of the installation and the motion tracking we considered two different possibilities: either working with motion responsive sensors or, using an expanded infrared camera, equipped with a fisheye lens installed above the central object, which tracks the visitors movements. After a long process of evaluation we finally decided on the implementation of a small

on-and-off sensor (monitoring audience visitor presence), which was wired inside the sculptural cylinder, plus sequencing and control of the lights via Arduino boards. On entering the space, the spectacle of a random sequence of moving lights in the cylinder is initiated through the physical presence of the visitor, and on the visitor leaving the space the lights gradually turn off again. For the visual appearance of the LEDs we tried to develop a solution which implements a certain amount of the speed factor and creates a rotating feeling of the cylinder. The change of the colour range was pre-programmed randomly, fading in and out, with the finding that each singular row of the LEDs should stay with one colour



Figures 4, 5 and 6. Testing and development of the LED set up

Synaesthesic real-time kinetic poetry

In order to approach the Aurora experience in a poetic way, a synaesthetic-linguistic code was created. Random words have been extracted form various scientific texts on the Aurora, in such a way, that their meaning could be re-constructed within a personalized context. Some conjunctions were also included i.e. 'at', 'and', in order to form a minimal syntactical structure through randomness of word repetition. These words were then separated into three databases according to the synaesthetic code: Red, Green and Blue database, since the software used was programmed to track these basic colours and their hue variations. Each word matches the colour of its initial letter through this code: A=G, B=R, C=B, D=R, E=B, F=R, G=B, .H=G, I=R, J=B, K=B, L=G, M=R, N=G, O=G, P=R, Q=G, R=G, S=B, T=B, U=B, V=B, W=R, X=B, Y=B, Z=R. Each database consists of 100 words starting from these same initial letters. Each time the lights change colour in the installation, a camera tracks the colour. Via interactive programming designed by Matti Niinimäki, a word matching

this colour is drawn randomly from the corresponding database. There is subsequently, a real-time projection on a double screen display: one part of the display shows the streaming 'light performance' and the other part next to it shows the responsive real-time synaesthesic poetry where the words appear in the same colour as the lights (Figure 7). This code is totally subjective according to the case of colour-to-grapheme synaesthesia, since every synaesthete has his/her own colour correspondences (see Harrison 2001: 29). Synaesthetes of this type may also see each word in the same colour as its initial letter (see also Campen 2007: 4-6, 33-36, 93-95, 125). This interactive poetry responds to the movement of the visitors through the main sculptural part of the installation. As the visitors enter the space of the installation, a motion sensor is triggering the lights. Thus the physical position of the visitors within the exhibition space affects the colour of the lights and creates phrases or sentences to appear randomly on the screen according to the changing colour. In the second exhibition, the 'performance' of the lights and the poetry will be streamed/recorded and available on line as a poetic spatial metaphor between real life and virtual experience, physical presence and networked communication environments. Each time someone will enter the virtual exhibition of *Aureole* he/she will see a different recording: www.media.uoa.gr/emobilart/aureole.

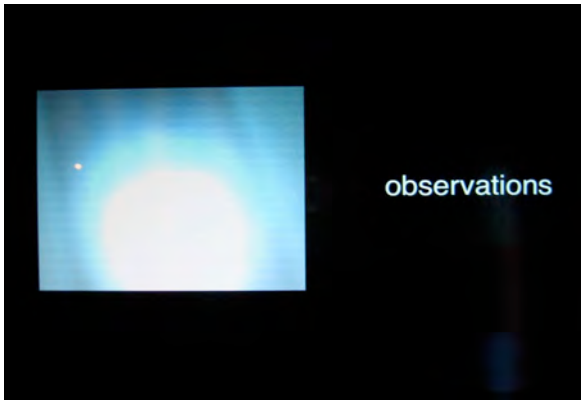


Figure 7. Still from the real-time responsive synaesthesic poetry

Soundscape component

The soundscape composition has three conceptual strands - to reflect the beautiful poetic and magical nature of the aurora, refer to real tangible sounds captured during aurora borealis happenings, and to explore sonic connections with the visual/physical installation experience. Amidst ongoing scientific scepticism about Aurora’s

producing sounds, there are extensive witness reports - e.g. swishing, whistling, and crackling (members.tripod.com/~auroralsounds/), investigative studies (Silverman and Tuan 1973), numerous on-site VLF (very low frequency) recordings, and a few cases of recording using microphones. VLF receivers convert captured radio wave emissions into sound waves having the same frequencies – possibly the richest set of recordings during aurora events is by Stephen P McGreevy, based in Northern USA (auroralchorus.com). The Aureole soundscape utlises several layers and sequences selected from these recordings (under kind permission). An important ambition is for the soundscape to touch on the wonder and magic of the aurora, and with this in mind, digital synthesis and envelope/harmonics/filter techniques were used (fitting with the science of aurora creation, and the purity of the aurora experience) to create a second layer of sounds. A meeting with Prof. Unto Laine (Helsinki University of Technology), who has in depth experience of research into aurora sound recordings (using microphones), included listening to selected research recordings and discussing the background to the studies. This had a significant influence in the sense that care was taken that the sounds give reference to the nature of this research data. Infrasound (frequencies below 20Hz) can be found during aurora activity (> 0.1 Hz), and some propose that the physical effect of these frequencies could be part of why we get so affected when experiencing an aurora. Hence, the final element of the aureole soundscape is infrasound - 18 Hz was chosen, as this is infrasonic and yet readily audible and furthermore it is associated with triggering heightened awareness and alertness. This infrasonic element was made interactive in that short faded sections (60 seconds) were introduced when a certain colour was picked up by a camera monitoring installation LED’s (which in turn were affected by audience presence and movement). A somewhat arbitrary / indirect interaction, but it gave the desired outcome of uncertain presence.

Evaluation/conclusion

An essential part of the process was to constructively discuss methods to evaluate audience response. Certain questions were put forward: How can the experience of the audience be evaluated? How can artists be (objective) observers of their own artwork? In the authors' opinion an increased amount of subjectivity prohibits the artwork to be evaluated by the artists, unless there are specific parameters to evaluate. However, we have made some observations of the audience and the interaction. Surprisingly many visitors entering the exhibition space of *Aureole* stayed

within a very close distance to the central sculptural object. It almost seemed that the lights where 'physically attracting them'. Furthermore, many visitors were 'touching the lights'. One interpretation of this action could be their need to explore any further possibilities for interactivity or simply their interest to explore the art piece through their additional sense of touch. It was 'like being *drawn* into a ring, or *atmosphere* surrounding the cylinder, possibly attributed to the very slow, almost hypnotizing rhythm of the lights and sound'. Another observation was that the sound (a psychoacoustic reaction to infrasound?) was at some points 'pushing' the visitor towards the lights. An additional reflection was that the sounds engaged the viewer to immerse into 'a dark void space', a feeling of being 'unstable', 'like stepping on unsteady ground'.

In conclusion, it is clear that the evaluation of interactive artworks remains challenging, especially as at this point universally agreed criteria does not exist for such an assessment, even though some related publications (Bilda Z; Hook K: Beta Space) propose methods for quantitative analysis. In effect, the fundamental question of 'how an awe-inspiring natural spectacle can be conveyed through an artwork?' remains still unanswered and requires future exploration.

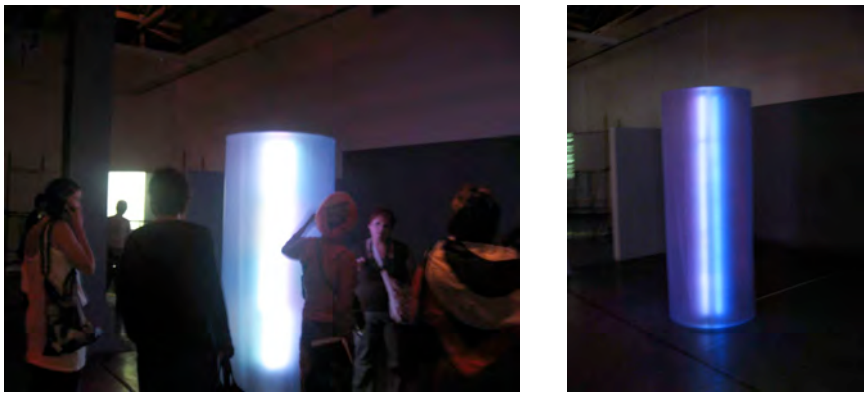


Figure 8. Installation - view

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Lets Go Global: transforming lives through participation, digital engagement and creativity

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Introduction

Lets Go Global is an arts-led community Internet TV channel which was founded in 2003 to develop the means for local people to have an active and creative role in their communities. It operates from a production studio located in a community setting in Old Trafford, Manchester. It was the first community Internet TV channel in the country to be operated by a local authority. Lets Go Global forms part of Trafford's Arts & Cultural Development Section.

Lets Go Global brings together a wide range of people that participate, share ideas and collaborate to create content that enables different voices to be heard. Working with many leading new media artists to facilitate this process, it aims to challenge the artistic and social possibilities of new technologies. The demand for this activity has been very high, with many local authorities and development agencies, nationally and regionally, recognising the identified benefits of their own community led content and broadcasting/publishing tools. Lets Go Global epitomises the democratising power of the digital revolution, enlisting the imaginations of deprived communities from across Greater Manchester to test the artistic possibilities of new technology. Perceived as being 'ahead of their time', the brand identity combines both artistic innovation and community empowerment.

Context

The government identifies extensive benefits of digital inclusion for vulnerable social groups including; enhanced self-sufficiency for vulnerable adults, increased access to public services through e-government channels, enhanced community cohesion and improved education, attainment and life/work chances. (*Understanding Digital*

Exclusion Research Report, Communities and Local Government 2008: 13). Community empowerment: digital inclusion provides an important route for enabling communities to become self-supporting and autonomous in meeting their information needs. (*Technology Futures and Digital Inclusion Research Report,* Communities and Local Government 2008: 32).

Lets Go Global has a clear understanding of how working with communities can contribute to the priorities and strategies set out by central and local government and other improvement initiatives across Manchester city region. It contributes significantly to: Trafford's corporate priorities, Cultural and Community Strategies and National Indicators, NI11: Engagement in the Arts, NI29: Serious gun crime.

But how exactly does Lets Go Global work to achieve successful and meaningful work using digital technology to tackle real life issues? An example would be to focus on a partnership project between Lets Go Global, Trafford Council, Greater Manchester Police, Dodge the Bullet, and Mothers Against Violence. Working with a group of young people from across Greater Manchester the *Living to Die* project produced a short on-line film and educational resource which explored the issues of youth violence, weapons and gang membership.

The approach

Using a participatory approach and by working with new media artists, young people had the space, access to digital tools and opportunity to express their ideas in a dynamic and creative environment to produce the on-line film. This enabled them to have an active and creative role, becoming producers, publishers and distributors of their own content and participants in the new digital age.

The project also provided a learning environment where young people could: think, work collaboratively, respect difference, research using a range of sources, be locally grounded but globally situated and aware, be able to communicate their ideas using a range of new information and communications media in order to critically interpret their voices.

In this learning environment young people developed a global awareness but one that was grounded in their own locality, they began to understand, analyse and participate in government and community in order to shape the circumstances that

impact their daily lives They used technology to develop media literacy skills that would be directly applicable to today's world. They developed learning skills for life such as being able to think critically, collaborate and solve problems.

Lets Go Global provided a place where, through engagement in an authentic practice such as making a piece of video for a particular audience, participants can come to understand how technologies could be used in other areas of their lives, acquiring transferable skills in digital media.

The topic

Gun and knife crime are serious topics that affect many young people: according to statistics produced by Greater Manchester Police, nearly half of all firearms' murder victims in Manchester are under the age of 18 (Shropshire 2002: 4). The issues are complex: there are many reasons why young people become involved in gang related activity, and the consequences of their involvement affects many different aspects of their lives and those of families and communities. Becoming involved with a street gang often means becoming involved with criminal activities such as drug use, violence, robbery, and the carrying and use of weapons. These problems are compounded by the fact that gangs themselves are not stable, and their organisation and loyalties are loose and chaotic. Indeed, recent research by Manchester University suggested that the concept of 'gang' membership is itself misleading, and that 'gangs' are very much like informal friendship networks whose boundaries vary according to whom you ask in the network' (Aldridge et al. 2007: 17). Young people can become involved in gang related activity simply because of where they live and the people they associate with, not through any conscious choice to join a gang.

The complexity of these issues makes solutions extremely difficult to find. But through the use of creative technology, and partnership work, *Living to Die* addresses these problems - by enabling young people who are most likely to be affected - to think about the causes and consequences of involvement in street crime and gang membership, in giving them the opportunity to express their ideas in a positive and productive way. It was a guiding principle that it was the young people themselves, their friends and the wider community who were most likely to hold the solutions to these problems. The work aimed to enable young people to develop the skills and knowledge to make *good choices* about how they live their lives. *Living to Die* and its accompanying resource are intended to provide a starting point for peer

learning, discussion and collective problem solving with other groups in Manchester and the UK.

Conclusion

The impact of this project has been immense - it has made young people view gang and gun crime in their community in new ways. It has empowered young people and their friends to make a difference by discussing solutions to solve serious issues: an aim is to raise awareness for the next generation - with the intention of transforming communities.

This kind of creative led arts activity has the ability to make a difference and contributes to national agendas such as the White Paper, *Stronger and Prosperous Communities* by delivering creative digital services and outcomes that directly relate to the *National Outcome and Indicator Set.*

This kind of activity stimulates the grass roots of democracy. Making public services reflect what communities want - by using digital technology - can help give people their say, which in turn helps transform services and quality of life within a community. It can also leave a meaningful legacy - that participatory media can inspire collective action and change.

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Transformative practices: the aesthetics, ethics and politics of social relations

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The rapid and unprecedented changes effecting societies since the 1960s are having a profound effect on the production, dissemination, interpretation, documentation and archiving of cultural artefacts and events. Many refer to these changes as globalization, although other terms such as 'the post-industrial society, the information society, the network society, disciplinary society, control society, informatization, scale-free networks, small-worlds and smart mobs' are also used (Thacker 2004: xii). The exact nature and extent of globalisation is fiercely debated and competing analyses are often rooted in claims and denials regarding epochal shifts, the decline or otherwise of the nation-state and corresponding transformations in social relations. Suggesting that the 'information society' perpetuates and promotes long-term capitalist relations enormously, social theorist Frank Webster declares that 'while there is undoubted change taking place, and this at a speed and with a reach hitherto unimaginable, it is for the most part a matter of the continuity, consolidation and extension of established relations' (Webster 2000: 70). Whilst acknowledging the significance of information, knowledge, advanced communications and computing technologies to these developments, he urges resistance to any consideration that these are the cause or indeed privileged factors in contemporary change. Instead, Webster identifies ongoing features of capitalism such as: ability to pay; market criteria, competition, private ownership over state holdings, wage labour and commodification of activities as markers of global network society.

The displacement of social relationships with market relations brings about a proceduralisation of the everyday that is characteristic of what Juergen Habermas calls the 'colonisation of the lifeworld' in which rationalising systems infiltrate more and more areas of everyday life substituting protocols and procedures for informal modes of organisation. Habermas' *Theory of Communicative Action* is concerned with how increasingly rationalised contemporary societies create conditions within which 'communicative action' can take place. He argues that the lifeworld which affords individuals the possibility of reaching common understandings with others through mutual, face-to-face encounters over time is becoming disabled by 'non-communicative' fully rationalised systems. For Max Weber and Habermas, the archetypal manifestation of processes of rationalisation is the *bureaucratic* organisation. Weber defines a bureaucracy as: '[a] 1 Theorists such as Juergen Habermas, Frank Webster support this view. Hierarchical organization designed rationally to coordinate the work of many individuals in the pursuit of large-scale administrative tasks and organizational goals'.

Operating on an impersonal level with a well-established division of labour the bureaucracy is hierarchical and centralised with paid, full-time administration of officials that form a chain of command imposed by written rules and regulations. It is through the bureaucratic organisation and the internalisation of its protocols and procedures that the lifeworld becomes colonised. It is through the emergence of the 'network' as organizational form of the Information Age' (Castells 2000: 1) that the lifeworld within global capitalism becomes vulnerable to particular *protocological* forms of rationalization, and into these established processes of rationalisation - enclosure and commodification - that new technologies insert themselves. The distributed network differs to bureaucratic structure in that it has 'no central hubs and no radial nodes' (Galloway 2004: 33) to organise communication. It is a centre-less structural form that 'resembles a web or a meshwork (ibid: 5): it is 'a specific network architecture characterised by equity between nodes, bi-directional links, a high degree of redundancy and general lack of internal hierarchy' (Galloway 2006: 317). Protocol is the medium that organises interactions in distributed networks: it is 'a set of technical procedures for defining, managing, modulating, and distributing information throughout a flexible yet robust delivery infrastructure' (Thacker 2004: xv). Protocol 'functions largely without relying on hierarchical, pyramidal or centralized mechanisms; it is flat and smooth; it is universal, flexible and robust (Galloway 2006: 317). It is not concerned with the content of what passes through the network, but rather with the facilitation and maintenance of communication between nodes. As media theorist Alexander Galloway suggests, protocol is fundamentally a technology of inclusion and openness; a fact that 'makes it especially difficult to speak about protocol in a negative sense' (Galloway 2004: 147). A concept of freedom is implicit in the flexibility with which Internet protocols 'enable thousands of diverse networks to link together, distributing control into autonomous locales' (ibid: 142). At a cultural level too, the open-source culture of distributed networks promotes the benefits of collaboration, sharing and openness between participants. Yet Galloway identifies an inherent contradiction in networks and protocol: an explicit tension between freedom and control. He suggests that `for protocol to enable radically distributed communications between autonomous entities it must deploy a strategy of universalization and homogeneity. It must be anti-diversity. It must promote standardization in order to enable openness. It must organize peer groups into bureaucracies […] in order to create free technologies' (ibid: 142).

In theorising centralised and inflexible structures of bureaucratic organisation as synonymous with authority and control, and because 'networks exhibit a set of properties that distinguishes them from more centralized power structures' (Galloway & Thacker 2004: 3) many artists and theorists imagined that distributed networks *in themselves* represented an organisational form that could resist control. Arguing against this position, Galloway suggests that rather than removing authority, 'distributed networks produce an entirely new system of organization and control, that while incompatible with pyramidal systems of power, is nevertheless just as effective at keeping things in line' (Galloway 2006: 318). In fact, he argues that it is precisely

because distributed networks ‘create new, robust structures for organization and control’ that it is imperative ‘to understand the nature of this new logic of organization’ (ibid). Although distributed networks facilitate open, participative and collaborative processes and practices, they operate within an algorithmic logic controlled by protocol. In their attention to protocol *transformative distributed* artworks engage one of the key conditions of the network paradigm. From 1995 until 1999 the highly conceptual phase of network art known as ‘net.art’ gave particular attention to the Internet and the properties of the World Wide Web (WWW): a global information medium or service that operates over the Internet. Rather than aiming at ‘beautiful or effective artistic expression, or at a convincing representation of an abstract principle’ (Broeckmann 1997: 2) a number of net artists used ‘the fact of machinic and interpersonal communication across the network’ to ‘amplify, mock or playfully subvert’ the ‘technological structure and functions of the network’ (ibid). Referring to those works that use ‘only the radio buttons, pull-down menus, and textboxes found in HTML forms, Alexander Galloway described net.art as having ‘unique protocological characteristics.' (Galloway 2004: 225).

Cornelia Sollfrank’s *Female Extension* (1997) is one of the most sophisticated explorations of technical and social protocols of the network. Following Katherine Hayles’ exploration of ‘writing machines’ (Hayles 2002: 25-28) as reflexive loops between the material apparatus of literary work and the imaginative world emerging from its semiotic components, it is possible to understand *Female Extension* as an interrogation of the technology that produces it. Sollfrank foregrounds processes of making art in a network context emphasising the ways in which such processes are structured by the materiality of the Internet. The form of the work, then, affects it's meaning: strengthening connections between the structure of the work, the artist, and the production of art, she foregrounds processes of automation inherent in distributed networks. By designing and building not only the programme that automates the creation of 200 works of art by 200 ‘simulated’ artists, but the conceptual platform within which her simulated artists are able to interface with the competition, she becomes a prototypical ‘meta artist’: devising the platform within which others participate (even if ‘others’ in this case are simulated ‘others’). The attention artists gave to devising the platform within which others participate is, I suggest, an indication of the emergence of protocol as a medium.

In their attention to relationality *transformative distributed* artworks engage another of the key conditions of the network paradigm. Whereas *net artists* critically engaged the new information and communication technologies emerging in the 1990s, with some forging a vibrant lifeworld based on democratic and participatory communicative action, (Bourriaud 2002: 8) curator Nicolas Bourriaud described how many others felt ‘meagre and helpless when faced with the electronic media.’ Describing the instrumentality of life in contemporary society, in which ‘[t]he social bond has turned into a standardised artefact’ (ibid: 9) he locates processes of rationalisation within the new and emerging technologies themselves. Critical of

the communications technologies that plunge ‘human contacts into monitored areas that divide the social bond’ Bourriaud identifies a range of non-technologically oriented artistic activities that engage the realm of human relations and which have ‘to do with interactive, user-friendly and relational concepts’ (ibid: 8). In *Relational Aesthetics* a series of essays produced from curatorial and theoretical collaborations with artists such as Liam Gillick, Vanessa Beecroft and Felix Gonzalez Torres, Bourriaud identified ‘[t]he possibility of a *relational* art - an art taking as its theoretical horizon the realm of human interactions and its social context, rather than the assertion of an independent and *private* symbolic space’. For him, relational art ‘is a state of encounter’ (ibid: 14) in which ‘including the other […] turns out to be […] essential to the formal understanding of the work’ (ibid: 52). In *Crazy Tourist* (1991) Gabriel Orozco puts an orange on the stalls of a deserted Brazilian market. In *Hamoc en la moma* (1993) he slings a hammock in the garden at MoMA in New York. Bourriaud suggests that both these works operate ‘at the hub of “social infra-thinness” that minute space of daily gestures determined by the superstructure made up of “big” exchanges, and defined by it’. Orozco’s photographs are ‘a documentary record of tiny revolutions in the common urban and semi-urban life (a sleeping bag on the grass, an empty shoebox, etc.)’ (ibid: 17). For Bourriaud these works produce micro-communities within which individuals come together in momentary groupings. Art ‘strives to achieve modest connections’ that opens up obstructed passages so as to ‘connect levels of reality kept apart from one another’ and contributes to the emergence of places in which non-commodified social relations can exist and in which the subject is not ‘reduced to the condition of a consumer of time and space’ (ibid: 8-9). New distributed transformative practices give attention protocol as the medium of relational practices. Artists devise the protocols that mark the parameters of performance and participation.

Just as technical protocols organise and control the activities within an electronic network, so artists organise the activities of others. Of particular interest are the ways in which artists use and subvert protocol, and an historical example is useful here. For Sol LeWitt for whom the emergence and liberation of the ‘idea’ was the most important aspect of conceptual art, the use of ‘principle’ or protocol meant that he could make work to be executed not just by himself but also by other artists, students or draughts-people. Exploring the relations of production embedded in Sol LeWitt’s work, Lawrence Alloway (1975) suggests that ’provided his ideas are capable of being transmitted and obeyed, he can dominate work done in his absence. In his hands, Conceptual art is executive control’ (ibid: 97-9). Perhaps speaking to the intensification of processes of automation and commodification that the emerging network society engendered, LeWitt’s work precisely engages the mechanisation and standardization characteristic of processes of rationalisation (ibid: 97). Lawrence Alloway identified a correlation between the procedures devised by LeWitt and old schoolbooks such as The Rational Elementary Arithmetic of 1899 that instructed pupils to:

> Draw: A line one inch long. A line twice as long as the first line. A line three times as long as the first line. A line twice as long as the second line. A square with each of its sides the length of the first line' (Alloway 1975: 97).

Yet for all their explicit attention to the rational, Rosalind Krauss suggests that LeWitt's ideas, 'exist on an entirely different order than that of the mathematical, the deduction, and the axiomatic. If one uses the "idea of error" to generate a work, one has done something quite different from illustrating an order that is ideated or Ideal, the order LeWitt's critics keep insisting on associating with his art'. She goes on to suggest that '[t]he kind of idea he inevitably uses is subversive, addressing itself to the purposeless of purpose, to the spinning gears of a machine disconnected from reason.' (Krauss 1985: 255). Robert Smithson, spoke of this when he wrote, 'LeWitt is concerned with enervating "concepts" of paradox. Everything LeWitt thinks, writes or has made is inconsistent and contradictory. The "original idea" of his art is lost in a mess of drawings, figurings, and other ideas. Nothing is where it seems to be. His concepts are prisons devoid of reason' (ibid).

Extending Galloway's theories of protocol as *the* mechanism of control within the distributed network I suggest that protocol is a medium via which contemporary transformative art practices communicate and transport the parameters of everyday performance. By definition, protocol is relational: it prescribes and communicates the parameters of exchange. It is synonymous with the network itself and therefore, as Galloway (2004) argues, there is no escape from it. How we engage the politics, ethics and aesthetics of protocol is what matters now.

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Transaction as interaction

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Abstract

The rapid technological change of our society provides a revision of the perception of cyberarts and interactive works. While the spectacle of technology remains a dominant factor concerning many interactive projects, surprisingly few artists examine the social relations of the viewer with art objects. This is intriguing as current technological advances clearly enable enhanced communication between the artwork and the audience, providing a variety of options for an effective exploration of interaction as a state of transaction. On examination, underneath the most obvious and often dazzling exterior layer, one mostly encounters a predetermined set of responses nested in pre-framed constructions. Consequently, the interaction between the audience and the artwork needs further exploration. How more effectively could we involve the viewer within the artwork? Audience awareness indicates comprehension, knowledge, cognition, perception and recognition. How do these concepts correspond to notions of interactivity? How is consciousness (of the participant/viewer) addressed in interactive artworks? How can interactive technology be used to enrich social interaction?

Introduction

Recent explorations into the nature of consciousness and awareness have found new currency among scientists and artists alike. In addition to biological expressions, including neuroscience and psychology, the subject has also been reviewed from an interdisciplinary point of view, incorporating philosophical, spiritual and techno-scientific factors. Several aspects of awareness related to the inter-relations between man and machine (including artworks) have been researched, presented

and widely published. Further to academic considerations, artists have developed novel, consciousness-related interactive projects. Yet, observing the impressive landscape of interactive installations, the authors find conceptual and/or pragmatic evaluation of audience consciousness and awareness not readily available.

Awareness indicates comprehension, knowledge, cognition, perception and recognition. Consciousness is defined as the mental and emotional awareness of an individual or a group. How do these concepts correspond to notions of interactivity? How is consciousness (of the participant/viewer) addressed in interactive artworks? How can interactive technology be used to enrich social interaction? While seeking answers to these and related questions, a long list of artists and their works comes to mind, however a detailed analysis of the topic is outside the scope of this text and consequently only a few examples will be discussed here.

Transaction as interaction

We can observe that many accomplished media works have investigated a transactional component, but how can transaction as interaction be defined - especially from the perspective of Transformative Creativity and Participatory Practices? One of the most frequently used definitions of the term transaction describes it as an agreement between a buyer and a seller to exchange an asset for payment, and it is often used in relation to the exchange of items of value, such as information, goods, services or money. Another definition refers to the change of one entity into another, or the process of change from one form, state, style or place to another. Interaction is a kind of action that occurs as two or more objects have an effect on each other and, as result this two-way effect, can lead to surprising emergent phenomena.

What we are interested in is how this process of transaction can become visible in the interaction between the audience and the art object within interactive installations. How much does the participant change the work and how much of his/her visual perception becomes changed through the work? Transaction here takes place through energy and subsequently, how might this energy become visible?

A form of transaction can arise in several, variable manifestations such as:

1. Between the viewer and the object
2. Between the object and the space
3. Between the viewers themselves. (If there are a larger number of participants within the space, a collective collaboration can accrue).

Transaction as a form of interaction can be described as a communicative action or activity involving two or several parties or things that reciprocally affect or influence each other. Through experiencing a transaction on all the levels mentioned above, one can ask where the parameters of perception might be, and, how might we challenge the norms by which reality is produced. When the viewer enters a dialogue with the art object and space, it is important to be aware that any form of transaction can occur on several, diverse layers.

Interactive installations create the potential for many different interpretations, and can be multi layered with various different aspects. Important to remember is that not all visitors will have had experience with these kinds of artworks and installations. Players/participants might need to know how to operate the installation, and while in some projects it can be enough for people to watch other players, some works need to have explicit instructions. Furthermore, participants are routinely requested to become actively involved in and engaged with - as artistic collaborators - through physical action within a responsive environment. They may become part of the work or even have the power to control the visual outcome or direction of the work (which consequently asks for a self- contained audience). Instead of being a silent observer, as presumed previously, one has to take action, or engage with the art object and consequently a transaction takes place.

The transaction of the object itself can be characterized though the change from one entity into another, which can be initiated within a responsive environment in various forms. It is the artist’s decision if an installation is designed for only one visitor at a time or for a collective audience: both methods lead accordingly to social interactions. This consideration might have essential input on creating the project. What happens if there are more people inside an installation and participants are contributing significantly to the experience of the work? Is it still possible that the singular participant will recognize his/her own contribution to the installation, or could a collective perception arise? If there is a presence of more players it might become difficult for individuals to follow their own actions. On the other hand, if a collective interaction accrues, it could lead to a common experience. Furthermore, this could

lead to players attracting the attention of other visitors, leading to a transaction and interaction amongst other participants. From this point of view, the artwork could take on the role of an initiator or promoter of interactivity and processes of interaction amongst the audience. The social perspective examines the relationship between people before, during and after entering the installation: visitors can share a common space, perceiving a common experience, but nevertheless, their impressions about their own personal involvement might vary tremendously, depending on their individual perceptions, experiences, understandings and emotions.

While the spectacle of technology remains a dominant factor, it is clear that subjective perception - under the influence of rapidly growing technology - is changing. We are moving towards a technological, machine-driven perception. The loss of reality, of space and time, as historically defined is now characterised by the simulation of reality and the borders between reality and cyberspace are becoming more and more indistinct. The viewer is becoming part of a virtual reality inside the physical space of a responsive environment. Through his or her own energy, a transaction between the art object, the space and the participant can occur with all the different components interacting and influencing each other. When systems and organism react through environmental input, we call these living systems. Since interactive installations are based on real time, and there is interaction between the installation and the participant, one could also compare this form of interactivity as a living organism. According to James Grier Miller, a pioneer of system science, living systems are self-organizing and have special characteristics of life that interact with their environment. This takes place by means of information and material-energy exchanges. Interactive installations are based on the (participants') experience within a space and time frame, and what is generated is directly connected with the attention within a certain moment. One could say the moment of attention creates a unique experience in space and time and the term site-specific can be extended to site-and time-specific perception.

Spatial perceptions may show cultural specificity, yet certain properties of spatial sensing remain characteristic of human existence. What are these features? How much do we know about spatial cognition? The private spaces we all inhabit include our visual, auditory, tactile and olfactory biosphere. In our visually privileged world we take it for granted that vision provides the major source of spatial information. This belief is due to the generally accepted rule that our sensations tend to be dominated by the perceptual tool that provides the most reliable facts in relation to our

surroundings. Vision, in this case, is considered to provide the most detailed information about significant properties of objects in our environment. Consequently it is often used as a spatial guide, informing (and sometimes misinforming) our senses. Auditory or olfactory spaces seem to have different properties, and while they belong to our most basic senses, are rarely considered in industrialized societies. Tactile space is viewed as 'friendly' possibly because touching implies intimacy - a controversial notion in an age when direct contact is increasingly replaced by remote control devices (Czegledy 1999).

Processing and storage of spatial schemas form a central element of human intelligence, yet despite 75 years of intense investigation it remains an inaccurately defined process. Are spatial schemas mere metaphors, or are they actual internal mechanisms? According to Gattis, spatial cognition is the essential foundation of more abstract cognitive tasks (Gattis 2003). The concept of subjective vision i.e. that no two people see exactly the same thing in a natural setting might be astonishing, yet these differences help us to translate experience and meaning from one perceptual world to another. To complicate this hypothesis, factual interpretations by cognitive scientists constitute only a partial explanation of our capacities as sensory beings. Spatial cognition and practice has become a topic of great interest lately, evidenced by the encyclopaedic variety of interdisciplinary investigations. For the longest time our senses were considered entirely autonomous ‘perceptual modules’, each functioning independently. However recent studies have shown that our perceptual experiences are formed by manifold, complex interactions between sensory modalities (Eimer 2004).

Physical, bodily and mental engagement with an artwork and its space, implements is a multi-sensorial experience. Vision, sound, touch and motion (as outlined above) changes perception, and can create and enhance a new dimension through the flow of information. The trans-sectoral aspect is explored through different ways of perceiving our surrounding and within this process it becomes visible - where spatiotemporal thinking and perception are connected to action. It should be noted that some of the most significant contributing factors to our shifting perceptions today include the effects of technology on our awareness of the scale of space and subsequently the changing sense of self - which this awareness has created.

From the perspective of technological innovation, it is clear that spatial visualization and the sense of human anchorage is co-joined. In a similar way, the mediation of

technology can produce experiences of our own bodies at the internal and even at magnified levels, thereby creating sensory experiences that can be actually and partial representations which are enhanced by digital imaging functions. In these terms, what we see of ourselves is an approximation, part reality and partly devised.

Providing some examples: To navigate consciousness, David Rokeby in 'Giver of Names' (Rokeby) engaged the awareness of his audience by creating a complex feedback loop through the perception, consciousness and memory of the viewer. The installation consists of a video camera, a computer and a sound source. The camera 'observes' objects presented to it by the audience, and as Rokeby wrote: 'thinks about them, associates metaphorically, and then speaks aloud a sentence it formulates about its impressions of the object.' Here Rokeby is challenging the viewer's preconceptions of the presented 'objects' while he draws them into speculative explorations. 'Giver of Names' presents us with a dialogue between man/machine, art object and audience.

Consciousness in the communication loop of interactivity has been notably addressed via the 'Helpless Robot' by Norman White (White). The artificial personality of this robot responds to the behaviour of the viewer/participant by using a multitude of phrases utilizing an electronic voice. 'The speech that is delivered depends on its present and past experience of "emotions" ranging from boredom, frustration, arrogance and over stimulation.' By his own admission, White has tried to develop electromechanical systems endowed with 'a life of their own' and states: 'I started out asking myself - can a machine which is fundamentally a product of the intellect also model emotions? Are there primary emotions, like primary colours, from which all other emotions evolve?' Helpless Robot aims to elucidate this issue.

Conclusion

Participatory practices, in the form of transaction (a state of interaction), provides a change of perception in cyberarts and interactive works. The subject has been reviewed from an interdisciplinary perspective on several levels. It is clear that an alteration of our society generates a change in cognition. Rapidly growing technological developments have resulted in not only in changing art works, but also the role of visitors/participants. Consequently new parameters have to be defined for these altered roles. We must become conversant with new forms of realities and new

orientations including the notion of transaction as impacting upon audience awareness.

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07 Tracking emotions

Email (its being emotional …)

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Abstract

Electronic mail and messaging systems are becoming the more dominant communications tool of modern life. From the teenagers in their bedroom to the pensioner in the library – email is a de facto way to communicate for personal and business use. Email is different however from other means of communication, for instance the dimensions differ in: speed, permanence of the message; cost of distribution, deliverance to individuals and groups; an ability to filter, channel, record, and control messages. Graphic design can be viewed from a structuralism perspective as a language system - to extend the understanding of language from a spoken and written system of signs - to a manner of visual signals. Designers play a part in reinventing and redefining signs and symbols and cognitive semiotics is something designers explore over time with intuition and experience. This paper describes the need for expression in electronic mail.

Introduction

This research attempts to transform the static nature of electronic mail into a more dynamic form that can offer new ways to interpret verbal information visually. Electronic mail is becoming the most widely used form of communication today, but is very limited in terms of communicating. The biggest problems in electronic mail are misinterpretation of e-mails and lack of ability to express oneself. A related topic is 'flaming,' in which emotions are expressed through electronic mail. Advantages of email are; being able to communicate with others in moments, letters notes and reports can be sent using the same technique, email can be dealt with at a convenient time and the cost has no association with distance. Disadvantages are

that email is not necessarily private, email can be forged, unwanted email is too easy to receive and of course emotion is difficult to express.[1]

The success of online virtual support communities, such as cancer support groups - a common health-related use of the Internet - suggests a willingness of patients to share intimate emotions with others. Online communications may be perceived as more advantageous than face-to-face support groups because of their 24/7 availability and the absence of perceived pressure to participate in the discussions (Penson et al 2003). There is a need to express emotion visually in electronic mail. At the moment 'emoticons' are the only solution to the problem. Even Fahlman (the originator of the ′emoticon') now realizes that emoticons have to be replaced with an improved approach in solving the problem of non-expressive e-mail systems. As electronic communication grows more sophisticated, users will no longer rely on strings of dashes and words or sentences to convey their point. ′A lot of people ask me whether I expect these emoticons to be around in 50 years,′ Fahlman says. ′I'm amazed that they are around now. Smileys only make sense in an ASCII world. They resulted from ASCII's limitations.′

To communicate effectively people need more than just words to fully understand, interpret, and validate the meaning of information. The only emotions that do exist in electronic mail are the ones attached to the words. There are no other challenges in contradicting people's perceptions, only the misreading of information. Words are pegs to hang ideas on (Fletcher 2001). According to James-Lange, a sociologist, actions come before emotions and the brain interprets a response. The response may include any or all of the following: perspiration, heart rate elevation, and facial and gesture expression. The person is unaware that they are experiencing an emotion when the response occurs; only when the brain cognitively assesses the science of the normal function is it labelled as an ′emotion′ (Klein et al 1997). Walter Cannon opposed the James-Lange theory by stating that the emotion is felt first, and then actions follows. In their view, the thalamus and amygdale interprets a situation, which evokes emotion and sends signals to the ANS (Autonomic Nervous System) and to the cerebral cortex, which then interprets the situation cognitively (Klein et al 1997).

[1] http://people.umw.edu/~ernie/cpsc104/emailadl.html

Affective Computing is trying to build computer systems which, in their interaction with users, consider their emotional needs. Computers need to be designed to support users' social and emotional natures. Reeves et al (1996) have researched this topic and found that people have a preference for praise, particularly in the face of criticism. Two primary types of emotional needs have been identified: firstly ′experiential emotional needs,′ such as the need to feel understood by others, the need for physical and emotional connection with others. Secondly is ′emotional skills′ such as empathy and emotional awareness. Emotional skills' needs are similar to what Daniel Goleman considers as faculties of ′emotional intelligence′ (Klein et al 1997). Educational technology could be twisted to construct emotional-skills that enable the users to meet their emotional needs. There are benefits to be made by this development - to those with non-verbal learning disabilities, to people with autism in need of emotional situation modelling, and dyslexia, who have difficulties in reading words.

It is a difficult thing to convey emotion in an email. People frequently get in trouble for typing exactly what they would say out loud. Without the tone of voice to signal their emotion, misinterpretation is easily made. We wish to progress the ability to infuse electronic messages with more authentic personalities and expressions: an aim to interpret the sender’s thoughts and convey his/her emotion and personality through a combination of graphical components, image, and expressive typography. In contrast to the new, developing and successful language that is rapidly spreading in the use of mobile devices, this personalized e-mail will introduce a visual language that people will acquire through using their e-mails. Initial findings are presented from exercises of visual literacy, where the viewer has to play a series of matching games with words and image in order to derive each user’s meanings and interpretations. Introducing young designers in college to semiotics could speed up this essential mental process (Crowe 2003). We investigate reading pictures as sentences and the semiotic and linguistic meaning derived from those sentences.

A semiotics prototype

We investigate the creation of a graphic language that has no communication barriers. In order to do this images must be able to be read in sentences. Early man was reading long before writing - dating back to translating symbols on cave walls and deriving information from animal footprints with the intent to track them. In Egypt, hierographs were invented - where the sounds and names of objects depicted forms

of spoken words, and this gave rise to punning pictures. One picture or a combination of two, or graphic marks could convey abstract thoughts (Figure 1). The expression of complex ideas was illustrated through comparison and metaphor. Graphic marks could indicate whether something was male or female, singular or plural. Picture punning is said to be the origin of all languages (Fletcher, 2001). In relation to the quiz, picture punning will be used to test the viewers' understanding of it. Computers are semiotic machines based on written development (Gramelsberger 1994). They allow signs to be processed and produced, stored and represented. This separation of storage and representation of the signs, leads to the separation into 0-1 sequences and signs.

The use of typography illustrates the uniqueness of this proposed system (see Figure 2) by illustrating the letterform ′A′ in large bold type - suggesting the system is the 'only' one. The image itself is a brown envelope and this provides texture to the screen. Orange is the colour that seems to be able to evoke

Figure 1. Abstract Thoughts

Figure 2. Interface

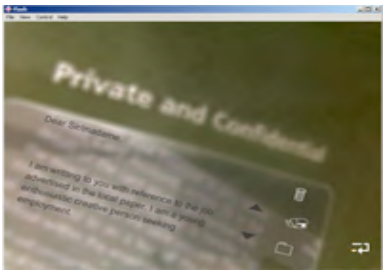

Figure 3. Inbox

strong emotions. It somehow manages to create an impression of oscillating between pleasant optimism and budget trendiness (Schmitz & Zwick 2003). It has a high intrinsic brightness coupled with warm browns which brings it to the foreground of the screen. The colour brown dampens brightness, reduces text-background contrast and is composed of roughly equal proportions of light emission (Schmitz & Zwick 2003). The interface provides a pleasant aesthetically balanced feel. This interface subliminally applauds the Apple Macintosh computer for building on emotional value, in the image (Bowe 2000). The idea behind the product was that the computer was a desktop friend by appealing to the eye and leads the way for ubiquitous computing. This interface celebrates the coming of emotion into the physical product (computer) as well as the theoretical. There is a rollover command on the symbols - to prompt what they are. There is also a curser command on the mouse to make the screen more enjoyable and dynamic.

Figure 3 shows the use of dynamic typography to evoke emotion. People can scroll through their letters using the arrow symbols. There is also the option to view attachments and empty trash. The reading of the written language from a different angle while still being legible supports the idea of new ways.

Design must try to break away from the preoccupation with appearances, and move towards an alternative theoretical form, one which relates physical form to cognition and understanding. Design needs to focus more on semiotic interfaces - allowing the reconstruction of meaning by the receiver. Cognitive semiotics is the study of signs that are considered mental activities and essential units of thought and meaning. It allows tangible and cognitively grounded intelligibility of form. In the semiotic-cognitive model, the design content changes from an object - to a cognitive process - and designers are enablers through providing interfaces, regarding the physical form they take (Kazmierczak 2003).

Pictorial and textual components take advantage of cognitive differentiation between the processing of different types of sensory information: they visually depict the intended meaning, and benefit from the efficiency with which people process visual information. Intellectual processing takes longer because linguistic messages are processed more slowly. Graphic diagrams represent the way people think and are suited to different learning styles (Kazmierczak 2003). Designers create stimulants and represent an object by presenting qualities that will fulfill expectations. The designer has to use an appropriate trigger for the receiver to construct meaning. Graphic diagrams are objects of cognition; they create sensorial configurations that operate semiotically to communicate conceptual relations (Kazmierczak 2003). The two aspects of graphic diagrams are the logic of visual syntax and the laws of visual perception (Philip and Varzi, 2000). The visual arrangement determines the perception and understanding of components. The designer has to be aware of the semantic qualities of graphic arrangements. The arrow in Figure 5 implies a specific direction, motion and possibilities for transition. Peoples' understanding of diagrams, by means of sensory perception, is grounded in the physical. For instance, a vertical line is linked with motion ′up′ or ′down′. The upward movement is understood as positive while the downward movement is negative. This is linked with organic growth and advancement, and with decay and decline. A horizontal line is associated with the ground, it is perceived as static. Diagonal lines are understood to be active and unstable, the meaning is in the praxis of experience (Kazmierczak 2003). Figure 4

shows negative movement and amplifies the idea that the message has not been sent through visual stimuli. The interfaces, shown in Figures 4 and 5, illustrate also

Figure 4. Failed message

Figure 5. Message sent

Figure 6. Our design

the use of code - of symbolic representation, by integrating text as if it were image. The complexity of the architecture causes the viewer to consider syntactic relationships as guides to the meaning associations of texts. The viewer is forced to conclude conceptual relations using clues from visual composition. Sensory proximity and perceptual diagrams determine what people link together. There are no explicitly stated rules for reading text, it is indicated by intricate logical layering of information according to closeness and directionality (Kazmierczak 2003). The interfaces show different spatial arrangements, which triggers alternative reconstructed meaning.

Evaluation

The subjects were asked to explain the point, or message intended, by the pictures. They responded that the visuals did make an impression on them, and they explained the symbolism they saw in the imagery. When the subjects were asked to participate in a 'picture walk' exercise - where they had to talk about what they saw - elements such as light, colour, perspective and placement of objects indicated the story. An STW strategy was used (Thibault and Walbert 2003). A code was established on a semiotic analysis of the elements of meaning intended by the designer of the images. This form was used to deconstruct and categorize the clusters of meaning found by the viewer responses. This approach is qualitative, although it used content analysis methodology which gives structure to the responses of the participants used.

Figure 6 is one of the many visuals presented to the group of people. The first question asked about the image, was to determine the dominant feature. The most

dominant element of the image was the colour red, 90 per cent of the respondents agreed. Frequently used terms included the words ′love′ ′blood′ and ′mirror′. This experiment operated on several semiotic levels. On the iconic level it was clearly the word love; on the symbolic level, it represents alternative meanings. The results were positive (with regards Figure 6) and the intended meaning for both designer and receiver were almost accurate. The subjects themselves drew upon their own experiences of love which can also include feelings of the pain. Some found the image quite disturbing and felt it insinuated murder. The context in which an image is used is an important aspect as it can alter the meaning.

Conclusion

This paper describes the need for expression in electronic mail and the development of a personalised email system. This interactive piece (as illustrated by the Figures) is attempting to transform the static nature of electronic mail into a more dynamic form that can offer new ways to interpret verbal information visually. The devices used will instil the user's message with more authentic personalities and expressions. The prototype hopes to accelerate the coming of emotion within computer systems. The user of this prototype can be anyone open to expressing him or herself. Words and letters lose meaning to dyslexic suffers, who become distracted with form itself. This new electronic mail system could be beneficial and create a three dimensional structure that shows the enactment of the extended effort of a dyslexic reader, and enables them to express and obtain meaning visually.

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Cinematics and narratives: creating an archetypal character based experience

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Abstract

This paper addresses our current stage of research and our strategy for addressing the challenges of developing a design driven narrative and methodologies. Cinematics and Narratives (CaN) is a research project in its first of three years, whose goal is to significantly explore approaches to contemporary animation. CaN is comprised of three integrated objectives: the first is focused on developing and exploiting real-time animation and content within the context of a visual and narrative design based repository of primitives; the second explores the dynamic of context, exposition and expression, e.g. mixing our design primitives into a new form via cinematic narratives, and the third interfaces this system with an audience in such a way as to enable the system to learn from viewer interaction, where the system through a layer of predetermined rules automatically refines the design. CaN is focused on integrating computational intelligent agents designed as character archetypes within a dynamically changeable world created to adapt along a possibility of multiple narratives.

In the context of design, this research investigates the viewer experience as played out by their reaction to the work. Using the notion of archetypes and viewer experience, our work delves into the notion of presence within subjective space and the viewer's immersion therein. As part of our experience our goal is to develop a method to elicit contrasting reactions from the viewer. By designing imagery that emphasizes contrasts, we mingle the 'attractive' and the 'repulsive' in a single immersive experience.

Developing a method to capture the viewer emotion through a gesture based system is our primary goal. This is a system that uses proximity and action to assume the viewer's state of emotional being. We incorporate this assumption back into our character system to further agitate a reaction from our viewer.

The research attempts to create a bridge of immersion connecting the physical space with the synthetic. To create a space that immerses the viewer in such a way that they are forced to reconsider their impact on the world around them. As referred to by French Renaissance writer Rabelais when writing about medieval carnival, 'not a spectacle seen by the people; they live in it, and everyone participates because it's very idea embraces'.

This research approach plans to leverage upon the mechanics and genre of magic realism. As Gustavo Adolfo Bécquer a Spanish post-romanticist writer of poetry and short stories writes about grotesque mechanisms in literature, The first of these is the fact that the mechanisms of imagination depend in good measure on distortion and violence. Secondly, this subjective distortion is linked to a larger chaos in the universe, whose tragic force can be glimpsed by poetic fantasy. Third, the manifestations of that universal chaos are found in the grotesque aspects of Nature and art, and particularly architecture. They are also found in a 'second' reality, a nether-world of demonic forms. And finally, both realities often fade away in the presence of the commonplace and disillusioning environment that we all live in, which can also be grotesque.'

Introduction

The current state of our research focuses on quantifying the meaning of images in a series of artistically created works. This research takes shape in two primary approaches. The first approach, proposed by fellow Principle Investigator Chang Yun-Ke, discusses the usage of imagery, generated by student artists under the tutelage of Ina Conradi and Mark Chavez, to analyze and compare the layman interpretation of the image to an artistic one. The second approach uses visual structure methodologies with beat boards set to different components of visual exposition in a time based medium. (Block)

The approach of Perception Study on Emotion-Provoking Images

This study is primary research and includes both the theoretical and empirical foundation to its subsequent application. It aims to explore how abstract images affect and provoke the perceived emotion in viewers.

Various studies in information retrieval realm (Jorgensen 1999; Jorgensen 2003; Wang and Wang 2005) have identified that images can carry certain emotional meaning, which could effectively provoke viewers' emotion. Hence, the intrinsic relationship between image and emotional meaning can be utilized in the study of emotional information retrieval (Schmidt and Stock 2009) to give the evidence of cognitive process. For these studies, the perception of emotional meaning is largely based on concrete objects in pictures conveying explicit meaning, such as people's body parts (feet, hand, face, etc.), indicatively emotional gestures like hug, kiss, etc. and only the viewers' understanding of images has been observed. There is to date limited research in both information science and cognitive psychology focuses on the study of relationship between perceived emotion meanings by artists and viewers' perceptions upon emotion-provoking images. This study addresses the gap in current theories of how viewers perceive the emotional meaning of abstract imagery that has been embedded into images through creative intuition and observation by artists.

This multi-discipline collaboration is involved with artists' creative work, information retrieval science, and media-effect studies. A cognition-affect model (Bolls and Jin 2005) grounded in social psychological theories will be included as the approach for examining the process of how perception and cognition influence the emotion.

Existing emotional image retrieval studies are mostly based on tests of viewer's tagging-evaluating behaviour and quantitative methodologies. However few studies have been devoted to testing the dynamic relationship between viewers' perception and components of image. As foundational research in both fine art and information science, this study will focus on how the change of imagery influences the viewers' perception in its emotional meaning.

Classification of emotion

Everyone knows what emotions refer to, however there is no consensual concept of precisely what emotions are. Basically, an emotion is considered as a mental state

associated with feelings, thoughts and behaviours and so on, although arrive at a consensual concept of emotion is not an easy task. An emotional state can be stimulated by either extrinsic conditions or intrinsically through physical needs (such as hunger activates anger). Previous arguments in emotion studies have also revealed that human emotion can be either the result of cognitive process, or functioning differently from cognitive system (Lazarus 1982). Psychologists and other scholars try to approach human emotion via both subjective description of emotional experience (Robinson and Clore 2001), including some studies made to dissociate the emotion expression from emotion experience (Gross, John et al 2000), and physical data such as facial expression, body reaction and so on assumed as relevantly objective measurement which is able to tangibly reflect the subjective estimation of emotion degree (Fridlund, Kenworthy et al 1992; Messinger, Cassel, et al., 2008). Scherer pointed out in his article that 'defining emotion is a ‘notorious’ problem' (2005). Although he tried to highlight the importance of this definitional issue in emotion research, so far not a single scholar or a study claims that they could give a consensual definition of emotion. Hence, the more important aspect of this study seems to be to find out a reasonable classification of emotion in lieu of struggling with the definition.

Emotions can be roughly divided into three types, positive, negative and neutral, although neutral emotion is automatically wiped from the classification. According to Parrot (2001), emotions are categorized into a short tree structure constructed by primary (basic), secondary and tertiary groups. The first-tier emotions, which are supposed to be the primary feelings of human beings, comprise love, joy, surprise, anger, sadness and fear. And Paul Ekman (1978), who is a pioneer in the study of emotion and their relation to facial expressions (Haggbloom 2000), also classified emotions into anger, disgust, fear, happiness, sadness and surprise. Although Scherer (2005) argues that the classification of emotions could only show the 'prototypically patterned types of significant events in the life of organisms', there are a lot more different categorization methods depending on the theory the scholar adopts (Ekman 1992; Izard 1971, 1992; Tomkins 1962, 1984). We adopt the method of emotion classification from Ekman developed in 1978, that is, emotions incorporate categories of anger, disgust, fear, happiness, sadness, and surprise.

Creation of abstract imagery

During the study, when trying to depict emotions, we used the term abstract as equivalent to the expression of 'nonfigurative art' or the broader term 'nonrepresentational' art. Artists were not only to distort or exaggerate the figurative, to emphasize or simplify ‘what things look like’ but rather they had to eliminate figurative depiction all together to create an image of emotion in itself charged with affective energy of expression. The abstract imagery painted was to symbolize the artist’s subjective emotional experience. It is believed that figurative representation limits the artist’s capacity to express the actualities of experience, including spiritual experience, and emotions with the kind of intensity or clarity that would reveal its true nature and hidden relations between things (Gooding 2001). Therefore, the abstract components of design and structure, line and shape, texture and facture, rhythm and interval, light and shadow, colour and tone were used independently from naturalist representation, rather for themselves as representation of sensuous experiences of emotion alone.

Meanings are created as these concrete actualities impinge, through senses, upon the receiving imagination. It is in this discord around art that later words will come into play: spoken or written, language answers to image, articulating personal responses that enable the negotiation of shared aspects of meaning. Abstract art has many ways of touching upon things known, but its reference to events in familiar narratives is never literal and unequivocal: it always demands imaginative extrapolation (Gooding 2001).

The starting point for this study involving image generatiion was research into the diversity of stylistic methods of abstract art: abstract expressionism, such as Franz Kline, Philip Guston, Hans Hofmann, Barnett Newman, Ad Reinhardt, Robert Motherwell, Arshile Gorky and Joan Mitchell, painterly automatism with free creation of imaginary forms, action painting like Jackson Pollock and Willem de Kooning, expressive mark-making such as Cy Twombly, techisme, Lyrical Abstraction as the Cobra group artists and Japan's Gutai group, Colour field painting with highly articulated and psychological use of colour, typically as Morris Louis, Mark Rothko, Clyfford Still, Ad Reinhardt, Helen Frankenthaler, Richard Diebenkorn, Sam Francis and Mark Tobey, and last but not least, calligraphy.

The abstract visual language and its linear complexity, energy, suspense and colouristic brilliance were used to express dynamic relations between different emotion categories. They differ in terms of colour palette from overly saturated pinks reds and greens in the disgust category, following with extreme contrast of morbid black and white hues in anger, dissolving hues in sadness to the delirium of contrasting blues reds and yellows in happiness. Linear sweep also changes from ornate swellings and curved spilling in fear, with an articulation of linear dribbles and whorls in anger, arabesques and splashes in joy to stains and splotches in disgust.

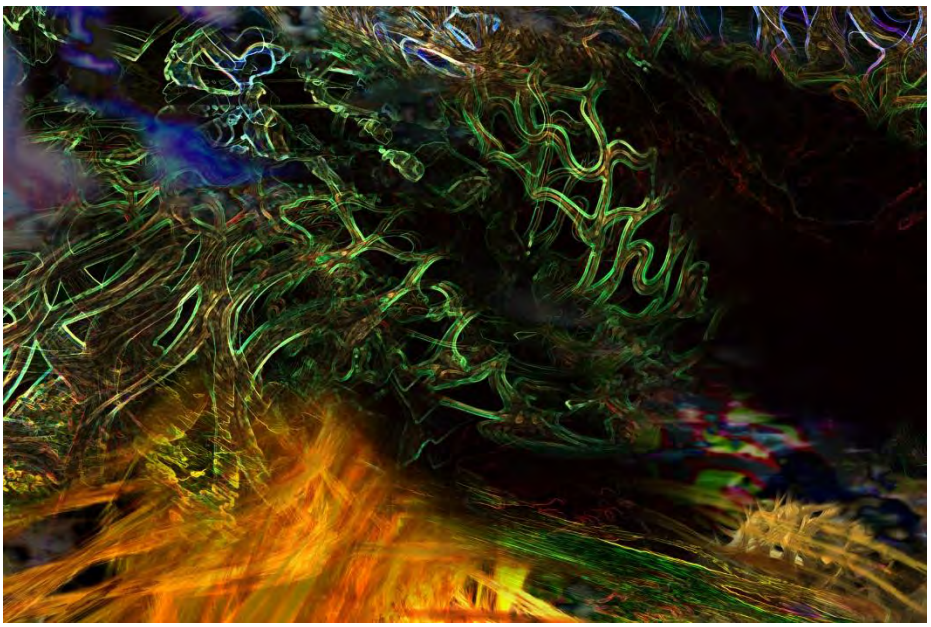

Figure 1a Jealousy

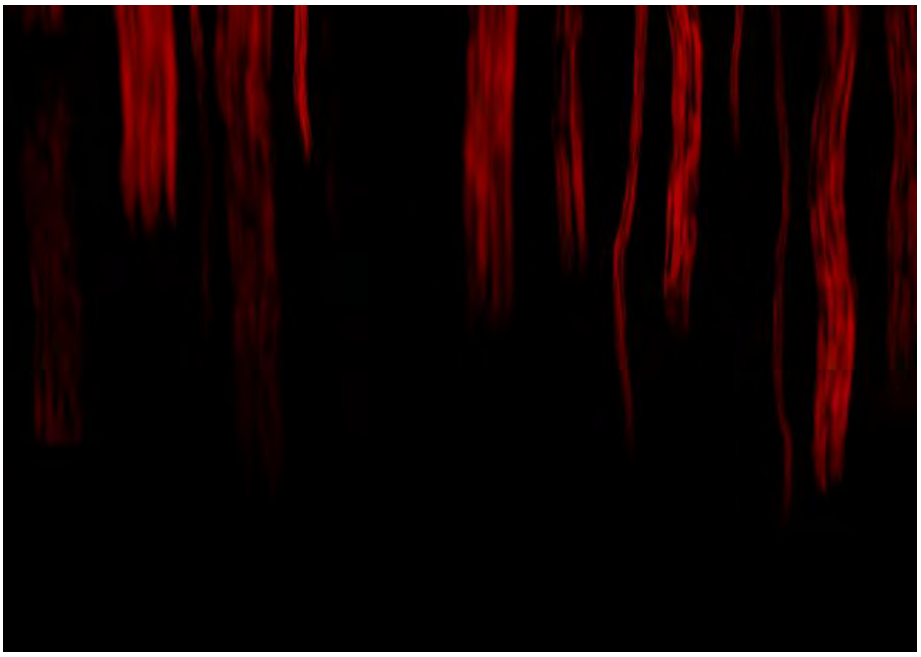

Figure 1b Mortification

Figure 2a Happiness

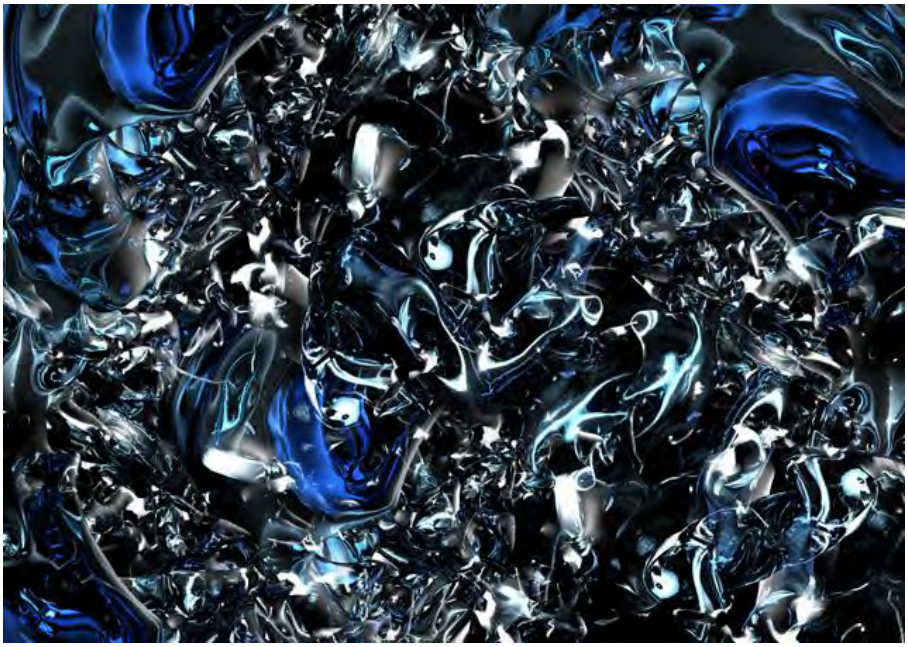

Figure 2b Fear

Image selection and test design

More than fifty images were specifically created for each basic emotion category by faculty members and graduates from the School of Art, Design and Media, NTU, comprising abstract paintings and photographs. Fifteen images were manually selected for each group, which were supposed to be the most representative for the given emotion. A three-round selection procedure was employed, which means (1)

Initial setting of image pool, (2) Crossed Agreement on image selection and (3) the final decision carried by the main supervisor. There was also a group of relevantly neutral images selected as control group. Next, participants were invited to use emotion-describing tags (anger, disgust, fear, happiness, sadness, and surprise) to indicate at least five images of each emotion group. To avoid unnecessary work on determining the semantic level of terms participants might use, viewers could only choose tags from prescribed words from these six categories. Furthermore, they could adjust a scroll bar to suggest their emotion intensities, which would be automatically calculated as a numeric value in the system to facilitate the importing into a database.

Prior to including the large sample size, a pilot study with a number of students and staff in School of Art, Design and Media (max. 30) would be conducted as a pre-test. A website dedicated to the formal test will be launched to collect all necessary data, including personal particulars and tagging-scrolling results. The designed and ideal size of valid respondents should be no less than 500 people. The test will be open to all participants for about two months.
All test results will be imported to a database then processed by the statistical analysis software SPSS. Coding will be done by the authors. Data analysis will be based on result of descriptive statistics (mean and standard deviation) and correlations (Pearson, two-tailed).

However, abstract art also challenges the viewers in a particular way: they are required to look with fresh eyes at pictures that are different. They have to discard old habits, such as the desire to recognize something. Abstract art does not imitate; it represents in a different way. Viewers find no affirmation of themselves in what they see. They are denied the satisfaction of re-encountering a known reality. One of abstract art’s great discoveries is undoubtedly to have made reality’s energetic side visible again. It helps us to comprehend that Nature is just as invisible, immaterial and dynamic as it is tangible, concrete and static. The importance of the in-between is rediscovered. The abstract representation of reality is founded in the two-way flow of visual energies. Gottfried Boehm (Gooding 2001).

Limitations

The study is unable to investigate the pre-condition of viewers, that is, when images were exposed to viewers, their emotional mood before seeing pictures was unknown and thus ignored. They are assumed to be neutral and calm to judge the pictures. Apparently, some of the audience may not be as calm and neutral as we assumed. Viewers are required to tag images with proper emotion-describing words to reflect their feeling of certain image. The tagging process can be considered as a way of confirmation of viewers’ emotion, but on the other hand, this also could be considered as an evaluation process, that is, emotion-describing words merely play the role of markers instead of emotional meanings. Viewers think that this picture stands for certain emotional meaning doesn’t mean they really feel in that way, which means that even viewers can tag certain emotion category on a image doesn’t necessarily mean the image is able to provoke such a feeling for viewers, since 'the

emotion itself is thought to be largely unconscious' (Barrett). That's why we only set the objective of the test as figuring out the perception of viewers on an emotional image, instead of inspecting viewers' emotion state activated by the picture. So probably, in the further study, we can include the third-person effect theory and objective capture device (such as facial expression capture) to approach the distinctions between their judgment on emotional meanings and their real emotion states.

Cultural differences are ignored in the study, but psychology scholars have testified that there are different cognitive styles between Westerners and East Asians. The prominent distinctions in the attention allocation to visuals suggest Westerners tend to pay more attention on focal objects while Easterners care more about the whole background (Boduroglu, Shah and Nisbett). So it could be inferred that such distinctions also exist in different races of people in our tests.

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Emotional interactions: audience encounters with virtual personas and robots

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In 2004 I wrote a conference paper called 'Talk to me: getting personal with interactive art' exploring the emerging subjectivity and agency of interactive art works. New technologies such as robotics, computer graphics and animation techniques, combined with sensing technologies and automated ‘artificial intelligence’ programming, enable art works to ‘come to life’ and interact with audiences demonstrating sophisticated life-like behaviours. These new art works don’t just sit passively in the gallery waiting to be looked at, they actively engage the audience, interacting with them in real time, talking to them and positioning them as interactive social partners not just as mere observers.

As a curator and theorist my interest in the interaction between audiences and these lively and life-like interactive gallery entities, has continued with an ongoing investigation and analysis of the various strategies artists use in creating interactive art works and the ways that audiences respond to them.

What is it about these works that makes us treat them as ‘social actors’? The human tendency to anthropomorphise technological entities that display life-like or human qualities is clearly a key factor. This predisposition to anthropomorphise may be explained by a phenomenon that Byron Reeves and Clifford Nass have called the ‘media equation’. In *The Media Equation* (1996), Reeves and Nass document the apparently innate human tendency to treat computers, robots and audiovisual media as if they were real. Their work draws on neuroscience, sociology and social psychology to show that our ‘old’ brains are neurologically hardwired to respond to media as social actors.

Reeves and Nass have done numerous experiments investigating how humans react to computers, robots and audiovisual media and have concluded that our responses are fundamentally social and natural. Ingrained human physiological responses (such as reacting to sudden movement or sounds) and social responses (such as a

tendency to be polite) are carried over from the physical world into our interaction with mediated screen images and human simulations. When a robot moves into our physical space we have a strong sense of its presence and agency. We turn and orient our bodies toward it as we assess what it's going to do - whether it's friend or foe. When a screen character directs a comment at us we feel socially compelled to respond.

However, this human tendency to anthropomorphise non-human technological entities and images is counter-posed by a phenomenon described by Japanese roboticist Masahiro Mori as the uncanny valley. As discussed in my previous paper, the attempt to create very realistic human representations in robots and virtual characters (such as Stelarc's interactive talking *Prosthetic Head* (2002)) can fall into the trap of Masahiro Mori's uncanny valley which postulates that as representations become almost (but not quite) human they generate feelings of disquiet and uncanniness (Mori 1970; Cleland 2004). There seems to be an innate human tendency to become spooked by robots and digital animations that look almost but not quite human, when the illusion fails or breaks down the effect can be distinctly eerie. This uncanny effect may also be traced to a hardwired neurological response as our brains respond uneasily to images of humans who look sick, unhealthy or zombie-like (Hanson 2003).

Realistic appearance is only one aspect of the uncanny valley phenomenon, realistic movement and behaviour is another. A sense of uncanniness or social discomfort can also be generated by the movement and behaviour of robots and animated characters. We read the emotions of gallery entities not just by facial expressions but also by their communication (text messages, voice and sound) and by their body language, gestures and behaviour. Behavioural realism in terms of believable and socially appropriate responses may be more important in creating satisfying social interactions than trying to achieve a super-realistic human appearance (Blascovich 2002).

Most of the art works I discuss in this paper I have exhibited in two recent exhibitions, *Face to Face* and *Mirror States*, so I have had an opportunity to observe audience interactions and responses at close hand. These art works incorporate various aspects of the uncanny and demonstrate the inherently social nature of the interaction between humans, computers and mediated images.

In his 1919 essay on the uncanny, Sigmund Freud refers to the profound uncanniness of detached body parts, 'a severed head, a hand detached from the arm … feet that dance by themselves' (2003: 150) which evoke in us primal fears of castration and dismemberment. Otherwise inanimate objects that move as if possessed also fall into this category. Nevertheless in certain contexts (Freud mentions fairytales and fantasy narratives as typical circumventions of the uncanny) uncanny objects may provoke delight and even humour. The 'safe' fantasy context of the gallery environment can also provide a 'magic circle' environment (Huizinga 1955) where we are safe to enjoy experiences and interactions that might otherwise be experienced as unsettling and uncanny.

Sean Kerr's and Wade Marynowsky's gallery entities don't try to pass as human, instead they play with exaggerated and iconic signifiers and symbols of humans and machinic entities and use trickery, sleight of hand and humour to engage audiences. Kerr's interactive gallery characters in *Klunk, Clomp, Aaugh! - Friends Reunited* (2008) are variously represented by cartoon-like dots on a computer screen representing eyes and other non-human objects that are triggered by motions sensors and automated computer programs.

The uncanny and apparently unmotivated movements of Kerr's robotic bucket that loudly clanks and skitters across the gallery floor as if possessed may startle audiences, but the typical reaction is one of humour rather than anxiety. Similarly, his giant pink plastic finger that inflates and deflates when triggered by audience sensors - literally giving his audiences the finger - creates a humorous performative scenario, particularly when it lands on people's heads as it deflates. Another one of the friends, trapped in a small bunker in the gallery with only a pair of iconic computer eyes visible through a gap in the partially opened door, delivers a slow and plaintive version of The Beatles song *Help* using a synthesised computer voice. 'Help me if you can, I'm feeling down. ….Won't you please, please, please …help me!'

Wade Marynowsky's cross-dressing 'bourgeoisie robot' Boris (*The Discreet Charm Of The Bourgeoisie Robot* (2008)) is camp rather than uncanny. Although Boris playfully references human attributes in his voice, clothing and behaviour he is clearly a robot. His glass-domed head and his camera eye proudly proclaims his technological status. However, while Boris' appearance is humorous rather than uncanny, his movements and comments may strike gallery visitors as somewhat eerie. The robot's apparently autonomous movements and comments are controlled

by creative sleight of hand. The artist (hidden in another location) observes Boris and his audience participants via webcam and directs the robot's movements remotely. Boris greets audience members as they enter the gallery space by twirling and moving towards them. The robot's comments (often showing a seemingly uncanny knowledge of the gallery participants and their actions) channels his master's voice through a pitch-shifted Skype application.

Interactive gallery objects as social actors

In the gallery setting, interactive art objects become 'social actors' - interactive partners in the gallery experience. The audience takes on a performative role as they participate in the interaction and become part of the artwork for other audience members to observe. This can generate particularly strong emotional reactions and social interaction, not just between audience participants and the art works, but also among gallery audiences as they collaborate with each other to interact with gallery entities and make sense of those interactions.

Reeves and Nass argue that it is human nature to treat media entities in a social way and to treat them at 'face value' – if entities appear to be intelligent and to have emotions then we will treat them as if they do. However, it is us the audience who make them participants by our psychological and physiological reactions. As Reeves and Nass point out: 'Social and natural responses come from people, not from media themselves (1996: 252).

Drawing on their own knowledge of social behaviour and empathic understanding of emotional states, audience members typically project complex motivations and emotions on to their interactive gallery partners. It is these interpretive responses of audience members in reaction to the behaviour of the interactive gallery object that generates much of the emotional valence of that encounter. Watching audiences interact with Mari Velonaki's robotic wheelchairs (*Fish-Bird* (2005)), it is common to witness strong empathic responses. When Fish (the shyer wheelchair) turns its back on Bird and the gallery audience and wheels itself into the corner of the gallery, an audience member follows it, gently murmuring, 'Oh, are you alright, what's wrong?' Another audience member joins the discussion, 'Perhaps it's shy, should we leave it alone?' 'Fish, what's wrong?' 'Bird, why don't you say something?' Clues to Bird's feelings are intuited from the poetic messages it prints out onto the floor. In a later

visit to the gallery, a message from Bird saying 'Don't leave me here' makes me feel surprisingly guilty as I walk out of the gallery.

Fish-Bird appeals to our human desire for intimacy and connection and the desire to help and nurture. Strong bonds between audience members and the wheelchairs can be generated surprisingly quickly and the audience's desire to help can be intense. During one exhibition, gallery attendants had to stop audience members from 'rescuing' Fish and carrying it out of the gallery and down the stairs to go to the local river in response to the wheelchair's request to 'Take me to the water'.[1] In this situation, there is a willing suspension of disbelief as the audience member 'plays the game', treating the interactive gallery entity as they would another person. Frequently, audience members will creatively interpret behaviours and responses to make them meaningful – the audience fills in the gaps and interprets behaviour in such a way as to make them relevant and maintain the illusion of a responsive two-way relationship and understanding.

The flip side of the audience tendency to treat media as full social actors and participants is that we will also expect them to respond and behave in a socially appropriate manner. This is a big ask for interactive gallery objects.

As humans we have the full range of sensory modalities available to us, we can see, hear, touch and we can move around freely in the gallery space. We also have a lifetime of experience of social encounters and the physical world that we draw on in every new encounter. These abilities are typically not shared by our interactive gallery partners, and these physical and communicative asymmetries can cause problems in the social interaction, either by making the art object appear to be rude or stupid, or by forcing the audience member to behave in a rude or impolite manner to get a response. Typically many interactive gallery characters are deaf, dumb or blind - often all three.

Stelarc's *Prosthetic Head* can't see audience members or read their emotions and body language (although Stelarc is planning to introduce a vision system for the work). This means that audiences, whether smiling or pulling faces at the head, will get the same neutral facial expression in response. Although the head can talk (using a synthesised computer generated voice) it is 'deaf' and the only way audiences

[1] Personal communication with the artist.

have of communicating with it is via a computer keyboard. Inappropriate responses from the head to the audience's typed questions frequently break the social connection and technical glitches can also cause problems. At times the head has been known to freeze and audience members type away in frustration with no response, talking out loud to the head and other gallery participants in compensation. Of course, spoken comments elicit no response, further breaking the social connection.

The more human-looking the entity is, the more we expect of it. When humanoid entities don't react appropriately or don't understand things we would normally expect humans to understand, the illusion is shattered, and this inevitably leads to disappointment and disaffection. Another popular audience strategy with Stelarc's head is to try to catch it out, to test its limits and wilfully break the illusion. Less 'kind' audience members, typically antisocial pubescent boys, frequently give the head grief, telling it it's stupid and ugly. Of course, children love the opportunity of playing and being socially inappropriate - and so do many gallery participants.

Some concluding thoughts …

Limitations in the communicative abilities of interactive gallery entities can be creatively exploited when imaginatively used within the context of a believable social encounter (e.g. *Fish-Bird*) or in conjunction with some creative sleight of hand as is the case with Marynowsky's bourgeoisie robot Boris and Sean Kerr's interactive gallery personas. Another way of solving the problem of socially inappropriate, rude or uncanny behaviour is to make it a focal part of the interactive encounter and to deliberately provoke or startle the audience.

As a curator who has watched a lot of people interacting with art works in the gallery environment, I would argue that art works that under promise rather than over promise are the ones that provide a more satisfying gallery experiences. You don't expect a lot from two wheelchairs in a gallery space. If humour is involved, audiences also have a tendency to be much more forgiving of socially 'inappropriate' behaviour or 'mistakes'.

Advances in computer vision and other sensing technologies, along with more sophisticated artificial intelligence, computer graphics and robotics technologies, will help to make interactive gallery entities more equal communicative partners for their

human audiences. However, artists will still have to navigate between the audience's desire to treat these interactive entities as full social partners and the effects of the uncanny valley.

The more realistically human-looking an entity is in appearance, the more audiences will expect from it and the more they will be disappointed when that expectation is not fulfilled and the illusion breaks down in moments of social inappropriateness or uncanniness. Because of this it is likely that less human-looking entities, whether cartoon-like, machinic or alien may continue to create more satisfying social interactions for audiences.

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Inner-active art: an examination of aesthetic and mapping issues in physiologically based artworks

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Abstract

Much art seeks to describe or stimulate the feelings and emotions of the viewer, through both abstract and literal representation. With the exponential increase in computing power over recent years we also seek new ways of interacting with technology and exploring the virtual world. Physiological signals from the human body provide us with a view into the autonomic nervous system, that part of the nervous system largely unmediated by the direct intentions of the viewer. With the appropriate choice of signals and processing, we can even develop systems with the ability to interact with us on an emotional level - machines that know how we feel and can react accordingly (Haag et al 2004*)*. This gives us the ability to see into and map the interior worlds of artists and viewers through a direct and visceral connection - the human body itself.

A key issue in the development of physiologically based artwork is to make the observer-artwork dialogue meaningful to the observer, a question of translating the input biosignals to visual, auditory or experiential events. We have yet to develop a suitable language for this dialogue and so this paper seeks to explore some potential mappings for bio-signal art, illustrated using several case studies from past and current works (Knapp et al 2008) (Gonsalves 2009).

We also examine some of the other philosophical and artistic issues involved in 'affective' and bio-art such as monitoring emotion versus engendering emotion, the involvement of the observer in creating and contributing to bio-signal art and strategies for effectively developing such works.

Introduction

To begin let us make clear that this paper is not intended as a discussion of what constitutes beauty or aesthetic pleasure in art, it is more a technically oriented meta-discussion of the aesthetics of control and mapping in co-active artworks and installations. The final decision as to the aesthetic success or failure of a work must always rest with the viewer.

Artists strive to communicate with their audience and with new technological developments come new tools, techniques and metaphors that can enhance or confound this artist-audience dialogue. With the advent of the 'silicon age' we have seen the rise of participatory interactive digital artworks and entertainment, from shoot-em-up computer games[1] to sophisticated mixed reality and multimedia experiences[2]. These same advances in computing power and technology now enable artists and engineers to access information about the viewer that was previously the realm of medical technologies; information as to their physiological and affective state.

Artworks that seek to utilise these sensing technologies become not only interactive or enactive but *co-active*. A performer may also choose to work with biosignals to create or perform a work, however this is a far more specific and personal interaction, with the need for explicit interaction between performer and work not necessarily as important as with a generalised set of viewers/participants. Nonetheless performers utilising biosignals should consider how important is the audience comprehension of their control strategy in the work, such as the mapping of gesture to sound (Tanaka 2002).

The semi-conscious nature of physiologically based interaction creates issues unique to this type of work (aside from considerations of content or visual/auditory aesthetics) including those of the aesthetics and design of the interaction and participation with the work, and for certain works the mapping of high level behaviours (meaning, concepts) from low level control signals (pulse, respiration). In our experiences with physiologically based installations we have found that much of the satisfaction for users comes from exploring the boundaries of their interactions

1 Doom, iD Software, 1993, http://www.idsoftware.com [Accessed 12/06/09]
2 Can you See Me now? Blast Theory, 2002, http://www.blasttheory.co.uk/bt/work_cysmn.html [Accessed 12/06/09]

with the work, learning to 'play' it and play *with* it, and it is for this reason that we focus mainly on relatively explicit mappings.

Acquiring and mapping biosignals

Broadly speaking we may categorise sensors as perceiving physiological events that are *external*, such as cameras, pressure sensors and microphones, or *internal*, such as ElectroEncephaloGram (EEG) or Galvanic Skin Response (GSR). All sensors have individual characteristics that may preclude or commend their use in given situations, for instance ambient conditions (light, noise) or installation design (the issue of unobtrusive physiological sensing is far from trivial).

Systems such as the Arduino[3] or Infusion Systems I-CubeX[4] allow the artist/developer to build custom sensor arrays and pass the data from these to any number of commercial or custom software and hardware systems for processing and subsequent output e.g. Max/MSP[5]. Many of these developers now also supply compatible sensors[6] and there are a large number of resources available for those wishing to build their own (Petruzellis, 2006). Physiological sensors are now also entering the home health and entertainment sectors (Wii Vitality[7]) and could soon be implemented in portable computing devices like the iPhone.

Sensors which detect external expressions of physiology or affective state such as cameras or speech analysers, have limitations in that they can 'fooled' by the participant through exaggerated gestures or behaviours and have limited fields of focus (Cooperstock et. al., 2008). Biosignal based sensors, generally worn on the body, detect the correlates of emotional and intellectual states which are usually outside the control of the participant, who literally becomes 'plugged in' to the work. These types of sensors also have their disadvantages; they are very susceptible to electrical 'noise' generated by muscle movement, may require precise positioning for accurate detection and are also subject to a version of the 'White Coat Effect', in which the very act of wearing sensors may cause changes in the physiological signal being measured (Pickering et al, 1988).

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3 http://www.arduino.cc [Accessed 12/06/09]

4 http://www.infusionsystems.com [Accessed 12/06/09]

5 http://www.cycling74.com [Accessed 12/06/09]

6 http://www.biocontrol.com [Accessed 12/06/09]

7 http://www.nintendo.com [Accessed 12/06/09]

These sensors may also require calibration for each individual user in order to ensure accurate state detection: many such systems require a 'learning' period to establish the system boundaries for a user and map these to parameters such as affective state. One strategy to obviate the need for calibration is to build systems that detect and respond to *changes* in physiological state, as opposed to requiring sensors to pass arbitrary thresholds.

Especially relevant for performers using biosignals is the disparity between test situations and real-world deployment. In general stress levels are higher during performance which may require recalibration of physiological sensors. Environmental factors may also lead to unexpected changes, such as show lighting causing excess sweating which could lead to short circuiting of sensor electrodes.

Although the necessary hardware is now more accessible, the software processing necessary to accurately extract meaningful physiological information from multiple sensor inputs, in real time, is still significant in terms of power and expertise. We have found that using sensor systems of this type usually requires a dedicated machine and a high level of technical knowledge, even before questions of content or aesthetics.

Aside from the potential technical pitfalls, we should also consider the aesthetics of interaction and interpretation of the work. With interactive systems we should attempt to provide a meaningful user experience in which the viewer/participant can perceive their effect on the system, whether that effect is explicit or not, or else there is no *meaning* to the interaction (Koch, Gaw 1990) and by extension the viewers participation in the work.

The lack of concious awareness of changes in one's own physiology can be a barrier to development of these meaningful interactions, as well as the issue of how to represent physiological data as aesthetic content.

Strategies

When considering the purpose of working with biosignals in artworks, the creator should ask what is the purpose of the work. Is it to create a system that *responds* to the viewer (monitoring affect) or a systems that *provokes* responses in the viewer (engendering affect)?

In developing artworks that respond to physiology one must always be aware that one is, in effect, creating a feedback loop (as detailed in Figure 1). This can lead to states in which the viewer and work become ‘stuck’, trapped in a biofeedback spiral with the work amplifying the emotional state of the viewer which in turns amplifies the response of the system and so on. To avoid this one might consider working with responses that *contradict* the physiological or emotional state of the viewer, or building in fail-safe responses that allow the work to break out of these loops e.g. after a given time or when a particular threshold is reached.

One of the most basic and literal mappings of biosignals to aesthetic content is the literal representation of the physiological input e.g. sonification or visualisation of heartbeat (Figure 2, AffecTech 2008) (Figure 3). This is an explicit mapping, and straight away incorporates the viewer into the artwork without requiring any complex state evaluation by the system. This type of mapping may be made more abstract by using these raw biosignal as a controller e.g. heart rate to tempo, muscle tension to pitch (Ortiz-Perez, Knapp 2008).

Moving beyond this kind of low-level mapping we may begin to use the physiological data of the viewer to make estimations as to their affective or emotional states (Haag et. al. 2004). This sort of affective state evaluation allows us several options in mapping them to aesthetic responses, bearing in mind the more sophisticated the response, the bigger the danger of losing the connection with the viewer. At a simple level we have mapped the arousal level of an audience to lighting colour and intensity during an theatrical/musical performance (*The Reluctant Shaman*, Knapp, 2008), changing from blue to red with low or high arousal (D'Andrade et. al. 1974). One might also choose another literal representation of affect and map a state, as judged by the system, to a corresponding on-screen display of relevant text or imagery (Gonsalves 2009).

In developing systems that are intended to provoke a response in the viewer, the artist should be aware that it still difficult to differentiate subtle changes in affective state. One might consider using strong psychological interactions e.g. using imagery of spiders to provoke a fearful response (arachnophobia), in order to induce major state changes in the participant.

Other works have taken the approach of making the physiological signals themselves the content of the work, such as Christian Nold's *Emotional Cartography* project (Nold, 2009), in which physiological events are geo-tagged to construct an emotional map of the participants physical journey, mapping physiology onto geography.

So far we have mostly considered relatively direct mappings of biosignals to aesthetic content, however some might wish to use more abstract 'mediated' mappings, for instance navigation through a narrative, based on affective state. One option is to implement a 'Decision Tree' structure (Koch, Gaw, 1990) which sequences narrative episodes according to pre-determined, state-based rules.
As previously mentioned, when using complex mediated mappings there is a risk of reducing the perception of interactivity with the participant and this should be considered in the design of the work.

Future Directions

As engineers and artists experience working with biosignals and affective sensing grows, we hope to see more sophisticated works emerging. We see key areas for further research as multi-sensor fusion, less intrusive sensing, and more sophisticated user-modelling, leading to better affective assessment.

We anticipate that one of the next major advances in home entertainment will be physiologically-aware gaming, in which difficulty levels can be modulated in response to factors such as stress. This can also be applied to e-learning, allowing a system to respond to learner frustration.

A potentially interesting application of physiologically aware art is in the field of ambient assisted living, where a 'smart' environment could adjust aesthetic content to benefit health and wellbeing in the home or workplace.

While it is difficult to predict how individual artists may implement affect/bio-awareness in their work, it is our hope that it will lead to interesting and sophisticated content, as well as offering the opportunity for further research into emotional and physiological responses to art.

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AffecTech: an affect-aware interactive AV artwork

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New developments in real-time computing and body-worn sensor technology allow us to explore not just visible gestures using inertial sensors, but also invisible changes in an individual's physiological state using bio-sensors (Kim and André 2008). This creates an opportunity for a more intimate interaction between the observer and technology-based art (Gonsalves 2008). We present a technical overview of the AffecTech system; a bio-signal based interactive audio-visual installation commissioned as part of the pre-ISEA symposium in November 2008. Observers were invited to sit on one of 2 sensor-enhanced chairs (Coghlan and Knapp 2008), which transmitted physiological data about the occupant to a central control system. This data was used to control and modulate interactive visuals, live video feeds and a surround sound score, with events and interactions dependent on the observers' affective/emotional state and the disparity or similarity between the bio-signals of the chairs occupants. This technical overview is followed by an examination of the outcomes of the project, from both the artistic and technical viewpoints, with recommendations for modification in future implementations.

Introduction

Works such as the bio-aware jewellery of 'Medulla Intimata' (Gonsalves, Donaldson 2004) have sought to bridge the gap between the aesthetically pleasing and the raw inner world of the wearer, but we are only recently seeing the emergence of works that attempt to interact with and react to the viewers emotional state (Chameleon, Gonsalves 2009). We are still far from establishing universal templates for interactive aesthetics, but with every work that embraces affective sensing or every engineer that applies their research to the creative arts we come closer.

Recent years have seen the boundaries between art and science become amorphous, with technologies that would have been inaccessible due to cost or complexity, come within the reach of the 'average' computer literate artist. Low cost

sensor data acquisition systems such as the Arduino microcontroller[1] with active user communities and an open source, copy and paste collaborative ethic allow artists to incorporate elements of sensory/environmental awareness into their work (Blast Theory 2009). At the same time some practitioners have embraced 'virtual reality' technologies to embody the viewer in their works in an attempt to immerse the viewer in a world/universe of their creation, arguably a goal of many creators throughout history. Most of these virtual reality technologies have concerned themselves with external sensing or representation of the viewer and it is only through the addition of physiological sensing that we may incorporate the viewers' internal as well as external state.

With AffecTech we hoped to create a work that would respond to the internal affective or emotional state of the viewers and would, in turn, have the ability to trigger a corresponding or at times conflicting response in the viewers. We sought to play with the boundaries of the relationships between the installation space, the viewers and the artwork using external sensing (camera), physiological sensing (pressure, galvanic skin response), interactive visuals and immersive sound. In development of the AffecTech system we used a biological analogy, the sensors as its eyes/ears/skin, the audiovisual system as its face/mouth, and the decision-making systems its 'brain'.

The experience

As a visitor of AffeTech, you sit on one of the two empty chairs in front of the projection screen. The chair senses your presence and gives the instruction to turn the system ON: the brightness of the projection and the overall audio level increases. Also, an avatar fades in on screen, which displays an image sequence of you (Figure 2). You place one hand on the electrodes attached to the chair and your avatar changes colour according to your cortical arousal level, as measured by the chair's sensor. If there is any sudden change in your signal (e.g. after taking a deep breath or being startled), your avatar makes a rapid movement accompanied by a breathing sound. If there is another participant in the other chair, both avatars are displayed on screen and the virtual distance between them varies according to the correlation of both signals (Figure 2). In the case when the signals of both chairs are entrained, both avatars merge into a synchronous movement accompanied by a harmonic

[1] www.arduino.cc. Accessed 16/06/09.

sound. The video and soundscape material reproduced are selected according to the average arousal level of both participants. Once you have finished experiencing the installation, the system goes back to the OFF mode automatically upon rising from the chairs.

Figure 2. An image loaded inside a visitor's avatar (left) and two users with their avatars on screen (right).

Interaction

The system for AffecTech is based on a two way interaction model as can be seen in Figure 3. The installation's audiovisual outputs are through a projection screen and a four-speaker surround system. The system was awoken from its default stand-by state upon activation of the pressure sensors (Force Sensing Resistors - FSRs) mounted in the seat of each chair. The system represents in real-time the Galvanic Skin Response (GSR) of each chairs' occupant, measured as changes in skin surface resistance (sweating), known to be linked to the level of cortical arousal in a subject (Lang 1995). This is visualized using avatars which change their colour according to the GSR of the participant, and the virtual distance from each other depending on the similarity or difference of the signals of both participants. On a second level, the selection of visual and audio material played back is calculated on the participant's level of arousal. This works with three banks of material, selected for low, mid or high excitement. On a third level, the AffecTech system 'pokes' the participants if there has not been any significant change in their signals after a certain period of time. In order to do this, the system plays specific stimulating video and audio material to produce a response in the participants (e.g. lighting, white noise, etc.).

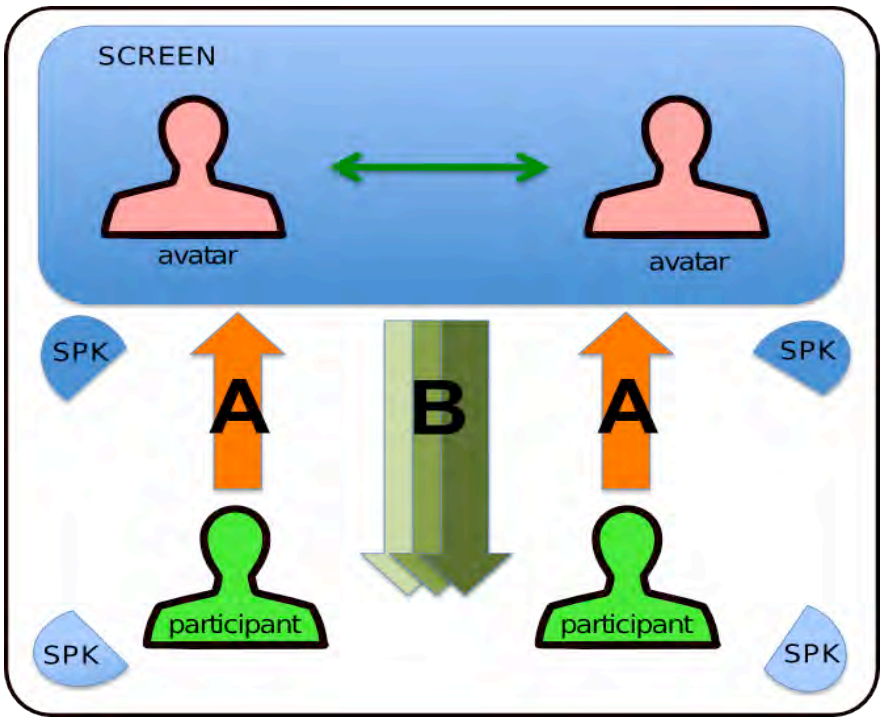

Figure 3. Interaction model for AffecTech. The participant feeds the system (A), which analyses the signal and reacts through real-time representation (B.1) of the signal, selection of audio and visual content (B.2), or an audiovisual stimulus (B.3) in order to generate a reaction in the participant.

The Central Control System

A Central Control System (CCS) was implemented in Max/MSP[2]. Its purpose was to coordinate the interactions between the users and the AffecTech system. In doing so it received data from the sensors, categorized the arousal level of the chairs' occupants, identified significant changes in state and output control messages, which triggered audio playback, flash animations and camera operations (Figure 4).

Based on data from the pressure sensors, the CCS detected the number of chairs that were occupied (zero, one or two). This allowed for either one or two person interactions and ensured certain audio / video excerpts were not triggered once the system was already activated. Taking data input from the GSR sensors, control changes were sent to the audio system and synchronously relayed to Flash to trigger occurrences of 'background', 'entrained', 'sudden' and 'system-poke' audio / video

[2] www.cycling74.com. Accessed 16/06/09.

excerpts (discussed below) meant to represent and / or provoke arousal in the participants.

Three levels of participant arousal were determined ranging from low to high. Such levels were established based on simple rules regarding how the data from the sensors changed in the short, medium and long term. Since GSR readings can vary significantly from one participant to another, where possible, the control system was designed to change the criteria on which these rules were based in order to more accurately reflect the arousal levels of the user group throughout the course of the installation.

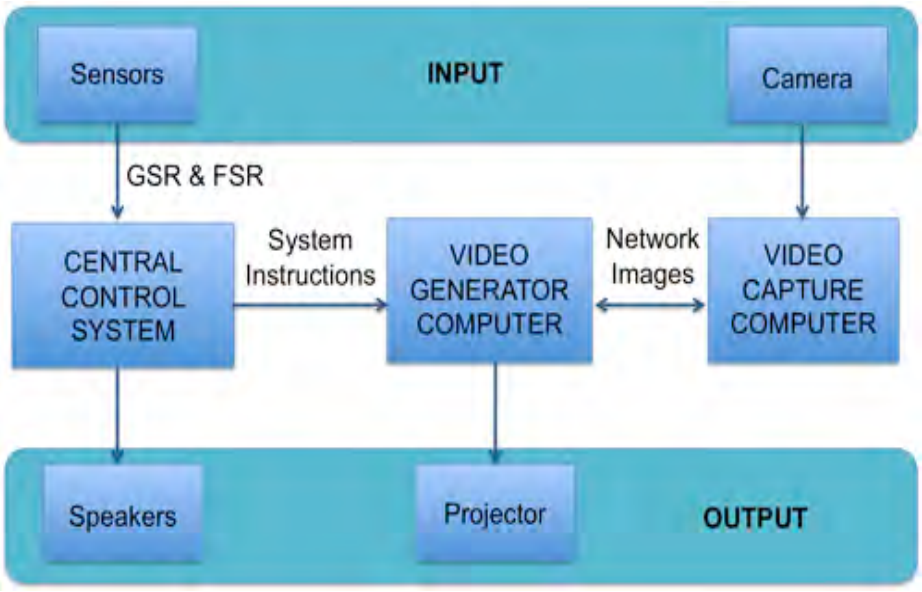

Figure 4: Signal flow diagram for AffecTech

Visuals

The visual content in AffecTech, consisted of two main elements that covered abstract and concrete imagery. On one hand it displayed an interactive set of movies using a Macromedia Flash[3] movie, which was controlled by Max/MSP using flashserver[4]. The patch controlled the video parameters (avatars, movies, etc) based on the instructions received from the Central Control System.

For the concrete content, a camera was set up just below the screen to record both participants. The image was then split, zoomed and cropped in order to have two

[3] www.adobe.com/products/flash. Accessed 16/06/09
[4] www.nullmedium.de/dev/flashserver. Accessed 16/06/09.

images, one for each chair. Each frame was then saved as a jpeg image to an external computer through the network to be used as part of the composite video content on the screen. This was displayed inside the avatar after a new participant would sit on the chair, for a short duration of time.

By using real video within the flash images, we established a link between the user and the avatars. The avatars represent them and their perception shifts from an external view (mirror) to an internal one, the changing colours controlled by the GSR signal. The simultaneity of said contents meant that this shift of perception was not linear or time based but interactive and individual to each participant.

Audio

All sounds were sourced from the Freesound Project[5]. A compositional approach was taken to the audio aspect of the installation. Our priority was to create an enjoyable sonic experience for the users whilst not compromising the integrity of the artistic concept. As such, sounds were sculpted to create a sense of continuity and fluidity whilst repetitive or 'static' sounds were avoided where possible. This was achieved by creating a large pool of relatively long sounds which were themselves dynamic in their changing timbres and amplitudes. The categories of sounds used are outlined below.

Welcome sounds: These sounds were triggered by the CCS when the system first became active, i.e. when the first user sat down. They were chosen to represent the system 'coming to life' and were not further used during each participant's session.

Background sounds: Three categories of background sounds were chosen to reflect the three levels of arousal categorized by the CCS. Dark, brooding and intense sounds were mapped to low levels of arousal. 'Neutral' sounds were mapped to medium levels of arousal and bright or colourful sounds were mapped to high levels of arousal.

Sudden sounds: These were chosen to reflect sudden changes in the arousal levels of the participants (as decided by the CCS). Bodily sounds, i.e. fast respiration or heartbeats were heard, representing physiological shock.

[5] www.freesound.org. Accessed 16/06/09.

Entrained sounds: The sound of angelic choirs, Tibetan throat chanting and deep meditative drones could be heard when the participants' arousal levels were 'in tune' or entrained with each other.

System-poke sounds: These were used to provoke physiological reactions when the CCS detected inactivity or non-responsiveness in the users. Harsh drilling sounds or loud sirens were used in this situation.

Conclusions

AffecTech was developed with the intention of creating an empathic dialogue between the participants and the work, and was designed to respond to changes in state as well as synchronicities in state. The three determined states of arousal (low, medium, high) are notional in nature and cannot be considered a true indicator of affect. Nevertheless the system was capable of sensing change, direction of change and lack of change, and could respond to these states with appropriate content, some of which was intended to trigger a change of state. Despite these predefined responses we were surprised by the complex behaviour of the installation in practice, without noticeably repetitive patterns and longer than expected periods of user interaction. We believe this is testimony to the intrinsic richness and complexity of working with physiological data.

Another unexpected (though welcomed) outcome of the extended periods of user interaction was our observation of entrainment between users. During these longer sessions (usually around the 10 minute mark) there appeared to be a tendency for the physiological states of participants to synchronise. We feel this could be a very interesting avenue of exploration for subsequent versions of the work.

While the *user* → *system* aspects of the installation worked well, we were less happy with the *content* → *user* feedback. The 'poke' stimuli did not have as great an effect on the viewers' physiology as we had hoped and we would recommend using stronger psychological stimuli. This does of course impact on the suitability of the work for a general audience, which must be taken into consideration.

In order to make AffecTech capable of emotion or affect sensing, the system would require more channels of sensor data, so that they can be cross-referenced (Russell,

1980) and in future versions we would recommend the addition of Heart Rate and Respiration sensors.

We intend to continue our experimentation with physiologically based art and engineering and look forward to feedback from our readers and participants.

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NewsViz: extraction and visualisation of emotions from news articles

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Abstract

News is commonly intended to be delivered in an objective, unbiased manner - and therefore presented plainly and formally - even though its content often affects readers emotionally. The NewsViz system aims to enhance the news reading experience by integrating 30 seconds long Flash-animations into news article web pages depicting their content and emotional aspects. NewsViz interprets football news texts automatically and creates abstract 2D visualisations. The user interface enables animators to further refine animations. Here we focus on the emotion extraction component of NewsViz ,which facilitates subtle background visualisation.

The emphasis of NewsViz lies on expression, impacting on the reader's understanding of the article and making it more memorable. NewsViz detects moods from news reports. The original text is part-of-speech tagged and adjectives and/or nouns, the word types conveying most emotional meaning, are filtered out and labelled with an emotion and intensity value. Subsequently reoccurring emotions are joined into longer lasting moods and matched with appropriate animation presets.

Different linguistic analysis methods were tested on NewsViz: word-by-word, sentence based and incremental minimum threshold summarisation, to find a minimum number of occurrences of an emotion in forming a valid mood. NewsViz proved to be viable for the fixed domain of football news, grasping the overall moods and some more detailed emotions precisely. NewsViz introduces a novel approach to a universally applicable emotion scheme which offers an efficient technique to cater for the production of a large number of daily updated news stories. NewsViz fills the gap of lack of information for background or environment depiction encountered in similar applications. Further development may refine the detection of emotion shifts

through summarisation with the full implementation of football and common linguistic knowledge. Future work will reveal whether NewsViz is feasible when extended to different domains.

1 Introduction

News reports are regarded as objective facts represented in a neutral and formal format: typically a static headline, a summarising paragraph with one image and the body text with one to three more images. Even though reporters find the content of news stories worth mentioning for emotional reasons, story brevity, scarce background information and poor combination of visual and verbal information hinders learning by viewers. In order to reach the audience emotionally, educate and entertain, emphasis on visual elements is important, as they tend to be more memorable than verbal ones. The software prototype, NewsViz, creates animations from news articles. Abstract design elements show emotions conveyed in the stories. The main objective of NewViz remains to provide information, thus emotion extraction is universally applicable and without opinion bias. NewsViz is an efficient software tool for designers to be able to build daily updated animations. Input for NewsViz is natural language text. Multimodal systems automatically mapping text to visuals face challenges in interpreting human language which is variable, ambiguous, imprecise and relies on common knowledge between the communicators. Enabling a machine to understand a natural language text involves feeding the machine with grammatical structures, semantic relations and visual descriptions to be able to match suitable graphics.

2 Background and related research

Text-to-visual mapping relates to the research area of natural language processing (NLP) and multimodal storytelling which attempt to enable computers to interpret and generate natural human language and mental images.

Text-to-visual mapping starts with linguistic analysis of the text. Despite variability, ambiguity and imprecision *syntactic analysis* tools achieve mostly reliable results. Part-of-speech tagger software tools identify grammatical types of words. For example, Qtag (Mason 2003) attaches a tag to each word labelling it as noun, verb, adjective or other.

Semantic interpretation and actual understanding of the meaning of a text is more difficult, because it depends largely on common sense knowledge. Common sense knowledge and mental images need to be structured, related through logical rules and entered into databases before computational text interpretation is possible. A commonly used tool for determining semantic relations between words is WordNet (Miller 1995), an extended dictionary specifying word relations such as similarity, part-of relations, hierarchy or manner. Sensing emotions from multimodal input has mainly been investigated with the objective of developing human-like agents. The football commentary system, Byrne (Binsted and Luke 1999), includes a commentator with emotions influenced by his personality and intentions. SOBA (Buitelaar et al 2006) extracts information from soccer match reports, annotates relevant expressions (e.g. players, teams, goals) and generates knowledge base entities. The collected football knowledge can set preconditions and context to consequently evaluate current events and assign appropriate emotions.

Automated story visualisation systems deliver initial results for object and action depiction, as in WordsEye (Coyne and Sproat 2001), creating static 3D images from written descriptions. Additionally, automated camera and character animation, interaction and speech synthesis is realised in CONFUCIUS (Ma 2006). The Unseen Video (Scheibel and Weinrother 2005), is a good example of abstract mood visualisation. Local weather data is automatically retrieved from news websites and influences the look and feel of the Flash animation through shapes, colours and images. The Story Picturing Engine (Joshi et al. 2004) visualises texts selecting and matching pictures and their annotations from image databases.

This work (discussed above) demonstrates that sufficient subsets of the English language can be mapped to computer understandable language for the visualisation of stories.

3 The NewsViz system

NewsViz takes online news articles as input and outputs animations reflecting the content of these news stories. NewViz consists of three main components: the linguistic analysis, the animation composer and an interface for editing text and animations (Figure 1). The linguistic component constructs three elements of the animation in different processes. The emotion extraction tool creates atmospheric background visuals, the action visualiser depicts people, objects and their actions

and the audio creator selects music and sound effects. The composer synchronises the different outputs. Here, we focus on the emotion extraction component (Figure 2) developed in Flash MX and Photoshop. Emotional aspects within the news story are identified and linked to appropriate presets of background animations.

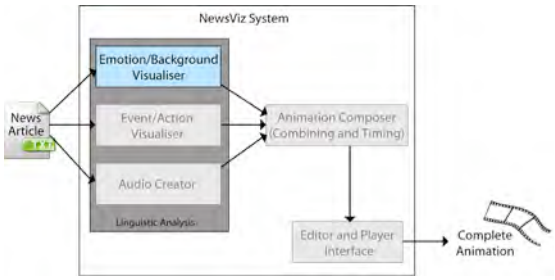

Figure 1. NewsViz system architecture

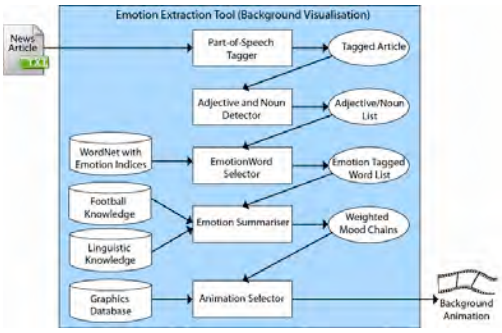

Figure 2. Emotion extraction component

3.1 Emotion extraction

The first step in processing the text is to define the grammatical type of all words. The part-of-speech tagger, Qtag (Mason 2003), attaches tags to nouns, verbs, adjectives and other parts of speech. The tagged text is sent on to the adjective and noun detector. Only these two types of words are selected for further processing because emotional meaning is mainly conveyed by them. Next, the emotion word selector checks the adjectives and nouns in the emotion dictionary and attaches emotion tags indicating their kind of emotion and intensity. The dictionary holds manually created emotion-indices and default intensity values of all affective words. Four emotions have been found relevant in relation to football matches – happiness, sadness, tension and boredom. Words with a neutral emotion index do not describe football relevant emotions. To achieve a coherent course of emotion and animation, neutral phases are replaced by the previous mood with decreasing intensity. The list of emotion tagged words is handed to the emotion summariser. During the summarisation process subsequent emotions of the same type are combined to one longer-lasting mood. Each mood is labelled with its type, average intensity and display duration. With the ‘word by word’ summarisation method, mood boundaries appear as soon as the emotion type of the next word differs. In order to reduce error and excessive mood swings, the minimum threshold method sets a minimum number of words required to represent a mood. Alternatively, the sentence based method

assumes that one sentence conveys one idea and consequently one emotion. Hence, it calculates an average emotion for each sentence, before combining identical emotions. A chronological list of mood chunks is created.

3.2 Animation construction

The animation selection component loads the individual animation elements from the graphics database and combines them in a 30 second long animation. The graphics database contains prefabricated graphics sorted by an emotion index which are combined and adjusted according to mood intensities. Based on the weighted mood list, the emotion sequence order, the type of graphic element, its display duration, and the background colour are determined. The intensity value specifies the element size and the number of objects loaded. An emotion change causes the current animation elements to fade out and to load different elements. Animation examples are shown below in Figure 3.

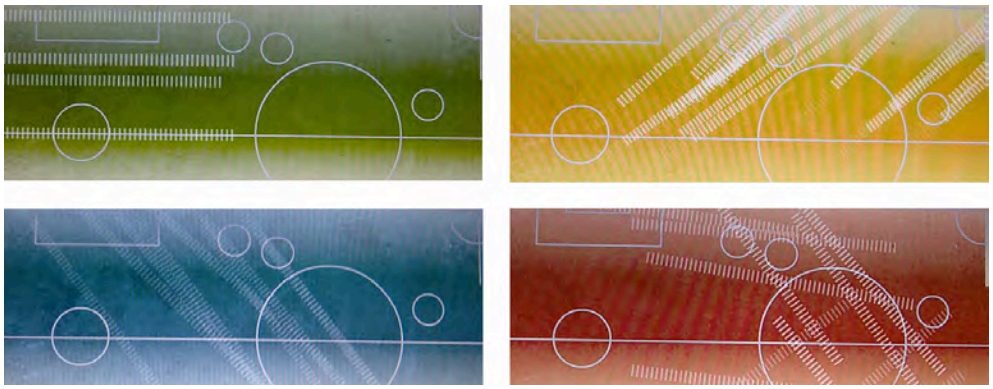

Figure 3. Animations for Boredom (green), Happiness (yellow), Sadness (blue) and Tension (red)

3.3 User interface

NewsViz users load or type news stories into the text editor. The options menu offers different emotion extraction and mood summarisation methods. By pressing the ‘run’ button the visualisation can be watched in the preview window. The text processing runs invisibly in the background. If the user is satisfied he can save the animation. If the user prefers to alter the animation manually, he has the option to edit the original text or the animation elements frame by frame. Figure 4 shows the user interface with animation player. The final animations are integrated at the top of the news article’s Internet page (Figure 5).

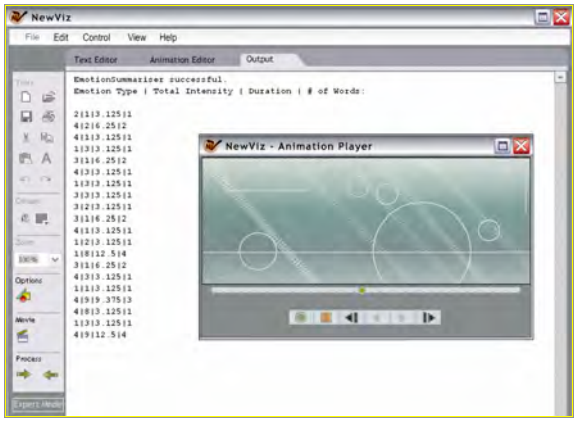

Figure 4. NewsViz User Interface

Figure 5. Animation integrated into website

3.4 Evaluation and testing

NewsViz was tested on four football match reports from the BBC and FIFA websites. NewsViz emotion output was evaluated against two forms of human interpretation of these news articles, a brief outline of the prevailing moods naming three to five emotions per article and a more fine grained interpretation assigning one (or two) emotions to each sentence. Three types of emotion extraction error were distinguished; falsely detected, missing and very close, but not exact, emotions. On average, the best results are achieved when extracting both, adjective and nouns, with the word by word method, but this output is too fine grained for visualisation. Summarisation methods need improvement. Overall the outcome of NewsViz is satisfactory and demonstrates that news texts are suitable for emotion extraction. The different sensations of the described football matches were distinguishable.

4 Conclusion and future work

NewsViz extracts emotion-bearing words from online football news reports based on an extended dictionary with emotion-indices assigned to each entry. The extracted emotions are processed and illustrated in abstract background animations. Results from initial testing demonstrate that this automated process has satisfactory performance. Technologically, NewsViz is viable for the fixed domain of football reports and offers a sound basis for more affective text-to-visual mapping. Future work will aim to improve the semantic processing of emotions. This involves the integration of rules for common and linguistic knowledge. Linguistic knowledge

identifies emotions in context, applying language rules to emotion interpretation, i.e. it solves negation by inverting emotions. With a dependency parser, expressions of related words can be found and their average emotion determined. Domain-specific knowledge (e.g. football) provides background information including match statistics, players' and teams' names, team colours and league tables. It also accommodates game rules or match situations with their emotional consequences. The mood list is refined through moods discovered with common knowledge and football facts which set pre-conditions and context, representing long-term moods influencing current event-based emotions. The emotion database could be extended through the WordNet-Affect dictionary (Strapparava and Valitutti 2004). NewsViz enriches standard news websites with attractive and informative animations and can track emotional aspects of people's views on world events. NewsViz brings news reported on the Internet closer to readers, making it more easily understood and memorised which is much appreciated by online users overloaded with information. NewsViz assists animation designers in the production of daily updated visualisations creating initial scenes.

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Dancing Sound: swarm intelligence based sound composition through free body movements

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Abstract

In this paper, we present the algorithmic interpretation of free body movements with sound. The interacting person moves within a specified area while his or her movements are detected by a laser scanner. We developed a methodology and a software application to translate free body movements to sound using swarm intelligence algorithms. In order to provide space for exploration the mapping from swarm intelligence to sound is fully adjustable. The system is integrated in the installation *Der Schwarm* that provides a visual, semantic reaction of light spots projected on the floor to free body movements.

Swarm intelligence and sound

The concept of swarm intelligence as an example of collective intelligence is been applied in various aspects. Due to it's autonomous but collaborating individuals, swarm intelligence offers the possibility to find complex solutions through simple behavioural patterns. This advantage of self-organisation has been used in informatics, to implement networked software agent systems, as well as in the logistic industry in order to determine the fastest connection. Employing swarm intelligence in the field of computer music, T. M. Blackwell and P. Bentley have realized an interactive music improviser (Blackwell 2002). Blackwell's project *Swarmusic* creates a swarm of musical events in a music parameter space. Each

musical event moves constantly, influences nearby events, and is itself manipulated by other events (Blackwell 2002).

The virtual learning environment *Der Schwarm* implements the Playful Learning approach (Resnick 2004) and aims to motivate children to learn about abstract models of primarily technology through Embodied Interaction (Dourish 2004). Special software detects free body movements and produces a reaction of light spots projected on the floor showing swarm intelligence as well as a behaviour pattern according to the interacting person's movements (Hashagen 2008). *Der Schwarm* originates in a student project[1] led by the authors' research group in 2004 and has continuously been enhanced. The evaluation of a workshop with children aged 9-10 years, in January 2009, focused on the children's ability to create an abstract model about swarm behaviour simulation. A comparative study with a group interacting bodily with the installation, and another group using a traditional software application, emphasizes the impact of sensual immersion to the children's motivation to learn (Hashagen 2009). Inspired by Blackwell's *Swarmusic* the enhancement *Dancing Sound* was developed in order to involve the children as active participants and foster sensual immersion.

Employing the swarm intelligence of the installation *Der Schwarm*, the software enhancement *Dancing Sound* translates *movement in space* into *sound in time*. The movements of the interacting person are tracked constantly by a laser scanner, and an audio system produces sound according to the reaction of the swarm intelligence. Mapping details are fully adjustable through an administration interface. The integration of sound opens another space for sensual perception and manipulation besides free body movements.

Application

Installation *Der Schwarm*

The installation *Der Schwarm* employs Reynolds' model to simulate swarm behaviour (Reynolds 1987, 1999). Additionally, six behaviour patterns are implemented representing the emotions trust, curiosity, observance, escape, confusion, and aggression. Each pattern is defined by a set of parameters such as velocity, level of

[1] Idea, concept and first realisation particularly by Merten Schüler and Andreas Wiegand

herd instinct, distance to interacting person, and hence alters the basic swarm behaviour. Besides the parameter set, distinguishing features of the states are colour and appearance. Figure 1 shows the colour and appearance of the light spots at each state, which we use at workshops with children. For example the behaviour pattern aggression triggers a parameter set that computes a quickly moving, red-coloured light spot swarm with a high level of herd instinct, whereas the pattern curiosity triggers light blue light spots, which slowly follow the interacting person.

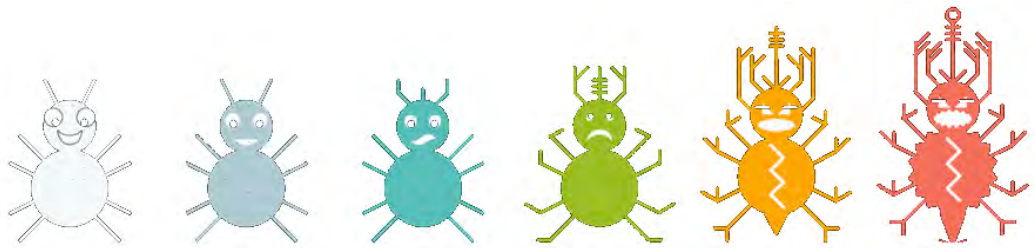

Figure 1. Color and appereance of light spots at each behavior pattern

The technical setup of the installation consists of a projector installed above the projection area, a laser scanner that tracks the interacting person's body movements as two-dimensional position data, and a computer calculating the position data from the laser scanner and sending an appropriate reaction by the light spots to the projector.

An artistic interpretation of the interaction between human and algorithmic beings with a professional dancer had been performed at the exhibition Shamba 2008 (Hashagen 2008). The integration of sound opens a multi-sensual space for the interacting person as well as the audience.

Enhancement dancing sound

The response of the swarm intelligence to the movement of the interacting user is represented through behavioural patterns, defining movement parameters such as direction and velocity. In order to represent the projected swarm intelligence through sound, the mapping had to consider both the behavioural pattern of the swarm and the movement of its particles.

Sound has been linked to a vide range of other non-auditory domains like digital image (see for example Z. Lee, J. Berger and W. S. Yeo), emotions (see for example Gabrielson and Juslin) , and movement (see for example S. Bakker, A. N. Antle and

E.van den Hoven). We researched existing mappings of sound to movement, and sound to emotion, to find defining parameters which are suited to describe both domains swarm intelligence and sound.

Particularly interesting for our purpose are Antle's study results with the *Sound Maker* which supports the linkage of sound and movement for learning purposes (Antle 2008). In the interactive learning environment *Sound Maker* tempo, volume and pitch of musical sounds are mapped to embodied metaphors speed, activity and proximity. The relation between sound parameters in music and speech and the emotions conveyed by them is discussed in many fields such as film score, music perception or music psychology. A common emotion model used in HCI is Albert Mehrabian's three-dimensional model, which has advantageous properties for digital systems and has already been applied to link properties of sound and emotions (Peter 2008, Loviscach and Oswald 2008). Mehrabian's representation oriented system is defined through the axes valence (pleasure / displeasure), arousal (arousal / nonarousal) and control (dominance / submissiveness) (Mehrabian 1996). Trying to arrange the different states of the swarm intelligence into Mehrabian's space, we found the parameters very intuitive to describe swarming behaviour without explicitly naming its patterns. Correlating swarm behaviour and sound composition, we liked parameters in both areas to Mehrabian's PAD representation (pleasure-arousal-dominance).

Sound event in PAD model

First we defined a single sound event by Blackwell's mini (note) level parameters named 1.note loudness, 2.time interval between events, 3.event pitch, and 4.time duration of events (Blackwell 2007). Secondly we linked these sound parameters to Mehrabian's model parameters valence, arousal and control.

> It is well known in both music and speech that a slower tempo, a lower pitch register and a smaller amplitude are commonly used to convey negative affect, whereas a faster tempo, higher pitch and greater amplitude are used to convey positive affect. (Cook and Fujisawa 2006).

John Sloboda has summarised the basic results of studies on emotional responses to musical features (Figure 2), which can easily be assigned to Mehrabian's PAD representation (Sloboda 2005). Based on the emotion-music links of Sloboda, the preset mapping of *Dancing Sound* assigns the pitch and timbre of a sound event to

the axe valence, the time relevant aspects are attached to the axe arousal and the way the sound events are arranged is determined by the control axe (Figure 3).

Table 12.1 Examples of emotion–music links (after Gabrielsson and Juslin, 1996)

Emotion	Musical characteristics
Serious, solemn	Slow, low-pitched, regular rhythms, low dissonance
Sad	Slow, low-pitched, minor mode, high dissonance
Happy	Fast, high-pitched, major mode, low dissonance
Exciting	Fast, loud, high dissonance

Figure 2. Emotion-music link of Sloboda, 2005

Swarm behaviour in PAD model

One of the most significant properties of the swarm particles is their irritation value, which causes a state change according to the defined threshold values. The current state, on the other hand, determines the behaviour of the swarm particles through four functions called *seek, arrival, wander and flee*. These functions mainly determine the particles reaction towards the interacting user concerning its moving direction. We defined the behaviour of the swarm intelligence in the PAD model using the swarm particles' parameters *irritation for valence, velocity for arousal and orientation for control* (Figure 3).

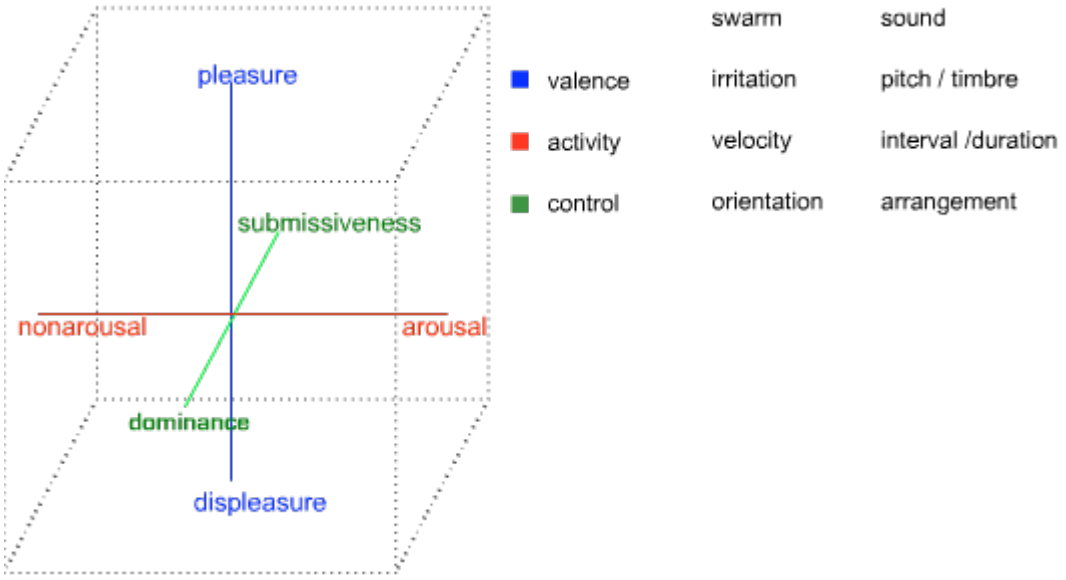

Figure 3. Mapping sound on swarm intelligence in Pad model

Educational aspects

The interface of *Dancing Sound* offers a flexible mapping of the sound axes pitch and timbre, interval and duration, and arrangement on the swarm axes irritation, velocity and orientation. Giving the opportunity of exploration is part of the didactical concept of the learning environment *Der Schwarm*. The concept of Playful Learning involves children as active learners and creators of their own learning process. In this context, we consider motivation as a key factor for gaining a deeper understanding of a topic. However, as E. Ackermann states, 'People cannot learn from their experience as long as they are entirely immersed in it. There comes a time when they need to step back, and reconsider what has happened to them from a distance.' (1996).
Based on Ackermann's keys of learning, the enhancement *Dancing Sound* facilitates 'diving-in' by interacting with the projected light points on the one hand and 'stepping out' by manipulating the determining parameters on the other hand (Ackermann 1996). Modifying and experiencing the different mapping possibilities shall help the user to understand the abstract concept of mapping and the impact of sound properties.

In addition the *Dancing Sound* component makes it possible to appeal to the user's sense of hearing. The benefit of multi-sensory learning is a main aspect of Dr. Maria Montessori's education method and is been confirmed by many studies (see for example Shams 2008).

Conclusion and future work

Throughout the system development we organized regular tests with different probands to ensure adequate processing speed and functionality. Improvements are planned in sound output quality and parameter modification with the administration interface. An interesting question to be evaluated is which mapping of axes is preferred most of all. Other aspects, yet to be investigated, are the users' perception of the generated sound composition and their behavioural modification towards the swarm intelligence.

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Power, emotion and virtuality

Margaretha Anne Haughwout

A number of ironies circle the idea of virtual reality, the first being that it, as fantasized in the cultural imaginary, largely remains virtual. We might take Wendy Hui Kyong Chun's acknowledgement of the non-existence of cyberspace and include virtual reality; it, like cyberspace, 'mixes science and fiction.' Virtual reality is 'a hallucinatory space that is always in the process of becoming', but 'where the future is destined to dwell.' Indeed, the virtual is always a becoming.[1] Like cyberspace, virtual reality often operates as a utopian space. Virtual reality in entertainment frequently operates as colonialist fantasy, where, 'the Cartesian project is completed,' as Simon Penny argues, and the dream of endless colonisable space, where finally there are no indigenous peoples prior to our presence, manifests.[2] The idea of virtual reality, like the idea of cyberspace, is key to selling the Internet and late 20th, early 21st technology 'as an endless space for individualism and/or capitalism, an endless freedom frontier.'[3] As a technology riddled with frontier narratives of dominance and control, virtual reality often favors spatio-temporal constructions in league with colonial narratives befitting progress and capital.

Given these ironies and because of them, my inquiry rests on whether a virtual space that emerges from unique spatio-temporal constructions on the Internet that resists the virtual reality envisioned by the early 'pioneers' of cyberspace and VR as the new 'frontier' might yet create spaces and temporalities where issues of power can be addressed and experimented with. The question is whether affectual possibilities intermingled with habitualised emotions can be witnessed, where a 'doubled virtuality,' a virtual space on the Internet, can be folded upon a 'singularity,' a 'moment of bifurcation' in such a way that allows for the potential of potential.[4] I would like to take Chun's provocation seriously, where she asks, 'rather than explore the utopian possibilities of a space in which anything is possible, [...] by refusing this

1 Wendy Hui Kyong Chun, Control and Freedom; Power and Paranoia in Fiber Optics (Cambridge: MIT Press, 2006) 43.

2 Simon Penny, 'Virtual reality as the end of the enlightenment project' (1992). November 20, 2004 <http://www.ace.uci.edu/penny/texts/VR_Dia.html>

3 Chun, 43

4 Brian Massumi, Parables for the Virtual (Durham: Duke University Press, 2002) 31.

myth, the Internet can enable something like a democracy.'[5] Here I extend Chun's argument to actively refuse the utopian version of the virtual; in so doing, an antagonistic model emerges, where power relationships move to the fore. Attending to power relations evoke uncomfortable emotional responses and affectual possibilities to be witnessed and experimented with.

This argument steers into the rich debate between Claire Bishop, Nicolas Bourriaud and others around Bourriaud's designated term, 'relational art' in late 20th and early 21st-century artistic production, and in an arguably new era of participatory art more broadly. Questioning, contestations and ethical concerns emerge: should artworks prioritize a work method and/or a framework that in someway challenges established flows of power; aesthetics: should there be an aesthetics of participatory art, and if so what is the criteria, or does a participatory aesthetics undermine its very participatory - ness; and the political: what is the social context in which participatory and relational art functions? It seems essential to find modes of engagement that maintain ethics that confront viable possibilities and experimental models for social change, yet aesthetics where creative modalities are not solely analysed by degrees of collaborative 'success.' Here I navigate between both Bishop and Bourriaud's positions.

In her response to Bourriaud's *Relational Aesthetics*, Claire Bishop asks whether participatory art has the ability to alter the political sphere; to resist late capitalist modes of production, which has after all, produced far too facile modes of relational art making (rather than the other way around which she observes, Bourriaud has somewhat naively failed to notice).[6] Bishop introduces a model for relational art making that stands in league with Chun's call to reject utopias. In this act of rejection, uncomfortable power relations are permitted to arise. Bishop's examples of artworks are striking in contrast to Bourriaud's; she uses Santaigo Sierra and Thomas Hirschhorn to argue for works that sustain unease and tension throughout a piece, while Bourriaud, she points out, exemplifies artists who obfuscate power relations for the sake of inclusion by 'collapsing these relationships into the work's content.'[7] A work of Santiago Sierra entitled *Workers Who Cannot Be Paid, Remunerated to Remain Inside Cardboard Boxes*, for example, includes six boxes each with a

5 Chun, 76

6 Claire Bishop, 'Antagonism and Relational Aesthetics,' October Fall 2004: 58

7 Bishop, 69.

'Chechnyan refugee seeking asylum in Germany.'[8] It should be noted as well that Sierra and Hirschhorn maintain positions within their works that also troubles. Sierra often operates as a businessman running an exploitative corporation, and Hirschhorn as manipulator (leaving participants at a site for indeterminate periods of time with no real way to leave before another taxi comes, etc.).[9] Drawing from Laclau and Mouffe's seminal work on antagonism, Bishop advocates for relational artworks that elicit conflict, uncomfortable reactions and unavoidable conditions that comprise our daily lives. In the rejection of the cozy space of a utopia, or 'micro-topia' (as Bishop labels Bourriaud's picture of the relational art-space), the artist forces an antagonistic, deeply uncomfortable situation for the part of the viewer/participant, highlighting various power relations that are the result of capitalist forces and state violence. But the antagonistic work does not need to stop here. While it is unfortunate Bourriaud chose to use artists whose work is so unchallenging (his text is perhaps superior to the artists he describes, and the examples always threaten to undermine his argument), his case for relational artworks being spaces for experimentation should not be abandoned. If art has the capacity to make more space for virtual experiences and if, in so doing, this creates room for higher awareness of affect, we might take actions that allow us to experimentally route around inscribed and habitual emotional responses to power, and thus enter into becomings that can alter the political sphere. Virtual spaces have the ability to create such environments. I am not arguing that other art spaces disallow experimentation and witnessing of affect, but instead want to point to the potential for such, when spaces are collapsed and/or time is alternatively constructed as is often the case in virtual space.

Emotion, according to Brain Massumi, is habitualised and narrativized behavior.[10] In her book *Feeling Power; Emotions and Education*, Megan Boler resonates with this

8 Bishop, 79

9 On this point, I differ from Hirschhorn's proclamation that political art should not seduce (see Bishop, 75), and point out that the activity of enticing visitors to a remote location is seductive. Seduction can be useful to gain meaningful interaction and/or participation. As an artist, I find that enticing visitors into a 'participatory' mode usually means various degrees of deceit and manipulation. For instance, if I want two people to engage in a dialogue about love, I write narrative scenarios about death and war. If I want them to engage in a piece about war, I write narrative scenarios that have more to do with longing and desire. Generally I tell my audience they are playing a game or that they are in an interactive story, rather than a participatory theater piece. While my work probably aims to be closest to being participatory theater, were I to call it such, my visitors/audience/users would freeze up and fail to engage with the content of the piece. Therefore, I tell small lies, or fudge the truth a bit to get the kinds of behavior I feel to be conducive to what I feel will be a meaningful experience. I classify these manipulations as aesthetic decisions that help to create a frame, removing what happens within the frame from the 'everyday,' even if what happens inside the frame is everyday.

10 Massumi, 35.

position; specifically, she addresses defensive anger and fear as being moments of emotional confrontation ripe for witnessing.[11] Affect is the experience of intensity, the moment where the virtual meets the real.[12] Culture often functions to rigidify and channel intensities into certain reactions and emotions that, when unchecked, often serve the status quo. A practice of witnessing is a process of attending to the affectual and the habitualised, consequently allowing for alternative possibilities.[13] The self-consciousness, reflexivity, or 'witnessing' that a participatory art piece can elicit is a first step towards Bourriaud's call for experimentation in the realm of relational art. It is the pairing of witnessing and emotion that can bring about greater consciousness around affectual dynamics accompanying an event. Boler describes witnessing in contrast to spectating in that witnessing 'is a process in which we do not have the luxury of seeing a static truth or fixed certainty [...] Rather than falling into easy identification, as a witness we undertake our historical responsibilities and co-implication....' In the moment of witnessing, we are able to observe the discomfort, anger or fear that arises from a moment of conflict, and in this moment 'attend' to the interplay of forces and desires occurring on or within one's body.[14] Drawing from Spinoza, Massumi notes; 'Conscious reflection is a doubling over of the idea on itself, a self-recursion of the idea that enwraps the affection or impingement at two removes.'[15] The moment of attending is the potential moment of experimentation. Complicity is what is emphasized, and in the witnessing of this complicity, we are able to then experiment with other moves.

In a piece active for the entire month of May 2007, entitled 'Domestic Tension,' artist Wafaa Bilal sequestered himself in one room of the FlatFile Gallery with a webcam and a paintball gun. Visitors to an online site could maneuver the webcam and click a button on the website that fired the paintball gun in Bilal’s room. Below the live cam feed on the website was a textbox and text entered by recent users. Bilal's piece demonstrates how a compulsion to watch is related to a shooting gun. The camera is attached to the gun. The Iraqi in this scenario is still vulnerable, but an uncomfortable intimacy is opened up, because a power relation is exposed. Complicity is largely

11 Megan Boler, *Feeling Power; Emotions and Education*. New York: Routledge, 1999: 186

12 Massumi, 35.

13 Elsewhere I argue that a combination of immersion and witnessing can be achieved in new media artworks; those who were once at opposite extremes envisioning the toppling of the proscenium, namely Bertholdt Brecht and Antonin Artaud, now may join with the advent of new media art.

14 Boler, 186.

15 Massumi, 31.

unavoidable. In the case of 'Domestic Tension', our colonizing gaze is indeed solicited, and here we are literally given the agency to ritually erase this body with a gun that spits yellow paintballs that hurt. In this piece I am fascinated, transfixed by Bilal's vulnerable body. I am tempted to shoot, but do not. Still, I stay watching in wait for someone else to click the button on the website interface, curious, to watch someone else's violent impulse and the result. The creation of virtual space happens through a collapse of locations, through a projection of self through the manipulation of the gun and camera. Bilal refuses to make virtual space utopian or even micro-topian by replicating conditions in the world, rather than obfuscating them. The piece, framed as participatory art, forces a witnessing of power relations in which one is implicated; it forces emotions associated with the individual's perception - a refusal or reaction to the power relation emerges. Alternatives to the obvious relational modes provided by the artist did emerge during the month of May 2007. Several participants organized their actions to move the gun far to the left, creating a 'virtual human shield,' and thus preventing it from hitting Bilal for several hours.[16] Others had food delivered to the gallery (as he relied entirely on food from others for the month and committed to never leaving the building). These actions did not permanently solve the violence happening in the gallery, nor the broader conditions the work speaks to, but they did cause temporary shifts in power relations and feed a hungry man. These actions certainly demonstrated how this work was a space for experimentation.[17]

Finally, I would like to note that the artist's own emotional and affectual states were profoundly experienced and witnessed for the duration of the piece. On the 22nd day, he writes, '... I'm increasingly concerned about the health problems I've developed. Insomnia, nightmares, paranoia and other post-traumatic stress symptoms, shortness of breath, chest and abdominal pain, strange freckles on my skin, rashes from the fish oil, exhaustion.' Because of the unforeseen effects of the tensions of the piece, Bilal was forced to remember unresolved pain and trauma that led up to his departure from Iraq in 1992. His recent book, in which he narrates the month he spent in FlatFile and filled with memories of his life in Iraq, prevents a facile linear temporality so conducive to progress and capitalism, in that the haunting, mourning and grief revived by 'Domestic Tension' refuses to stay in the past.

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16 Wafaa Bilal and Kari Lyderson, *Shoot an Iraqi; Art, Life and Resistance Under the Gun*. San Francisco: City Lights, 2008: 142

17 It should be noted, for those unfamiliar with the piece, the paintballs did hurt Bilal tremendously, both physically and emotionally, so rerouting the gun, even for a brief period caused great relief.

By titling this piece 'Domestic Tension', Bilal dissolves the notion that the Iraq war is occurring 'somewhere else' outside of, or between our 'homes.' In this virtual space, illumined by its closeness to reality, subjectivity and significance loosen their hold as Bilal deftly re-imagines distances between spatial and bodily practices. My hope is that through this example, and the brief illustration provided here, we can retain some of Bourriaud's optimism for relational art and the possibilities it holds for experimentation, while also heeding Bishop's call for antagonism through a thorough rejection of the space of art as 'utopia' or even as 'micro-topia.' In new media art, this call must also translate into a rejection of virtual reality and cyberspace as utopian, ideal or even neutral spaces. This rejection, I maintain, makes a space for affectual and emotional interplays that may illustrate alternative actions and new routes for relations and power.

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Enactive Dialectics: inter-subjective emotional feedback through an embodied approach

Ian Holder

Abstract

The emotions we present to the world and those we feel inside may often be very different, in fact our facial expressions act as form of communication and manipulation in social settings, a non-verbal 'language'. The ability to present the correct expression is an important and evolved tool for gaining sympathy, eliciting love or displaying anger. But would greater inter-subjective understanding be achieved if we had access to the hidden emotions? That question is investigated by the interactive media artwork *Enactive Dialectics* which is currently in development.

The work, which investigates human interaction through an embodied, situated, enactive approach, comprises two 'treatment' chairs directly facing each other; these are used to evoke a sense of being a subject in an experiment. Behind each chair a digitally modelled three-dimensional synthetic face is projected. Inside the chairs are placed a range of biosensors, reading the sitter's emotional state. The biosensor data then influences the expressions displayed by the synthetic face above each sitter, however this can be switched to display the inner expression of the opposing sitter, enabling them to view their own 'emotional' state. This is likely to set up an emotional feedback loop where participants attempt to conceal their own feelings, even to themselves or try to develop a greater empathy for those around them.

The ethical implications are clear and care must be taken; the biosensor data only gives part of the story and the representations of the emotions have been authored by the artists. This potentially false feedback then becomes part of the system, raising the question that even if we think we have inside information we still cannot really *know* how another person is feeling. We cannot even be sure if we ourselves are feeling the way we feel.

Through this work we attempt to question how familiar intuitions about personal identity and subjective experience can be re-drawn and experienced with unexpected

results through digital mediation, placing the boundary, between self and other, into question in both real and virtual space.

Introduction

This project stems from a collaboration formed through the European Mobile Lab for Interactive Media Art (e-MobiLArt), which brought together artists from across the globe working with transdisciplinary art/science practice. The artist team comprises John Holder, a virtual reality artist/technologist specialized in synthetic facial simulations, Pia Tikka, a filmmaker working with enactive methodologies and biofeedback and Anna Dumitriu a conceptual/performance/installation artist working with embodied approaches to consciousness. Dr Blay Whitby, a philosopher and a collaborator with Dumitriu also joined the team, which is also supported by the Enactive Media Group at University of Helsinki.

Emotional displays

The emotions we present to the world and those we feel inside may often be very different. Our facial expressions and body language have evolved as a very important form of communication and interaction, a kind of non-verbal language. The ability to present the correct expression is key to making oneself properly understood and individuals who lack the ability to display or read emotions in the way that society expects (for instance those with autistic spectrum disorders) can experience difficulties. To compound this complexity we are also able to hide our real emotions (at least to a certain extent) and manipulate social interactions by showing certain expressions when internally we may be feeling very differently. Sometimes we are very successful at hiding our emotions and sometimes our masks slip (especially around those we know well – who have a certain amount of additional background information). Sometimes we can even hide our emotions from ourselves, and if even we are unable to successfully introspect then the problems of inter-subjective understanding must be compounded. Through this work we attempt to investigate how access to our hidden emotions might affect inter-subjective understanding.

An enactive approach

The project investigates human enactment within an environment through an embodied and situated approach and is inspired by the current interest in enactive

cognitive sciences, which emerged from the autopoiesis theory of Francisco Varela and Humberto Maturana (*The Embodied Mind,* 1992).

Enactive dialectics

The notion of dialectics or dialectical reasoning is an ancient and recurrent theme in both Eastern and Western philosophy. One might even say that the history of dialectics is the history of human thought. It has, of course, been modified and adapted over the centuries.

Of particular importance in modern Western intellectual history was Hegel's adaptation of the Socratic dialectic (*The Science of Logic*, 1812). Hegel's description was roughly that an initial 'thesis' would be countered by an 'antithesis' eventually resulting in a 'synthesis'. This in turn was further modified by Marx (*Das Kapital,* 1873) as 'dialectical materialism', the fundamental philosophical underpinning of Marxist economics and politics.

Such a widely used and often-modified concept has attracted many critics, particularly from the point of view of the positivist philosophy of science. It has, until recently, seemed that much of the approach of physical science is fundamentally opposed to the long philosophical tradition of dialectics.

What enactive dialectics assumes is another, further development. Incorporating, in a very literal sense, new ideas about the importance of action in the world as constitutive of intellectual understanding of the world, it attempts a move towards another synthesis. This move is the combining of new ways of understanding our physical heritage with the dialectical account of our intellectual heritage.

We now know, as Hegel could not, that we are physically the products of an evolutionary process. We also know from recent scientific discoveries that our capacity to perceive is a product of our capability of acting upon our environments. In philosophical terms, the importance of being an evolved, embodied actor in producing our intellectual capacities needs to be clearly restated.

Enactive dialectics is a way to describe this new intersection. It reflects the way recent scientific developments are bringing the body and its capacity for action back into thinking. It draws on the rich history of dialectics as well as some of the most

recent developments in science. Exploring these possibilities through art can, of itself, bring about a synthesis of the intellectual and embodied aspects of human experience.

The installation

The work comprises two ‘treatment’ chairs directly facing each other; these are used to evoke a sense of being a subject in an experiment. Behind each chair a digitally modelled three-dimensional synthetic face is projected. Inside the chairs are placed a range of biosensors, reading the sitter’s emotional state. The biosensor data then influences the expressions displayed by the synthetic face above each sitter, however this can be switched to display the inner expression of the opposing sitter, enabling them to view their own ‘emotional’ state. This is likely to set up an emotional feedback loop where participants attempt to conceal their own feelings, even to themselves or try to develop a greater empathy for those around them.

Digitally mediated emotional feedback

Currently there is much interest in the area of facial expression and emotional representation based software, for example in Tina Gonsalves’ ‘Chameleon Project’, which combines video installation with ‘mind reading’ (expression mapping) software developed at MIT. But in ‘Enactive Dialectics’ we specifically wanted to work with digitally modelled faces. The group considered a number of potential methods and compared different software packages to see what they might offer and how we might best interpret and convey the emotions of the participants.

We also looked at software architectures that might enable better facial animation and how they would be interpreted in the participants’ virtual representations. FACS was one such system; it is comprehensive in its ability to convey different expressions. One problem however, is its ability to easily continuously emote a variety of sub-expressions that might link to genuine emotions in a real human, in that we also intend to suspend belief and give the impression that participants are looking at live representations of themselves. Another difficulty when employing a FACS based system was the size of a database needed to convey a great range of expressions with an element of accuracy, even if the interpretation is artistically authored.

Eventually we chose a different approach to facial animation, one that is potentially more limiting but allows the gaps between key expressions or emotions to be filled in, much as keyframes are filled by tweens, but in this case they are persistent emotionally based tweens. The system chosen was created by a company called Haptek, which allows the presetting of a range of variables, and the animation is then (to an extent) automated, in as much as it maintains a level of persistence of belief in the three dimensional character that is being animated.

We focused upon several elements; the characters themselves; their skin textures mapped on to the polygonal models and the method of communication between the biosensor data and representations of these avatars. The participants are initially photographed, and a predefined facial structure or polygonal facial model is selected, their photo is then mapped in real time onto their chosen model. This enhances suspension of belief and invokes a feeling of the surreal. There is also an interesting relationship to Masahiro Mori's notion of the uncanny valley (*Uncanny Valley,* 1970) in that the facial representations are not quite perfect. The uncanny feeling generated by robots and avatars that are almost but not quite human has been shown to have a destabilizing effect on the relationships between humans and such humanoid robots and avatars.

Biosensors

We reviewed several types of biosensors including the brainwave sensor technology 'Interactive Brainwave Visualization Analyzer' (IBVA) however we chose to employ the emfit medical sensor system due to them not requiring any form of physical wiring to the body. This is key as it does not interfere with the participants' experiences of the installation and makes the work more stable for long-term exhibition. The sensors read movement, including micro movements such as breath and heartbeat. This data is then authored and interfaced to the facial representations using a C++ bridge to the haptar files driving the emotionally representative facial animations in the three-dimensional models.

Ethical dimensions

Empathy is central to our interaction with others. It may also be important in our understanding of ourselves. There are ethical risks involved in deliberately altering or distorting this process. The ethical implications of this project are clear and care must

be taken, the biosensor data only gives part of the story and the ‘emotions’ have been authored by the artists. This potentially ‘false feedback’ then becomes part of the system, raising the question that even if we think we have ‘inside information’ we are still cannot really ‘know’ how another person is feeling.

Mirroring the other

The feedback loop may be activated through ‘mirror neurons’, a phenomenon first described by Giacomo Rizzolatti. A mirror neuron is a neuron, which fires both when an animal acts and when that animal observes the same action performed by another (especially con-specific) animal. In humans, these neurons have been detected in the anterior cingulated. In neurophysiological terms it is just as though the observer were itself acting. Brain activity consistent with mirror neurons has been found in the pre-motor cortex and the inferior parietal cortex and may be important in empathy, social learning, and autistic spectrum disorders (*The Mirror Neuron System,* 2004).

Conclusions

Through this work we attempt to question how familiar intuitions about personal identity and subjective experience can be re-drawn and experienced with unexpected results through digital mediation, placing the boundary, between self and other, into question in both real and virtual space. Art practice-based research offers a new way to investigate these experiences in rigorous ways. Through the development of this work the team may investigate the role the emotions of the inter-subjective embodied experience

Art is often about persuading audiences to experience the world in novel ways. In contrast this work investigates if it is possible for members of an audience to experience themselves in a novel way.

Relationships between mood and aesthetics in video game design

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Current video games are commonly based on an underlying narrative structure. As with most narratives in various media, the intention is often to affect the audience on an emotional level. To accomplish this, the storyteller creates a world that mimics or references the audience's 'real' experiences. Once the audience can accept the virtual worlds of these media they are more likely to be receptive to the characters, story elements and aesthetic cues aimed at affecting their emotional responses to the experience. The game experience is created through the relationship of player to the environment within the narrative structure and underlying rules of the game. While the relationships and interactions among players may be the driving force in the game experience, the aesthetics of the game world play a supporting and sometimes central role in efforts to establish mood and influence players' emotions. 'It is the game's aesthetics that generate the atmosphere necessary to establish a themed environment, but it is not the determining factor in the meaning of the game' (Wright 2007: 252).

In this paper we will focus on how emotional cues are expressed through aesthetic elements that form the basis of game world design. In this sense mood is not emotion, but an environment that favours some emotions and discourages others. Once the audience is in the proper mood, the author may use additional storytelling devices to evoke a specific emotion; for instance, once the audience is in a suspenseful mood, the author can scare them more easily.

Mood management theory explains how people select specific media to suit the mood they are in or wish to be in (Zillmann 1988). Studies have shown that a player's mood influences decisions made in the game and that the mood a game communicates to a player can influence that player's later behaviour in real life (Ivory and Kalyanaraman 2007; Knobloch-Westerwick and Alter 2006; Schneider, Lang, Shin, and Bradley 2004; Unkelbah, Forgas, and Denson 2008).

How mood is expressed via aesthetics

Game design draws upon the long-standing understanding of media aesthetics applied to film and video. An equally important precursor to game design is the design of themed spaces intended to immerse the audience in a constructed physical story space, particularly theme parks (Carson 2000). Though the three media have distinct differences, they share the common intention of affecting the mood of the viewer through constructed or virtual realities.

We argue that there is an important distinction to be made between the *expression* of mood and the *communication* of mood in media. A mood is *expressed* through manipulation of available techniques and aesthetics. Regardless of the medium involved, the creator must find ways to combine elements of sight, sound and motion to express the mood he or she considers appropriate to the story. The choices the creator makes, however, do not guarantee that the audience (or reader, or player, or visitor) will experience the mood the creator intends. A mood is *communicated* when the audience experiences the mood the creator intended. This distinction allows us to comment on the aesthetic choices a creator makes in an apparent attempt to express a mood without making any claims about the experience of the audience. Successful communication of mood can be the result of skilful expression.

Cinema and video games

Like cinema, video games offer a view into a constructed world, usually within a rectangular frame of the video monitor, similar to the rectangular film frame. The game designer's ability to control light and colour within the story space is also a common attribute. And like cinema, video games are a time-based medium, allowing for the control of motion of characters and environments, as well as the inclusion of dialogue, sound effects and music as means of developing character personalities, enhancing the believability of the story space, and expressing mood.

Fundamental differences between cinema and video games result from the structure of linear and nonlinear media. Cinema is linear, and does not allow for interactivity in terms of viewer exploration of the story world and interaction with the characters in that space. In cinema, it is the director and cinematographer who control what the viewer sees and doesn’t see. Games must provide the player with at least some control over the field of view. A designer can encourage attention in one direction or

another, but ultimately the player can decide to ignore the cues. Success in the game, in terms of acquiring points or higher levels, often depends on recognizing visual and aural cues, but enjoyment of the game can derive from subverting or ignoring those cues (Taylor 2006). Costikyan (2007: 6) notes: 'Games must provide at least the illusion of free will to the player; players must feel that they have freedom of action - not absolute freedom, but freedom within the structure of the system.' Thus, while many of the visual and aural aesthetics that make the expression of mood possible in cinema are available to the game designer, deploying those tools in game design must anticipate the player's likely choices and accommodate their less-likely choices too. Consistency of mood in a game calls for creation of an environment that supports the mood's expression holistically, or as Jenkins (2008: 2) puts it, 'spaces ripe with narrative possibility.' rather than over-determined by the designer.

Games and theme parks

In some ways video games have more in common with theme park design than with cinema. Wright (2007) found that the most common emotions experienced in virtual game worlds were the same as those experienced in theme park rides and other themed venues. He attributes the anxiety (tension) found in multiplayer games to the challenge of competing with opponents in the virtual landscapes. The corollary in physical themed spaces is the excitement of exploring new environments and the physical experiences of riding the attractions. The similarity between theme parks and video games is due to the interactive nature of both experiences and the fact that neither medium relies on the camera as a means of directing audience attention. Video games and theme parks cannot fully control how or when the player or visitor experiences the environment. Nor can they fully control character actions and dialogue since the visitor plays a role in the story. Wright (2007) notes that the ability to choose where to go and what to see in a virtual world increases the player’s engagement with the experience and the story. With limited control over player actions, theme park and video game designers must rely on the design of the story space to progress the narrative and express the intended mood.

Manipulating visitor experiences in virtual space

Theme parks and video games generally do not allow the designers to specifically compose the frame (with the exception of 'cut scenes'). The challenge for the

designer is to find alternate methods of composing a shot to guide the viewer's eye through the scene (emphasis), to control the degree to which a scene feels balanced (harmonious) or imbalanced (discord), and to establish a visual rhythm as a way of expressing calm or agitation. In theme parks and other physical spaces, perspective can be manipulated to exaggerate distances between objects or the heights of buildings. This practice of forced perspective can be seen in the design of Main Street in Disneyland. There the scale of the buildings decreases from bottom to top so that the buildings appear to be taller than they actually are (Finch 2005).
In virtual space there are few constraints on the dimensions of architecture; perspective doesn't have to be exaggerated via the visual tricks used in physical space. However, issues of proportion remain important to a game designer. In fantasy-themed games these take a unique twist. With no real-life analogue to emulate, the game designer can rely on the genre's conventions, examples from previous games, and the demands of the specific game's story and contest logic, but the end result must somehow make visual sense to the player. And yet for all their importance in making for a coherent visible world, proportions of size in fantasy games must also be, in some ways, irrelevant. In *Lego Star Wars* the characters' abilities to use 'the force' allow them to manipulate objects far heavier than a real world character could possibly manage. The game logic makes this seem plausible.

Path design

One of the keys to creating a sense of composition and directing the viewer's attention in themed space is through the design of the pathways through the environments. To some degree a path offers a form of linearity in a nonlinear interactive medium. Paths present certain options and limit others, providing what might be thought of as the illusion of choice. This is common in both virtual world design and theme park design. Real (1977: 47) notes that 'Disneyland as a medium thus involves and influences visitors by combining the flexibility and freedom of a stroll through the park with the structure and security of pre-programmed narrative plots.' Wright (2007: 249) points to a similar experience in video games, which 'direct and control the movement of the player through that virtual space by placing of map objects that restrict movement and visual or aural cues, which encourage the player to move in one direction over another.'

Light and colour

The control of light and colour is key to the expression of mood in any three-dimensional physical or virtual environment. Light can 'establish an aesthetic context for our experiences, a framework that tells us how we should feel about a certain event. Lighting helps us, or makes us, see and feel in a specific way' (Zettl 2008: 20). Zettl also emphasizes the importance of the use of shadows, which help to clarify and intensify shapes and textures. Through effective design, light and shadow can emphasize certain elements in an environment and de-emphasize others, thus guiding the viewer's eye through a composition or space.

Colour that we perceive is a combination of the hue, intensity and angle of light playing off of the colours and materials of illuminated surfaces. Complementary colours are those that appear opposite of each other on the colour wheel. They can be used together in a way that is considered pleasing to the eye. Complementary colours include combinations of orange and purple, yellow and blue, red and green. Contrasts in these colour pairs can be used to lead the viewer's eye to a particular part of the scene. For example, a night scene of a grey house in blue light can be contrasted by a window into a room illuminated with yellow light. This not only draws the viewer's attention to the window, but also makes use of the aesthetic benefits of complementary colour.

For purposes of visual design, colours are divided into warm and cool hues. Warm colours include red-violet through yellow while cools span green through blue-violet on the colour spectrum. In general, warm colours pull forward in contrast to cool colours. As in the window example, this can be used to good effect to pull the viewer's eye into the frame. Additionally warm colours against cool backdrops tend to express a sense of safety, like a light in a storm.

Sound

Sound has been an integral part of cinema since its inception. Music is also frequently used in theme parks and video games as a way of expressing mood. The function of dialogue as a means of communicating information is obvious, but the tone of an actor's voice can also make a tremendous difference in the type of mood being expressed. In addition to music and dialogue, sound effects are used to support on and off-screen action (literal sound) and to express the general

atmosphere or ambiance of a location (non-literal sounds) (Zettl 2008). The source of sounds can be visible or hidden from the player's view. When the sound source is visible there is a direct association between the object and the sound effect, allowing the sound and visuals to support each other. But when the sound source is off screen, hidden behind objects, or in shadow, it can convey a sense of mystery, anticipation, or danger which is sometimes more powerful than images. Sound also helps people understand the structure of their environment through auditory cues, such as background music.

Unique features of video games

Video games offer unique opportunities for expression of mood in the design of themed space. Structure in virtual space is contrived; there is no requirement that such spaces should take on recognizable forms or follow laws of physics. The designer can at any time alter the structure and appearance of anything in a virtual world, including architecture and any of the aesthetic attributes discussed. In a world where there is no requisite aesthetic stability, stability has to be established in the design. While the lack of stability is a form of expression, the potential player disorientation resulting from this absence may trouble the player. Disorientation could cause players to reject the game experience altogether. This would likely occur when they are no longer willing to suspend their disbelief in this confusing version of virtual reality.

Dynamic simulation and artificial intelligence agents

Many game animations are calculated and displayed in real time, based on a set of programmed parameters, rather than previously established motion data. This type of motion is referred to as dynamic simulation and is often used for special effects, such as fire, water, pyrotechnics, etc. In virtual space characters can emit flames, buildings can explode, and water can flow from any source. All of these effects are dynamically simulated and require no direct programmer intervention. A more advanced form of dynamic simulation takes the form of AI 'agents.' These software-generated characters have the capacity to interact with players in very realistic ways, initiating actions and responding to actions of other characters. Some current game developers making use of advanced AI have reported that players express empathy for the AI agents as they respond in realistic ways to danger (McEachern 2008).

Rendering style and the challenge of photorealism

The creators of computer modelling and rendering software have strived to create photorealistic imagery for many years. But to what end? Justification for such efforts seems to be rooted in the underlying belief that players prefer realistic imagery over more stylized approaches to rendering. Emotional response in the player is directly related to the level of realism in a game and the player's ability to identify with the game experience in terms of game play and environment (Ivory and Kalyanaraman 2007; Wright 2007). In his essay 'The Uncanny Valley' (1970) Japanese roboticist Masahiro Mori suggested that as artificial human characters approach realism and appearance and performance, the audience will find them increasingly frightening, revolting and 'uncanny.' But once realism has been achieved the audience will respond to them as they would a living person (Geller 2008). A recent example of this was seen in the animation in *The Polar Express*, in which the characters had the overall appearance of being human but lacked the subtle expressions that communicate human emotion. In essence, they seemed physically alive but emotionally dead.

Conclusion

Our purpose here has been to specify the tools available to a game designer to express mood. To explain why players feel the way they do in response to a game, it is important to have an understanding of the elements of game design meant to affect their feelings. Game designers can benefit from learning what factors contribute to successful communication of mood to players. Players should appreciate games that put them in the mood they desire. Of course, a player's mood precedes playing the game, and lingers when the game is over. The ability of a game to affect the player's mood is not only interesting as a matter of game design, but as a matter of interest in media effects more generally.

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Combining educational games and virtual learning environments for teaching physics with the Olympia architecture

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Keywords: emotion, intelligent tutoring systems (ITS), Olympia, probabilistic relational models, serious games, virtual learning environments (VLEs).

Abstract

Attaining student understanding and motivation for learning is the main challenge of virtual learning environments (VLEs). Educational games easily obtain the student's attention, which is reinforced by an emotional link established between the game and the learner with a high level of interactivity. This research aims to enhance the human computer interaction (HCI) of a VLE through the addition of specific features present in the architectures of serious and commercial video games. The Olympia architecture, which enables the combination of VLEs or serious games with intelligent tutoring systems (ITSs), is introduced. A new generation of learning environments that synthesise the features of both learning environments can be created. Olympia was evaluated in a particular case study focused on teaching introductory Physics to 20 undergraduate students at Tecnológico de Monterrey, Mexico City Campus. A traditional VLE and an enhanced VLE were implemented. The differences between

both environments are in their affective feedback, graphics rendering and game mechanics modules. Probabilistic relational models, i.e. Bayesian Networks, were deployed to infer student knowledge. Weighted hypothesis testing was used in evaluating the effectiveness of Olympia. Results show that students learn in a similar way with both learning environments, although they feel more motivated whilst interacting with the enhanced VLE. Olympia is an effective guideline for the creation of intelligent VLEs. Future work will focus on repeating the experiment on a larger population, creating educational games and enhancing the student model.

1 Introduction

An innovative era of learning and delivering instruction has arisen. Ultimate goals are to make the teaching and learning processes more effective, interesting, personalised, interactive and accessible. Virtual learning environments (VLEs) and educational games are effective teaching and learning tools. However, both areas still have challenges to overcome. The key aim has been to find the most effective way of responding to student actions and hence enhancing student understanding. Enhancement with educational games is often sought through the addition of subliminal messages (Williams 2008). Conati (2002) and D'Mello et al. (2008) focus on the enhancement of intelligent tutoring systems through the recognition and generation of emotions in the teaching and learning process.

Noguez & Sucar (2005) introduced a generic architecture that combines VLEs with intelligent tutoring systems (ITSs). This architecture has proven to be effective for teaching robotics at undergraduate level. The architecture of Noguez & Sucar (2005) was improved here through the addition of features and elements in the architectures of commercial and educational games (Bergeron 2005; Adams & Rollings 2007; Sherrod 2007). The student model is a probabilistic relational model that infers the student's cognitive state from student interaction. The architecture was adapted to also enable the combination of serious games with ITSs. The improvements to the architecture were made with the objective of enabling a virtual learning environment to attain a level of interactivity required by an educational game. The result of these improvements is a new architecture, Olympia. Accordingly, it is inferred that an enhancement in the human computer interaction can increase student motivation for learning, which can enhance understanding.

Section 2 reviews the state of the art of VLEs and serious games related to the rationale of this research. In section 3, the aims, objectives, hypothesis, analysis, requirements and design of Olympia are given. In section 4, results on the evaluation of Olympia are discussed.

2 Background and related work

Students' attitudes and aptitudes have evolved to adapt to Information Technology (IT) and applications with high media content, which have changed the expectations of learners. Oblinger (2004) observed that students at undergraduate level had the tendency of being experiential learners and community-oriented. VLEs and educational games have been developed to help teaching, training and learning processes become more engaging, interactive and effective. However, both still have challenges to overcome.

ITSs and VLEs have evolved to offer intelligent learning. Nowadays, the focus is on adapting the response to the learners' needs and preferences. Research has focused on the interface, on the representation of the domain and on the representation of the student (Du Boulay & Luckin 2001). Affective Computing enables computers to recognise and express affect (Picard 1995). Emotion and cognition are deeply intertwined and equally important. While cognition understands and comprehends the world, emotion modulates the functional parameters of cognition and alerts the user in case a possible danger is detected (Norman et al. 2003). ITSs and VLEs more easily attain student understanding through the addition of an emotional dimension (D'Mello et al. 2008). The main question posed has been to what degree do systems have to imitate human teachers (Du Boulay & Luckin 2001).

Educational games can easily engage students. However, it is difficult to ensure that the student is focusing on domain knowledge whilst learning to play successfully (Conati 2002). VLEs have been effective at enabling students to understand domain knowledge, although they have had more difficulty motivating them. Research has suggested that the success of educational games is due to an emotional link established between the game and the learner (Bergeron 2005). The emotional link is created through the high level of interactivity offered by educational games, since it results in the delivery of immediate feedback to student actions (Sykes 2006). Learning and entertaining goals are embodied by an educational game. The

emotional connection established between the learner and the game and the accuracy of learning and entertaining content influence the effectiveness of the learner experience (Bergeron 2005). Features and elements responsible for the high level of interactivity of commercial (Adams & Rollings 2007; Sherrod 2007) and serious games (Bergeron 2005) were identified through the comparison of their architectures with the architectures of VLEs (Noguez & Sucar 2005; Neji & Ben Ammar 2007; Duarte et al. 2008). The high level of interactivity in the graphic user interface (GUI) is supported through the core mechanics module, which manages the actions-challenges relation (Adams & Rollings 2007). The graphics rendering and audio and playback modules mainly provide immediate feedback to the learner's actions (Sherrod 2007). Hence, the addition of these modules to a VLE's architecture can facilitate enhanced student motivation and understanding.

3 The Olympia architecture

Olympia is a generic architecture that enables the combination of VLEs, educational games and a new generation of VLEs with ITSs. The aim of this research is to enhance the effectiveness of a VLE through the addition of features and elements present in the architectures of commercial and educational games. The objectives are to increase student motivation and hence improving student understanding. The hypothesis of this research states that an enhancement of the Human Computer Interaction (HCI) experience can be a motivating factor and lead to a better understanding of domain knowledge. The methodology of this research started through the design of Olympia. To test the hypothesis and the effectiveness of Olympia, it was evaluated in the specific case study of teaching introductory Physics at undergraduate level. Traditional and enhanced VLEs were implemented. The differences between them are in their game mechanics, graphics rendering and emotional feedback modules, which are related to the sight and hearing senses, essential in human communication. Finally, the results were analysed through weighted hypothesis testing (Wasserman 2004).

The Olympia architecture, shown in Figure 1, is a semi-open environment (Noguez & Sucar 2006) where the learner can interact with the simulator to attain specific learning goals. Olympia comprises interaction modules at the GUI level. These modules were incorporated as a result of analysing the architectures of serious and commercial games (Adams & Rollings 2007; Sherrod 2007; Bergeron 2005). A combination of modules can be chosen according to the level of interaction to be

implemented. The *Physics and collisions module* comprises the physics and maths driven objects used to enhance the level of realism in the simulation. The *Emotional feedback module* comprises sounds that can set or change the student's mood. The *Interactive AI module* contains the Artificial Intelligence (AI) techniques used to create the believability of a learning environment. The *Input detection module* senses and handles the input. The *Networking module* controls the transmission of data across the network. The *Utilities module* comprises tools that assist completion of the tasks in the most efficient way. The *Scripting module* enables the external control of the application. The *Graphics rendering module* comprises all the graphic resources and manages the graphics and the scenes in real-time. The *Game mechanics module* manages the action-challenge relation. The *teaching and learning AI module* comprises an ITS.

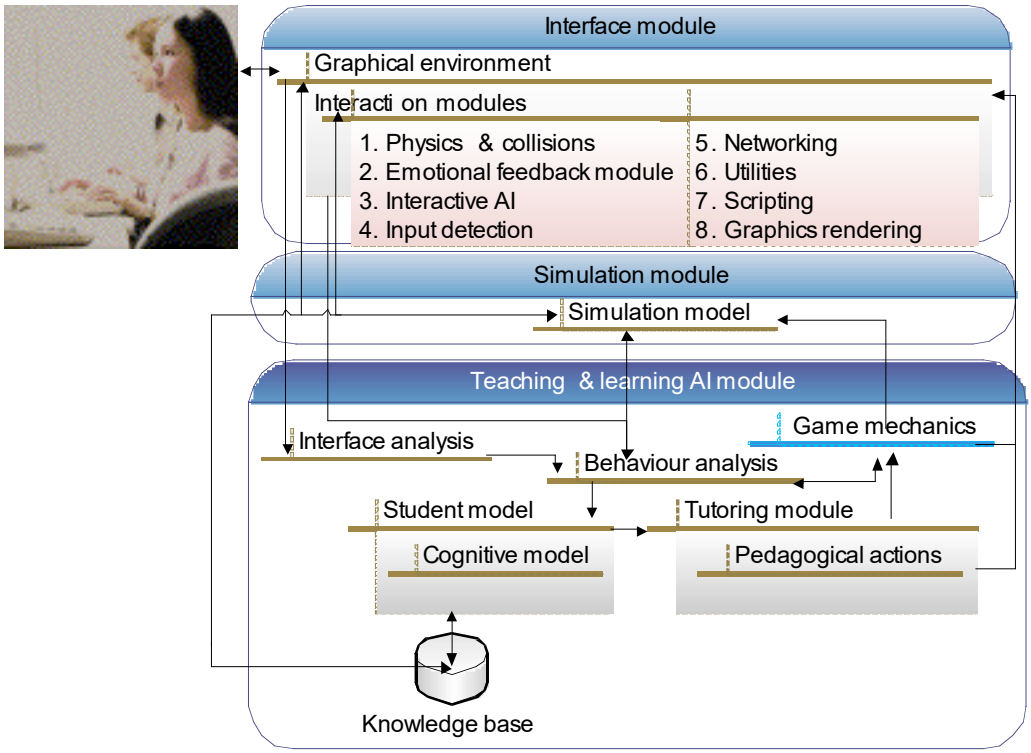

Figure 1. Olympia architecture

3.1. Case study

In 2007, a need to find new ways of motivating and challenging students of Physics at undergraduate level at Tecnológico de Monterrey, Mexico City campus was evident. The creation of an intelligent virtual learning environment embodying ITSs was suggested as a possible way forward. Environments can be accessed online by lecturers to consult students' performance. Users must authenticate through a

username or password. The students are between 18 and 24 years old and are familiar with the use of IT.

3.2 GUI design and student model

An enhanced VLE and a traditional VLE, shown in Figure 2, were designed. The former includes an enhanced look and feel with high quality graphics and sounds that are synchronized with positive and negative feedback and the learner interacts through keyboard events. In contrast, in the latter, the learner interacts through sliders and buttons and it has neither sounds nor graphics which accompany the final feedback message. The story depicted by the case study is about an astronaut who needs to return to his spaceship using his tools, e.g. pipe wrench, screw driver, adjustable wrench, before the oxygen is depleted. To attain this goal, the student must use Physics principles. Using the VLE, the student can explore the effect that mass and velocity, i.e. speed and its direction, in a particle system have over the conservation of momentum. The *relational student model* (Sucar & Noguez 2008) was generated using an expert-centric approach and is used to understand the student's actions: this understanding is used by the *tutoring module* in choosing the pedagogical response. Feedback messages are synchronized with music and graphics to express happiness and sadness in cases where the student attains or fails to attain the learning objectives.

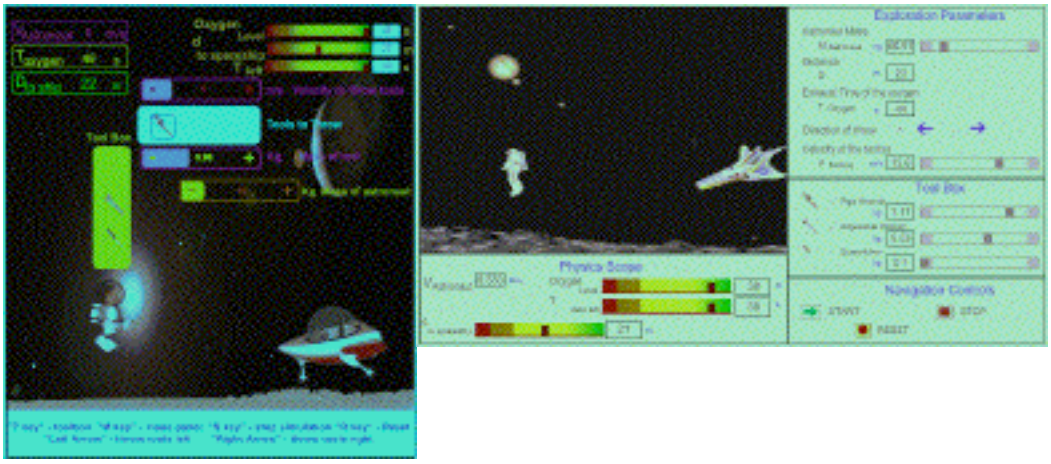

Figure 2. Interfaces of enhanced VLE (left) and traditional VLE (right)

4 Results and evaluation

20 undergraduate Engineering students reading an introductory Physics module (Physics I) at Tecnológico de Monterrey, Mexico City campus were separated equally into control (traditional VLE) and experimental (enhanced VLE) groups. The probabilities, corresponding to the topics: linear momentum, velocity and conservation of momentum, were inferred from student interaction. The average probability of each topic was calculated for the total number of interactions per student. Also, the total number of student interactions and successful cases were calculated. This data was analysed using weighted hypothesis testing (Wasserman 2004). The statistical function, Z_0, shown in Equation (1), was used to validate hypotheses with a small quantity of data. $Z_0 = (X - \mu)/(\sigma/\sqrt{n})$ Eqn. (1)

Where, μ is the median of the control group, $\bar{x}$ is the median of the experimental group, n, the total population and σ is the standard deviation of the control group.

The hypothesis given in section 3.1 was divided into two alternative hypotheses (H_A) and two null hypotheses (H_0): H_0 -'The students acquire the same quantity of knowledge interacting with the two learning environments' and H_A -'The students interacting with the enhanced VLE acquire more knowledge than the students interacting with the traditional VLE'; H_0 -'The students have the same motivation whilst interacting in both learning environments' and H_A -'The students interacting with the enhanced VLE have more motivation than the students interacting with the traditional VLE.'

The data plotted has a right tale behaviour profile. The risk of wrongly rejecting the null hypothesis, α, is fixed at 0.05 for standard convention. As a result, $Z_{0.95} = 1.645$. To reject the hypothesis the null hypotheses, Z_0, must be larger than 1.645. Tables 1 and 2 show the data obtained from evaluating Equation (1) using the data acquired during student interaction. The two null hypotheses could not be rejected with the data obtained. These results may be due to the small population size, since Z_0 is a measure of the existent evidence against the null hypothesis. Also, the probabilistic relational model requires some improvement. The node saved in the student model, which represents the final result of the interaction, should not be part of the model. The GUI interface of the enhanced VLE is less intuitive than the GUI of the traditional VLE. As a result, many students made the observation that they found difficulty interacting with it. The differences between the interfaces of both learning

environments were kept relatively minimal for this preliminary research. The students were asked to complete a questionnaire, addressing the qualitative aspects of this research, after interacting with the system. In this questionnaire the students evaluated the traditional and enhanced VLEs using a scale between 2 and 10, where 2 is completely disagree and 10 completely agree. The results of the questionnaire showed that students feel more motivated while interacting with the enhanced VLE.

	Average knowledge detected (%)					
	Velocity and rectilinear uniform movement		Linear momentum		Conservation of momentum	
Statistical function	Enhanced VLE	Traditional VLE	Enhanced VLE	Traditional VLE	Enhanced VLE	Traditional VLE
Average	65.88	61.83	61.09	59.69	58.81	57.67
Standard deviation	19.79	16.62	24.38	22.33	19.48	17.84
Z_0		1.09		0.28		0.29

Table 1. Data on student knowledge

	InteractionResults (number of cases)			
	Successful cases		Total cases	
Statistical function	Enhanced VLE	Traditional VLE	Enhanced VLE	Traditional VLE
Average	2.20	2.70	7.50	6.60
Standard deviation	2.04	2.15	4.06	2.69
Z_0		-1.04		1.50

Table 2. Data on student motivation

5 Conclusion and future work

This research focuses on enhancing the effectiveness of a VLE through the addition of features present in the architectures of commercial and educational games. This research is focused on testing the hypothesis, which states that a high level of interactivity increases motivation whilst learning and enhances student understanding. The Olympia architecture was introduced in this research. Olympia incorporates features of VLEs, commercial and educational games. In testing the research hypothesis, Olympia was evaluated in the specific case study of teaching introductory Physics at undergraduate level. A traditional VLE and an enhanced VLE were implemented. The latter comprised high quality graphics, sounds synchronised with positive and negative feedback and with the student interacting with the

environment through keyboard events. Experimental results show that students learn in a similar way in both environments, but that they feel more motivated when interacting with the enhanced VLE. Olympia is an effective guideline for future work, which will focus on experimenting on a larger population, enhancing the student learning model and further employing educational games technology and techniques.

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Hitch Haiku: An Interactive Supporting System for Composing Haiku Poem

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Abstract. Human communication is fostered in environments of regional communities and cultures and in different languages. Cultures are rooted in their unique histories. Communication media have been developed to circulate these cultural characteristics. The theme of our research is "Cultural Computing", which means the translation of cultures using scientific methods representing essential aspects of Japanese culture [1]. We study the reproduction of a traditional Japanese Haiku by computer. Our system can abstract an essence of human emotions and thoughts into a Haiku, a Japanese minimal poem form. A user chooses arbitrary phrases from a chapter of the essay "1000 Books and 1000 Nights" [2]. Using the phrases chosen by the user, our system generates the Haiku which includes the essence of these words.

Keywords: Poem, Haiku, Haiku generation, Art, Interactive art

1 Introduction

Haiku is a Japanese classical poem style with minimal length of five-seven-five characters including a seasonal word called *"Kigo."* The original form of Haiku was called Hokku and in the late 19th century Shiki Masaoka revised it and finally established the present form of Haiku [3]. Haiku include various imaginative expressions and thus has been applauded by many people. Haiku is a story that generates context - the shortest story in the world. Known as the first great Haiku poet in the Japanese history, Matsuo Basho is responsible for *"Oku No Hosomichi"*, a prime example of his work [4].

We developed a new interactive system, "Hitch Haiku", which supports a user for composing a Haiku. The user inputs some words into the system, and the system composes phrases consisting of five-seven-five characters which most fit with the user inputs. The system is called Hitch Haiku as it generates a Haiku "hitching" the phrases chosen based on the user inputs. If the user does not like the composed Haiku, the user can modify the Haiku and make the system to learn the composition of better Haiku. Hitch Haiku is one of the automatic poem generation systems. In 1959, Theo Lutz developed a system of poem generation for the first time [5]. The system only showed words at random based on grammatical rule, and could not generate a poem in its real meaning. In 1971, for the first time Masterman developed the generation system of a Haiku [6]. By rearranging the words which users chose from the pull

down menu in the interaction process the system generates a Haiku. However, in these interactions, users could input only a few limited words into the system.

In the field of Interactive Art or Game, the quality of contents is important [7]. But in these cases only simple techniques have been used. On the other hands, in the field of AI, many researchers have been using various kinds of technologies to find some relations among input words/phrases by users and to compose answers in relation to these inputs [8]. These techniques have been often used, because using one of these techniques they can develop an interactive system that can achieve relatively interesting interactions. But the relations they try to find out and they try to use in their systems are static, and the quality of their interactions have been mostly dependent on the quality of the relations given beforehand.

Based on his long carrier as an editor and a philosopher, Matsuoka fund four several basic forms called "*Thoughtforms*," that exist as basic forms of relations among things [9]. By tracing and re-constructing some relations indicated by *"thoughtforms,"* Tosa and Matsuoka created an art work called *"i.plot"*, which displays dynamically hidden relations and contextual emergences of English, Chinese Character, and so on [10]. As this technique can re-construct interesting relations and enable to generate Haiku poems, we apply the technique to our system. Furthermore in our system we included the learning function. If the users do not like the generated Haiku based on the users inputs they can modify the Haiku. The whole process is observed by the system and it learns method of generating better Haiku using these examples. The more the users play with our system, the better relations among words/phrases our system learns, and the better Haiku our system can generate.

Process of Generation

Our system generates a Haiku according to the following process (Fig. 1). We describe the detail of the process below.

(1) A user chooses arbitrary phrases from a chapter of a famous Japanese essay called "1000 Books and 1000 Nights", which introduces more than 1000 books covering many genres from all over the world [2].

(2) The system carries out a syntactic analysis for each of the phrase and detects a basic form of noun or a verb from each phrase.

(3) Then the system composes a phrase of a Haiku by adding a special propositional particle called *"Kireji"*, which not only separates a Haiku into three phrases but also gives each phrase a Haiku-like feeling.

(4) In addition to these phrases the system tries to generate new phrases so that the combination of the phrases would expand the imagination of a reader/listener. For this the system uses six types of databases; Haiku thesaurus, Kigo thesaurus, idiom thesaurus, case frame of onomatopoeia, thesaurus, and case frame.

(5) From these databases, the system searches the phrase which is most related to the user inputs.

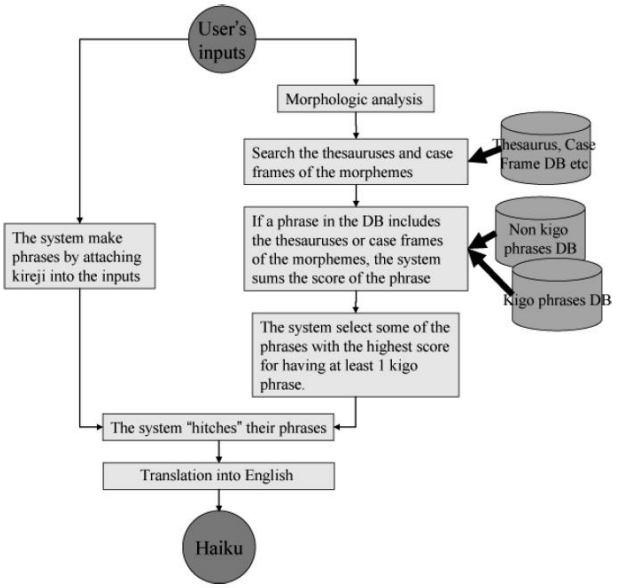

Fig. 1. Haiku generation process

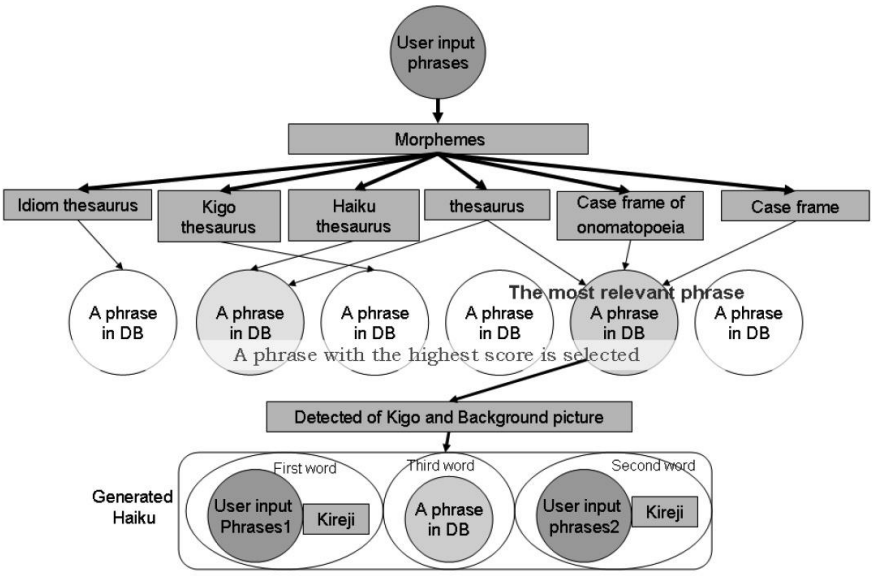

Fig. 2. Selection of the phrase with the highest score

(6) The system scores all phrases using the following weights: Haiku thesaurus is 3, Kigo thesaurus is 3, idiom thesaurus is 3, case frame of onomatopoeia is 3, thesaurus is 3, case frame is 1, user's relation is 5. If a phrase includes two or more related words, the system sums the score respectively. The system chooses one of the phrases with the highest score, and by presuming the season of the Haiku from the user inputs choose a Kigo using the Kigo database (Fig. 2).

(7) The system translates Japanese Haiku into English Haiku using the translation system, *"Language Grid"* developed at NICT [11]. Language Grid has many dictionaries of translation in many communities. By choosing and using a suitable dictionary of a Haiku community in all dictionaries and by using it, Language Grid translates phrases.

(8) If the user does not like the generated Haiku, the user can modify the Haiku phrases and register these new phrases in the system. We assume that the user inputs have strong relativity with the phrases modified by the use. The system adds the relations between the user inputs and the morphemes of the modified phrases into the database, thus the system learns the new relativity.

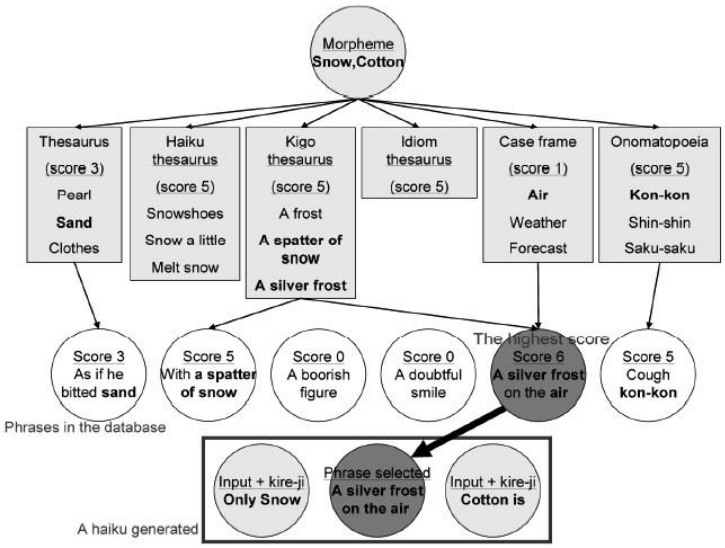

Fig. 3. An example of the phase selection

Figure 3 shows an example of the selection process where two words "*snow*," and "*cotton*" are selected by an user. First to each input word, the most relevant Kire-ji is selected so that two phrases composed from these words would have five or seven characters. As Haiku consists of three phrases, it is necessary to generate one more phrase. For this, the system searches the words related to *"snow"* and *"cotton,"* from the database. Form the thesauruses, *"pearl, sand, cotton"* are found, and from Haiku thesauruses, *"snowshoes, snow a little, melt snow,"* and so on. Then again using the database the system searches Haiku phrases which include these words scores each of

these obtained phrases. For example, the phrase, *"As if he bitted sand"* is scored 3 because the word "*sand*" is including in the thesaurus whose score is 3, and *"A silver frost on the air"* is scored 6 because *"a silver frost"* is included in the Kigo thesaurus whose score is 5 and *"air"* is included in the case frame whose score is 1. The system chooses the phrase, *"A silver frost on the air"*, as it has the highest score. Thus the system generates a Haiku by "hitching" the user inputs. If the user does not like the generated phrase "A silver frost on the air," he/she can modify the phrase to new phrase, for example "Like the wind on the air." Then system adds the relations between *"snow"* and *"air," "snow"* and *"wind,"* into the system. (Here, snow and air are the user inputs, wind is a morpheme of the modified.)

Table 1. Examples of the database contents

Database	A Example of Category	Expression
Case frame	fade	sound, taste, part, focus ...
Thesaurus	Expression	Enlightenment, Crying, A facial expression showing familiarity ...
Haiku thesaurus	Love	Relics, Courting, Affection, Loving one another ...
Kigo	Spring	Lunar New Year, First day of spring ...
Kigo	Summer	Summer, Early summer, April, May, First day of summer, Summer-like, Slight heat ...
Kigo	Autumn	Autumn, Early autumn, July of the lunar calendar, August, First day of fall, Lingering summer heat. Autumn-like ...
Kigo	Winter	Winter, November of the lunar calendar, December, Winter solstice, The end of a year, The days of year-end ...
Kigo	New Year	New year, Early spring, The New Year of the lunar calendar, This year, Last year ...
Idiom thesaurus	Love	The whip of love. Autumn breeze blows, Parents often cannot judge the right way to love their children, ...
Idiom thesaurus	Gather	hang out. Many faces, In a crowd, ...
Idiom thesaurus	Walk	turn legs toward, Leave stranded, Extend one ' s trip ...
Case frame of onomatopoeia	Oh	Mouth, Large, Open, Cry ...
Case frame of onomatopoeia	Frank	Taste, Color, Deep, Style, Form, ...
Case frame of onomatopoeia	Hesitant	Attitude, Action Decision, Condition, ...

Database

We have prepared six types of databases. The case frame database (with about 31,000 records) describes the relation between verbs and nouns. The thesaurus database (with about 32,000 records) is constructed by classifying words with similar meaning into one category. It is constructed based on a general thesaurus dictionary. The Haiku thesaurus database (with about 2,500 records) is constructed by finding relationship among entries in a general Haiku dictionary. The Kigo thesaurus database (with about 13,000 records) is constructed by setting a Kigo (a seasonal word) as its entity and various kinds of expressions as its contents. The Idiom thesaurus database (with about 1,300 records) contains words as its entries and various kinds of idiom phrases frequently used in Haiku poems. The Case frame of onomatopoeia (with about 8,800

records) contains the relation between an entry word and various kinds of onomatopoeias that are used in relation to the word. The database of user's relation contains the relation between the user input and the morpheme extracted from a phrase modified by the user. The records in this database increase whenever users make any revision to a generated. Some of the examples of the records in this databases are shown in Table 1.

Interaction Example

We show an example of Haiku generation by our system.

(1) First if an user logs in the system, he sees a map of the City of Book (Fig.4).

(2) By manipulating a mouse, he can walk around in the city.

(3) If he finds an interesting keyword of a book at particular points of the city, and clicks the keyword, he sees the title and the author of the book. By clicking again, he sees the essay of the book contained in *"1000 Books and 1000 Nights."*

(4) When the user marks some words on the essay using a pen or an ink brush, the Haiku system generates a Haiku based on the marked words (Fig.5).

(5) If he does not like the generated Haiku, then he can modify and save it.

Figure 6 shows an example of generated Haiku. In Fig. 5, an user selected *"Zen"* and *"ink."* The system chooses the word *"god"* that comes from "*Zen*" using the thesaurus database then chooses the phrase *"The one of the seven gods of Good Luck"* based on the algorithm described above Finally, the system generates the Haiku, *"Even Zen, The one of the seven gods of Good Luck, It's in Ink."*

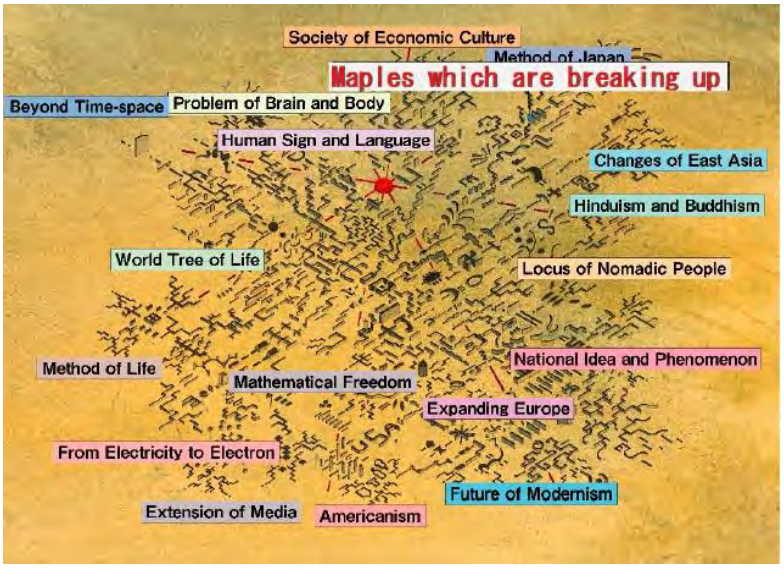

Fig. 4. An example of the map of the City of Book

Fig. 5. Selection of words/phrases

Fig. 6. An example of a generated Haiku

Conclusion

In this paper we proposed an interactive system which supports an user for composing a Haiku. Haiku is a short poem with an abbreviation. Atmosphere and emotion of Haiku is also part of the abbreviation. Based on the algorithm we have developed, we found that sensitive atmosphere and emotion which even we could not expect emerges. We have exhibited this system at ACM SIGGRAPH 2007 and obtained fairly good responses from the visitors [12].
There are several issue for further studies. To increase the contents of each database is one of the important issues. As this system was originally developed for the purpose of Japanese Haiku generation, the process of the translation into English needs a further improvement. At the same time our future target is a system that would support the generation of Haiku based on an interaction between the system and user. So far, what users can do is only to select several phrases/words from texts they like. Although this would be relevant to give a beginner a feeling of Haiku generation, experts would need a system that would really help their creation process. To achieve this target starting from our present system would be a big challenge.

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Altogether Human: tracking and recording human emotion online

Edward O'Riordan

Abstract

This paper will outline the creation of *Altogether Human*, a project which allows users to gain an overview of what people were feeling in the last 24 hours as reported by their internet personas in the forms of blogs and social networking services. The project attempted to both provide an overview of how people reported they were feeling in the last 24 hours, and also provide users with a means of accessing the individual 'emotional stories' which made up the overall picture. The project provided a service whereby users could gain an overview of people's emotional states in the last 24 hours, browse individual emotional stories, compare emotional trends over time, and create graphical visualisations based on this emotional data.

The paper is divided into four sections (with further subsections). The first section will introduce the project and the motivation behind its creation. The second section will outline the content of the project and outline how Altogether Human gathered its content - where it looked for it, and how it filtered relevant from irrelevant content. The third section will outline the functionality which Altogether Human provided its users. It will examine how the project's design goals were transferred into concrete functionality. The fourth and last section will briefly outline the future of the project.

1 Introduction

It is nothing new to say that the Internet provides access to user's personal data. Indeed one of the most well reported news stories in relation to the Internet are situations in which user's private information is stolen or in some other way compromised.

What may not be as well discussed is the amount of personal data which Internet users have chosen to make public. Personal not in the sense in which the term is used in relation to identity theft (a person's real name, address, occupation, social

security number, etc.) but personal in the sense of detailing people's feelings, emotions, and thoughts. Data, which in many instances might traditionally have been understood as private, has been made public by users of blogs, social networking sites, and other similar services. Such publicly accessible, yet deeply personal, data is available easily and instantly online. In their blogs people detail events which have in some way effected them emotionally. They write about all aspects of their emotional life and detail both their positive and negative emotional experiences. In online forums they ask others for help and advice about their personal problems. On their social network profile pages they describe their current feelings be they trivial or serious, short lived or long lasting. Quite simply, the Internet provides a large repository of emotional, personal data.

The possibilities that this data provides served as the motivation behind the creation of Altogether Human. It allowed us to create a service which could track, collect, and filter this data. Altogether Human set out to create such a service whereby the details of Internet user's emotions (as reported by themselves) were collected and presented.

2 Content

This section will deal with the data Altogether Human gathered and which form the content of the application. It will deal with the three major questions that arose in determining and accessing the content to be gathered for the project. These questions are:

1. Where to look for this data? What existing services can be employed?
2. What is considered emotional data?
3. How best to get this emotional data only and filter out all other content?

2.1 Where to look

Many different sources of data where considered as means to provide suitable data for Altogether Human (for a full list see 'Altogether Human: Emotion Online' (O'Riordan 2008: 23)). Two services, however, stood out as excellent means of obtaining such data (both in terms of the data returned and the tools available to access the data). These were Google Blog Search and Twitter Search. A brief description of each of these services in given bellow.

Google Blog Search provides a service which provides Google's typical search services but searches only for data contained in blogs. Google hopes to eventually search every blog that publishes a site feed (Google). Google Blog Search provides an API and also publishes various feeds which allows for easy access from a development point of view.

Twitter Search (formerly known as 'Summarize') provides a service to search the communications between Twitter users. Twitter is a 'micro-blogging' platform that allows users to send messages based on the idea of users providing frequent answers to the question: What are you doing? (Twitter, *What*). As of July 2008 Twitter had over 2 million registered users (Twitter, *About*). Like Google Blog Search Twitter Search provides an API.

2.2 What is emotion in this context?

In order to begin to see how we might look for emotional data online it is worth briefly examining what, within the confines of the project, emotional data was considered as.

The type of information which was to qualify as 'emotional' and merit inclusion in the service was very broad. The project made no attempt to distinguish between mood, feeling, and emotion. Indeed it avoids of any definitional issues with defining or classifying emotion and remains thoroughly agnostic in this regard. In the context of the project emotion was considered to be a very broad church, which encompassed all aspects of people's personal lives. Emotion was considered in lay terms and was looked for by searching against common emotions (such as love, hate, etc) or phrases which indicated that the blog post might contain information about emotion (phrases like 'I am feeling', 'I felt', etc.)

2.3 Searching

Having seen the broad manner in which emotional data was defined within the project the question becomes how best to look for this type of data amongst the enormous quantity of data to be searched against. A decision was taken to look for emotional data by searching the data set for exact matches against key phrases (phrases such as 'I am in love', 'I am not in love, 'I feel heartbroken', etc.). Such an approach, although simple, provided what was found to be the optimum balance between practicality and utility.

More complicated approaches were also considered, approaches where searches attempted to bridge some of the semantic gap between the what was searched for, and what it is that the user actual wanted to return. This approach while desirable was felt to introduce too much complexity to the application. The application is not, and does not, claim scientific rigor. As such, while accuracy is desirable it was not considered essential.

After determining the manner in which the searches would be preformed the question arose as to who would decide the key phrases which would be used to search. It was felt that ideally the phrases should arise out of a combination of pre-defined terms and terms which the user wished to search for themselves. Such an approach allowed for the user to be presented with several search terms that had been proven through testing to yield interesting results while also allowing the flexibility for the user to learn from these suggested searches and then perform their own searches. This approach would ensure that the user found interesting content while also being open ended enough to encourage users to explore and customise the service. A design goal of the project was to allow users to build a list of their own favourite searches and then be able to check back periodically to check on the number of people who had felt that way during the day. Due to limitations on time it has not yet been possible to include these features at the time of writing. Currently users cannot customise the system and instead are given only information for system-defined searches. It is hoped, however, that a fully customizable system will be included in future versions of the project.

2.4 Summary

1. Altogether Human used the existing services such as Google Blog Search and Twitter Search to access emotional data.

2. Altogether Human considered emotional data to be all issues of a personal nature. No special theoretical position on the what was to constitute emotion was adopted.

3. Searched for data was by searching for exact textual matches to key phrases in people’s blogs.

3 Functionality

In the previous section the content of Altogether Human was outlined. Having defined and outlined the various data which provides the application with its content it still remains to outline the manner in which this data is presented. This section will outline the functionality which Altogether Human provides. It will detail the various ways in which the service presents its content to users and the ways it allows users to interact with it.

3.1 Design goals of Altogether Human

Altogether Human set out to allow users to achieve three goals:

1. To obtain an overview of the data and to see trends over time. For example to see the number of people who report that they are heartbroken on any particular day and compare the figure to previous days or over a longer period of time.

2. To allow access to individual emotional stories. For example to read the individual stories (blog posting or tweet) of all the people who report they are heartbroken on any given day.

3. To visualise the data in unique ways.

In order to facilitate these goals a detailed planning and design process was undertaken. For a full description of this process please see 'Altogether Human: Emotion Online' (O'Riordan 2008: 45). A summary of this process is given bellow and a description of the functionality which Altogether Human provides (and the design goals behind this functionality is given).

3.2 Overview and trends

In order to allow users to view trends and obtain an overview of the data provided by Altogether Human two distinct approaches were taken. Firstly users were provided with a means to view the numbers of people who had reported certain predefined emotions. This number is the number of results returned for an exact match against a system-defined key word search. It is displayed on the entry point to the application.

This entry point provides nine groups of key word searches, which are variations on a particular emotional theme such as love, hate, feeling, etc. Each of these groupings in turn contains nine particular searches. For example the love grouping contains searches like 'I am in love', 'I love him, 'I love her', etc. Such an approach allows the user to obtain an overview of the number of people who reported feeling a particular way over a period of the last 24 hours.

Apart from a textual overview of the numbers provided in the main application of Altogether Human the project also provides a means of charting the numbers by means of a sub component. This component uses the data of Altogether Human to create charts of trends over time. This component asks users to enter searches which interest them and a period of time over which to search for entries. The component then charts the numbers returned with the time (in increments of days) on the x axis and the numbers on the y axis.

3.3 Individual entries

In order to provide functionality which allowed users to read the blog posts that contained information about people’s emotional states, a summary of the content was displayed. These summaries took two forms. On the initial entry point to the application a summary of the content was provided which was itself filtered so that only the phrase and the subsequent hundred or so characters were shown. This displayed to the user the type of content which each of the emotional groups contained and also provided interesting content in and of itself. The second form these summaries took was the entire summary of the blog entry returned by Google Blog Search. These full summaries were accessible on the micro view of the content, which occurred when the user clicked on any of the text which displays the numbers of entries. This micro, more detailed view, allowed the user to display all the summaries on the content which matched each of the key word searches. This view also provides the means to navigate to the url of the original blog post.

3.4 Visualising the data

Apart from displaying the content in a purely textual form Altogether Human also set out to show the data in other more visual ways. The chart component described in the previous section is one example of an obvious way in which it was advantageous

to view the data in a visual manner. Several experiments were undertaken in order to find effective and engaging visualisations. The most fully developed visualisation (which has been developed into a separate but related project) was entitled 'Circle Search'. This type of visualisation took searches for emotional data and displayed the text of the results to form a circle around the initial search.

4 Future

Altogether Human can be considered to be very much a work in progress. From the initial idea of creating a service to track people's emotional states and emotional stories online, the project evolved to encompass several related projects - all of which involve the collecting and categorising of different aspects of people's personal live and their thoughts and opinions. As such the future of Altogether Human will involve the creation of several interrelated projects which will take the data from the various sources of data of people's personal lives and put them to work in ways that are will be engaging and interesting.

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Emotional exchange: embodiment and creativity in wearable technology

Susan Elizabeth Ryan

In *Postemotional Society* Stjepan Mestrovíc proposes that postmodern social response is fried by compassion fatigue. Bombarded by media's exaggerated reports of violence and terror, we are manipulated by second-hand, mediated passions. Mestrovíc describes a world in which quasi-emotions are culled like historical data from the past by media, which trains populations to respond to current events via older, and predictable, symbolic emotions. (Mestrovic 1997: 2-4) The postmodern mentality recycles and repackages - another Woodstock, another Great Depression, another *Star Trek* movie. All leverage our emotional memories of earlier cultural events. While Mestrovíc has his critics, the syndrome he describes is familiar and he asks an important question: how do we revive our emotional resources? One way to do this might be to stimulate emotions in unfamiliar contexts - like interactive garments that redirect our focus from the representation of emotion to its complex embodied processes.

This paper reviews creative uses of wearable technology from the past decade that address emotion. I want to distinguish two different schools of thought. One conceives emotions in terms of display and functionality - emotion is something that intelligent systems can sense and manipulate. They are mindless operations of the body. By contrast, the second view considers the process of having emotions and how they affect our lives.

Since the dawn of the digital age, some have defined identity as a pattern of information: one's brain could be downloaded into a computer, a viewpoint evidenced by the Turing test. Combining technology and the body in any way, including via dress, evoked cybernetic or 'borgian' images that supported a concept of agency that divided body and mind. According to N. Katherine Hayles, 'the cyborg was created as a technological artifact and cultural icon in the years following World War II'. (Hayles 1999: 2) In the wake of cybernetic theory, emotions were part of a lost corporeality. The implications of this permeated culture, especially our notions about the body.

Coordinating the location of reason and intelligence in the mind has been attempted by the use of technological wearables to index emotions as information. An early example was the mood ring, a piece of jewellery from the 1960s marketed mostly to women; it was claimed to indicate the wearer's level of excitation to onlookers. This view of the body as the generator of mindless emotions useful for display persists today. Individual and corporate designers like Philips Technology have created works that index the body in much the same way as the mood ring, though much more advanced. Philips has proposed a 'brand' of emotional clothing in their SKIN research initiative led by Lucy McRae based on linking skin surface and light emission through biometric sensing technology (Debatty 2006). More recently, Philips' designer Paul Lemmens has presented a prototype for a man's 'emotion jacket' (designed like a typical athletic jacket) that intensifies physical effects of emotion in the movie theatre, coordinating with the ongoing narrative on screen. When the protagonist is fighting for his life, the wearer-viewer feels a pulsation that simulates rapid heartbeat. Here, the emotions are commercialized (they help sell movies, ultimately) - a manipulative and nightmare scenario of Mestrovic's 'postemotional' distress.

Lisa Stead and her collaborators at Central Saint Martins College of Art and Design developed a computing platform to create clothing with personalized display: 'an emotion wardrobe'. (Stead 2004: 284) She proposed garments that connect internal sensing and external display (LED's sewn into the fabric) programmed beforehand to respond to epidermal conditions via emotional templates created by measuring the sensors' responses to actresses simulating emotional states. Eight emotional states were specified, in accordance with R. Plutchik's mid-20th Century categorization of primary emotions. It is a sophisticated project, but one still rooted in the passive, and somewhat gendered, position that clothes are enhancements to visual and emotional subjectivity: emotions are categorizable autonomic effects and the system does not require consciousness to work.

In the meantime, new media theory has advanced the body, but as a mediated phenomenon. In his book, *New Philosophy for New Media*, Mark Hansen bemoans the virtualization of the body expressed by 20th Century cybernetic theory. He combines ideas from Henri Bergson, Walter Benjamin, and Gilles Deleuze to argue for embodied affectivity at work in digital media art (Hansen 2004: 269), but his argument for re-corporealization is hampered by its restriction to virtual and screen-based forms. In *Getting Under the Skin* Bernadette Wegenstein treats phenomena from popular culture and feminist performance art to argue that the body has taken on the characteristics of

a medium: mediality is the new corporeality. (Wegenstein 2006: 161)

A more phenomenological approach, the experience of the moving body in responsive media, is addressed by researcher Sha Xin Wei, who has written about gesture in performative environments and installations. Gesture produces agency, a 'subjectifying act of creation' (Wei 2002: 471), an idea that supports an animated interpretation of the wearing of garments as a process that incorporates breathing, posture, and the specificity and sweep of body movements. In Wei's view, the wearer becomes an agent operating the body-garment synthesis.

Recent directions in cognitive science also reveal emphases on embodied emotion and experience in opposition to post-Turing, mind-centred theories. In particular, the work of Antonio Damasio is most useful in reconsidering how emotion might be used in wearable technologies. In his book *Descartes' Error*, he points out that, far from a Cartesian mind or self existing at the core of, and in opposition to, the body, the mind and any sense of self we might fleetingly possess is an interplay of processes distributed throughout the body. (Damasio 1994: 87) In *The Feeling of What Happens* Damasio focuses on the importance of emotions for consciousness. He says we propagate emotions intentionally by surrounding ourselves (and I would add, adorning ourselves) with things we emotionally respond to, and we do this because emotions are bound up with our ability to think, imagine, and even reason. (Damasio 1999: 54) Emotions are bodily functions in humans that foster thought processes. He says emotions are not exceptional states - rather we are always having them. (ibid: 42) Furthermore, having feelings is a complex, distributed, and constantly changing process. Damasio bolsters his arguments with research done on patients with specific brain damage that can be located physically with advanced brain mapping techniques. He distinguishes between emotion and feeling: the first is a collection of responses that form a pattern. They come in many forms, not all of which are publicly displayed. The second is the private, mental experience of an emotion:

> We can feel our emotions consistently and we know we feel them . . . [they are] part of a functional continuum.' (ibid: 43).

Emotions are impossible to enumerate - there is no finite list of primary emotions, although Damasio thinks that certain broad categories are possible to distinguish because they involve different locations in the brain and different chemical conditions in the body. Furthermore, beyond having an emotion and feeling it, we know we feel

it. This 'feeling feelings', as Damasio calls it, involves a second order of representation necessary for core consciousness, and it is of extraordinary value in the orchestration of survival. 'Emotions are useful in themselves', Damasio says, 'but the process of feeling begins to alert the organism to the problem that emotion has to solve'. (ibid: 284)

Damasio's notion of 'feeling feelings' is illustrated by artist Riitta Ikonen who creates non-technological garments that express unenacted emotions like anger that arise from specific physical sources in the everyday, like being over-heated on subway, or perhaps anger at nothing we can name. These garments are performative and presented as photographs, but Ikonen imagines they might be worn experimentally in the real world, so the wearer herself tests the impact of the garment on herself and others, as an inducer to feel and contemplate exaggerated levels of emotion.

Many artists working with wearable technology are bringing new perspectives to long standing debates concerning the attenuation or depletion of emotional capacities in the so-called digital society. Their work conceives of the experience of dressing as one in which motion, cognition, and gesture are embodied precepts bound up together - and distributed throughout the system. In particular, new works produced under the rubrics of wearable technology art or technological fashion are trending away from the manipulation of emotional display mechanisms and reflect something more like Damasio's exploration of emotional processes: how we live our lives embodied and dressed and dealing with the stresses of our environments.

In 2000 at MIT, Elise Co completed *Chimerical Garment* - a back covering or backpack. A highly evocative piece, it literally projects her backbone through the technology, as it if were her 'inner core', projecting her back as fantasy in an LCD display. In use, an abstract representation of a classical nude back appears, with graphics suggesting transparent, billowing skin and fern-like wings. When the chin sensor picks up strong inhalation/exhalation, the graphics flutter, expand, and contract; when the wearer raises her arms, sensors there cause the wings in the image to unfurl, - all of which recalls the breath-navigation of Char Davies' Immersive Virtual Reality environments like *Osmose* (1996) - though in Co's case, implanted in the real world. *Chimerical Garment* offers unusual means of personal imaging which illustrates Damasio's ideas on how emotion combines with imaginative capacities of consciousness to formulate alternative, creative scenarios when dealing with physical limitations. (Damasio 1999: 303) Co writes:

> The *Chimerical Garment* enables the projection of imaginary clothing into the physical world. This piece was created as a prototype for garments that take account of unrealistic or impossible fantasies about our bodies and ourselves as exotic, changeable creatures, and use these figments of imagination as expressive elements on the body.' (Co 2000: 57)

Like a real world avatar, the backpack becomes a personal projection of corporeal existence: 'I wanted to explore how people conceive of themselves as fantastical beings, or even . . . how clothes themselves might dream of flying'. (ibid: 52)

Like Co's dreaming clothing, Joey Berzowska / XS Labs' *Skorpions* (2007) are garments that appear to display their own emotions and force the wearer to react. *Skorpions* is a collection of kinetic dresses made with circuitry, textiles, and the shape-memory alloy Nitinol. In the words of the designers:

> … (the garments) move and change on the body in slow, organic motions. They have anthropomorphic qualities . . . They breathe and pulse, controlled by their own internal programming'. They are not interactive insofar as their programming does not respond to simplistic sensor data. They are 'programmed to live, to exist, to subsist' and to 'exploit characteristics such as control, anticipation, and unpredictability'. (Berzowska)

In other words, *Skorpions* are garments that resemble the body's landscape - the simulation of epidermis, viscera, and autonomous movement. As our organs or even limbs act surprisingly, how much more strange when our garments do so. *Skorpions* enable us to consider how we learn to coexist with our bodies and continuously draw information from them.

The dynamic interconnectedness of inner awareness of feeling and its outward display is also present in Matt Kenyon and Doug Easterly's *Improvised Empathetic Device* or *IED* (2005), a title recalling the homemade bombs that killed hundreds in the Iraq War. *IED* features an armband wirelessly connected to a software application (running nearby), monitoring a website - icasualties.org, that updates the personal details and numbers of slain U.S. soldiers. When the data is sent to the armband, the armband's LCD readout displays the soldiers' name, rank, cause of death, and location and then triggers an electric solenoid to drive a needle into the wearer's arm, drawing blood. The vigilant wearer proceeds in anticipation of personal

pain, and at the same time is made aware of the far-away war and participates in a level of stress reminiscent of soldiers' and civilians' real life in a war zone. The result subverts the distancing effect of journalistic reports in information technologies. This piece illustrates Damasio's ideas on progression: immediate inducement of feeling (pain) is processed together with information about its source and the subject is led to have an emotion that changes the bodily state ('body loop') and raises awareness in the wearer in an ongoing process (Damasio 1999: 283).

Finally a piece by Ricardo Nacimento, Ebru Kurbak, and Fabiana Shizue's entitled *Taiknam Hat* (2007). This is a feathered *chapeau* that exists as male and female versions. In this case the wearer does not feel the emotion, but the hat demonstrates the function of fear. It responds kinetically to surrounding EMF waves. In the artist's words, it is an attempt to 'materialize electrosmog', but also to emulate horripilation, an automatic reaction of living creatures to sources of irritation and stress. In birds and mammals, horripilation is the massive erection of hairs or feathers on the body in the 'fight or flight' response, approximated in humans by goose bumps. (Nascimento et al.) The reaction is instinctive, like being startled, which Damasio does not consider an emotion but rather a physical response which we share widely with other organisms and which connects with emotions like fear and need for community. As the hat responds 'automatically' to an environmental threat that we cannot perceive at all (we cannot sense radio waves), we can perceive the hat, and, like the animal, display it to warn others. The hat dramatizes the process for the wearer who can adjust her own cognitive ability to contemplate the threat felt in this second-hand way.

In conclusion, these artists and designers as examples are people who have exchanged an interest in how garments might expose emotional states in functional applications to that of how they might help us explore complex emotional processes and, as Damasio points out, their critical role in consciousness.

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Fig. 1 Riitta Ikonen, My Unexpressed Anger At Nothing In Particular, photograph, 2008

Fig. 2 Joanna Berzowska and Di Mainstone/XS Labs, *Luttergill*, part of *Skorpions*, 2007.

Fig. 3 Ricardo Nascimento, Ebru Kurbak, and Fabiana Shizue, *Taiknam Hat*, 2007.

The Confessional Machine

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Conceptual foundations

My current project, *The Confessional Machine,* explores certain complexities of computing that are relevant to this discussion of 'Emotional Tracking.' I would like to sketch out my conceptual interests in this theme and then relate how they are integral to my current work.

My interest in the theme of 'Tracking Emotions' begins with the perspective that 'tracking' is a reductive, and in many situations, problematic practice. How can one 'track' or objectively target and categorize such a complex, emergent phenomenon such as emotions? Further, how can one catalogue, with any intent of representational accuracy, a phenomenon like emotions which are constantly filtered, and therefore conditioned by, systems of linguistic representation? As Jordan Crandall has noted, tracking is implicated in:

> …(a) landscape in which signifiers have become statistics … TRACKING EMERGED out of the mid-century demands of war and production. It emerged through the development of computing, the wartime sciences of information theory and cybernetics, and the development of structuralism. (Crandall 2006)

Not only is tracking implicated in the military-industrial complex, but as Crandall points out, it is also built upon structuralism as its ideological paradigm. The thing being tracked (think signified) is represented in digital space by its signifier (a blip on the radar screen). As such tracking in all its current manifestations, from consumer purchase records to aircraft trajectories is built upon structuralist logic.

These systems of tracking are inseparable from systems of inscription, or the act of recording the tracked object, and this leads us to the cultural and technological form of the database that is integral to all practices of tracking.

Lev Manovich’s claim that the database is the 'key form of cultural expression' (Manovich 2001) of the computer age suggests certain anachronisms. Manovich’s assertion implies that the database is a structuralist formation. If all objects within our cultural paradigm can be listed, indexed, and searched according the linguistic conventions that represent them (let alone the voltage differences that are their ontological reality) then is culture (both popular and high) simply exhibiting a return to something that resembles a 'digital Modernism.' Despite the fragmentary nature of literary and artistic Modernism, some scholars have noticed a tendency within digital culture for works to resonate more with Modernism (and therefore structuralism) than one might expect. In her paper on Young-Hae Chang Heavy Industries’ *Dakota*, Jessica Pressman details characteristics, such as difficulty in reading and works that privilege 'interactivity over narrative' that are earmarks of high-modern literature, more so than the more appropriate era of post-modern:

> YHCHI demand a cultural repositioning of these critical concepts as literature enters the post-postmodern period and electronic literature, (and) I argue, adopts a strategy of digital modernism. (Pressman 2008)

I am not suggesting that all electronic work, or even digital culture in general, can or should be framed as 'Modernist,' nor is there any reason or particular advantage in doing so. However, if the database in particular operates according to an outdated logic, is there artistic value in exploring a way to alter the foundational apparatus of database through poststructuralist theory? Any post-structuralist would no doubt take issue with my inference that all social and cultural phenomena evolve chronologically - there really isn’t any philosophical problem with a structuralist phenomenon such as databases becoming popular post-post-structrualism, but that also doesn’t mean that there isn’t room for exploration.

Despite the various types of databases and data-models that are in use today (flat, relational, hierarchical, networked, object-oriented etc.) they all fundamentally operate under the Saussurian logic that pairs a signifier with a signified; within a database, a thing (whether virtual or physical) is represented by a signifier, or a set of signifiers. This paring makes any database inherently structuralist.

Even digital narratives that are driven by a database, such as Lev Manovich's 'Soft-Cinema' (http://softcinema.net) or Sharon Daniel’s and Eric Loyer’s 'Public Secrets' (http://vectors.usc.edu/issues/4/publicsecrets) use databases in a strictly structural

fashion. Media objects (text lexias, sound clips, videos) are stored, indexed, and retrieved according to metadata calls and queries. Even when 'random' functions or unique sequencing methodologies are employed, they still merely reorganize the resulting text, and do not push or break with the aforementioned logic.

But within digitality, even the structural/poststructural dyad has been challenged. In her book, *My Mother was a Computer,* Katherine Hayles radically suggests that processes of signification within computer languages are phenomenologically and ontologically more complex than natural language as explicated within structural and poststructural theories. Specifically, the characteristic of code as a language that is executable, and the fact that code can act simultaneously as signifier and signified, complicates the Saussurian division of signifier and signified. In commenting on the difference between natural language and code, Hayles writes:

> Thus voltages at the machine level function as signifiers for a higher level that interprets them, and these interpretations in turn become signifiers for a still higher level interfacing with them. Hence the different levels of code consist of interlocking chains of signifiers and signifieds, with signifieds on one level becoming signifiers on another. (Hayles 2005: 44)

These ideas are useful in exploring databases as a subset of computer applications that run on various levels of code. Hayles' distinctions between natural language and code not withstanding, if we trace a genealogy of semiotics starting with Saussure, through Derrida, to our current computer culture, the database's ostensible reliance on clean Saussurian logic again seems anachronistic. Aesthetics, poetics, and art, however, are traditional spaces to explore such anachronisms. The foundational question becomes: what might a post-structuralist database look like?

In the 'real-world,' experimental databases that do not follow structural logic are often abandoned, as they are not functionally useful. There is no commercial or industrial benefit for a database that does not follow clear representational logic. At best, the relations between objects in a database are explored as in object-oriented or associative databases for improved data modelling and efficiency. Fundamentally a thing is still a thing. But artists for whom functionality might as well be anathema can interrogate the structuralist notion of 'thingness.'

My goal is to develop a database that reflects a specific relationship to poststructural theory (or, oxymoronically, a poststructuralist database). For example, one possible characteristic for this database to mimic is Lacan's notion of the 'floating signifier.' Signifiers are not fixed; they float above a sea of indeterminate and mutable meaning. Correspondingly, a poststructural database could allow for and incorporate these 'slippages.' What if the relations within tabular data were not fixed? What if signifiers within databases 'slipped' in order to offer complex readings of the data? As an example, if within a certain record, the word 'cat' is used, the database could, at certain points based upon the user's emotional state, slip into 'bat.' As expected, this type of activity will result in bizarre, and hopefully indecipherable but suggestive texts.

Project description

These ideas and questions are the basis for my work in progress, *The Confessional Machine.* Digital culture is rife with examples of confessional discourses. From Postsecret.com to GroupHug.us, society seems to be fascinated with practices of digital confession. As an artist, my desire is to find ways to explore this phenomenon from the Foucauldian perspective of the discourses that we engage in actively shaping us as individuals. Is it possible to create a database narrative that complicates the reductive relationship between the 'thing' itself in reality, and its linguistic or numeric representation within database structures? Can this return to Saussurian logic be complicated? There is nothing particularly novel about a space for digital confession, or an art project that employs a database, but I assert that a database that is structured according to the ideology of post-structuralism will prove interesting.

Formally, the project is an online priestly avatar that guides users through a quirky, yet provocative series of questions, interrogations, and discourses related to confession. Specifically, this project attempts, however ironically, to trace the emotional state of its users throughout the 'sacrament' of digital confession while allowing that emotional state to actively shape the discourse itself. It is my assertion that the ubiquitous 'form' structure (think the series of drop down menus, checkboxes, and short answers that 'allow' us to represent ourselves digitally in various commercial and social architectures) is the quintessential example of how discourses of representation actively produce subjects within digital culture. My project attempts to break this structure from the inside: to use the structure while

simultaneously attempting to complicate and expose its logic.

'Tracking' the emotional reactions of the reader is a crucial component to this project. The 'E.Q. Meter' or the emotional quotient meter, which will allow a user to input his emotional state into the confessional machine, will accompany each question and response. This will in turn affect the narrative trajectory of the machine. The E.Q. Meter itself will be based upon Robert Plutchik's emotional colour wheel. Despite its tendency towards over-simplification, Plutchik's psychoevolutionary multi-dimensional model is attractive because of its form, which provides a useful graphic interface and representation of emotional states. Once entered, these emotional states will directly influence, not only the database, but the post-structural slippages as well.

Formally, this project ironically situates itself somewhere between a digital confessional and a digital mood ring. The goal of this project is to develop an interface around a 'post-structural' database that drives a larger narrative experience. Instead of simply being a repository of narrative objects, a user will not only actively influence her particular reading, but the reading of the database of future readers as well.

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Video mirrors and mirror neurons: a look at empathy in participatory immersive environments

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Mirror neurons

One of the most important recent developments in neuroscience comes from the discovery of mirror neurons, a type of brain cell that is activated both by performing an action and by watching the same action performed by others. Mirror neurons offer a scientific explanation for our intuitive or 'gut' understanding of how others feel, by the direct transmission of experience through the stimulation of the viewer's brain. The viewer senses and understands someone else's emotions and sensations as if they were experiencing it themselves. Using advanced sensing techniques to measure brain activity and physiological response, scientists have found that the same neural activity is shared by both the observer and the observed. (Gallese 2008: 771). Neurologist V.S. Ramachandran calls mirror neurons 'empathy neurons,' as they give us the ability to feel what another is feeling, and thereby understand their internal experiences. This leads to the dissolution of the barrier between self and others, the basis of many philosophical beliefs and artistic experiences (Ramachandran 2007:1).

These findings are especially relevant to artists, suggesting a new way of thinking about their work, where audience members share a direct neural experience with their creations. Of course, empathetic engagement has always been central to artistic creation and experience, only now that the neural mechanisms have been revealed they are fair game for artistic exploration. Although mirror neurons have been shown to be active in auditory systems (Gazzola 2006) and in creating physical responses to historical paintings and sculpture (Freedberg and Gallese 2007), it is the multi-sensory world of audio-visual installations, immersive environments, and multimedia performances that holds great promise as the laboratory for mirror-neuron experiments.

Entanglement witness

These concepts are explored in the author's immersive installation, *Entanglement Witness*, a collaboration with choreographer Cindy Cummings. *Entanglement Witness* explores the transitional space between the real world and the virtual world. In a large darkened room, the audience walks through and around a triangular-shaped space built from three 2 x 3 meter grey video screens; the video is the only light source. There a video avatar, played by Cummings, beckons them into the screen environment, meets them.

The projection of Cummings is life size, shot with a black background, and she stands on the floor, eye-to-eye with the audience. She appears, most of the time, as a 'normal' person, casually dressed in blue jeans and a white shirt as she earnestly tries to connect with the audience, using constant eye contact and pedestrian movements. Her facial expression, movements and demeanour are all designed to 'make contact,' to initiate an empathetic connection and response from the viewers. However, the virtual world is not exactly like ours, the avatar's movements behave by their own laws of physics as they are all shot in stop action mode. This was a difficult process that required Ms. Cummings to move very slowly with the camera taking five frames per second, so that she would look 'normal' on playback at the usual 30 frames per second. The result is an uncanny image, even with pedestrian movements, with the ability for parts of the body to move at hyper speed, or for the entire body to hover and float. The accompanying surround sound contained two layers, a hypnotic trance-inducing environment based on vocal samples, plus sounds of dry winds that suggest gesture, movement, and energy. There were six sections, in total, with the entire work running for 25 minutes on a loop.

The installation ran continuously for one week in at the 2008 Kilkenney Arts Festival in Ireland, and for two weeks at the Pixilerations Festival in Providence, RI USA. We noticed that many visitors, especially children, automatically attempted to imitated Cummings movements, even the 'impossible' movements according to normal laws of physics. Other people interacted with Cummings by dancing with her, or placing their bodies in the line of the projector so that their shadows appeared with her on screen.

Why did people imitate her movements? Firstly, we can explain some physical responses by mirror neurons. Children naturally respond my imitating the actions of

others, without the self-consciousness and restraint that they will later develop. Their spontaneous, imitative movements reflect what is going on at the mirror neuron level with the adults. Some adults with more exploratory personalities, or perhaps less repressed, also expressed themselves in this way without regard to social convention. Finally, there is a strong drive for harmonious relationships and 'attunement.' The audience members attuned to the video character, attuned to others in the room, and attuned to the music. Both kids and adults exhibited empathetic responses to each other. No matter how interesting the video material was, the other people who shared the room were always acutely aware of each other, and often the social situation within the room dominated the experience. They watched how others behaved in the room to find out what was safe and socially acceptable, then encouraged each other to test out various behaviours within the room (interacting with the avatar, with their shadows and with each other).

Several sections used a live video feed and video processing to attempt to break down the barriers between the self and others. Using an infrared camera, silhouetted images of the audience are captured, with the body cavity filled with moving water or moving light. This live 'video mirror' flattens out the differences in the audience, so that they all appear similarly on screen. At the same time, the Avatar is also similarly transformed, so that all of the audience members and Cummings appear as very similar moving bodies on screen. The effect is to imply a complete world, where audience members are invited to interact with each other and with the avatar. In addition, the projectors are positioned so that participants moving inside and outside of the triangular space may cast shadows onto the screen, and subsequently get 'painted' on their physical bodies with the coloured light coming from the projector. There was a large repertoire of bodies appearing in the installation, blurring the physical and the virtual and in empathetic relationship: the 'filled' projections of the audience; the filled body of the avatar; audience shadows on the screen and live bodies coloured with moving projection light. At these moments, all members of the audience and the avatar are made of the same 'material,' with everyone’s body outline filled with the same moving video. There is a liberating loss of physical detail in the silhouette; what is left is the expressive outline of the body in social interaction with real and virtual characters. The close physical proximity of the participants and the projections ensure that 'empathy neurons' play a significant role in the experience.

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Composition of visual imagery for Shakespeare's plays

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Introduction

We have created a story visualization system for literary works. A hint as to how this can be accomplished lies in language education; babies and small children grasp the meaning of long complex sentences by focusing on the keywords that they had already understood (Chatera and Vitanyi 2007). The overall meaning of the story is then roughly reconstructed by the combination of these keywords (Yoon and Park 2005). One of the problems that remain currently is how to reconstruct a story systematically from scattered keywords. A number of trials in robots and human interface machines have achieved a dialogue with humans by means of pattern recognition in the conversation (Meng and Wong 2004, Chen 2007). Such software development is now underway in artificial intelligence research, beginning with corpus classification (Singh and Dey 2005), topic mining (Lee et al 2007; Kuhn et al 2007) and language compilation (Pons-Porrata et al 2007). Another approach to analyzing a long story is to introduce advanced mathematics into the text data.

A second problem is how to present the meaning of the story to a third party. Different from the visualization for nature or physical phenomena, though which are often observed as beautiful image (Hertzberg and Sweetman 2005), the story itself includes emotional substance for the readers.

In the present work, the first attempt towards story visualization considers the two issues discussed above. Shakespeare's plays have been selected as the target of the visualization since these are the most famous historical literary works and the structure of the sentences have been investigated in great detail. Although the results presented in this paper might seem primitive to literature researchers, we are confident that this initial step is necessary to pioneer future development. A possible achievement might be that someday a robot will enjoy reading a human letter, and

will begin to write a literary work by the end of this century. The visualization of a story aimed at in this study, will hopefully become the basis of such a system that is realized in the future.

Method of visualization

Famous dramatic works by William Shakespeare (1564-1616) are chosen to demonstrate story visualization. These works have been loved universally across countries and centuries. Shakespeare established the literal essence of drama, poetry, and novels by making the best use of vocabulary. In using his works, we believe that an analysis of literary works arrives at the heart of the problem. Shakespeare's works have several common features:

A) The scenario advances exactly according to time because of the nature of plays.
B) A number of the characters create intrinsic human relationships between each other to deepen the story.
C) The theme is clearly defined by love, hatred, life and death.
D) Various expressions are used repeatedly to transfer a player’s sentiments to the reader/audience strongly and precisely.
E) The structure of sentences and phrases mostly obeys a particular rule including rhyme, i.e., morphological artifice. So-called 'iambic pentameter' provides the reader/audience with a unique and rhythmical impression.

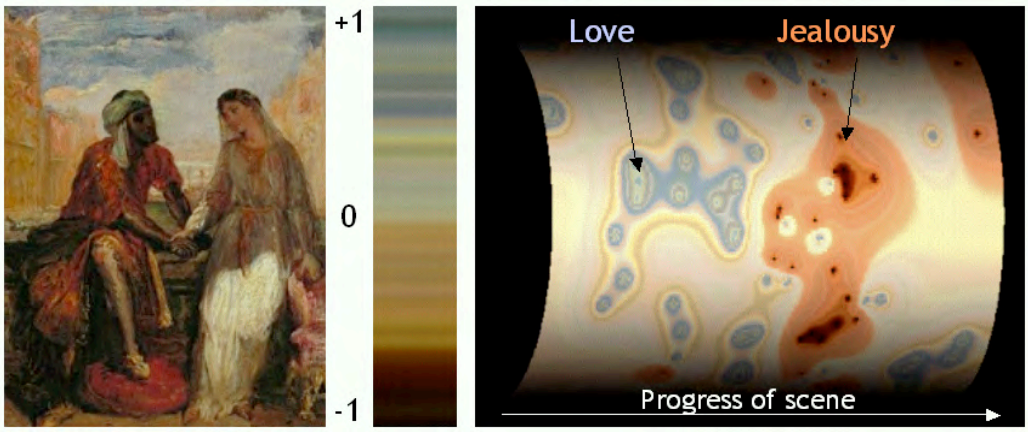
From the five distinguishing factors given above, this study deals with A), B), and C) since these three build up the whole trend of the stories. To compute the literature data, we utilized the electronic library of the complete works of Shakespeare (available on T-Time ver.5.5.7.6, Voyager Japan Inc.).

Detection of keywords is the simplest, yet most important, method of capturing the story meaning. A single keyword does not make much sense, however, the distribution of a few keywords generates organized meaning. When a pair of keywords with contrasting meaning is investigated, the outline of the story can be extracted. A statistical approach for Shakespeare's plays was first reported by Spurgeon (1935). More recently, Foster (1997) employed a computer to count keywords in these plays. We basically follow these approaches but construct our original software to create the visual distribution of keywords. The computation time

for processing the text data is only about 0.5 sec in each play. The keywords are distributed in space as like PTV-data (Ido and Murai 2006). Continuous distribution of significance intensity is obtained by using a post-processing algorithm which was originally developed for PTV and applied for the keyword analysis.

Results

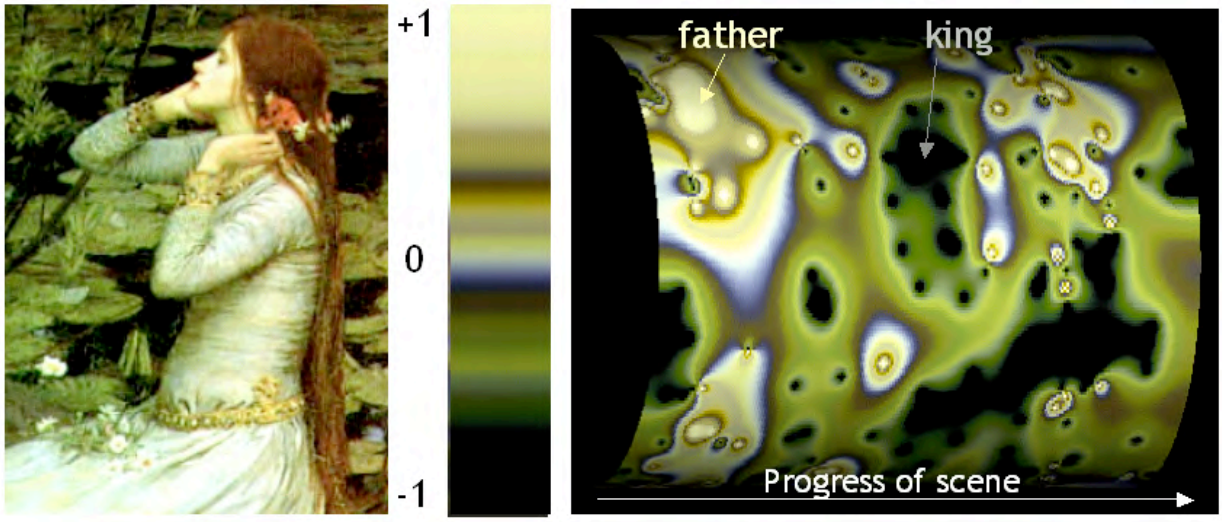
Figure 1 shows the visualized results of the tragedy *Othello*, for which the colour bar was obtained from a picture by Théodore Chassériau. The colour bar is defined by the colour evolution from one point to another in the picture using original image handling software. The hue in the painting includes pastel blue and dark red, which corresponds to a general sense of pleasure and distress, respectively. Othello is known as a story of conflict within the heart of the main character Othello. The first half of the story deals with Othello's love for his young wife Desdemona. The latter half deals with his strong jealousy towards her, which is contrived by his subordinate Eago. The visualization is created using the keywords 'love' as positive and 'jealousy' as negatives. The result matches the outline of the story as seen in the sky-blue spots on the left side and the red spread on the right half. At the end of the story, a red region is seen again, indicating the death of the characters. A different pattern emerges when other keywords are used. Namely the individual plays have plural imageries that depend on the theme of visualization. Since the visualizing target is a literary work, we think that the solution should not be unique but is allowed to include subjective contribution. In this paper we publish a single story visualization result for each of Shakespeare's works, which functionally expresses the structure of the story after examining more than ten combinations of keywords.



(a) *(b)*

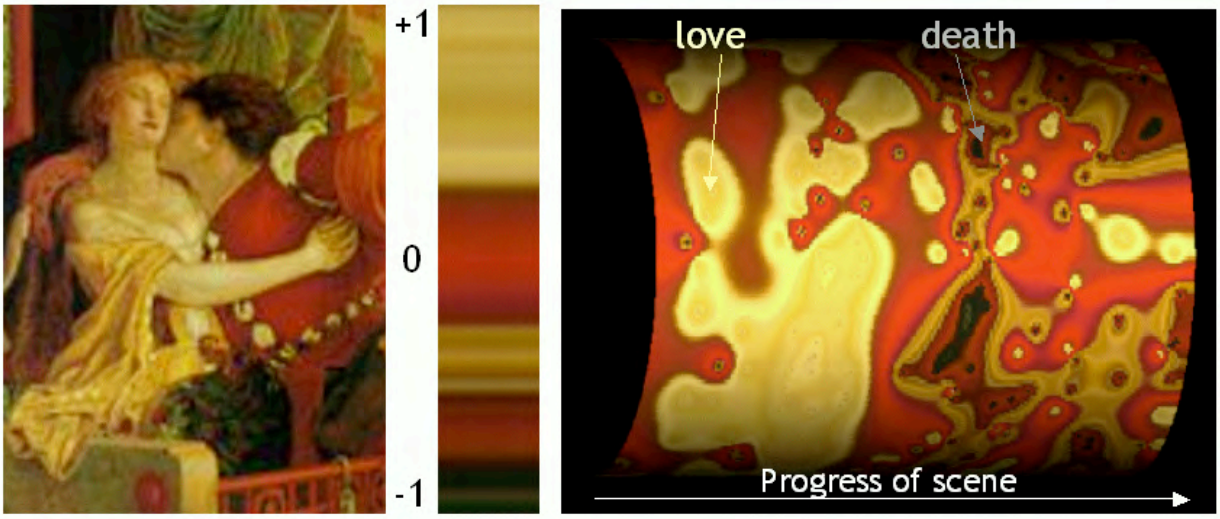
Figure 1. Story visualization for Othello: (a) a picture of 'Othello and Desdemona in Venice' by Théodore Chassériau (1819-1856), and (b) the story visualized with 'love' as positive and 'jealousy' as negative.

Figure 2 shows the visualized result of Hamlet. This is one of the most loved tragedies in the world. The story is about Hamlet's hatred for the king, or his uncle, who killed his father and married his mother. The colour bar was taken from a picture by John W. Waterhouse, which is featured by the flesh colour of Hamlet's fiancé, Ophelia, highlighted on the dark background. In Figure 2 (b), the positive region shown in white corresponds to his love and admiration for his dead father, detected by the keyword, 'father.' The white area that appears in the beginning of the story matches the scenes in which his dead father appears to him as a ghost. Contrarily, the story advances to the dramatic discord within his heart when he learns that the present king murdered his father. These scenes are expressed as dark colours by the keyword, 'king.' White spots are interspersed in the latter half of the story when he compares the king to his father during his revenge. Consequently, the turmoil in Hamlet's heart is well expressed by the visualization of two contrastive characters set as keywords.



(a) (b)

Figure 2. Story visualization for Hamlet: (a) a picture of Ophelia by John W. Waterhouse (1894), (b) story visualized with 'father' as positive and 'king' as negative.



(a) (b)

Figure 3. Story visualization for Romeo and Juliet: (a) a picture of 'Romeo and Juliet' by Ford Madox Brown (1821-1893), (b) story visualized with 'affection' as positive and 'death' as negative.

Not requiring any introduction, Romeo and Juliet is one of the masterpieces of Shakespeare's work. A number of films representing young love have been produced in the 20th Century based on this play. This story tells of the affection between Romeo and Juliet, and of the competition between the two separate households that they belong to. Figure 3 shows the visualized result, for which the painting by Ford Madox Brown has been borrowed. The red primary colour and bright yellow colour used in the painting well express the strength and the pureness of their love. The positive keywords are defined by 'love' and 'affection'; the negative keywords by 'kill,' 'die,' 'dead' and 'death.' The bright gold colour in the first half shows the scenes from the outset of their love until their marriage. In the middle of the story, a black area appears, corresponding to the death of Juliet's cousin, Tybalt, who was killed by Romeo as revenge for his friend's death. The end of the story has both gold and black parts since both leading characters eventually die because of their strong love.

As shown above, the visualization of individual stories produces colourful pictures enabling us to capture the meaning visually. It is obvious that additional analysis can be performed with this tool. For instance we expect to find out the difference and the correlation among plays. From an informatics point of view, a Fourier analysis will show the speed and the rhythm of the story. Taking the gradient vector of the scalar field, may silhouette the mutual interaction between two events or characters. Furthermore, other mathematical approaches are available, such as calculating the entropy of the story, the eigen value of the scenario, and a streamline of the story

flow. If some model equations are applied to the data, we expect to extract further latent information hidden in the story. These are included in the next stage of the study.

Summary

A new methodology for story visualization is reported in this paper. For demonstration purposes, the world's most famous plays - works by William Shakespeare have been chosen. Our proposal for the visualization is to detect keywords in the text to derive the structural pattern of the story. The pattern is expressed by a continuous scalar distribution that is uniquely determined with a Laplace equation. The numerical distribution is converted to a colour picture using an original colour code that is relevant to the story. The visualized results are generally consistent with the real story. Thus, the story originally described by the text is successfully visualized by a visual imagery. As this study advances, the authors expect that more sophisticated visualization will be enabled by introducing a variety of mathematical functions to the plays. In parallel, this tool is going to be applied for all Shakespeare's plays, not only tragedies but also comedies and histories, in the next stage of our research.

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The engineering of experiences through the Mind Cupola: interaction as a cognitive feedback loop

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Keywords: cognitive feedback loop, cognitive-driven interaction, affective computing, biofeedback interface, affective environment, aesthetic experience, Mind Cupola.

This paper introduces a new modality of interaction for art that produces meaning through cognitively inclusive sensorimotor capacities of the user. This application, which builds upon the psychophysical capacities of biofeedback interfaces, explores the potentiality of technological feedback for the affection and evaluation of the user. Through this the concept of 'cognitive feedback loop' will be applied in order to produce more effective aesthetic experiences. This proposal will be exemplified with the affective environment of the Mind Cupola. The paper finally anticipates that such a cognitive-driven approach to interaction might serve to enhance self-awareness and welfare through self-regulating processes.

There has been a great variety of disciplines that have approached the matter of aesthetic experiences in order to explain how particular qualities in a participant's interaction can be engineered. These concepts – comprising of the literary account of open work (1989) by Umberto Eco, initial artistic applications of 'Endo-physics' (Rössler 1992) and the model of 'Endo-Aesthetics' (Gianetti 2005; Weibel 1992), and finally the cognitive scientist Alva Noë (2001)'s approach to art as enaction – ground their argument on the dynamicity of the sensorimotor capacities of the body. Open work emphasised the work-in-progress quality of the artwork, which is fulfilled through the perceptual motions of the participating subject. The quality of bodily shaped experiences (embodiment) is where they activate the artwork and this makes it generative and varied through each user's engagement. Rössler's account (1992) of Endo-physics or the 'physics from within' - greatly informed by quantum and chaos research - offer an attractive solution to science that might be considered as a radical phenomenological approach to physics. In his theory Otto E. Rössler (1992)

suggests an observer-dependency, which makes the word into an interface on which each 'endo-reality' emerges. The endo-perspective (which rejects the exo-approach of sciences) addresses the view of the participants in the open work who, though not able to go beyond her interface reality, generate a reciprocal relationship to the world - thus the state of the world changes according the observer states. Noë's approach of enaction takes further the observer-centred approach and applies it to art. He suggests that art might not only re-produce an idealistic representation of a room (e.g. from an objective perspective when all of the details are represented) but can demonstrate the sensation of 'being in the room' (a subjective approach). Designing experiences in this sense implies not only the visual comprehension, but the *quality* of how we interact with the world (Figure 1).

Through this overview it can be argued that the engineering of experiences might be approached from a phenomenological comprehension of the experience. In the framework of interactive media art this implies that artists work toward an 'enactive aesthetics' which propose that they anticipate a chain of affections in the user's experience based on the artistic meaning production of embodiment.

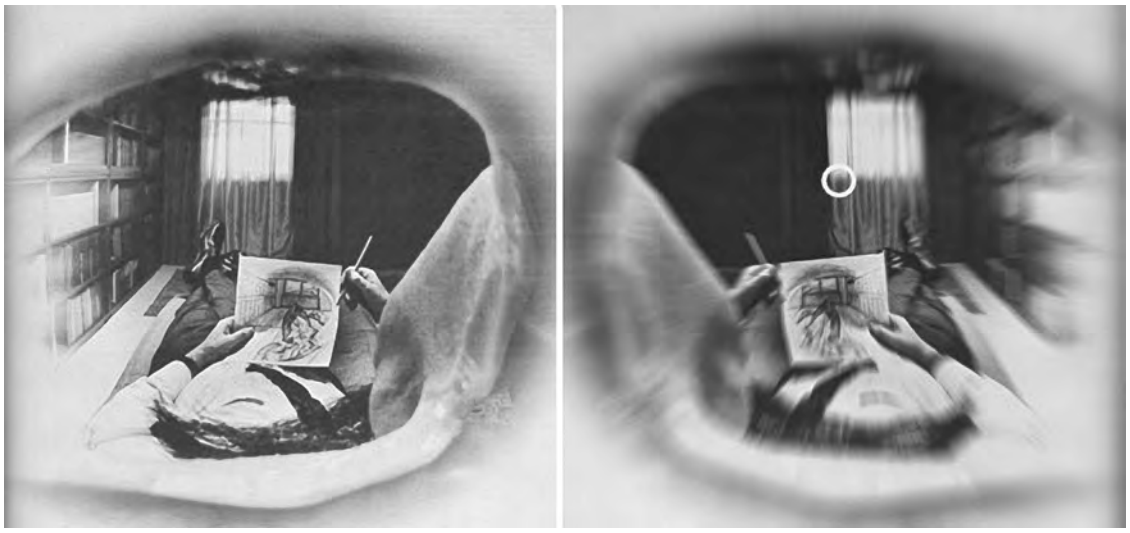

Figure 1. J.J. Gibson (1950) and Luc Desnoyers (2008) re-interpreted Ernst Mach's (1897) drawing of the visual experience (second image is mirrored). Similarly to Noë's suggestion, these representations attempt to visualise the 'enactive quality' of the experience. Desnoyers' visual field with the white circle of the fixation point displays a spectrum of density of the environmental detail.

Passive interaction: cognitive-driven meaning production

In order to understand how enaction can produce meaning through a cognitive-based strategy in the interactive artwork, this approach can be grounded in the phenomenological discussion of the body and mind. Body and mind in this discourse are transposed and this relates to the qualities of material and immaterial. It is the quality of their interconnection rather than how they might be separated. This means that the body-mind nexus here, relates to the quality of enaction as interaction; in other words, how the body gives rise to the chain of immaterial thought processes for aesthetic knowledge production.

With regards to differentiating this cognitive-driven approach of interaction from common design solutions (for example tangible interfaces or applications of full body involvement), this research terms this modality as 'passive interaction'. Passive interaction refers to the bodily passive status and as how the system evaluates the person's actions. It focuses on cognitively inclusive biofeedback capacities of the body (e.g. facial expression, eye-tracking , EEG for brain activity, ECG for heart rate, EMG for electrical discharge in the muscle fibres, EOG for the resting potential of the retina and GSR for electrical qualities of the skin)[1] and produces meaning through these affective responses according to the user's intentional engagement. Consequently, there is a great importance in the application of the body-mind nexus operating as an aesthetic tool in the design of biofeedback interfaces. Therefore, the artist engineers the experience according to the quality of the relationship between embodied knowledge and the new knowledge in the interaction (this is the artistic-functional novelty of the interface): the artist merges conscious and subconscious actions of the users in order to produce fluidity in the experience. This can be termed the process of 'mastering the interface', when the user reaches an immersive state through a spectrum of qualities of body and mind interaction. The great potentiality of the mastering the interface process lies in the fact that the person initially has to operate against habitual (embodied) bodily actions, raising self-awareness and re-valuing meaning (the inhabited knowledge of 'being-in-the-world'). With the aesthetic conceptualisation of learning processes, the artist goes beyond the common action-reaction qualities of interaction, as the users have the capability to produce meaning through actions which are not merely based on habitual responses but simultaneously driven through conscious awareness and control of the interaction. As

[1] EEG: Electroencephalogra, ECG: Electrocardiography, EMG: Electromyogram, EOG: Electrooculography and GSR: Galvanic Skin Response.

a consequence, an aesthetic experience emerges from a fluctuation between habitual responses and actions that steer these responses in order to achieve new meaning - leading to self-regulation and self-knowledge.

Although there has been no continuity and homogeneous aesthetic development in art by applying biofeedback devices, some of the outcomes offer potential solutions for novel aesthetic experiences applying biodata of breathing/heartbeat[2], brain activity[3], eye-movement[4] or multiple bio- measurements[5]. Beyond such aesthetic solutions, the applications of passive interaction look at strategies of meaning production of biofeedback devices that might also provide potential applications in heuristic learning and therapeutic capacities. In order to extend these potentials and provide more effective forms of interaction, this research looks at emerging solutions for passive interaction such as 'affective computing'. Affective computing investigates the relationship between emotion and cognitive processes and how the tracking and evaluation of this information helps to produce more qualitative interactions between human and machine (Picard 2000). As affective computing is mainly focused on facial qualities and how particular affections reflect on the facial physiology, this research looks at potential facial measurement systems including eye-tracking and their potential to evaluate cognitive meaning.

The fractal-like consciousness in the aesthetic experience: the cognitive feedback loop

Whereas affective computing might provide the technologies required to evaluate cognitive qualities of the user, it is important to look into methods that offer a more efficient solution for how aesthetic meaning arises through this cognitive-based information. The main objective of this investigation was to identify audiovisual media which would trigger valuable cognitive responses of the user through physiological affection. It has been identified that electromagnetic phenomena might be a useful

[2] Significant examples of biofeedback environments applying breathing for meaning production include: Ulrike Gabriel's 'Breath' 1992; Christian Möller's 'Light Blaster: Immaterial Membrane' 1993; Char Davies' 'Éphémère' 1998; George Khut's 'The Heart Library: Biofeedback Mirror' 2008; Laura Colmenares Guerra's 'Lungs: The Breather' 2008. (MediaArtTube: 2009)
[3] Biofeedback environments with brain-driven interfaces: Horst Prehn and Werner Cee's 'Braindrops' 1993; Thomas Tirel, Sven Hahne, Jaanis Garancs and Norman Müller's 'BIOS' 2002-03; Yoshimasa Kato and Yuichi Ito's 'White Lives on Speakers' 2007. (MediaArtTube: 2009)
[4]Potential applications exploring human gaze for meaning production: Joachim Sauter and Dirk Lüsebrink's 'Iconoclast', Eye-responsive visualisation 1992; Andrea Polli's 'Intuitive Ocusonics', Eye-driven sound interface 1998; Chris Sugrue's 'Re-Gaze', Eye-responsive visualisation 2005. (MediaArtTube: 2009)
[5] Biofeedback environments with more than one biofeedback devices: Horst Prehn's 'Psychophysical Mirror' 1993 (Horst, 1993); Pavel Smetana's 'The Room of Desires' 1996; Tobias Grewenig's 'Emotion's Defibrillator' 2005. (MediaArtTube: 2009)

application for investigating affections and their impact on a person's cognitive system. Therefore, a variety of devices are required to produce a spectrum of electromagnetic frequencies in the form of sound, visual vibration, radiations, mechanical vibrations including affective visualisation systems which together can meaningfully change the user's consciousness. This cognitively inclusive method builds upon the electromagnetic devices and is called in this research 'instant affection technology'.

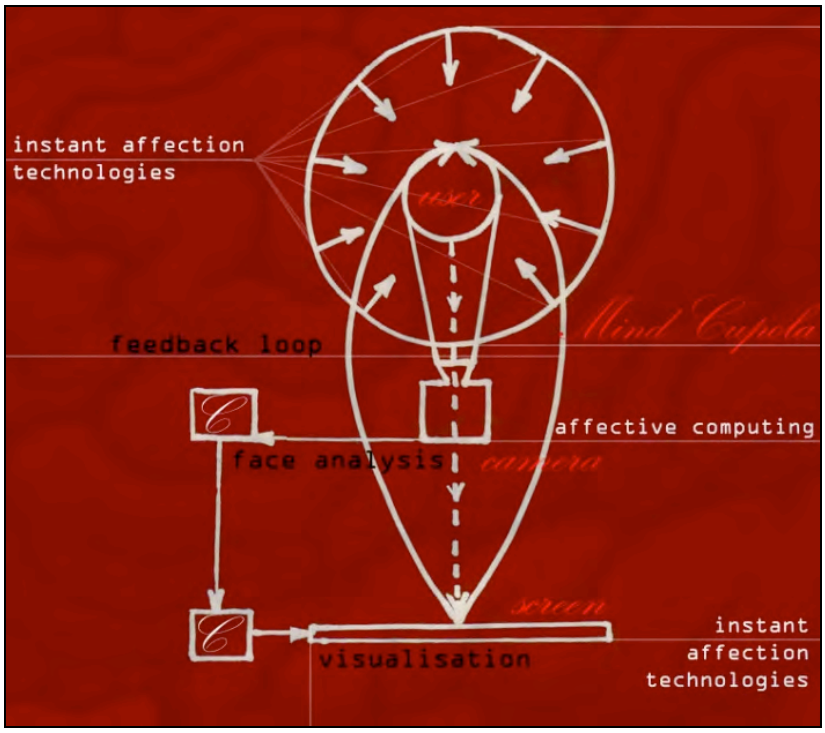

Figure 2. The Technological Feedback Loop in the Mind Cupola's system. (© Zics 2007)

Considering modalities of interaction has been frequently acknowledged in literature. This includes how technological feedback might provide a potential solution for generative interactions - thereby going beyond a mere responsive human-computer communication. The intervention of passive interaction proposes an interconnection of affective computing with instant affection technologies. This provides not only an emerging technological solution, but a new aesthetic tool for interaction (Figure 2). This concept of the 'cognitive-feedback loop' takes the capacities of technological feedback further by incorporating a psychophysical method of interaction, and this offers a circulation between the biological representation of the cognitive states (facial responses) and the technological representation of those cognitive states (instant affection technologies). This implies that the affective data gathered through affective computing is fed back through the stimulators of instant affection

technologies and consequently enables a self-regulation by the user since they control the interaction intentionally in order to master the interface. This type of learning process which Dave Warner (1994) terms as bio-cybernetics, builds upon cognitively inclusive meaning that guide the person to an optimal quality of experience. This results in an immersive state when dynamic oscillation between these technologies generates a certain complexity in the user's cognition through the repeated technological feedback. This might be explained as the 'fractal structure' in the user's consciousness since fractals are representative forms of mathematical feedback loops whose pattern repeats the same design and constituency at a range of scales producing complexity with an outcome of unpredicted patterns (Figure 3).

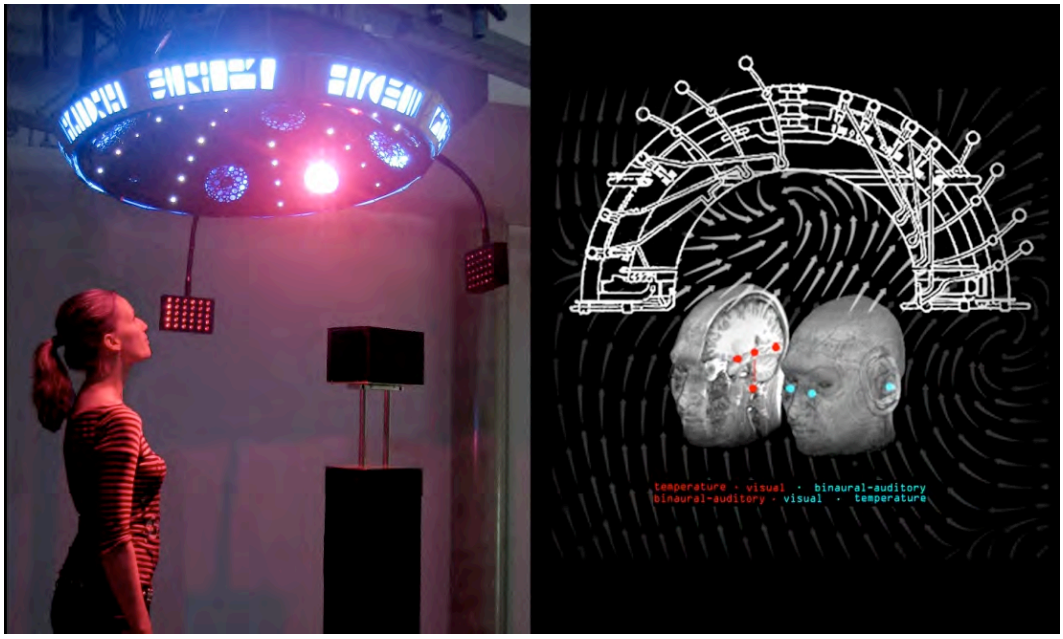

Figure 3 The Mind Cupola's affective environment (on the left) produces a cognitive feedback loop through the technological feedback represented at the conceptual image on the right side. (© Zics 2008)

This suggest that technologies incorporating cognitive-based design have potential to trigger a complex cognitive outcome based on common action-causality, interlinked with a tendency of unpredictable qualities that offer new types of user experiences. The 'world within the world' quality that fractals hold might offer a new capacity for welfare and cognitive wellbeing of users with potentials for self-regulation.

Aesthetic affections in the Mind Cupola

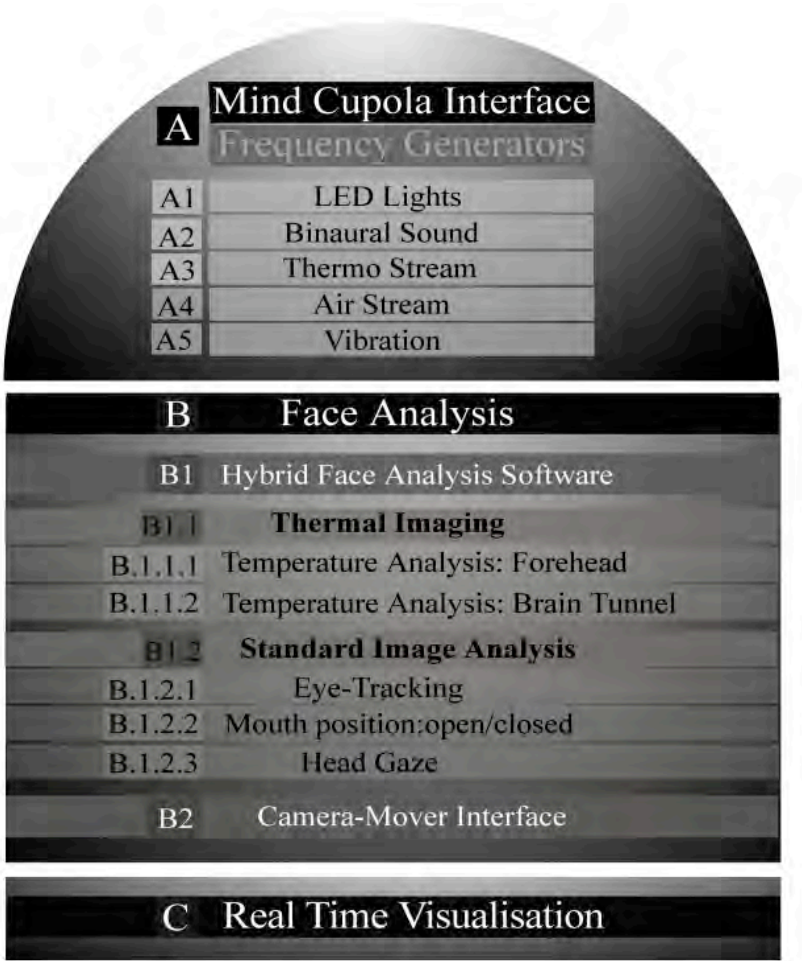

Figure 4. The Mind Cupola's technological system overview. (© Zics 2008)

The engineering of the cognitive feedback loop implies developing an environment that responds through affections to the user's action. One of the examples of a potential application is the affective environment of the Mind Cupola. The artistic system (Figure 4) comprises of the cupola interface: (A) the illumined golden cupola, camera-mover interface (B2) and a visualisation (C). When the user steps under the Mind Cupola's interface she is instantly embraced with affective devices as the cupola moves towards the person's head. Simultaneously, the camera mover interface identifies the user's face and moves up to the same height (the front of the participant). The LED display on the Mind Cupola's sides signals the start of the interaction for which the participant is advised to be relaxed and only use movements of the face/eyes to react to the system actions. Every user is instantly captured through the system, which evaluates the emotional and behavioural reactions

through non-contact temperature measurement, and the frequency of head and eye gaze.

The Mind Cupola demonstrates exclusively combined technologies, which on the one side affect the user with a spectrum of frequencies of flicker effect (A1), binaural sound (A2), hot (A3) and cold stream (A4) and affective visualisation (C) (instant affection technologies). On the other side it dynamically captures the behavioural responses, thermodynamic features and eye-movement of the user (applications of affective computing), which set up a cognitive-driven circulation between affection-user-evaluation (Figure 5). The system frequently updates its state according to the cognitive characteristics of the user based on the quality of eye (B1.2.1) and head gaze (B1.2.3), and facial responses (B1.2.2, B1.2.3, B1.1.1 and B1.1.2). This forms a significant part of the meaning production when the system interlinks the physiological changes with possible psychological qualities based on the particular responses or changes (over time) on the user's faces. The aim of this circulation is to guide the person toward an optimal experience that implies that the user learns and lives the rules of interaction that incorporates the perceptive/attentive qualities and thermodynamic/electromagnetic qualities of the body, through which they have the potential to control their own responses.

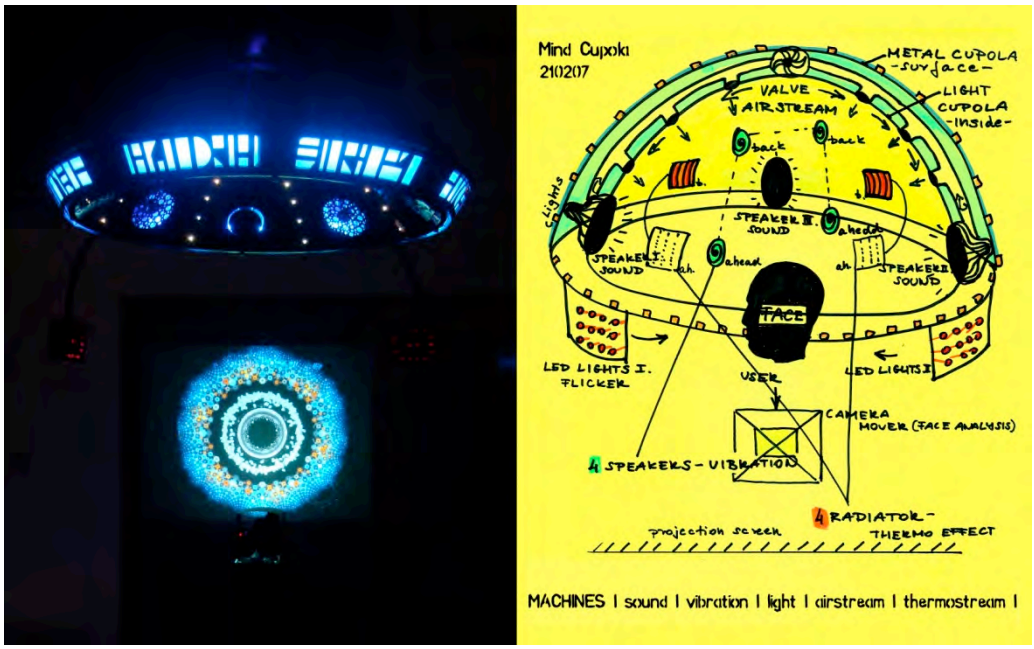

Figure 5. In the Mind Cupola's immersive environment (on the left) the user is affected with a spectrum of electromagnetic frequencies (illustrated on the right) in order to enter into an optimal state of experience. (© Zics 2008)

According to the quality of how the user interacts, they trigger stimuli of heating/cooling affects, pulsation of the LED lights directed on peripheral vision or generative sound that might relax or interfere their cognitive processes. For the mastering the interface process users are assisted by the affective visualisation system that guides the person toward the state of equilibrium (instead of chaotic or meditative states) with the help of visual semantics of motion and textual information (Figure 6). The user has to find hidden messages on the display through the intentional control of their eye/head gaze, and control mechanisms provide them with guidance and also trigger events of self-reflection.

Figure 6. The affective visulisation reacts to the user's passive sensorimotor actions providing a guide toward an effective immersive state of consciousness. (© Zics 2008)

An optimal experience can be achieved when the user, rather than through the habitual actions of the body, changes the states of the system through their emotional and attentive actions. In this case the user's effort to master the interface is in balance with the artistic content gained through the feedback of visual-semantics and perceptual/mechanical affections. This cognitive flow is a result of the aesthetic application of the enactive capacities in the user's experience, which means that the artist anticipates cognitive qualities of the user. The engineering of experiences concerns a unique knowledge production, which goes beyond explored enactions of everyday life with an aim to produce a new intimacy between human and machine.

Since the user activates the Mind Cupola with their passive psychophysical interaction, this system is an open work that explores the user's 'endo-capacities' (the user as observer of her own observation) through the aesthetic application of enaction. The dynamic self-exploration goes beyond the semantics of common tangible and screen based interfaces in the way these types of interfaces are driven from static capacities of cognition (symbolic and metaphoric meaning production).

Mind Cupola offers a radical knowledge practice which has a different phenomenological perspective to that which has been proposed in semiotic-interfaces, namely acting through bodily capacities that establish a heuristic quality to learning. As this kind of passive interactions produce new embodied knowledge with increase of psychophysical control of the body, they might provide potential therapeutic and health-promotion applications which provides a key objective of future research into biofeedback art.

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08 Artists Presentations

Syncretia: a virtual geography for play

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Abstract

This paper examines the strategies and theories involved in the creation of a virtual habitat; the island Syncretia located in the virtual world of Second Life®. The island is comprised of a series of narrative/play installations, which can also be considered as 'artistic environments'. Syncretia should be seen as an endeavour for providing a context for play, storytelling and metaphor; involving an examination of virtual geographies, cyberpsychology/presence studies, ludology and their relationship to *objets trouvé* or ready-made art/architectural objects which have been utilized to a substantial degree in the structuring of the visual/narrative language of Syncretia.

A virtual geography for playful activity

A concerned effort has been made by the artist to integrate Syncretia both with the geography as well as the climate of Second Life. Indeed, the island has not been conceived of as an artistic abstraction, superimposed in defiance of the virtual terrain upon which it has been rezzed but instead very much as a natural extension of the virtual geography itself.

Terraforming, a term usually associated with the hypothetical process of deliberately modifying the atmosphere, temperature, surface topography or ecology of extraterrestrial planets, acquires novel meaning and purpose in a virtual world: Bradshaw (Bradshaw et al 2001) discuss cyberforming terraspace as early as 2001, thus giving agents a permanent foothold in a materially virtual world. Stating that, 'civilization begins when human beings find places to be, make these places their homes, then create ways to communicate and work together in their chosen locations', Bradshaw concludes that cyberspace will need to be built to fit the human sense of space; adding that as research increasingly couples virtual reality technologies with high-bandwidth connectivity, the perception of cyberspace as

'space' will become a reality [1]. Thus, terraforming, through which the virtual simulation of physical geographical elements can be attained, constitutes the primary tool of a building system which attempt to take advantage of vertical space through the usage of geographical strata.

While a considerable part of Syncretia is submerged under the ocean of Second Life, much else makes use of a steep central mountain as a structural backbone into which huge cantilevers have been embedded, raising parts of Syncretia high above water levels. There are 4 distinct domains, defined by compass directions; however thought has also been given to creating transitional spaces between these distinctive domains. Climate is brought into play whereby these have their intrinsic climactic properties, created through the implementation of various scripted weather systems.

Figure 1. Syncretia, North Shore. Stormy Weather

Presence and the avatar

Syncretia has been built as the home of the avatar Alpha Auer and as such acquires significance when considered within the framework of Presence studies: Presence is defined as a sense of 'being there' in a mediated environment (Jsselsteijn 2000). Lombard and Ditton (1997) define it as an illusion of non-mediation in which a user no longer perceives the display medium as a separate entity. A high level of

presence will help users remember a virtual environment as more of 'a place visited', rather than 'a place seen' (Slater et al., 1999) [2], and indeed Syncretia is intended as a repository of memories and associations both for her owner as well as her visitors. 'Presence' and it's relevance to the immersive virtual experience is discussed by Mantovani and Riva [3] who challenge the notion that experiencing a simulated environment deals with the mere perception of its objective features; instead proclaiming that presence in an environment (real or simulated) means that individuals can perceive themselves, objects, as well as others not only as situated in that external space but as immersed in a socio-cultural web connected through interactions between objects and people, leading us to the paramount importance of the interacting agent within a virtual culture, i.e., the avatar.

A validation for realizing art work based upon the power of physical embodiment of the avatar and all appended structures such as virtual geography and architecture comes from Joerissen [4], who playing upon McLuhan's famous statement says that if soul is indeed 'form', the body is then the medium within which form becomes corporeal and as such the body becomes the very message which it carries. According to Joerissen, viewing avatars as mere representational agents in virtual realms has become increasingly problematic over the past decade. Instead a holistic approach which weaves together the human handler, the representation thereof and the medium / environment within which this representation materializes seems to be called for.

Figure 2. Syncretia: Public Baths

Art for experience, art for play

'Play is freedom. Play is extraordinary. Play is distinct from the ordinary both in locality and duration. Play is fun'. [5] Syncretia is a playful geography comprised of both amphibian and terrestrial strata, blending into one structural whole, into which objects and buildings have been integrated to create a playground of absurdity, frivolity and imaginative acts of embodiment which, whilst often drawing their metaphors from the physical realm often combine these with NPIRL [6] (Not Possible in Real Life) elements. For example a gym, built very much along the lines of a Real Life gym, nonetheless manifests distinctly un-physical attributes when it is constructed underwater and its exercise stations are placed along pipes which power the construct through an elaborate steam system. Similarly, the public baths of Syncretia present their users with Real Life-like bathtubs, albeit filled with virtual water which manages to stay within the bathtubs although these are situated in an amphibian environment embedded into the ocean of Second Life itself. The most noticeable construct on the island however is the alchemical power plant Citrinitas, structured to resemble a Real Life refinery. However, upon closer inspection this industrial complex materializes as an enterprise in which the virtual dross of several rusted trucks is expected to turn into gold and the astounding by-product of which are two instant rejuvenation spheres wherein avatars are asked to place themselves for a speedy anti-aging cure.

Huizinga [5] sets play and culture side by side, however insists that play is the primary force, since animal play pre-dates human culture. He does not define the place of play as being amongst all other manifestations of culture, but rather as an assertion of how far culture itself bears the character of play, thus setting an evolutionary framework for the concept. This idea is picked up by Brian Sutton-Smith in *Ambiguity of Play* (2001), drawing from the fields of animal play, psychology, folklore, literary criticism, biology and anthropology. The book considers seven major categories of play rhetoric that cover play as progress, addressing the claims of research into animal and child development; play as power in sports and games; play in the construction of identity through cultural activities such as festivals; imaginary play in art and literature; the self in play from the perspective of individual psychology; and the frivolous as a deconstruction of play.

Much inspiration as well as clarity of purpose has been attained from reading John Dewey on the experiential qualities of aesthetics and art [8]. In as synthetic a world

as the metaverse of Second Life®, where the bulk of art work presented is still housed in designated art spaces, such as galleries or museums, Dewey's concern for the separation of art work from its experiential functions seem well founded, particularly given the suitability of virtual worlds for an in-depth re-examination of the role of artistic output in (virtual) society.

Drawing attention to the modernist practice of relegating art work to rarefied but sterile repositories where they pursue an existence essentially cut off from everyday usage and appreciation, (e.g. museums), Dewey draws attention to cultures, ancient and contemporary, where aesthetic appreciation is inextricably bound with day to day usage, proposing that 'we do not have to travel to the ends of the earth nor return many millennia to find peoples for whom everything that intensifies the sense of immediate living is an object of intense admiration'. He suggests that the present task 'is to restore continuity between the refined and intensified forms of experience that are works of art and the everyday events, doings, and sufferings that are universally recognized to constitute experience', thus elevating art work from its current state of being the provider of mere 'transient pleasurable excitations' into once again becoming the powerful carriers of experience.

Play and the found object

While the geography of the island as well as the bulk of the architectural structuring upon it has been created by Alpha Auer, substantial amounts of objects, either found as free objects or purchased in Second Life, have been woven into this terrain and architecture. Indeed some of what can be experienced and seen at Syncretia has been added to the environment by friends and such additions have been kept in situ since the island is considered to be a living warm entity that welcomes such interventions: not an artistic object to be examined as such, but rather an immersive location for a 'Second Life' to fully be lived and participated in. Developing the theme of integration of objects created by others, metanomic activity is also brought into play through the integration of objects both found and purchased in Second Life. Thus, Syncretia can also be viewed as a virtual experiment in object trouvé or ready-made art:

In *Art and Agency* (1998) Alfred Gell expounds upon the found object as part of the process of artistic activity: the 'found object' or the 'ready-made' is where the artist does not so much 'make' as 'recognize the particular cognitive index of the object.'

Japanese Art is particularly rich in the use of found objects for artistic purposes, particularly in the use of natural objects. According to Gell Western cultures seem to have a more activist notion of artistic activity, whereas the Oriental approach esteems the 'quietist' mode of creativity where success attends those who open themselves to the inherent physiognomic appeal of the (naturally) found object. Thus, the use of the found object by Western artists, such as Duchamp, are less passive, with their selection being presented as pure acts of will on behalf the artist. Duchamp claimed that his ready-mades possessed *'*the beauty of indifference*',* that is, the objects used in their creation were selected on the grounds that nobody could possibly imagine there could be any particular reason for them to have been selected in preference over others. However, having 'no reason' to select some 'thing' as an object of ready-made art, is in itself a reason, since it is motivated by the need to avoid selecting anything for whose selection some reason might be proposed. Consequently, even the purportedly 'arbitrary' ready-mades of the Dadaists, forced themselves on these artists *'*who responded to the appeal of their arbitrariness and anonymity, just as the Buddhist landscape artists responded to their mutely speaking boulders' [9].

The integration of found objects into Syncretia is for the purposes of play. These 'ready-mades', which in some cases have been assembled out of pre-existing items or used as found, are toys used by Alpha and her friends in the creation of make-belief. Found objects, such as the rusted trucks whose transformation into gold is anxiously awaited as are the numerous other vehicles such as helicopters, hoverpads and cars scattered throughout the island and used for day to day transportation. Throughout the island planes which have taken sad, nose-dives mark previously incurred virtual plane crashes. A huge radio antenna is placed on the northern shore, and it is widely assumed this enables the inhabitant avatar population to obtain radio transmission from the BBC world service. Yet other found objects are pets, such as the horse and the swans on the eastern shore and of course, the Botanical Gardens which are created entirely out of purchased plants. It is the richness of the underlying 'metanomic' framework [10] resulting in a staggering array of commercially available output of every imaginable size, and shape and created for purposes ranging from the most utilitarian to the most sublimely bizarre which enables the realization of such a rich cornucopia of make-belief objects. This engenders situations which culminate in virtual memories through the creation stories and narratives - visually commemorated through a proliferation of virtual toys.

Conclusion

Syncretia has been built over a period of almost 2 years with structures and components added at diverse times and for diverse purposes. Over this period all and/or various parts of the island have been shown at international exhibitions and the island has been fully documented for these purposes. Although much has been added, as well as deleted, throughout this period in its essence the island has not really changed and is felt at this juncture to have outlived its original purpose of playful activity, having become overly familiar through repeated usage.

Given that one of the distinctive attributes of virtual artifacts is not only change and modification but ultimately a cycle of destruction and re-birth, Syncretia will not continue in its present incarnation for much longer. The avatar Alpha Auer will be undertaking a full re-building of the island in the fall of 2009, this time also incorporating elements of interactive/reflexive architecture, (deliberately omitted in its present incarnation), thereby enabling a newly created geography.

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[re]locate and environmental storytelling

Tahera Aziz
London South Bank University, UK

[re]locate takes the form of a responsive, multi-channel sound installation revisiting an ordinarily public 'place' that retains the traces of a deeply significant event; it is concerned with the processes involved in struggling to preserve the memory of the event whilst offering new insights. The idea for the artwork flows from the tragic events surrounding the racially motivated murder of 18-year-old Stephen Lawrence near a bus stop in south London in 1993, and the deep impact this has had both privately, for the Lawrence family, and publicly. The Stephen Lawrence case received widespread media attention following the damming conclusions of the Stephen Lawrence Inquiry Report (Macpherson 1999) into the police handling of murder investigation and its subsequent lack of resolution.

Taking the notion of the daily routine of waiting at the bus stop as its starting point, the sonic artwork explores the disruption of the everyday to foreground the event once again, highlighting detailed elements that have particular resonances. On entering the space audience members assume the role of 'pedestrians' or 'passers-by', guiding the unfolding of the sonic 'story'. Depending on their movements within the installation, they unravel multi-layered 'story' elements, recounted from different perspectives or time frames of significance to the case. Essentially, the audience rediscover fragments that bear witness to the event that has long since past, but still demands closure.

[re]locate has been developed with Arts and Humanities Research Council funding through the Practice and Applied Route. The project has involved working with fifteen actors to develop the dialogue and 'action'; a field recording artist and sound engineer to experiment with simultaneous multi-channel recording, audio compositional techniques and spatial configuration, and a computer programmer to introduce responsiveness (using real time processing software and motion sensors) into the sonic environment. This creative approach to storytelling flows from a desire to explore the potential of computer-based interaction and non-linear forms as a mechanism for deepening audience engagement. Furthermore, it provides a rich and fertile ground for re-examining the multiple narratives associated with the case. As Janet Murray states:

> The retracing of the situation from different perspectives leads to a continual deepening in the reader's understanding of what has happened, a deepening that can

> bring a sense of resolution but one that allows for complexity of the situation and that leaves the moment of shock unchanged and still central. (Murray 1997: 136)

The decision to work solely with sound arises from an interest in its ability to articulate place and space, audience experience and to conjure up multi-sensory imagery in the mind of the listener. The privileging of sound over image offers a creative strategy for introducing a degree of ambiguity in the interpretation of events in keeping with the nature of the incident itself, which was sudden, unprovoked and short-lived. *[re]locate* has also been funded by Arts Council of England and London South Bank University, and is partnered by PVA MediaLab.

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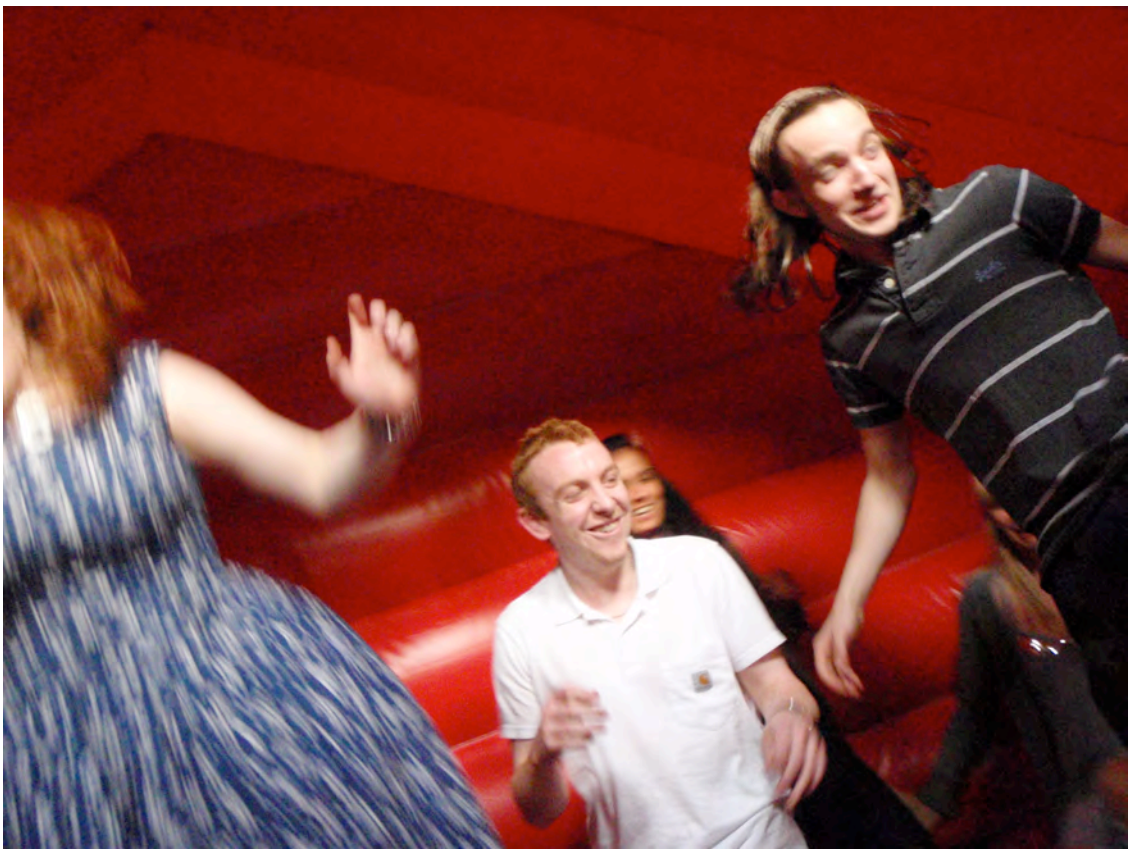
Laughing is allowed!

Andy Best
Meetfactory / Goldsmiths College, University of London, UK

Merja Puustinen
Meetfactory / Finnish Academy of Fine Arts, Finland



Having fun inside Empty Stomach at Eurocultured 09, Manchester. (Photo by Andy Best).

Over the past twenty years the body and substance of our media art work has been driven by a desire to create interactive experiences. Applying Brenda Laurel's categorization, the forms range from the mechanical click-through solutions to the deepest sense of interaction where the work cannot be rendered back to any point of origin after the user participation. Our works range from 3D web based community gaming platforms through

mobile applications to sensor-controlled real time video projections, audio soundscapes and immersive environments.

Our 'encounterings' as media artists working within and outside the institutional art world have led us to pay close attention to both the evident disparities in value propositions and the expected artist and audience roles provided. The paradigmatic hybris for the technological determinism surrounding the media art scene is often countered by institutional reservations reinforced by traditional readings of art history, curatorial and conservatorial practice and pedagogical politics. On the one hand - paying tribute to the ethos of truth to materials within the minimalistic tradition of art - the technology itself is seen worthy of exposure. The technology turns into the cultural high as a self-referential end to the phenomenality of materiality, whereas the conceptual end of the realm carries a promise for the extension of the mind and body - a gateway to an improved self, deeper social engagement, and sensory experiences. On the other hand the self-referential quality of the technology is regarded as a potent, if not an exclusive, obstacle in the quest for a transcendental art experience of a higher order.

In our view however, the human being as a species is a social animal and hence by default interactive with her physical environment and social surroundings. According to neurobiological and pedagogical research our sensory perception, basis of logical thinking and linguistically organised thought are built on an a priori sensomotorical bodily experience with the physical world. Cognitive processes themselves are largely multisensory, metaphorical and unconscious - as based on our experience of the bodily movement in space. Interaction with our physical and social environment is therefore the natural condition for the cognitive mind seeking for the adaptability and fitness for survival in terms of knowledge production, logical thinking, emotional and intuitive understanding.

In our most recent works we have created full-bodied physical interactivity within a communal space. We pursue the creation of a Temporary Autonomous Zone (TAZ) around and within the work. We regard the artwork as an offering to the participants – there are no rules attached, you interact as you see fit. Due to the highly visual nature of the works, they attract children and fun-seeking adults. By breaking the taboo that art must be serious (and/or boring) we seek to re-invent the conditions within which artworks are thought to be experienced. Quite naturally the works also speak to people who otherwise would be disenfranchised from the art community.

In conclusion, we believe that technology is a worthwhile tool within a wider palette of materials and social interventions for creating deeper forms of interaction. The social community that appears in our physical environments compares strongly with those that form within online virtual communities. The empowering nature of fun as physical play within a stimulating environment, allows mental reflection on the meaning of the artwork in an entirely new light.

Último Esfuerzo Rural (2004-2008)

Peter Bosch and Simone Simons

Último Esfuerzo Rural ('Last Rural Effort') was premiered in Valencia at the Ensems festival of contemporary music, in May 2004. It is composed of two rather different installations. Both produce sounds, big or little, always coarse, sensitive and individual. One part consists of maximum nine giant *zambombas* (lions roars), made of barrels, measuring 1m 30 and played by pneumatic cylinders. The other part is hayforks which scratch on metal plates or glass. Both machines have such a peculiar sound world, that its origin cannot be other than the countryside. A feeling which comes out of the deepest interior, like the braying of a donkey. The hayforks make up a small machine with a long-range energy radiation while the barrels, on the contrary, compose a grotesque machine with a relatively small energy radiation (when not amplified). The minimum with the maximum performance, or the maximum with the minimal performance, the result is similar: in this paradox poetry is born.

Re:New Festival, Huset y Magstraede, Copenhagen 2008

Ensems Festival, La Nau, Valencia 2004

Technically both machines span and unite the rural, industrial and computerized eras. Rural thought predominates mentally. The rural world is 'self-thoughtful': the individual himself looks for simple, but creative and playful solutions to the problems that happen in the world surrounding him (with sweat, strength and courage), a state of mind that is disappearing in our globalised world. We do not want to romanticize rural life but rather the original thought and strength of the individual. We think this is how the creation of our work takes place. Último Esfuerzo Rural continues the vibratory tradition that characterizes a great number of our previous works. However, the origin, lead and the direction of the music it produces creates another phenomenon related to vibration: friction. We think that the rural mind and that unpredictable, non-linear phenomenon of friction together make a powerful combination. This almost natural couple combines with our interest in creating living machines with a language of their own. The sound colour of the work is a mixture of very low frequencies, even inaudible ones, with atonal scratching. This effort, with its peculiar sound and its mental and associative potential, announces a new stage within the series of the vibratory machines.

At the MEM festival, Bilbao 2006 we introduced several new elements. We developed a new type of *zambomba* that acts in another frequency range as the

giant barrels, bringing the work even more into life. While the big *zambombas* sound and tremble stronger than ever, being amplified individually, each with its own mike and bass combo, the new model produces surprisingly organic sounds, introducing a new, mysterious and playful flavour. The improvement of the hayforks was simple but maybe even more effective. Instead of using a specially built construction to scratch on, the forks scratched directly on the show-window of the gallery, transforming the work into public art to be enjoyed inside and outside of the space. The sound is much dryer and more direct than with metal plates and the transparent image is more efficient and stronger. Further development of both components of Último Esfuerzo Rural will increase the impact of the work, shown together or separately.

Bosch and Simons have focused since 1990 on the development of 'music machines', inventions that play largely their own game in a fascinating world somewhere between order and chaos. These machines are dynamic: sound and movement are in constant development. The resonant frequencies of the constructions and mechanically generated vibrations are so keyed into each other that the movements and sounds created by an installation can change almost imperceptibly from order into chaos and vice versa. *Krachtgever* is their best-known work for its Golden Nica it received at the Prix Ars Electronica, Linz, 1998. Other projects are *Cantan un Huevo,* that obtained a mention at edition XXIX of 'Bourges', 2002, or *Aguas Vivas*, awarded with a honorary mention at the competition VIDA 6.0., Madrid, 2003. They have shown their work and have participated in numerous festivals inside and outside Europe, at the Stedelijk Museum, Amsterdam, Z.K.M. Karlsruhe, Nagoya City Art Museum, Nagoya and ACMI, Melbourne, among others. They participated in various editions of the symposia ISEA (International Symposia on Electronic Art) and ICMC (International Computer Music Conference). Recently they exhibited at the Verbeke Foundation, Kemzeke, Belgium and the Biennale ArteScienza, Rom (both in 2008), at the Kinetica Art Fair, London and at Observatori X, Valencia (both 2009).

Peter Bosch (1958) studied psychology at the Universities of Leiden and Amsterdam and thereafter studied sonology at the Royal Conservatory in The Hague.
Simone Simons (1961) studied at the audiovisual department of the Gerrit Rietveld Art Academy in Amsterdam. Since 1997 they work and live in Valencia, Spain.

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www.boschsimons.com

Drawings of a Floating World

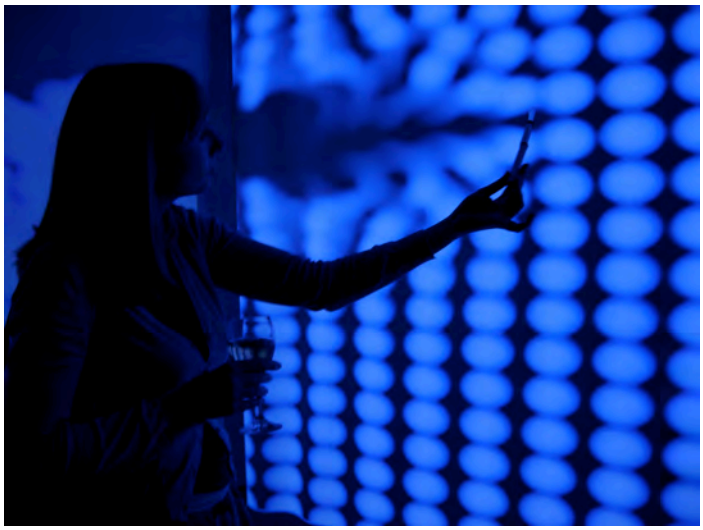
Tara Carrigy, Neill O'Dwyer and Colin O'Sullivan

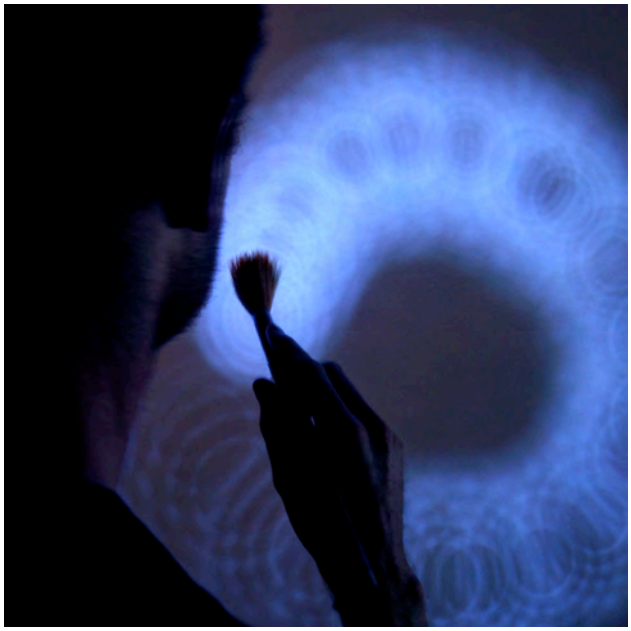
Drawings of a Floating World is an immersive, responsive digital media environment, which invites participants to engage in a playful, intuitive, kinaesthetic and social interaction - through the simple and universally familiar metaphor of drawing and painting. Fluid patterns and sounds are projected on to a series of encircling, floating planes which dynamically respond to participants' movements and gesture. Digital media is presented as a tangible and malleable medium that can be pushed, pulled, stretched and sculpted. The intention is to initiate a compelling and affective experience through embodied interaction, and to promote spontaneous and open-ended social interaction through ludic engagement and physical action.

Audience involvement is integral to the work, which is co-created in collaboration between the participants, computer system and authors. Generative graphics are drawn in real time by the computer, in response to the behaviour of the participants and in relation to the parameters set by the authors. The aim is to create an intuitive interface by establishing a haptic or kinaesthetic connection between the participants and the media space. This was achieved by creating a coherent and instantly legible

connection between cause and effect, thus enabling the participant to test the limits of their agency by observing the response to their gestures. As well as engaging individual people, the aim is to facilitate playful conversation between two or more participants. To this end, the media is programmed to respond differently as more people participate in the installation.

The installation uses computer vision and motion tracking techniques to detect movement within the space. Infrared (IR) imaging via live web cam feeds, pick up light transmitted by paintbrushes fitted with IR emitting diodes and map their movement across a series of calibrated screens. Visual and audio responses were programmed using Open Source software programs, including Processing, Pure Data and TouchLib. *Drawings of a Floating World* is a collaborative project developed by Tara Carrigy, Neill O'Dwyer and Colin O'Sullivan. This interdisciplinary team brings together skills and knowledge from different creative and technical backgrounds including visual art, design and computer science.





Jurong West Street 81: a synchronised community video project

Shannon Lee Castleman
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Nanyang Technolgical University, Singapore

The project *Jurong West Street 81* revolves around the architecture and residents of a group of Singapore public Housing Development Board (HDB) blocks. The title of the work makes reference to the address of the HDB flats (Figure 1) that are the subject of this video installation. The Singapore landscape has changed dramatically over the past forty years with the rapid development of HDB estates[1] and currently, over eighty percent of the Singapore population live in public housing.

This project had an open-ended objective, to entice residents of Jurong West Street 81 to film the lives of their neighbours within a structured framework of time and space, and to see what happened after that.

Figure 1. Jurong West Street 81 Housing Estate, Singapore, 2008

[1] For the Singapore government's perspective of HDB development, see: http://www.hdb.gov.sg/fi10/fi10296p.nsf/WPDis/About%20UsA%20Brief%20Background%20-%20HDB's%20Beginnings?OpenDocument&SubMenu=A_Brief_Background

With the help of student volunteers from Nanyang Technological University's School of Art, Design & Media, and over the course of several visits, we knocked on some one hundred and thirty two doors, finally persuading eight pairs of residents from sixteen flats to participate.

In a synchronised event that took place on Sunday June 1, 2008, sixteen residents in opposing flats agreed to have video cameras placed in the windows of their kitchens. The cameras were all turned on at the same time and the video recording lasted thirty minutes. For the first five minutes, residents were asked to stand in their windows so that they could be seen in their apartments. After five minutes had passed, they were asked to go about their usual business, and the video cameras were left to catch the sounds of life from within each flat.

Figure 2. Video stills from two opposing apartments

Residents were looking at each other from across a parking lot, between nearly identical structures and from flat to flat. Although the architectural forms of the HDB flats are uniform, the project exposed a rich diversity behind the facade via the simple intervention of recording sound as well as video.

After the video recording had concluded, there was a party held in the common space beneath one of the housing blocks that is commonly referred to as the void deck. Participating residents shared a meal with neighbours who had previously been strangers.

In September 2008 in a solo exhibition at The Substation gallery in Singapore the videos were edited down to 13 minutes and exhibited on podiums with the views from

each window playing in a synchronised manner. This meant that the footage recorded in one flat could be seen while hearing the sound in the opposite monitor. The sounds of the everyday lives and multiple languages spoken by the persons in each window overlapped in a cacophonous merging of public and private in the final presentation of the piece. This cacophony (as well as the variety of languages spoken) made it somewhat difficult to discern individual conversations within the different flats. Therefore, subtitles have been added the original languages and English are included on each film.

Emerging from this experiment and the simple conversations about and between neighbours, are a surprising series of funny, idiosyncratic and even moving vignettes.

Jurong West Street 81 addresses the unthinkable and unexpected. It allows HDB residents to view and be viewed, with tacit recognition and permission. It is an artwork about neighbours discovering neighbours, looking at each other from across a void.

Bellows: bringing digital animation into the physical world

Eric Dyer
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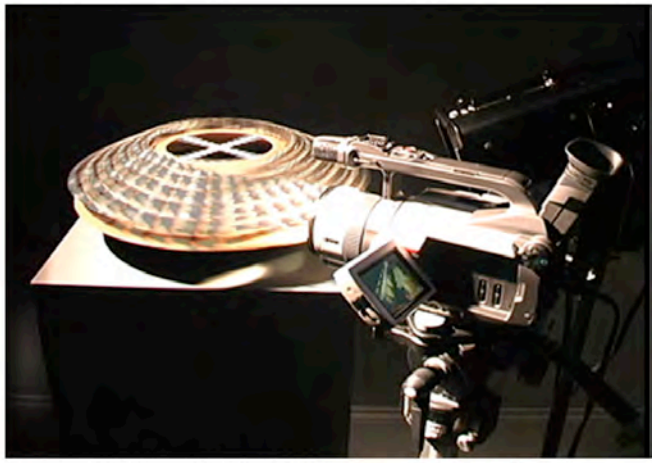
a pre-cinema zoetrope, circa 1845
(Albin O. Kuhn Library collection, UMBC)



Bellows March (2007): cinetrope animation
is "seen" by live video

Introduction

Bellows is an art installation and cinema project that uses a new animation process. I have combined the concept of the zoetrope, a pre-cinema optical toy, with rapid-prototype 3D printing and fast-shutter digital video to tell a story suggesting the destructive and expressive potential of humans. In *Bellows*, anthropomorphized concertinas take the place of people. Concertinas serve as the metaphor for humans because both breathe and both have great expressive potential.

Exposition

Procedurally, *Bellows* creates a much needed bridge between digital and tactile processes in animation and filmmaking. The *Bellows* animated sequences and resultant 'cinetropes' (my term for this variation on the zoetrope) are created in a three dimensional animation software application, then printed in ceramic or plastic

on a rapid-prototyping (3D) printer. The cinetropes are then hand-painted and manually altered, spun using a variable-speed motor, and shot with a fast-shutter progressive scan video camera. Progressive scan shoots full frames of video instead of interlaced fields. The fast shutter removes the motion blur from the spinning cinetropes. The variable speed motor allows the proper number of sequence 'frames' to move past the camera lens. This combination allows the animations to be 'seen' by the camera, while the human eye can only see a blur. The ability to print out three dimensional animated sequences, alter them in the real world, and shoot them in real time is lush, unexplored territory.

The process rethinks the status quo of digital animation, blurring the line between virtual and real, and introducing the human hand, and the serendipity it enables, to digital time-based creations.

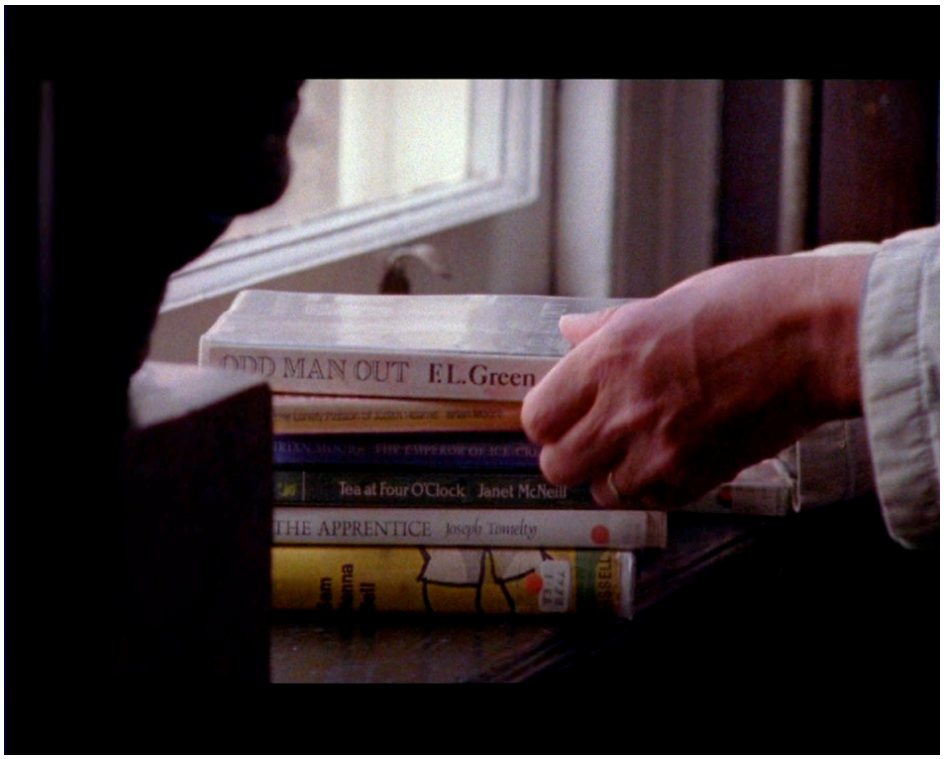
The original inspiration for the *Bellows* narrative came from a visit to Berlin, Germany during my Fulbright Fellowship in 2005. Berlin has made a determined attempt to reverse the horrors of Germany's actions in World War II, taking great strides to rub out tragedy and a dark past by elevating itself into an inventive, inspired, artistic, prosperous, 'green' city. Berlin exemplifies the human potential for both murderous destruction and inspired, optimistic creation. Current worldwide political situations, many tragic and dark, make the production of *Bellows* topical.

Conclusion

The *Bellows* film and installation explore topical matters of the human condition and create a new means of expression through a melding of rapid-prototyped sculpture, animation, digital video, and pre-cinema technology. A total of eighteen cinetropes have been created for the final film and installation.

Red Light

Redmond Entwistle



Red Light, a newly commissioned project by Redmond Entwistle, reflects on the indeterminate space that Belfast finds itself - in between the unfinished work of the peace-process, and the phantom promises of the market economy. The project brings together a gallery installation and three short films shown in cinemas around the city. Twelve previously unpublished photographs from Belfast Exposed's archive are displayed in the main exhibition space at Belfast Exposed and integrated in a sound and light installation feeding live sound into the gallery from Belfast's city centre. The images selected were taken in the early to mid-1990s and are photographs of large crowds, both Nationalist and Unionist, outside Belfast's City Hall listening to speeches.

These photographs are now over a decade old and yet for many in Belfast it seems as if the city is still in a state of suspension. Post-conflict, the centre of town has developed as a neutral space through business-led regeneration, but the overwhelming sense is of a space for consumption, and possibly of employment, rather than a civic or communal space where a new polity (body politic) might be established. While the exhibition at Belfast Exposed reflects on the recent transformation of Belfast's city centre, three short films shown on rotation at Queen's Film Theatre, the Strand and Moviehouse Yorkgate anticipate some of the prospects and perils of the near future. Each film is a piece of a puzzle of which the three films form a whole. Taking their titles from classic mid-20th century novels of Belfast life, the films are at once a description of a film to be made, a conversation between characters in a love triangle, and a portrait of a city attempting to refashion itself for entry into a global economy. The films draw on original interviews with professionals from the film and IT industry in Belfast, two key industries through which Belfast hopes to attract international investment and establish a position within a pecking order of service economies, knowledge economies and creative industries. Shown before feature films, most of which will be North American, the films hint at the promise and thwarted desires of mobility and economic participation at an international level that characterize the new economy.

Red Light has been curated by Monica Nunez.

Art, humour and advertising as tools for political dialogue

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The combination of art, satire, and advertising can create the opportunity for people to suspend momentarily their disbelief, responsibilities, and for a moment, to laugh – and to think. In this context, this melding of media – art and advertising – has the potential to disarm the audience and allow people to see the truths surrounding an issue. This brand of communication can break the ice, so to speak, and allow for new perspectives to surface. For this reason, I am investigating the use of satirical humour, art and advertising as ingredients in the creation of public dialogue.

The content of this presentation reflects that of my current doctoral research. This multidisciplinary research explores the use of conceptual art in the form of satirical medical advertising as a tool to generate public dialogue in Finland, regarding social and political issues. One of the objectives in this work is to present a better understanding of the role that satirical humour and advertising can play in contemporary culture, beyond the promotion of commercial products and services**.** This presentation will argue that conceptual art, placed within the context of satirical medical advertising not only serves as an act of personal expression, but can generate thought and dialogue that has the potential for social change. To this end, examples within my own art practice and that of other contemporary artists will be discussed.

My doctoral art project will be presented as a multimedia advertisement campaign for a series of fictitious, over-the-counter medications that offer simple treatments for complex conditions involving; economic recession, xenophobia, and weakening of religious faith, among others. One fictitious medication that I've created is a pill called *Ethnivox®,* which may be used to treat symptoms of xenophobia. Another medication called *Consumerin®*, helps stimulate consumer behavior. The advertisements for these medications take the form of posters, brochures, websites, mock pharmacy storefronts and live public sales pitches in shopping malls.

In this project, the format of medical advertising serves as a commentary on the increasingly popular pill-popping approaches for treating a vast array of physical and mental ailments. The satirical, fictitious ads suggest the possibility of an Orwellian future in which pharmaceuticals may serve as the cure for social and political 'ills'.

In the effort to create a public dialogue through art, the following questions and concerns arise:

1 Does the advertising format obscure the message behind the art?
2 Need the audience be told that such fictitious advertising is an art project?
3 In this type of art, to what extent does the use of technology (websites, online discussion etc.) facilitate public dialogue?

Art placed in the public realm must compete with the visual distraction created by other media. The artist must also deal with what the viewer expects to see, which is generally advertising, not art. However, even in a space filled with media and corporate culture, an effective public art piece framed in the context of advertising can serve as a viable public format from which dialogue can begin. As artist Peggy Diggs explains in her essay entitled, *Causing Conversations, Taking Positions*: 'At it's best, an artist's billboard [or advertisement] provides a space where citizens speak to citizens.' (Diggs 1999)

Video still from an advertisement for 'Jesurex', a medication that strengthens one's sense of religious faith.

Reference

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Specious Dialogue III

Julie Freeman

Specious Dialogue[1] consists of a pair of movable, sculptural concrete forms that house wireless audio playback systems. Mounted on pairs of swivel castors the forms are designed to be played with - pushed, rolled, kicked and shoved around the exhibition space. They are physical audio curiosities with personality.

The mobility of the work means that Specious Dialogue can intervene in other artworks, be silenced by a coat, join into visitor conversations, or be placed together in a conspiratorial corner. However they are encountered, they expect to be touched or moved in some way, at the very least they want to be listened to. By enabling this physical interaction with the objects the listener perhaps becomes an unwitting performer moving the sound, catching it, passing it to someone else, changing the sound dynamic in the space.

The pair spew an emotional dialogue, they bicker, coo fragments of love, they shout, scream and whisper, they are lonely lovers or clinging siblings. They miss each other, but also get angry and need their space. These multi-layered, twisted, specious conversations flip between mundanity, humour, drunkenness, apathy, passion, conspiracy and irritation.

Of interest is how these mumbling forms evoke feeling from the audience. The emotive audio personalities seem to surpass the objects' form which are an inorganic combination of steel, concrete and rubber. The work explores the gap in these faceless conversations, and asks what the audience is prepared to fill in. Are we happy to overhear? Can we empathise with a disconnected voice? Did we unwittingly join in?

1 *Specious* - plausible but false; Having the ring of truth or plausibility but actually fallacious; Deceptively attractive; Apparently good or right though lacking real merit.

Image credit: © Christian Mosar, Casino Luxembourg

About the artist

Julie Freeman’s work explores transforming complex processes into sound compositions, objects and visualisations. Her work spans visual, audio and digital art forms and investigating the relationship between science, nature and how humans interact with it. For the past 12 years her work has focused on using electronic technologies to 'translate nature' - whether through the sound of torrential rain falling on a giant rhubarb leaf, a pair of mobile concrete speakers lurking in galleries haranguing passers by or by providing an interactive platform from which to view the flap, twitch and prick of dogs’ ears. Through a sonic installation she has explored empathy in art and Asperger's syndrome in collaboration with psychologist Dr Emma Lawrence, and her pioneering artwork *The Lake* used hydrophones, custom software and advanced technology to track electronically tagged fish and translate their movement into an audio-visual experience.

She is currently Artist in Residence at the Microsystems and Nanotechnology Centre, Cranfield University. Julie holds an MA in Digital Art from the Lansdown Centre for Electronic Arts, Middlesex University, is a NESTA fellow and Wellcome Trust arts awardee. She is steering group chair of FreqOUT! - an award winning, innovative London based community arts programme, enabling young people to work with wireless technologies. Her work has been exhibited across the UK, including at the

Institute of Contemporary Arts and the Science Museum, and internationally in Brazil, Croatia, Lithuania, Luxembourg, Russia, and the USA.

The URL is : http://www.translatingnature.org

Sensitive Rose and the mobile tag era

Martha Gabriel
University of Sao Paulo / Universidade Anhembi Morumbi, Brazil

Introduction

The objective of this paper is to present the artwork *Sensitive Rose*, which was developed with dynamic mobile tags, and also to describe the potentialities of mobile tagging as a tool for creating artworks. In this sense, we will start introducing the main concepts of mobile tagging, and then presenting the artwork.

Mobile tagging

Mobile tags are 2D-barcodes that can be scanned by mobile devices in order to decode the information kept in the barcode.

There are many types of 2D-barcode (tag) and it is possible to encrypt many kinds of data into them. However, regarding mobile tagging, the most common encrypted information is URLs. The process of mobile tagging can see in the figure 1.

Figure 1. Mobile tagging process (source: Mobile Tagging Blog, 2007)

The most used patterns of 2D-barcodes for mobile tagging are QR Code (Quick Response Code) and Datamatrix. While conventional bar codes (Figure 2) are capable of storing a maximum of approximately 20 digits, a QR Code (Figure 3) is capable of handling up to thousand characters and all types of data, such as numeric and alphabetic characters, Kanji, Kana, Hiragana, symbols, binary, and control codes (Denso-Wave, 2009).

Figure 2. Conventional barcode storing the number 123456

Figure 3. QR Code storing the URL 'http://www.martha.com.br/'

According to (Denso-Wave, 2009), the capacity of storage of a QR code is:

QR Code Maximum Data capacity	
Numeric only	7,089 characters
Alphanumeric	4,296 characters
Binary (8 bits)	2,953 bytes
Kanji, full-width Kana	1,817 characters

Most of the new models of mobile devices come already with the mobile tags (QR code and Datamatrix) reader. Older versions of devices can install a QR code reader, such as i-nigma (www.i-nigma.com), becoming so able to scan them.

Sensitive Rose artwork

Sensitive Rose is an interactive compass rose formed by mobile tags (QR Codes) that maps people's desires (Figure 4).

Figure 4. Screenshot of the work Sensitive Rose, 29th Nov 2008, showing the coloured spheres related to people's participation. The tag in the right lower corner is the entrance to the work.

The work is a big projection (3 m x 3 m) and the interactions happen via cell phone or mobile devices by scanning the entrance mobile tag (the one that stays in the lower right corner of the projection (Figure 4). Once in the interaction page the interactor is

asked; What do you want from life? The possible answers can be: love, peace, revolution, nothing, everything, family, friends, money, power, and so on (Figure 5).

Figure 5. Page accessed via cellphone after scanning the entrance tag for the Sensitive Rose artwork

Each interaction creates a new sphere around the tag related to it – if the person chose love, it will cause the sphere to appear next to the tag love with the colour the work associates to love (in this case, red). A mobile tag is encrypted with the text 'Joe wants love' (imagining that the interactor's name is Joe) and that tag goes to the compass rose of desires replacing the previous tag related to love (see Figure 6).

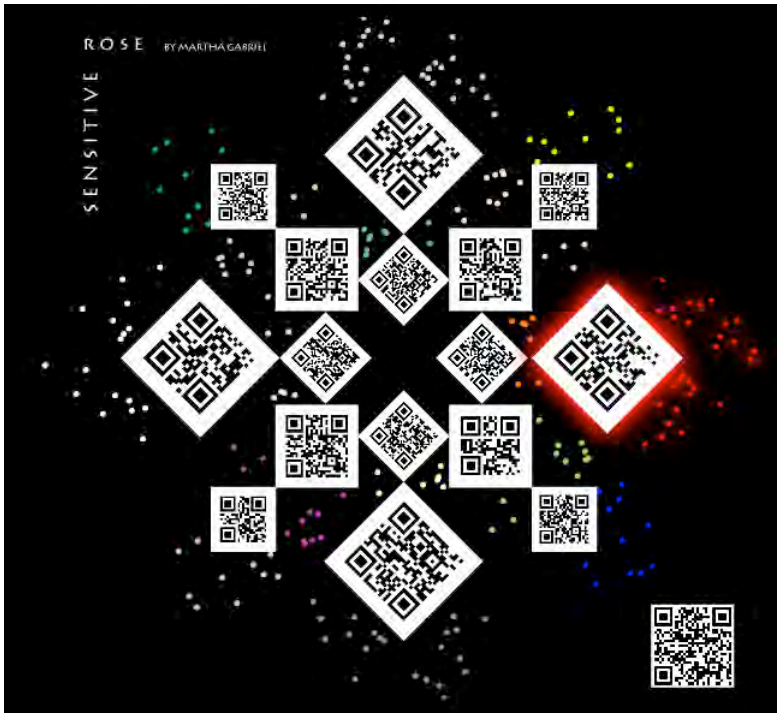

Figure 6. Sensitive Rose after an interaction with the tag “love”
(the red one shown in highlight)

Much as in a compass rose the most important direction is North, since all other directions are positioned according to it, in the Sensitive Rose, the most wanted desires are always positioned in North. Also, according to the order of relevance of choices of the desires, all the work reconfigures itself when the relevance changes. When this happens, the whole rose disappears as zoom out and appears again, reconfigured in zoom in (see Figure 7).

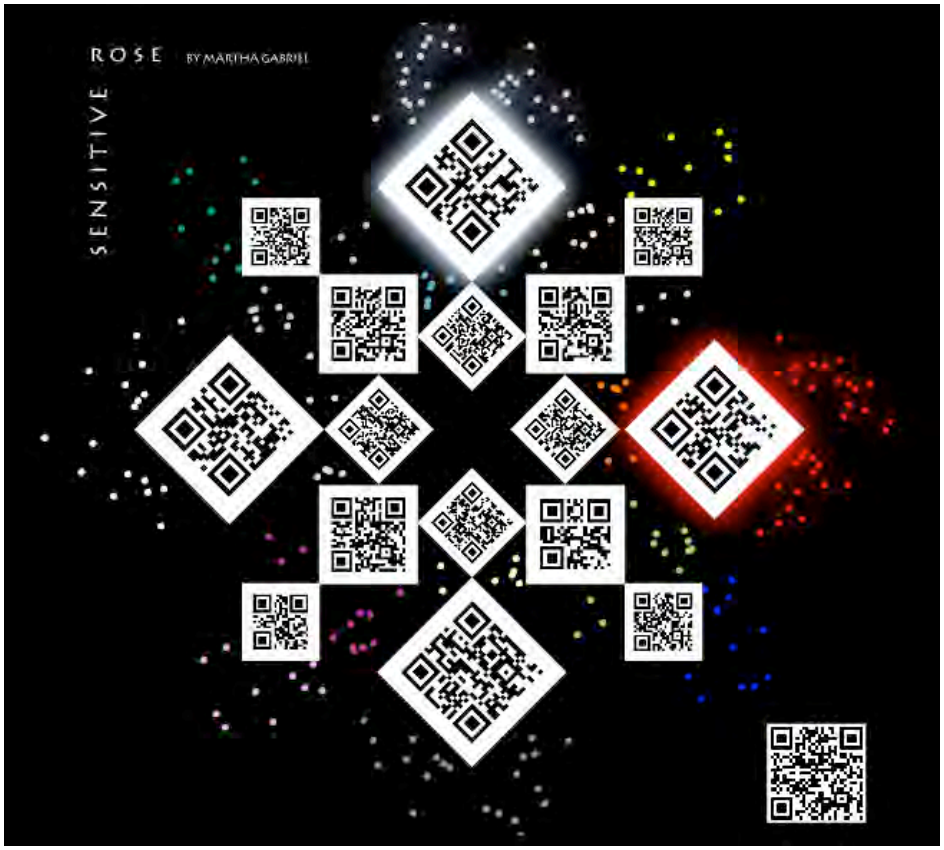

Figure 7. Sensitive Rose after an interaction with the tag 'love' causing the reconfiguration with the tag 'travel' (the blue one in North position in the top)

In this sense the work functions as a compass rose that navigate in the people's desires, showing what people want most in life. The navigation however is done in a secret way by using a codified poetic of mobile tags (QR Codes). So, the texts associated with each tag cannot be deciphered by naked eyes but only by using a device that allows seeing beyond the surface. The same thing happens in life, since when looking at people faces, we cannot know for sure their desires but only guess them. When they 'talk' and reveal themselves, decoding themselves to us, we get the information.

Another intention here is to extract poetics of the QR Codes in a Visual Poetry. In the same way that Concrete Poetry use alphabetic codes – letters/words – using their visual characteristics to create meaning, the Sensitive Rose has the same goal: creating concrete poetry formed by mobile tags (visual codes of information) where the data input and output are altered through the work.

Conclusion

Mobile tagging is a very accessible technology that functions as a physical gateway to the online world, increasing the possibilities of interaction with physical objects and people. In this sense, the mobile tagging use is unlimited and includes explorations in Arts.

The artwork Sensitive Rose explores the QR codes (Quick Response Code pattern of mobile tags) potentialities in order to build an interactive online navigation tool via a big wall projection. The objective of the artwork is to explore the codified characteristic of the mobile tags in order to not reveal the desire mapping to the naked eye, but rather, providing tools for navigating and exploring those desires, deciphering them, as it is in life.

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Exact change: the transit shelter - a site of activism

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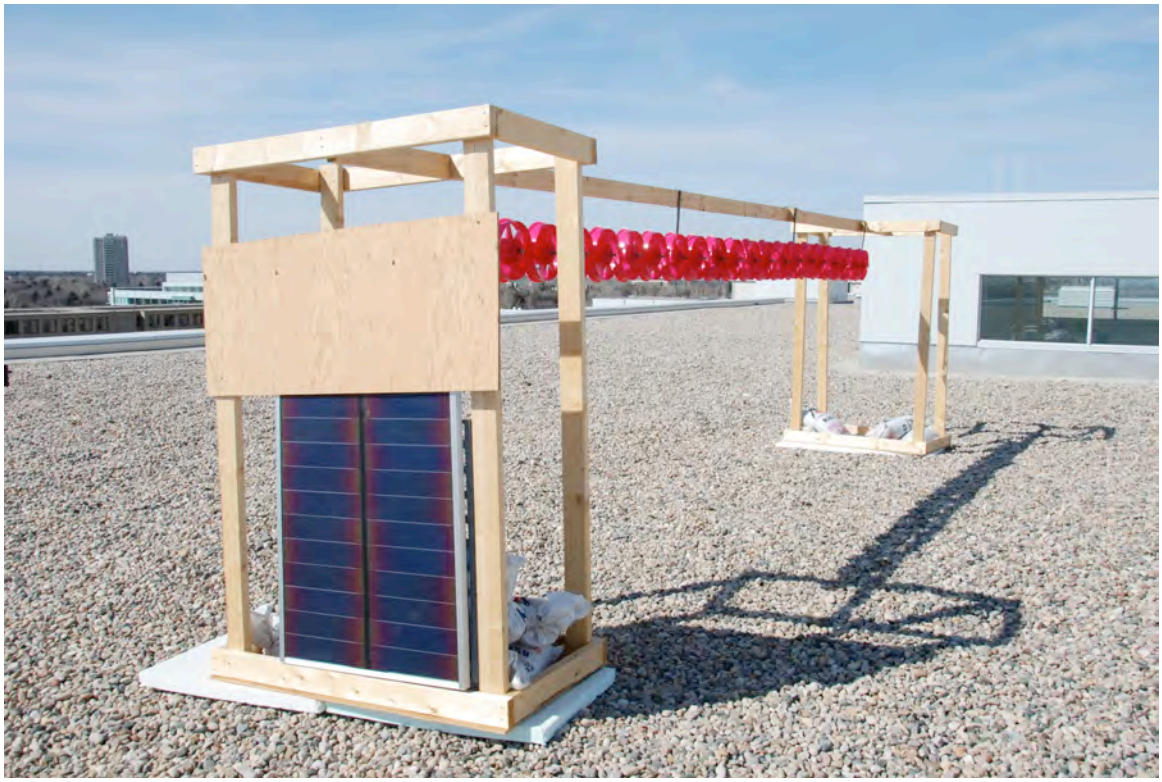
The transit shelter, generally an overlooked, under-considered object, is a public space offering opportunities for engagement in larger issues and with a diverse range of people. A rethink of the shelter in terms of aesthetics, design, energy, and interactivity changes it from a place of waiting, to one of action, interaction, and power. Usually it is made as a glass box, an object intended to be 'unseen'. Challenging this absent aesthetic - by announcing geography/location, promoting visible use of renewable energy systems, and increasing comfort of the space - the altered shelter acknowledges the value of citizens and the transit system it supports.



The Grafting Parlour

Saoirse Higgins
Dun Laoghaire, Institute of Technology, Ireland

Introduction

The Grafting Parlour is a fluid, growing, performative space between hybrid organisms and human worlds. The GfP is an emerging collective of artists and researchers who exchange and combine methodologies through thoughtful experimentation. Through collaborative enquiry and shared research, the GfP design communications models for interacting with different living organisms. This includes experiments with distant microorganisms and real time performances with varying views of the ecosystem, from the level of arctic bacteria, to the broad sky in Northern Finland.

The Grafting Parlour artists

The Grafting Parlour artists were initially inspired by Greek botanist Theodoros Orfanidis, who archived and displayed the many plant species he discovered. Formed in Athens in May 2008 through the European Mobile Lab for Interactive Media Artists, the collective's creative research takes the form of live portals into the laboratory, video and audio collected from remote habitats, scientific residues, and live experimentation while using performance to engage collaborators and visitors. The Grafting Parlour is an outgrowth of the research by each of the collective's members. GfP draws on Kelly Jaclynn Andres' work developing ecological interfaces for communication with living organisms, Nurit Bar-Shai's interactive installations, which rely on remote participants input to drive a physical narrative, and Saoirse Higgins mechanical communication devices that reinterpret and sonify live data, presenting the data in a new context with a meta-narrative. Lucy Hg brings her experience working with The League of Imaginary Scientists on interactive installations that approach scientific subject matter from a sideways perspective, while Antti Tenetz – a real-life naturalist – studies and records the world around him, starting with the Arctic and extending as far as Thailand. This core group of artists work in tandem with scientists, devising creative applications for their shared interests and joint research. The Grafting Parlour embraces the idea that anyone

could imagine what the next science might be, and that these playful ideas can have both practical and delightful ramifications through the experimental practice of art, science and technology.

Practice

The Grafting Parlour includes and builds on projects and research developed in collaboration with artists, scientists and the public. Their installations, which are performative in nature, draw from the collective's cumulative research, nodes of which become the creative and scientific residues presented as part of their ongoing process. The Grafting Parlour includes subcomponents - nodes of enquiry - developed in collaboration with project participants, scientists and the public, with displays of documentation of public discussions, live portals into the laboratory, video and audio narratives, scientific residues and live experimentation.

Exchange

The Grafting Parlour discussions on art and science with scientists in the field punctuate and redirect their research and methods of enquiry. *A Citizens Call to Synthesize!* was a transatlantic web-cast discussion on citizenship and synthetic biology, addressing ways the public can interact with science, and how a new model for an interactive laboratory fits into the history of science and knowledge. This transatlantic discussion and exchange was set up for the ISEA09 pre-symposium. It took place with The Grafting Parlour members spread out between Dun Laoghaire Institute of Art, Design and Technology in Dublin and in Dr. Natalie Kuldell's BioEngineering Laboratory at MIT with her students. Also with Varda Gur, Ben Shitrit and Professor Micha Spira at the Bloomfield Science Museum, Jerusalem, Israel; and the DIY Bioengineering group from the Personal Genome Project at Harvard Medical School with Mackenzie Cowell, Jason Bobe and Reshma Shetty.

Living portals, scientific residues and performativity

The artists have developed portals into different live habitats, spanning the forest to the microscope, thereby creating interfaces for interacting with these remote habitats and non-human species. *Growing Light and Other Conversations* installed at the Science gallery in Dublin allowed visitors to peer into the lives of photo-responsive microorganisms based in remote laboratories in MIT and a live link with the Auroura

Borealis in Northern Finland. These web-portals into the laboratory are real time images into living science.

Media archive

The Grafting Parlour is building a collection of video and audio narratives, which document their different research activities. Research expeditions include The Arctic Circle, Northern Forest, Finland, August 2008 with e-MobilArt Lab at Sodankylä Geophysical Observatory in Northern Finland, August 2008; collaboration with Dr. Natalie Kuldell and students, MIT Bio Engineering Lab, November, 2008; Dr. Natalie Kuldell and students Katie Loh and Fori Wang, with medialabers Marcelo Coelho, Jean-Baptiste Labrune, and Dana Gordon, MIT Bio Engineering Lab, Dec 2008; And a visit to Professor Jeff Lichtman's lab, at MCB Harvard, Nov 2008.

New works

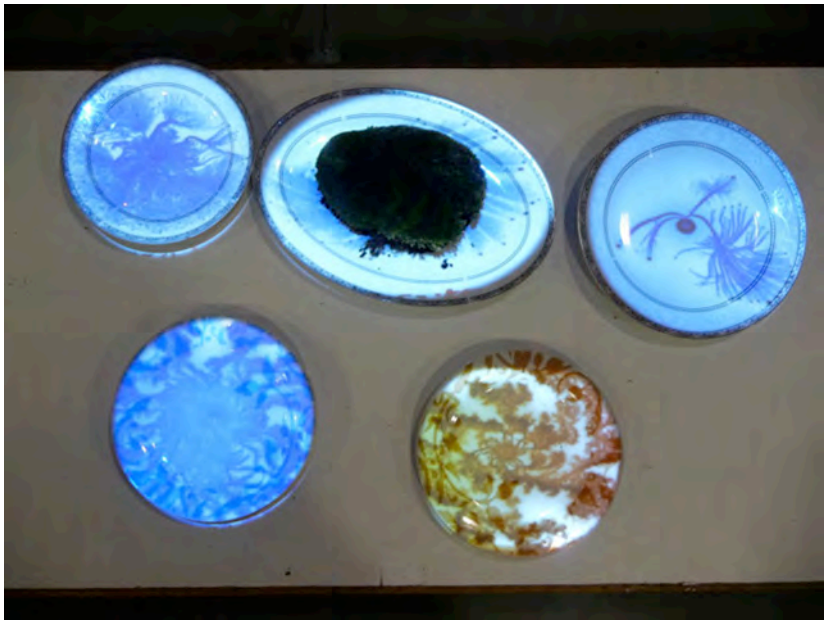
We have just completed an exhibition at the 2nd Thessaloniki Biennale in Greece. Our next exhibition will take place at The Lab in Dublin, coinciding with ISEA 2009. We are also planning to develop a piece for The Academy of Fine Arts in Katowice, Poland in October and The Beta Space Gallery at the Power House Museum in Sydney, Australia.

The ISEA 2009 installation looks at the contested space of nature/science and man. ‘Science is meant for the progression of man, but using science for evil can also lead to the downfall of men’ (*20,000 leagues under the Sea,* Jules Verne). There is conflict between man versus nature, the visible and invisible. The push and pull, power and control that man attempts to enforce on the world around us. We are exploring how natural and man-made power is operating and revealing the mechanisms and connections that make us, and the world we have built, operational in some sort of way. We are exploring the world as a symbiotic grafting machine.

'Growing light and other conversations', Lightwave exhibition, Science gallery, Dublin. (Copyright the Grafting Parlour 2010).

'Growing light and other conversations', live feed GFP under the microscope from Professor Natalie Kuldell's Bioengineering lab, MIT. LIghtwave Exhibition @ Science gallery, Dublin. (Copyright the Grafting Parlour 2010).

The Grafting Parlour, e-mobilart lab, State Museum of Contemporary Art, Thessaloniki Biennale. Audience interacts with live wheatgrass and Avermedia scanner viewing the University of Thessaloniki's Laboratory of Forest Botany local plant collection. (Copyright the Grafting Parlour 2010).



Live moss and bacteria projections onto china plates. Collection on loan from Prof. Eshel Ben Jacob's bacteria research @ School of Physics and Astronomy, Tel Aviv University (http://star.tau.ac.il/~eshel/) e-mobilart lab, State Museum of Contemporary Art, Thessaloniki Biennale. (Copyright the Grafting Parlour 2010).

Credits

Scientific Collaborators include:
Natalie Kuldell and her Biological Engineering Laboratory at MIT
Finnish naturalist Panu Oulasvirta
Additional contributing artists:
Jon Stevenson; Fang-Yu Lin; The League of Imaginary Scientists
Special thanks to:
e-MobiLArt Lab for launching and facilitating the collaboration; to Annick Bureaud, Dimitris Charitos for their input.

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* MIT Dept of Biological Engineering
* Council for the Arts at MIT
* Israeli Ministry of Culture
* IADT
* Science Gallery, Trinity, Dublin
* Culture Ireland

Websites

http://www.thegraftingparlour.org/
http://www.media.uoa.gr/~charitos/emobilart/
http://www.thessalonikibiennale.gr/Index.php?lang=en&info=

PuPaa: Butoh, digital media and collaboration

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1. Project description

PuPaa is a multimedia performance, inspired by Butoh, a dance-scape of transformative states of body, mind and perception. In *PuPaa*, the dancers are entities living in obligatory symbiosis reminiscent of a Mixotricha Paradoxa,[1] a micro-organism which can be determined as both one organism of five entities or five organisms. While each entity of *PuPaa* expresses unique species characteristics, they create a collective body with incorporeal connections using video and sound projection technology embedded in their costume, an outer layer of their body. The body later embraces the world of others as well, i.e. the audience: during the performance, a dancer, who was a part of an installation in the lobby, transported the audiences' sound during intermission into the theatre. Furthermore, their faces were projected onto the dancer's body. The entity of *PuPaa* signifies (or speaks) with their monstrous body embedded with technology, and participates in a de-territorialized collaboration process.

[1] 'Mixotricha Paradoxa is an entity that interrogates individuality and collectivity at the same time. It's a microscopic single celled organism that lives in the hind gut of the South Australian termite. What counts as 'it' is complicated because it lives in obligatory symbiosis with five other kinds of entities.' (Donna Haraway, 1999)

Figure 1. The dancer embedding a video projector and moving to centre of the stage.

Figure 2. The dancer embedding audience sound and entering the theatre.

2. Concepts

2.1 Elsewhere

The elsewhere is a place on the border, which has no central, nor peripheral, distinction and reforms itself in flux. An escaped body, e.g. a mail-order-bride, would remain with anxiety and instability in the elsewhere. One's other selves, which can intimidate one's inner self, could live without pressure once relocating oneself in the elsewhere. When borders are erased and blurred places are penetrated and blended. This area cannot be called a specific name because it does not have a designated space or border and those who go there are people on the run or people transforming continuously. It is a place where everything is de-territorialized.

Figure 3 Dancers coming out of the cocoon

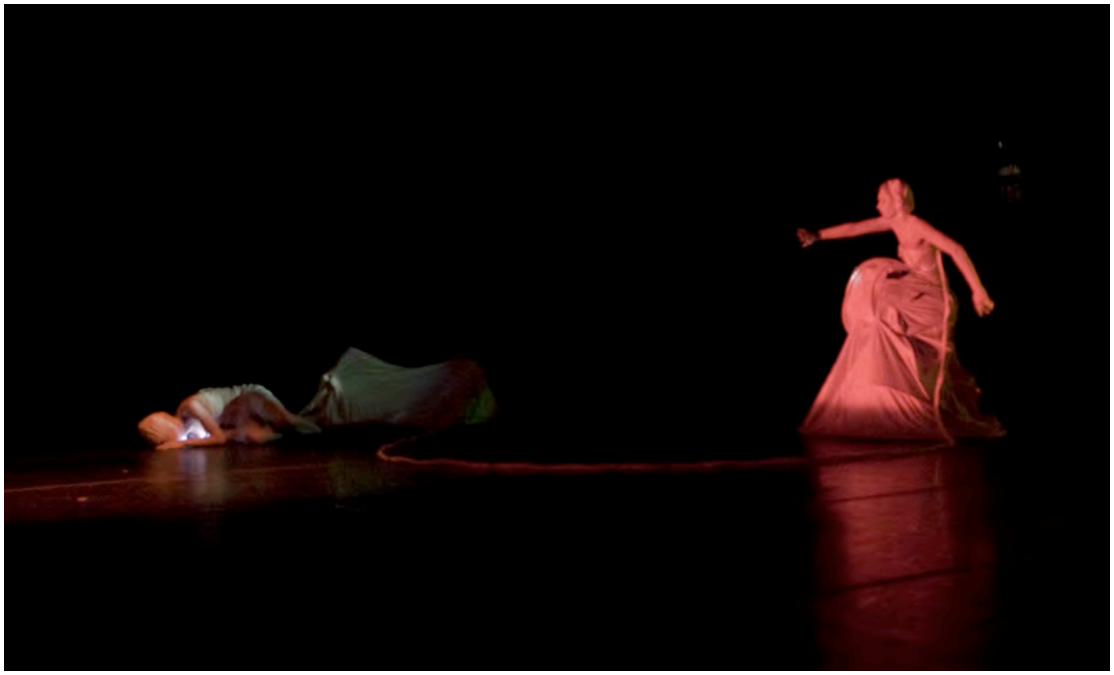

Figure 4. A dancer projects video on two dancers coming out of the cocoon: this video feed comes from the camera that one of two cocoon dancers is wearing. It often shows a real-time close shot of their body that is not recognizable instantly.

2.2 Body of elsewhere

In the elsewhere, a monstrous body escaped from the boundaries of social norms becomes a nomad. The nomadic identity can be achieved with the 'technique of strategic re-location in order to rescue what we need of the past in order to trace paths of transformation of our lives here and now,' as Braidotti (1995) describes her notion of 'as If'.

3. Methods

3.1. Body metamorphosis in Butoh

PuPaa performance was created based on Butoh Ritual Mexicano (BRM) techniques. BRM is a practice developed by Mexican master teacher Diego Piñón, which combines Butoh, ritual and shamanistic and energetic practices. Besides the dance performance, this practice was used for the collaboration process. All collaborators, dancers and non-dancers, were engaged in a specific process with Butoh exercises and imagery before performances as a warm up. It is one of the unique qualities of *PuPaa* project. Butoh allows the performer to transform and

morph by being present in body and mind, and creates a unique personal dance that is the source of an incredible amount of energy, which can be transformed, shared and expanded.

Figure 5

Figure 6. Three dancers dancing

3.2 Body metamorphosis in digital media

As McLuhan has stated, media is an extension of the body. We use computers and search the web to reach somewhere that is further than the 64cm of an arm. We exchange our voice and visage through the web and create an associated body that collectively draws a visual montage (e.g. flickrs.com) or a social montage (e.g. myspace.com). *PuPaa* creates the body mediating technology, as Braidotti proposed, in that there is no clear distinction between the nature (the body) and the cultural (technology).

There are a few different digital technologies embodied into *PuPaa* including: video projection and feedback, sound projection and spatial movement, and three dimensional sound and recording. The first dancer transmits video from the other two dancers. The ambient sound in the theatre creates a sound sphere in the space - like an invisible cocoon - embracing all dancers and audiences. The fourth dancer projects sound fragments from the ambient sound. She also connects the audience to themselves by recording and playing the audience's voice in the lobby through her body. At the end, the dancer with a camera as a part of her body looks at the audience. This dancer projects the image of audience onto the fourth dancer's costume.

Figure 7. Three dancers dancing

4. Collaboration

The use of Butoh imagery techniques and the commitment of the artists involved in this project include: textile artist Bo Choi, sound designer Donald Craig, the dancers and the directors (Kang and Garcia-Synder). They took a collaborative journey to the unknown: like the five entities in Mixotricha Paradoxa, *PuPaa* has the five entities of dance, sound, video, performers and the audience. *PuPaa* has also continues to evolve; its energy keeps growing as it is performed. The audience now becomes our collaborators as your voices and imagery are a part of *PuPaa*.

Figure 8. *PuPaa* installation in the lobby - what the audience sees before the concert. During the intermission, there is a dancer with her head inside of the cocoon. She is the one recording the audiences' sound and brings it into the theatre.

Figure 9. All four dancers are on the stage sharing their energy: they soon entangle themselves together.

5. Reflections and future

The audience in the premiere of *PuPaa* labelled it as the most integrated work where art and technology completely *loved each other*. Using mobile video/sound projection systems connected to video/sound sources in the distance, the world in the theatre turns into the 'elsewhere.' This happens when the audience meets the unfamiliar body of *PuPaa* and when they themselves become entangled with the body. The entity and the audience of *PuPaa* are not exiles or migrants, but nomads travelling the elsewhere.

PuPaa is designed so as to be transformed into a telematic collaborative performance through the web. Two modules, one mobile video and one sound embedded costume, as well as wearable camera and sound recording systems can be distributed in distant locations. The weaving of each entity and the audience in different locations creates the living dynamics of the performance. Also, the Butoh inspired warm-up rehearsals opens up the possibility of every participant taking on a dancer's role.

Figure 10.

Figure 11. The audience see their faces on the dancer's costume. (Note: This photography cannot show what the human eye (i.e. the audience) was able to see during the concert.

6. References

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From 'World Wide VIP' to 'TUTOR' and vice versa

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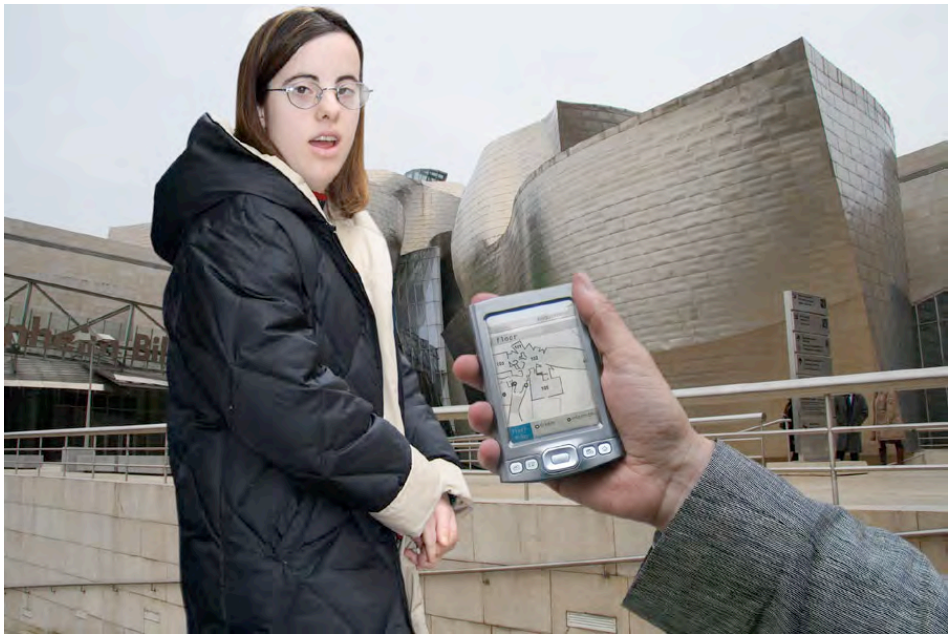


Figure 1. A person with Down Syndrome using TUTOR in Guggenheim Museum

TUTOR project is a work in progress that I developed in 2006-2007 in Bilbao and in San Sebastian (Spain) within the framework of DISONANCIAS. DISONANCIAS is an interdisciplinary project, founded in 2005 by Xabide Group, to promote the relationship between artistic creativity and technological innovation and to establish a new dialogue between the business world (and its technological environment), the artists' world (and its creative development) and society - the ultimate beneficiary of the results of innovation. During 2006-2007 I was artist in residency in LEIA Scientific Foundation. As a part of the Integrated Safety Unit, I was asked to carry out research on safe environments

to integrate disabled people with the aid of advanced design and simulation tools under the Design for All concept.

Figure 2. A person with Down Syndrome using TUTOR at his workplace

Objectives and structure

Design for All implies that environments, products and services are treated in such a way that everybody, irrespective of age, gender, capabilities and cultural baggage, can participate with equal opportunities in our society. It approaches the concept of 'safety' from an integrative point of view that uses one variable of business management combining Safety and Health at Work, Industrial Safety and Environmental Safety. The main goal of the project was the development of intelligent tutors for disabled people and the integration of multimodal tools and emotional analysis to ease its use.

The integration problem of people with disabilities in everyday life can be properly solved with the development of Intelligent Tutoring Systems (ITS) in portable platforms. The main feature of these kinds of tutors is the adaptation to the user's need. This becomes essential when working with people with special needs. Moreover, they try to get positive effects for the user: improving the individual performance, increasing the communication and worker capability, and growing the health and security factors.

On the other hand, complementary tools are integrated in these tutors, who are based on pattern matching (images and speech) and human emotional feeling

analysis. These capabilities improve the system reliability when working with handicapped people, sweeping away the frontiers. A critical aspect in the integration of this kind of product exists because of the specific ergonomic adaptability necessary (hardware and software) to meet the special needs of the people involved. The development is focused on achieving real industrial reliable and healthy product that fulfils standard approval criteria. The accessibility and adaptability of the immediate environments of handicapped people are closely connected to the design and ergonomic development of devices, systems, products or services, to the architectonic and city planning design and the development of software, as well as, in some cases, to these components a redesign. For the same tool or device the variability of the handicapped group requires the development of different applications to adapt their use to the different groups that could obtain benefits from using it. In this sense, the devices of access to terminals and communication devices try to solve different kind of problems, namely:

Mobility, skill and coordination problems of people with physical disabilities.

Vision, hearing and language problems of the people with sensorial disabilities.

Intellectual, language, understanding and memory problems of people with psychical disabilities.

Intelligent Tutor Systems apply Artificial Intelligent (AI) techniques and methodology to the development of computer based learning systems in order to construct intelligent systems for education. The 'intelligent' term is related to the capacity of dynamic adaptation to the learning process. An ITS focuses education as a process of cooperation between tutor and student, in which the tutor tries to teach concepts to the student. In general, the process is guided by the tutor, who must analyse the behaviour, knowledge and satisfaction of the student. The tutor has to determine and apply the more appropriate teaching strategies at every moment. These strategies must answer a series of questions to ensure that the learning process is carried out successfully.

These questions are: what to explain' what detail level is necessary, when and how to interrupt the student and how to detect and to correct errors? The four basic components that are classically identified in a ITS are: Domain Module, Pedagogic Module, Student Model and Dialogue Module.

The adaptation and integration of linguist engineering and intelligent tools in the system is necessary when cognitive disabilities appear. In these cases, the ergonomic directives, as well as the specific necessities of these persons, are fundamental in the development of appropriate tools. It is not possible to apply a general approach due to the variability of needs that this collective exhibits. However, there are some physical and psychological common characteristics in people with Down Syndrome: heavy and fine mobility altered, smaller capacity to stay out, difficulty to anticipate or to understand consequences of their conduct, better visual perception and retention than auditory, greater response time, difficulty in understanding a number of instructions given in sequential form. The adaptive ergonomics must adapt to the personal characteristics mentioned before. Complex task should be divided in brief and simple messages and the information should be presented in more than one media (multi-sensorial). The development of the vocal interface palliates the difficulties to interact with the system. The system developed in this way is adapted to the users - easy to use, interactive, friendly, error tolerant and it provides the required explanations eliminating unnecessary complexities and adapting the explanatory level to the knowledge and skills of the user.

Figure 3. Access to Guggenheim Museum is organised for wheelchair users, but nothing is made for people with a mental disability

Guggenheim TUTOR: scope and design

The main objective of Guggenheim TUTOR project was the development of an Intelligent Tutoring System, integrated on wireless portable devices (PDA, mobile phone etc) and adapted to the Museum's environment. The mobile tutoring system will help in the tasks people with Down Syndrome (DS) perform in their everyday life. Due to the characteristics of the people that are going to use these devices, it is absolutely necessary to design an interface that shows the following features: friendly, comfortable, flexible and ergonomically adapted to their cognitive characteristics. The objective of this project was to provide these users with a cognitive tool that contributes to the improvement of their autonomy, quality of life as well as help in the prevention of accidents.

The research team was interdisciplinary. This project collaboration included the company that contracts the disable people (GUREAK ARABA S.L. (GUREAK Group), LEIA Foundation - CDT (UDS), Disonancias (Xabide Group) and the University of the Basque Country (UPV/EHU) – GAL-LAN, LIPCNE, IXA research groups and the group of Computational Intelligence. The collaboration of the different groups and research labs allows us to consider a wide range of technologies that covers the necessities of this project.

This project was carried out in six phases:

- Phase 1: Analysis and definition of the Intelligent Tutoring System.
- Phase 2: Development of a prototype of the tutor.
- Phase 3: Workshop and evaluation of the prototype.
- Phase 4: Analysis and development of the mobile platform.
- Phase 5: Development and integration in the mobile platform.
- Phase 6: Exhibition and final evaluation.

The architecture of the TUTOR is composed of the following modules:

1. Domain Module: this contains the knowledge of the subject that is being taught. This module is completely configurable in that it allows the inclusion of new information.

2. Pedagogical module: this is the component where the different teaching strategies are included together with the learning session control methods for selecting and sequencing the suitable strategies and didactic resources. This module adapts the teaching to the characteristics of the learner.

3. Student model: this component represents the beliefs that the system has of the knowledge that the student has acquired during the instruction process. In addition it represents other personal information like cognitive skills, motor abilities, etc. The person that helps the user when performing the tasks can interact with this model and perform the appropriate changes when s/he detects new skills or problems.

4. Dialogue module: it defines the communication interface of the system with the user. On the one hand, it is responsible for translating the messages of the system to a representation understandable by the user. On the other hand, it transforms the inputs of the student to the internal representation that the system handles.

5. Dialogue toolkit: a toolkit has been developed with the aim of providing the system with intelligent behaviour, including speech treatment motor and face recognition motor. In addition, a set of intelligent tool prototypes has been developed aimed at people with disabilities: (syllabics, communicators, voice controlled tools and face recognition applications). These tools contribute to make the tutor accessible to people with motor disabilities. This toolkit is controlled by the Dialogue Module Manager.

In the development of the ITS XHTML marking language has been used due to its de facto standard character and its extensibility and also JAVA a multi-platform language. Both XHTML and JAVA will facilitate the exportation of the tutor modules to mobile platforms.

Figure 4. A person with Down Syndrome using TUTOR in Guggenheim Museum during the workshop.

Results and future works

During 2006 a Guggenheim TUTOR has been developed and presented in the Museum during the workshop organised in March 2007. Throughout year 2007 has been made its integration on mobile platforms. An analysis was made of the support necessities for people that suffer Down Syndrome when they come to the Museum. The results of this analysis are: their own and distinguishing characteristics (cognitive skills, motor functions, attention, perception, intelligence, memory, language, behaviour, sociability, etc). In this project, the tasks that have been selected for inclusion in the TUTOR are tasks performed during the Contemporary Art Museum's visit. In the same way, the physical and cognitive requirements of the tasks are different and complementary. All this has allowed an open and modular design that will facilitate the insertion of new tasks in the TUTOR.

In addition, a bibliographical review and study of the state-of-the-art in areas of accessibility and usability has been carried out. As a result, standard norms and guides applicable to this project have been identified: ergonomics for people with disabilities and software and hardware ergonomics. The aim of this study was to identify the application requirements to the ITS considering the characteristics of the group of people with Down Syndrome and the tasks to teach. The multidisciplinary composition of the project team (software/hardware developers, experts in ergonomics and people that work with people with Down Syndrome) has enabled the reach of the TUTOR. Furthermore it helps in the

integration of people with Down Syndrome within the cultural environment. The developed prototype exhibits the following characteristics:

A configurable and flexible system that allows people, without sound technical knowledge, to define tasks for different people and different environments.

A well-balanced system that allows the user to face important challenges: the completion of the task, with a help level adapted to the characteristics of the user, in order to gain a greater autonomy and knowledge.

A graphical system that allows, by means of images, an easily visualization of the tasks and the steps to perform.

A system that allows the user to initiate the work again and at any moment, to ask for external help and to ask for a complete guide.

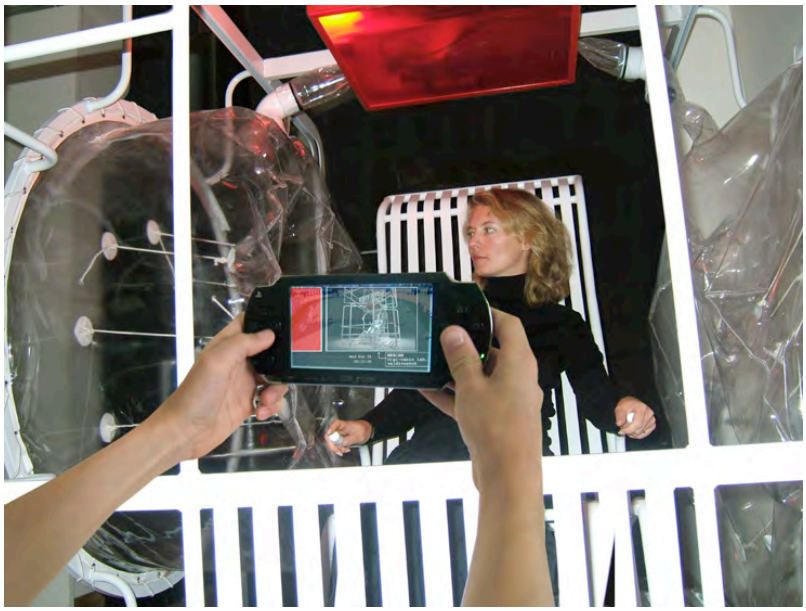


Figure 5. Olga Kisseleva's 'DG-Cabin' during the TUTOR workshop in Guggenheim Museum shows how a museum visitor can be 'tele-commanded' by multimedia tools

TUTOR has been designed to be configured in an easy handling, web application. The application manages the tasks to perform and the necessary subtasks at different levels - explained in a clear and concise way. The tasks

and subtasks are represented with the following information: title, brief explanatory text, graphics, sounds, images and videos.

Since 1999 when I created the first work with mobile phone, I saw mobile devises as a kind of contemporary prosthesis - which accompanies us everywhere. This dependence is the basis of my new project entitled, ironically, *World Wide VIP*. To belong to these planetary elite, it is necessary to be in possession of three essential accessories - a mobile phone, a credit card, and a EU/Swiss passport (soon a simple chip). These three small electronic objects are able to connect us constantly to the world and to open all doors to us. The problem is, when we lose one of them, we become almost disable!

In TUTOR project, thanks to the multimedia 'tutors' which are constantly available via their mobile phone, the handicapped people are enabled and become less handicapped, but paradoxically 'normal' people become increasingly handicapped - as they lose their reflexes through becoming more and more dependent on these electronic crutches electronic. I presented my multimedia TUTOR in the context of my personal show, which situated handicapped people within their everyday lives, using the tutors via their portable telephones, in different situations. The project also helps to sensitize the public, by a mirror effect, as to the dependencies and assistances most of us experience.

Figure 6. Olga Kisseleva testing TUTOR before the show

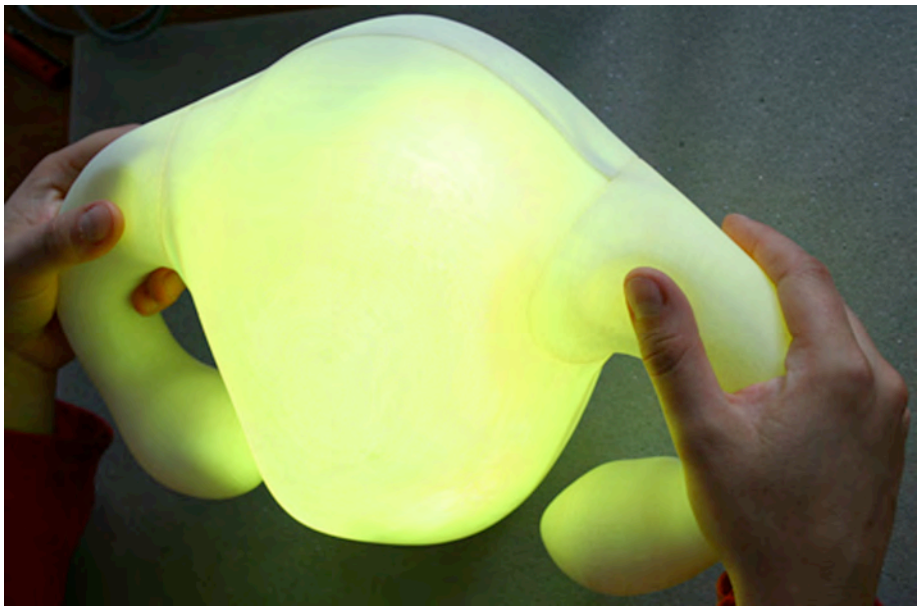
Biography

Olga Kisseleva, born in St.Petersburg, Russia, 1965.

Graduated from St. Petersburg University, Olga Kisseleva belongs to the first generation of Russian intelligentsia after Perestroika, which helped to bring down the Berlin Wall and cast aside the iron curtain. From the middle of the 90s, on the invitation of the Fulbright Foundation she found a roof for her work in the research group which dealt with the development of digital technologies. In 1996 she received her PhD. Her exhibitions include: Centre Pompidou (Paris), KIASMA (Helsinki), Guggenheim Museum (Bilbao), National Centre for Contemporary Art (Moscow), ARC (Paris), Reina Sofia (Madrid), Art Institute (Chicago), Venice, Istanbul, Dakar, Tirana and Moscow Biennials.

Emotion Lights: from biosignals to light art

Adinda van 't Klooster
University of Sunderland, UK



Emotion Light, version 3. Materials: ABS plastic, electronics, copper, Code, Arduino BT, LED's. © Adinda van 't Klooster, 2009

ABSTRACT

The purpose of the *Emotion Lights*[1] was to create a light artwork that could detect, and visually reflect, physiological variations in the viewer and in which sensor and artwork would be seamlessly merged. Technically, the aims were for this to be a non-invasive, portable (battery powered) and wireless light sculpture.

Physiological data has been linked to emotional variation, but the extent of this remains a much debated area in psychology, neuroscience, physiology and

[1] Project team
Artist: Adinda van 't Klooster (concept, design, porcelain model, sound design and project management).
Hardware design and advice: Ben Knapp, Ken Brown, Marc Boon.
Software: Vincent Akkermans, Ken Brown, Miguel Angel Ortiz-Perez, Nick Ward, Robin Price
Rapid Prototyping: advice on design for manufacturing: Alan Stafford.
3D modelling: Neil Milburn, Iain Barrett, Dave Knapton, AMAP, University of Sunderland.
PhD Supervisory team: Beryl Graham, Lieselotte van Leeuwen, Gilbert Cockton, Lynne Hall, Ben Knapp.

computing. This project aimed to explore how best to use biosignals in an arts/exhibition context, which is much less controllable than the lab environments in which this kind of research is normally carried out, and has aesthetic criteria which inform which technology can be used.

As we wanted the artwork to be non-invasive, we were restricted to only certain biosignals, from which we chose to track GSR (Galvanic Skin Response) and heart rate which can both be obtained from touch. For the touch surface, we used a conductive glaze on a porcelain sculpture and for heart rate we used a pulse plethysmograph that the user slots their finger into. The sensor circuitry used to amplify the biosignals was hidden inside the light sculpture. An Arduino microcontroller captured sensor data, and sent it to the laptop were it was analysed by a Max patch and transmitted via Bluetooth to a bespoke LED lighting system inside the artwork.

In computational terms, we compared two different approaches to working with biosignals. The first was to create a classifier that could detect 8 different emotions resulting in 8 different light sequences and the second was to use the GSR and heart rate in a direct mapping where colour of the light was directly linked to GSR and heart rate to the pulse of the light.

Our findings were that whilst changes in emotional state are reflected in bio signals, there is no one-to-one mapping between physiological data and discrete emotional states. Consequently, the latter method of direct mapping worked better in the context of this artwork, as it was the least reductive method, better reflected the reality of the data and left more freedom in the creative mapping process. We concluded that using biosignals to effect interaction can create powerful feedback loops which deserve further exploration in art contexts.

Context

Art has refined ways of arousing emotions, and we wanted to explore if we could create an artwork that would also be able to detect what it had aroused and feed this back to the viewer. In order for machines to detect emotion, they need to be able to detect emotional cues. Humans get these from looking at people’s faces and body language and from listening to the intonation of other people’s speech. The computer

can use these cues as well but has the added benefit of being able to record and analyse biosignals.

The best-known bio-electrical signals are the Electroencephalogram (EEG), the Magnetoencephalogram (MEG), Galvanic Skin Response (GSR) sometimes also called ElectroDermal Activity (EDA), the Electrocardiogram (ECG/EKG), the Electromyogram (EMG) and Heart Rate Variability (HRV). Biosignals are indicative of emotional variation: Juslin P.N., Sloboda, J.A. (2001); Gomez, P. and Danuser, B. (2007); Le Groux, S., Valjamae, A., Manzolli, J., and Verschure, P. (2008) but there is no one-to-one relationship between particular emotions and values per biosignal.

It is getting easier to obtain biosignals in non-obtrusive ways, but analysing the signals in an intelligent way is a complex area of research. There are also large interpersonal differences (van den Broek 2008) and even one person's data varies from day to day. It is also hard to obtain a ground truth: what is neutral in emotional terms and how can we detect it?

Biosignals have been used by artists and extensively by musicians. David Roosenboom, Atau Tanaka, Ben Knapp, Yoichi Naghashima, Miguel Angel Ortiz-Perez and others have used biosignals in their live electronic music performances on an ongoing basis. There are not many artists who have used biosignals more than once. Some exceptions to this rule are Char Davies who made two VR installations: Osmose (1995) and Ephémère (1998) and George Khut who created a body of work that uses breath and heartbeat as input and video and sound as output. Christa Sommerer and Laurent Mignonneau also made multiple artworks using heart rate, breath, blood volume pressure, GSR, and smell which are all captured in their *Mobile Feelings* series and sent to other anonymous users who can perceive and feel these private sensations through actuators, vibrators, ventilators, micro-electromechanical and micro-bio-electrochemical systems which are embedded inside sculptural shapes (Sommerer, C. and Mignonneau, L. 2002-3).

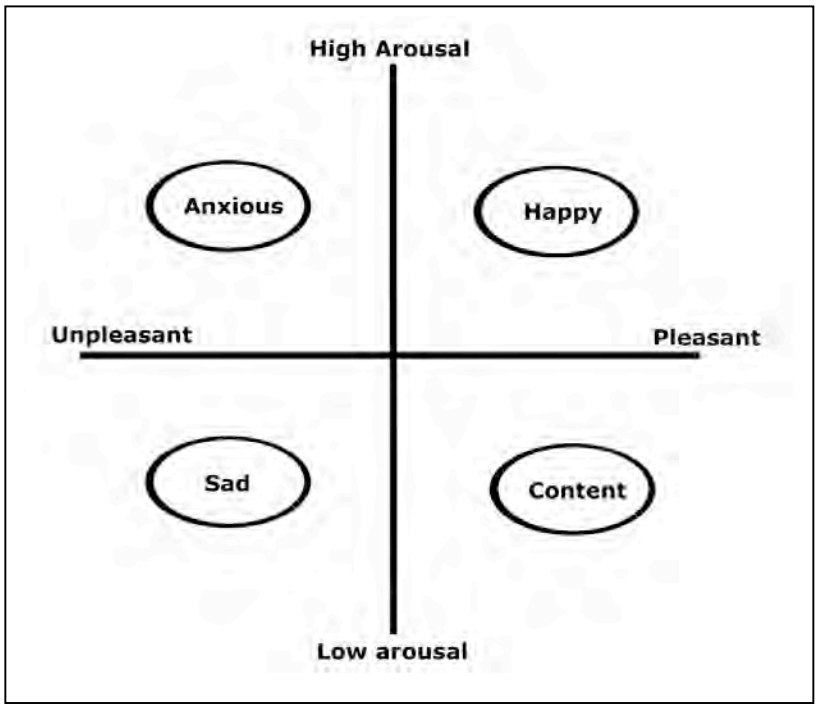
In comparison to the works described, the *Emotion Light* aimed to be non-invasive and portable like *Mobile Feelings* but to create more of an intimate feedback loop between the viewer and their own body data through changing coloured light emerging from a tactile sculpture. The title *Emotion Light* does not mean to imply it is possible to literally visualise people's emotions, as it is much more complicated than that, but it aims to make people consider how much the body and emotions/feelings

are interlinked. The shape chosen is a large uterus, an emotionally and symbolically loaded shape. Simultaneously reminiscent of a ram's head and spermatoids, this ambiguous sculpture renders the internal body visible and allows for an introspective and embodied experience. This piece relates to earlier artworks by the author of this article, such as *Receptive Mo(nu)ment*, which is a site-specific installation in Gloucester Cathedral (van 't Klooster, 2003-2004) where she recreated a womb environment by enlarging the pinopods found in scanning electron micrographs of the uterine lining. Pinopods are thought to be indicative of whether an embryo can implant in the womb but much remains unknown about them. By enlarging the microscopic to the macroscopic a new relationship to the body is created. Van 't Klooster's work also tends to choose those areas of science where there are more questions than answers. The field of emotion research is one of those areas.

Emotion Light, version 2 (porcelain prototype) © Adinda van 't Klooster, 2009
Materials: Porcelain, gold lustre, electronics, Code, Arduino, LED's.
Dimensions: 36 x 21 x 14 cm

There are many different theories of emotion and many different classification systems, and there is no general consensus. There is clearly also the problem inherent in classification itself, in that it doesn't leave much room for ambiguity, something intricately linked to emotions. The model of discrete emotions claims that emotions are isolated from one another and even derive from independent neural systems, whereas the dimensional model supports a view where all affective states

arise from overlapping neurophysiological systems (Posner, J., Russell, J.A., Peterson, B. 2005). A much used dimensional model is the circumplex model of affect which suggests that all emotions derive from two neurophysiological systems, one related to arousal and the other to valence (Russell 1980). The term valence in this context relates to being attracted (positive valence) or repulsed (negative valence) by a stimulus, which in simplified terms means positive or negative emotion, and arousal has to do with intensity and can be read directly from the biosignals. Valence is much harder to read from the biosignals, as it is higher-level information i.e. it has to do more with content. The circumplex model of affect employs a sliding scale and thus leaves more space for different shades and intensities of emotions than the discrete model.



'The circumplex model of affect' (Russell 1980)

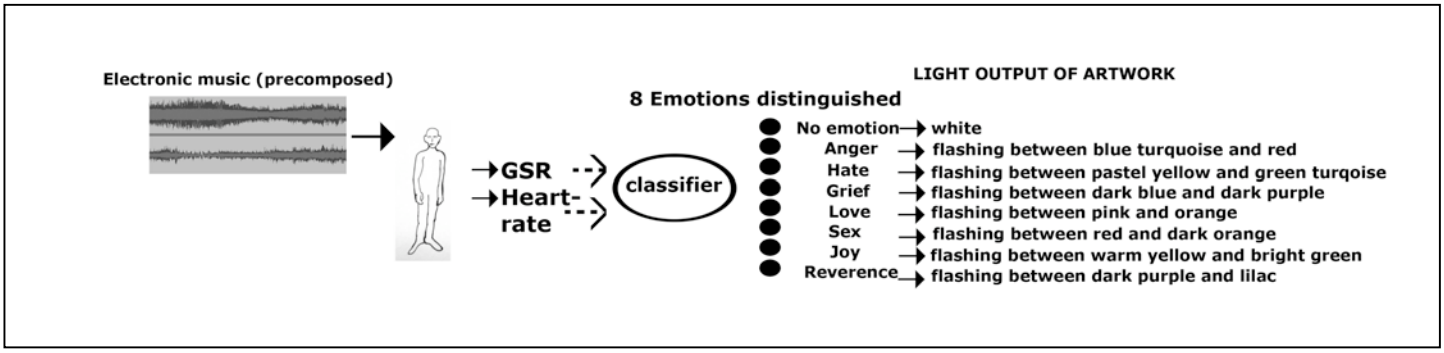
In the field of Affective Computing, a research field which aims to create Human Computer Interfaces that can sense and recognize the user's affective state or style, in order to adapt the machine's behaviour accordingly, one of the methodologies used is to create a classifier. This is a computational algorithm that can detect similarities and patterns in a database of, for example, biosignals tagged to different emotions. Using this method Picard reported a success rate of 82% in computer recognition of one of eight emotions: No emotion, Anger, Hate, Grief, Love, Sexual Desire, Joy and Reverence (Picard, R.W., Vyzas, E., Healey, J. (ud). This

categorization was taken from the sentics theory developed by Manfred Clynes (Clynes 1989). To create a database as input for the classifier, Picard used 4 bio signals and only one person. This means that her classifier worked on that one person only was due to the interpersonal differences in biosignals. Van den Broek (2009) had reported a success rate of just over 61 % for a person independent classifier using a system of 4 emotions (neutral, positive, negative and mixed emotion) and the K-NN (=K nearest neighbour) classifier on the dataset of 24 test people.

Methods

We compared two different approaches to using biosignals in a portable light artwork. Both had in common the final exhibition context where a pre-made sound sequence would instigate an emotional reaction in the viewer and this would be translated to light output through capturing the viewers GSR and heart rate. The difference would be in how the computer would analyse and map the bio signals. The first method was to use a classifier for Clynes eight emotions, each of which would be mapped to a different light behaviour. The second method involved using the raw biosignals, and map live variations in GSR to colour, and heart rate to the speed of the pulse of the light.

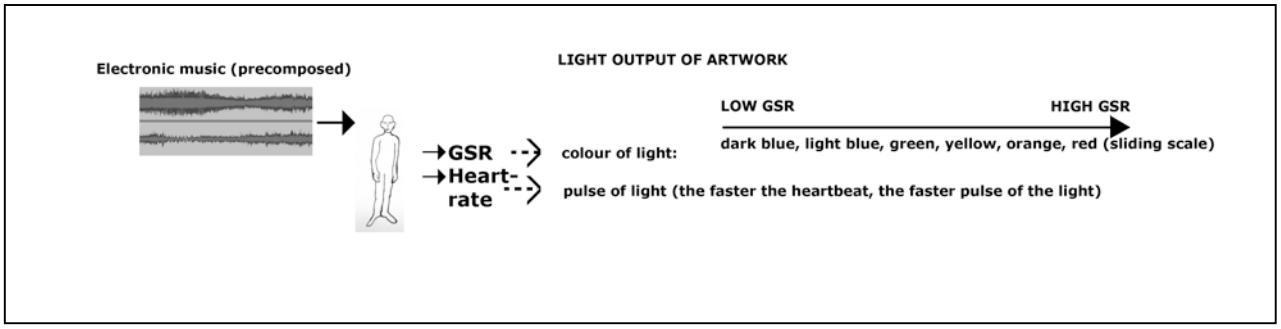
Method 1.



The first approach involved creating an offline database of GSR and heart rate signals from 20 people whilst they feel the emotions we want to detect. To induce the emotions, we let people listen to Clynes Sentic Cycle. (http://senticcycles.org/) Consequently, various clustering and classification algorithms were tested on the features of the biosignals in the database. Further technical information can be found on the STEIM blog: http://steim.org/projectblog/?p=762.

The GSR signal was obtained from a home-built sensor using an electrical diagram provided by Ben Knapp. This sensor could capture tonic and phasic separately and gave a good signal. The heart rate was obtained from a pulse plethysmograph, which we built from the diagram on http://www.picotech.com/experiments/calculating_heart_rate/index.html.

Method 2.



The second method was to use the biosignals directly as input to steer the colour and pulse of the light. GSR is divided into a phasic and tonic component. The phasic changes quickly, and shows peaks which happen every couple of seconds, and the tonic component changes slowly over a longer period of time. One could therefore say that the tonic component reflects mood and the phasic reflects more immediate responses to the external environment and emotional variations. The tonic component is also closely related to the stress level of the person. We mapped high tonic values to warm colours with the maximum set at red, and lower tonic values to blue and green hues.

A faster heartbeat indicates a higher level of arousal and was mapped to a faster pulsing of the light. More information, such as low frequency and high frequency variation, can be obtained from the heart rate signal by looking at it over a longer period of time, so we analysed the heart rate data in Max/MSP on the laptop, rather than on the Arduino as it did not have enough memory. We also added an accelerometer to the system, to detect when the signal was unreliable due to too much movement. The artwork was programmed so that more movement resulted in a darker light output and when the shape is held still the viewer is rewarded with brighter light.

Results

The first method of creating a person independent classifier for Clynes 8 emotions, gave success rates that were only slightly higher than chance level i.e. the computer could not clearly detect these categories from the biosignals. We only got success rates of 75% when limiting the classification to two different categories: no emotion and anger, and looking at GSR and heart rate for only those emotions.

The second method was much more fruitful in the context of this artwork. Direct mapping from physiological changes to light can already create an interesting feedback loop between artwork and participant. GSR provides instant feedback indicative of emotional changes and instinctive physiological responses to the external environment and so clearly lends itself for a direct mapping approach.

Conclusions

In terms of creating a person independent classifier with our lost cost sensors and only two biosignals, we concluded that a classifier for 8 emotions did not reflect the reality of the data. Person independent systems should use fewer classes. A major concern with Clynes induction method was that the participants reported difficulty in truly feeling some of the emotions. Added to that was the difficulty that the emotional descriptors meant different things to different people, i.e. reverence was not familiar to some people. Anger was the easiest category for non-actors to feel on demand and this was clearly reflected in the data.

There is no one-to-one relationship between emotions and body data, but body signals do reveal something of the emotional state of the person in question.

The second method of direct mapping was not only more simple and elegant, it also mirrored the complexity of the data much better. In the domain of psychology there are contrasting opinions on how to classify emotions, and by directly visualizing the output in colored light patterns, we didn’t have to opt for a system of discrete emotions, and could be more ambiguous. Emotion is like colour - it does not have distinct boundaries. The direct mapping approach also circumvented the problem of interpersonal differences in the data.

Further development

It would be interesting to develop these ideas further with an interdisciplinary team of neuroscientists, psychologists and computer engineers who are already developing advanced methods of introducing emotional intelligence in computing.

I also plan to further expand on the mapping and make at least four *Emotion Lights*, using different shapes and slightly different behaviors. People could then participate simultaneously and compare their lights and body data with each other.

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Negotiations

Daniela Kostov and Olivia Robinson

Negotiations is a project that explores cross-cultural communication and interpretation. Over a period of two years Daniela Kostova and Olivia Robinson developed an interactive system that utilizes blue screen video techniques as a tool for manipulating human bodies moving through unknown environments. The system has been performed in three distinct public environments: Sardinia, Italy, New York City, USA and Sofia, Bulgaria.

As both a conspicuous costume and virtual assimilation act, each performance has fostered the development of a site specific story. Recurring themes emerged from the performances: estrangement and integration; placidity of legality, territory and ownership; and mediation of experience.

Negotiations, 2006-2008

The *Negotiations* system uses readily available computer and surveillance technology to create the real time video. Two characters embody the system, an Alien (in blue) and an Authority (in black). Each has a video camera linked to a computer embedded in the Authority's costume. Custom software composites the two video streams to create a 'negotiated' final video. The resulting imagery is solely from the Authority's point of view - as she surveys the Alien. The Alien's image however has been replaced with her own point of view. The Alien carries a hand-held

monitor which displays the 'negotiated' video and passers-by can view the final video as it is being created. It becomes the focal point, allowing relationships to form during performances and highlighting the double-consciousness of cross-cultural communication.

Technology

The technology used includes: custom made software Max MSP Jitter; wireless monitor; wireless surveillance camera; wireless transmitters; video cameras; laptop computer; chroma key fabric

The Arts Center of the Capital Region

NYFA
New York Foundation for the Arts

Postponed: a site-specific installation concerning man and nature

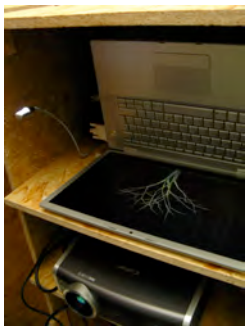
Nagehan Kuralı, Özlem Sulak and Selin Özçelik
University of Arts, Bremen, Germany

In this paper, we examine the contrast and correspondence of analogue and digital ways of interaction to the specific context and environment of our artwork *Postponed*. Moreover, we'll look at the effects of analogue ways of interaction on the user during the interaction, as well as on what the conceptual motivation behind our preference of using analogue interaction methods.

Interfaces, either digital input devices or analogue daily life tools, are usually the link between a user and the system during the experience of an interactive artwork. Within the realm of interactivity, the subject of an artwork is beyond being merely a spectator. In interactive artworks, a user does not only operate a tool to change the conditions within an environment, but also creates the artwork. The user becomes fully immersed into the spatial setting with his/her body. This embodied setting of interactive art presupposes close proximity on the physical and mental levels of interaction during the experience. The designer of an interactive system is not certain of the semantic level of human-computer interaction, because he/she cannot be sure whether mental representations of the machine correspond with the sign processes of the subject in action. In other words, every user might have a different understanding of how to use the input device - often differing from the expectations of the interactive system. In Maturana's terms, living systems are autopoietic machines that do not possess input and output channels (Maturana and Varela 1980: 81). Therefore the specific way that a user interacts with an interactive system may not correspond to the determined structure the system is designed with.

In the context of interfaces and their relation to a user, *Postponed* was a site-specific interactive artwork. The user was provided with analogue tools, and expected to alter a digital image. Participants were asked to mark their preferred death dates on a calendar with a pencil. A projection of a computer-generated representation of a tree onto a real tree in the garden changed correspondingly. During a classical music concert in a glass-canopied garden, *Postponed* was exhibited for approximately three hours. This garden is a specific space in which nature defends its individuation by adapting to the 'unnatural' setting that man prepared for it. Nature in this 'artificial' garden changes with an approximate delay of two weeks. When the leaves outside the garden have already fallen off the trees, the leaves inside are still strong and yellow. The garden is depicting a dialectical relationship between man and nature. This relationship was the main topic of our artwork, our disagreement with it, thus, our starting point. We believe that the essence of the relation between man and nature is such that both preserve their singularities in a mutual respect, rather than merely having a relation such as subject and object. Their relation is not on a causal level, where one is effecting and the other is affected, but more on a processual level. Their affection to each other supports their correlation, rather than differentiating them. In this context, with *Postponed* we attempted to entangle nature and man by capturing them within a constructed space and time. Our installation aimed to immerse the user in a thinking process with an analogue way of interaction via physically, hidden input detection. Niklas Luhmann’s theory supports this attempt: he states that a system’s structures and processes can only be understood through its relation to the specific environment it is implemented in (Luhmann 1997: 814).

During the exhibition, a pencil and a calendar were placed on a wooden table. A cherry tree was three meters away. Between both, a small pond was situated. The tree was covered with a semi-transparent screen, just as the garden is covered by the glass of the building. Participants of the interactive installation were asked to mark their preferred death dates on the paper calendar, which displayed each month on a different page. The participants were not directed in their preference of marking the date, they were merely asked to interact by means of two traditional analogue tools - pencil and paper. In the installation, the projection displayed a tree in the different stages of a year's cycle - projected on the semi-transparent screen covering the front side of the cherry tree. When a user marked a date in the calendar, the projection of the computer-generated tree was rewound or forwarded to match the specific date, and the computer-generated tree started living its year's cycle from then on. No digital sensor was attached to the pencil that the user was holding. Instead, the interaction was enabled by fiducial detection. Twelve fiducial symbols were attached to each of the calendar's pages. As the participants turned the pages, a computer hidden under the wooden table detected these symbols.


By offering traditional analogue tools, such as pencil and paper, we obscured the link between the input and the result in the interaction. The participants could not comprehend the link between the analogue device and the output screening of the image. Several users expected a digital sensor attached somewhere to the input devices. Users examined our system by checking whether a digital sensor was attached to the pencil's tip, or by applying pressure to the paper in search of a hidden sensor. For the user mental representations of the interactive systems are always subjective and therefore unpredictable. Halbach states that:

> When it is a matter of interfaces of human-machine interaction, then (a) input and output channels cannot be adjusted to each other, since they are precisely what a human being, as an autopoietic system, does not possess, and (b) is it not possible to speak of a translation of the coding method, since

> the subsymbolic representation forms of the human nerves have not (yet) been decrypted. (Halbach 1994: 166)

Concerning our conceptual motivation, the participatory nature and the style of interactivity had an essential significance for the user to empathize with a constructed year cycle, while defining his/her own disappearance from nature by marking his/her preferred death date. We intended that the user should spend time with the tree dwelling upon his/her own end of time, while observing the tree living its year's cycle. For users, who did not expect an interactive relation between the calendar and the projection, the time period between the physical level of interaction and the mental level became a learning process. While marking their preferred death date, they observed that it was not their direct input to the system that changed the projection. This learning process during the interaction resulted in another level of mental awareness, and they started examining the analogue devices by trying out different styles of marking on the paper after experiencing a change in the visuals. From a semiotic perspective, the meaning was not purely based on a sign (i.e. marking) but rather on the sign usage. The user constructed the meaning, not through a specific orientation by the system, but through what the conceptual background of the project expected from the user. Participants simply marked their death dates and reflected upon their own life cycles, while they observed a piece of captured nature going through its year's cycle.

The starting point of the project was the conflict, which we observed between man and nature in the garden covered by the glass building. The form of the building obscured the limits of the garden by, on one hand, capturing it inside a closed space, and on the other hand, revealing it back to the surrounding nature through its transparency. In such a setting, our interactive system provided analogue input devices that referred to the nature. The user was put into a situation where he/she can experience his/her own intersubjectivity by reflecting upon his/her death date and indirectly interacting, and, from the beginning, without being aware of the interaction.

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Ribbons: a live cinema instrument

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Universidad de la República, Uruguay

Abstract

Ribbons is a relatively small real time visual instrument created for maximizing the expressiveness of the performer within it's aesthetic paradigm. It's design questions the basic assumption of a flat rectangle as the traditional projection space by presenting a virtual three-dimensional space where the footage (or live video) can be projected and deconstructed, adding a new dimension of expressiveness orthogonal to traditional narrative.

We worked with the following design axes: playability vs. autonomy, expressiveness vs. narrative, and originality, and applied some of the basic techniques of Human-Computer Interaction and digital lutherie.

1 Introduction

1.1 Live cinema

Live cinema is a term recently coined for a long standing practice: real time audiovisual performances, which - in its current incarnation - are real time collaboration between sonic and visual artists (Makela 2006). Although the aesthetics of live cinema has been shaped mainly by VJing (the real time video mixing of footage) i.e. club-based visual performances - live cineastes have been performing at different spaces, with their oeuvres being shown in places ranging from traditional art galleries to multitudinous rock performances, and expanding traditional narrative cinema with a much broader conception of cinematographic space (Makela 2006).

This expansion, together with the images of club VJing, have led the production to very abstract and synaesthesia-focused works that somewhat deny traditional cinematographic narrative techniques and methods. This biases the production, by focusing only in 'the transitions, the movements, the pure visual beauty' (ibid). By claiming freedom from the narrative strings, the performer is not allowed to convey a potentially denser stream of images that benefits from less abstract images.
Live cinema’s performances, beyond their particular characteristics, are constructed by real time editing live or stored visual media (often both), using many gestures of traditional cinema (such as slow motion) and effects (such as scratching) that belong

to VJing. In order to permit these on-the-fly manipulations, different tools - both software and hardware - have appeared. The software tools range from the most general and low-level, for example Cycling74's Max/MSP/Jitter or Apple's Quartz Composer, which are full programming languages, albeit visual ones, to more application-like environments such as Resolume, Oscil8, etc. Hardware tools include video mixers, effects, and - of course - playback and output hardware.

1.2 Visual lutherie and Human-Computer Interaction (HCI).

These performance-oriented tools that produce moving images are called visual instruments, and therefore, their crafting should be called visual lutherie. As Miller Puckette said about computer music software: 'The design of the software cannot help but affect what computer music will sound like' (Puckette 2002), visual lutherie (as any tool used in art production does) influences visual production. Reciprocally, yet still talking about music, Bahn and Trueman present the concept of 'composed instruments' (Bahn 2001). If we believe 'new music tends to be the result of new techniques, which can be both compositional or instrumental' (Jordá 2005), we conclude that a possible approach for art production consists in the creation - the composition - of new tools of artistic performance, new instruments, and that it's creation may no longer be a stage previous to the art, but becomes part of it.
But this artistic approach to instrument creation should not forget that many guidelines and techniques of HCI are applicable (if consonant with the artist's desires) and aid in the instrument's design (Laurenzo 2008).

Two of the most important methodologies of HCI are user-centered design and iterative design, where the user becomes part of the development team - because he or she is an expert in his or her area of knowledge, and the team assumes that their work is perfectible and iterates by creating many versions that get closer and closer to what the user needs. Also, a very important interaction style is Direct Manipulation, which stands for interactive systems with continuous representation of the domain of interest, with rapid, reversible, incremental actions and continuous feedback. This allows the user to feel that he or she is operating directly with the objects presented to them with a direct representation of the domain of interest.
Both the methodologies and the interaction style are applicable to visual lutherie. In the following section we will present our live cinema instrument, which was created with these HCI concepts in mind.

2 The instrument

2.1 Design

Traditional cinema projects it's narrative onto the flat canvas of the projection screen: everything that happens in the film is under the 'tyranny-of-the- rectangle'. The live cineaste is also constricted by the same limitations, although it can be altered many times by using multiple projection screens which break the traditional rectangle, or by using projection mapping techniques.

However even in the most extreme cases, once the projection surface or surfaces have been chosen, all the narrative occurs on those pre-defined canvases. While *Ribbons*, like many visual instruments is at its core, a video player and is able to reproduce the videos in a standard way (a full-screen flat representation), and to apply some basic effects such as transparency, scratching and direct access, it's design challenges the flat representation by projecting the cinematic material (prerecorded or live) onto a three-dimensional, virtual, radically deformable canvas (see Figure 1).

To be able to do so, *Ribbons* creates a grid of three-dimensional particles with each one tinted with the corresponding colour of the video. The particles can be manipulated by the performer in novel ways, thus adding a new dimension of expression, orthogonal to the footages' original one, and distinct from the common VJing techniques.

This new dimension may or may not compete with the traditional one, and it is the performer's call to keep the images intelligible or completely deconstructed.
These particles can then be used as input for different visualizations (such as triangle trips, cubes or lines), which we shall discuss later.
In the design and construction of the instrument, three axes guided our work: playability vs. autonomy, expressiveness vs. narrative, and originality.

Figure 1. Different stages of deconstruction of the filmed image by applying a Perlin wind

2.2 Playability vs. autonomy

The defining characteristic of an instrument is that it is playable. Ideally, the user should feel that the manipulation is as direct as possible, even to the point that it's manipulation disappears from the cognitive universe of the user as he or she focus on the results: the interaction becomes a metaphor of a world instead of the metaphor of a conversation, that is, the manipulation is direct.

In order to reinforce the directness, all the commands built trigger an immediate response, and the user can directly control parameters (such as camera orientation), select representations, or set off some visual response (e.g. drawing text).

However, we wanted the instrument to be able to 'play by itself', that is, it should be able to keep on producing visual output even if the performer is not interacting with it. This was mainly because in real time performances sometimes one needs to focus on something else (e.g. a hardware video mixer) and the show must go on.
Two things were implemented to achieve this: sound reaction (the instrument processes the audio captured by the computer’s microphone and modifies the visual output) and inertial representation.

By inertial representation we mean that *Ribbons* allow the performer to deform the grid of particles by applying forces to them, and the particles act as if attached to strings (and then will oscillate and eventually converge to it's original position) creating an effect of deconstruction and reconstruction of the original frame that can be controlled by the performer. This allows the performer to deform the grid in such a way that it will keep on moving coherently, even if there is no user input with the synaesthesia reinforced by the before mentioned sound reaction.

The deformations can be completely random or coherently random (by using Perlin noise) and the performer can have medium to little control of each particle's actual movement but can always modify global parameters - like the strength of the strings, the direction of the particles, etc.

The final product is a visual instrument where the user can completely engage in the performance, yet is able to let the instrument perform by itself without the change being noticeable by the audience.

2.3 Expressiveness vs. narrative

As we mentioned, the performer can, for example, apply a Perlin 'wind' to the particles and deform the projection surface, even to the point of deconstructing the video frame, re-signifying its components (the pixels) as elements capable of independently conveying meaning.

This dichotomy between the narrative encapsulated on the cinematic material and the expressiveness of its manipulation conformed our second design axis.
Both the controllable deformations and the usage of the videos as raw data for the representations allow the performer to maintain the expressive language of traditional cinema while adding an orthogonal channel of information, expanding it for real time performance.

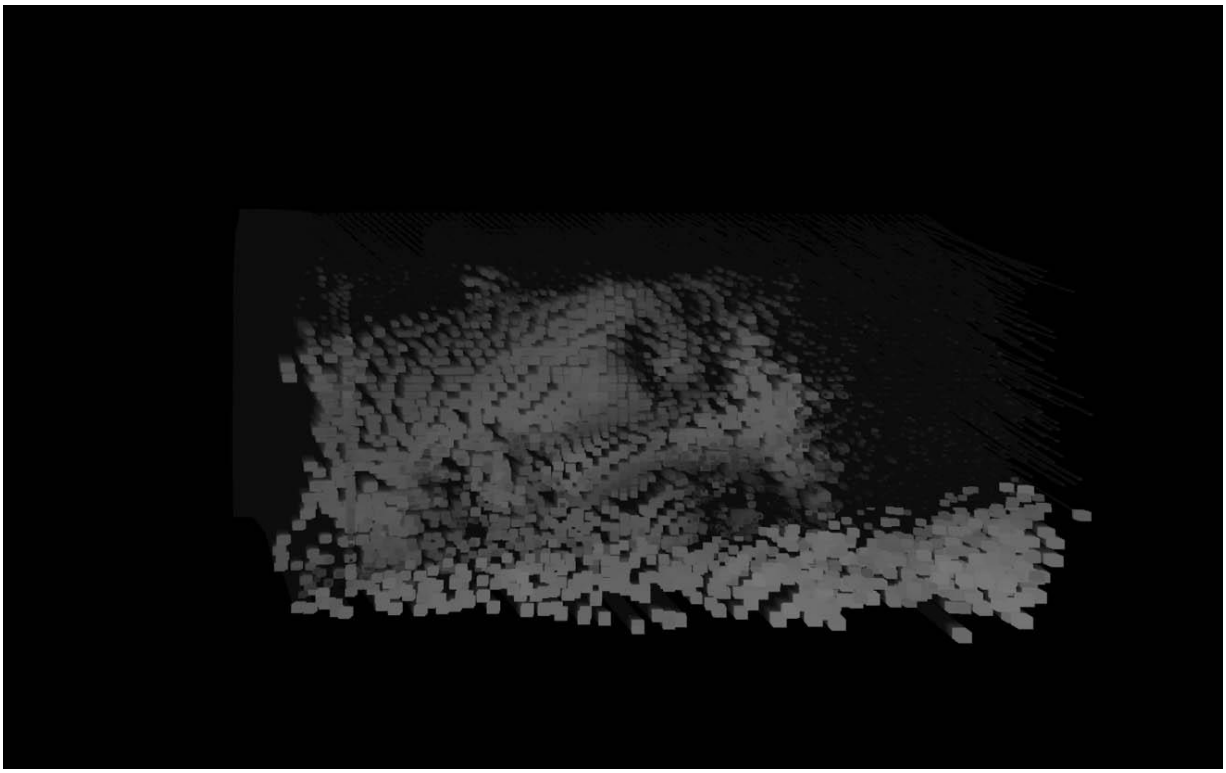

Figure 2. Ribbons screenshots: triangles (left) and triangles + lines (right) visualizations.

2.4 Originality

Our third and last axis of work simply consisted of the attempt to generate a distinct, recognizable visual output. Although we believe that we were moderately successful at this, we also coded some visualizations that are well known by the live cinema aficionado. For example, one of the completely sound-reactive outputs of *Ribbons* is directly inspired by, and reminiscent of, the visual output used by German artist Alva Noto in his latest tour. However it is obvious that the choices on whether or not use these visualizations, or how to combine them, is on the performer.

2.5 Operation.

Ribbons is controlled with one hand on the computer's keyboard and the other one on a drawing tablet (although it can be controlled with a standard computer mouse instead, the direct mapping from tablet-coordinates to screen-coordinates allows *Ribbons* to give an implicit feedback of the current level of the parameter being manipulated).

There are four different types of commands: *Selectors* select a video source or visualization with a keystroke; *Triggers* trigger an immediate visual response (such as drawing some text on screen or reversing the particles' rotation direction). Also with a keystroke (usually augmentable or modifiable using the shift key); *Faders* change a continuous value, such as rotation or return speeds. These are controlled by holding a key pressed and moving the pencil; and *Control commands* are metacommands (i.e. not belonging to a *Ribbons'* performance but commands for settings, quitting, saving, etc.).

2.6 Implementation

Ribbons was fully implemented in C++ and OpenGL using OpenFrameworks as a programming framework.

3 Conclusions and future work

We have shown our visual instrument *Ribbons,* which is not only theoretically consistent, but has also been successfully used in 'real life' performances (see Figure 3), where it provides the performer engagement that is expected from an instrument, while also being able to perform autonomously - delegating some decisions to an automated process, which also means to delegate some decisions to a previous ourselves (for brief periods).

The instrument allows us to investigate and question the basic need of expressive footage, and it's relation with, on one hand more abstract, generative visuals and on the other hand, it's real time manipulation by the performer. It also questions, by virtually projecting the footage onto a three-dimensional space where the camera can be moved around and the projected image can be deformed, the classic assumption of a flat orthogonal projection - without the costs and rigidity of more actual solutions. Finally we would like to praise frameworks such as OpenFrameworks and Processing, that allow for the creation of early prototypes quickly - offering artists the invaluable gesture of sketching.

Fig. 3

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A Bottle of Weather: an interactive media installation

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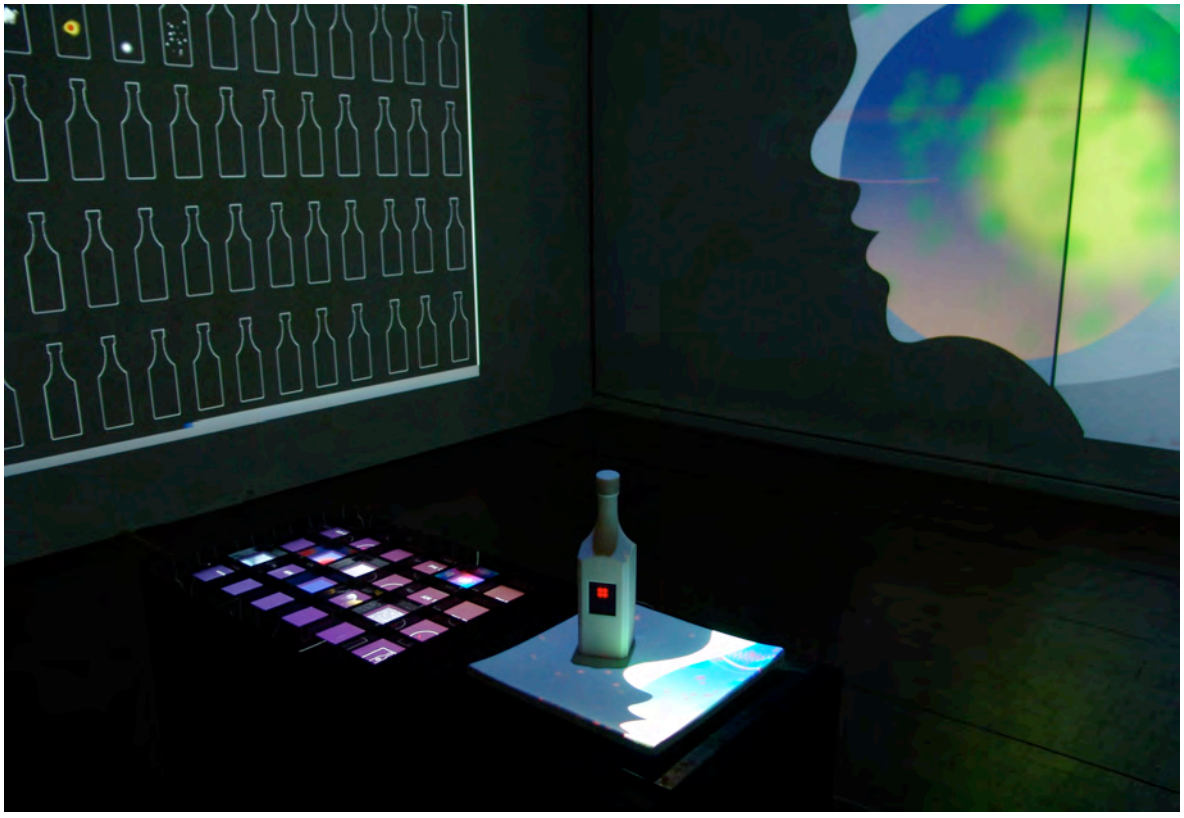

Zune Lee, *A Bottle of Weather*, Seoul Museum of Art, South Korea, 2008

The sense of taste is an important sense in ordinary life, but it has been ignored in media art. In the area of art the word ‘taste’ has usually been used to describe an appreciation of art pieces and to express artistic styles, though we never literally taste artworks with our mouths. This artwork is the author’s first step to ‘taste’ art in synesthetic ways. It also refers to the strong will that a visual artist uses in attempting to taste image and sound albeit not literally tasted by the mouth. In this artwork the author suggests the mixology of cocktail, and the context of cocktail bar, as a metaphoric methodology of mixing images and sounds, thereby enabling people to taste image and sound rather than see and hear them. Firstly, the author presents a set of tangible user interfaces with a network connection to blend image and sound: a bottle, table, and dish interface.

Conceptually, a bottle has been an object that contains something. The bottle stores, processes contents, and extracts something necessary from the contents. It is a void media that can store and process everything. Here, according to its functions and contents, the bottle can be something different from the original bottle. Based on the interpretation of bottle, the author tries to make the bottle contain weather. Originally, weather is given to us and we cannot choose and change it. The weather influences our everyday life and we sometimes express our feelings through weather. We may live with making our own weather in our minds, regardless of the actual weather outside. Humans live in the border of actual weather (real world) and imaginary weather (virtual world). Thus, weather becomes a metaphor for humans’ emotions in our mixed reality. In the artwork, we can make an experiment with the bottle - as a being that mixes weather (metaphor for feelings) and expresses it.

To embody this idea, the author borrows the method of mixing weather from the mixology of cocktail and provides audience with a cocktail bar surrounding - as an exhibition space. This atmosphere affords audience the following interaction flow: Select – Mix – Pour – Taste – Keep. In the flow, the bottle interface is an interactive liquidizer enabling users to choose and blend weather. With the bottle, the users can choose images and sounds of weather on the table interface and insert them into the bottle. By shaking it, audience can blend them in real time - like mixing cocktails. This act of mixing creates imaginary weather, and it becomes an audio-visual performance by audience. By pouring the mixed weather into a dish beside the table, audience can produce virtual weather, an audio-visual mixture. Simultaneously it appears on a front screen as a media collage, and participants 'taste' their own weather as a mixture of image and sound. Finally, the resulting weather is

automatically stored and displayed on a wall screen as the keeping procedure, thereby enabling the tasting of other audience’s weather.

AmeXica sKin: a colloborative event questioning borders

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AmeXica skin questions the worldwide migratory flux in collaboration with international artists who join the dialogue through on line web events and off line performances set into the installation.

'AmeXica' refers to the border zone between Mexico and the U.S. I resent the binary conception of the border as a separation between two worlds. ‘AmeXica’ points to a transforming, hybrid culture. This presents a challenge for an emerging artistic, transcultural, and collaborative form which is a necessity response to overcome violence.

In the open space of the multimodal and inclusive work *AmeXica sKin*
I am putting at stake my commitment to history as an artist: how can I shape my testimony, my point of view as an artist, beyond the clichés of mass media, of politics and cultural and aesthetical habits? 'I have chosen to witness the crossing of the border as a succession of trials, the symbolical image of the maze, the materialization of the threat of death but also of the quest of life.' (Sylvie Marchand)

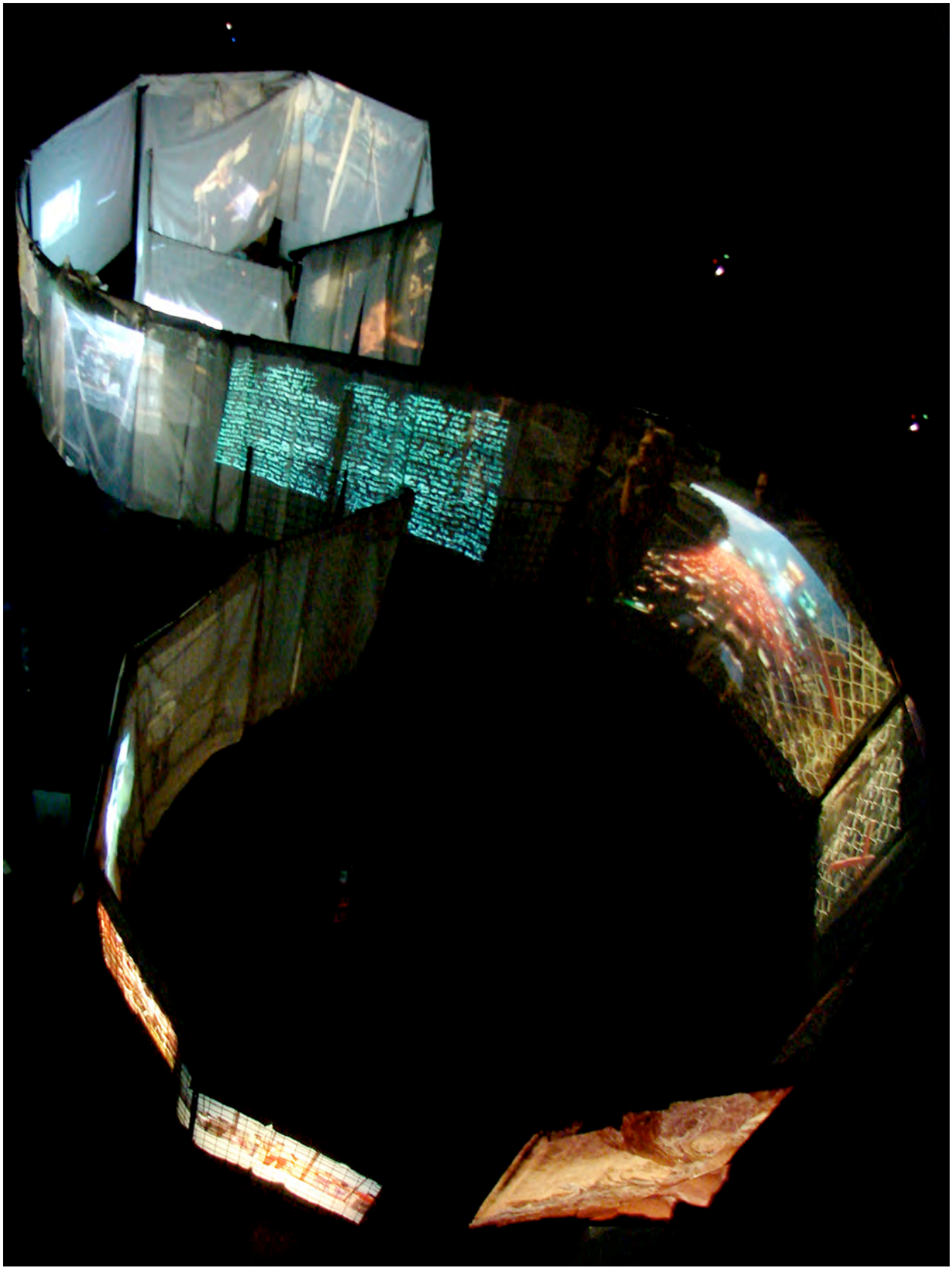
'sKin'

The frontier is sensitive and alive, changing, capable of feeling the world and it's flows just like the skin. The skin-frontier metaphor guides the creation of the scenography, offering a complex, porous and receptive interactive space.
Sylvie, with Gigacircus, uses today’s technologies of the 'increased body' to carry further the range of her voice and that of the migrants' she met, thereby extending and activating a network of artistic reflection.

Fieldwork, migrating art and mobility

'Of Gold and asphalt', 'Temps d'Histoires pour Compostelle', 'Tsagaan Yavarai, may the road be white…', 'Transhumances', 'Passages to Ostabat' or 'Passeur', are previous wandering web performances, installations, and collaborative events made by the Gigacircus Media Art Group. Like 'AmeXica sKin', these works were created in the process of action, on foot, on the road, in a truck or a caravan of the Gigacircus mobile lab, in the course of nomadisation …

Each of these particular scenographies questions the digital technologies and the tools of network communication, they obey the fluidity of travelling, the rhythm of the body, and focus on exchange and dialogue with local or distant audiences.



ElasticMapping: implications of a GPS drawing robot in times of locative media

Esther Polak
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How working with (nomadic) dairy transporters in Nigeria results in the need for software that makes GPS data flexible.

> To scale is not yet to edit. Editing begins when scaling can be balanced and adjusted to differed, chosen parts of data, to make pace for a choreography. This will give data an interval, a rhythm and a tone: in brief, a style.

Figure 1. *NomadicMILK* Cameroon version (courtesy Foundation Beelddiktee)

As an artist I have been working with GPS[1] since 2002 in a series of projects. My engagement with GPS data means that I am an artist working in the field of locative

[1] After a development phase of about twenty-five years, the NAVSAT GPS satellite system was fully launched between 1989 and 1993 for military use by the US army. The signal was only released at full accuracy for civilian use in 2000 by president Clinton, so general access to the technology is not even 10 years old now. http://en.wikipedia.org/wiki/Global_Positioning_System

media. As it is very difficult to find a solid definition for 'locative media', I borrow a description by Mark Tuters and Kazys Varnelis: 'Broadly speaking, locative media projects can be categorized under one of two types of mapping, either annotative - virtually tagging the world - or phenomenological - tracing the action of the subject in the world.'[2] For me, my main interest has always been slightly different still. Although I do trace subjects in the world, my focus is to create new visualizations of these tracks and see what new kinds of experiences of space these visualizations bring about. The newness of the medium is very important to me.

To see this in a perspective that makes sense, I like to compare the radical new possibilities of GPS data collection and visualization with the invention of photography around 1825-1838. It fascinates me to have the opportunity to witness a new visualization tool acquire a place in the world. During this process one could argue that all visualization tools undergo a comparable evolution: from a representation of the world that is as realistic as possible, towards a fictional story-telling tool, to finally becoming a medium for autonomous representation and art.

Let us assume for a moment that this evolution might also take place *with* GPS data visualization. If that is the case, it is now in an extremely early stage. Working with GPS data means that I have the opportunity to make evolutionary giant steps within the medium with relative ease. To illustrate the early stage we are in, where collected and visualized GPS data is seen as a fundamental print of reality, I'd like to quote some reflections by the artist Jeremy Wood[3]:

> I make maps of my tracks to contribute to the field of personal cartography. The act of tracing one's movements will be commonplace as it is such a rich source of information for business and government. (…) but perhaps it's most important for the public to have access to records of their own movements. I once considered providing an alibi to the police with GPS data after receiving a speeding ticket. I wanted to prove with my evidence that although I was there at the time, I was travelling at a different speed. The ticket was issued by a fixed camera on a

[2] Beyond locative media
http://networkedpublics.org/locative_media/beyond_locative_media

[3] Jeremy Wood; Synapse list July 11 2008
http://lists.synapse.net.au/pipermail/elist/2008-July/000136.html

> motorway so I checked its position against the speed recorded in the GPS data at the corresponding position. Unfortunately the results were the same.
> (Jeremy Wood, July 10th 2008 on Synapse list.)

What strikes me in the text is that although Jeremy Wood has already worked with GPS for years, (he is one of the founding fathers of locative media with his www.gpsdrawing.com project) he still totally trusts the data as an unquestionable representation of the real world, to the point that you could even use it as legal, juridic proof.

GPS and surveillance

It is not surprising that issues addressed by locative media projects are often determined by the fact that the medium produces actual data, connecting a set of coordinates with exact time, thus providing accurate information on speed, acceleration, elevation, accessibility of terrain, accuracy of satellite signal and so on[4]. The surveillance issues that come with the unquestionable realism of GPS data have been widely discussed in newspaper articles, in depth theoretical articles and in 'locative media' (art) projects. The fact that this might be a stage that will be left behind (and weakened) in time is not often acknowledged.

What does this mean for my own practice as a 'locative media' artist? Instead of engaging with the surveillance issues I have always been more curious about the experience of space that GPS visualization brings about and its power as a story telling tool. In this context I also depend on its realism in my projects: it makes my participants (and audience) experience GPS-tracks as being an accurate portrait of themselves, almost as part of their body, and certainly physical proof of their very existence.

[4] See for a list of relevant projects
http://delicious.com/locativeNL

Figure 2. *AmsterdamREALTIME* (courtesy private collection)

AmsterdamREALTIME

In my first project, *AmsterdamREALTIME,* 2002[5] we gave GPS devices to 60 people and transmitted the data via the mobile GPRS network. From these data a map of Amsterdam constructed itself in real time in the exhibition space. In addition, we visualized the data of each participant individually. In the project we inverted the surveillance situation by setting up the project so that our participants were on centre stage. We decided not to show the real time visualization on the website: the audience had to come to the exhibition space to see. There they could sit down and watch the tracks unfolding, or fill in a playful form to apply for participating themselves. This resulted in the audience identifying with, rather than observing the participants. After they took part in the project we gave each participant a printout of his or her own route. What surprised me was the emotional reaction of the participants to their own personal tracks. One of them even stated: 'I am going to show this print to my grandchildren.' My conclusion was that people experienced their GPS tracks as part of their identities. At that point however it was not clear to me as to how: as a portrait, a diary, a story, or even as a part of their physical being?

[5] http://realtime.waag.org/

MILKproject

In the next project, *MILKproject* 2004[6], I wanted to investigate this further, and decided to focus totally on the reactions of participants to their own tracks. We followed one dairy transport, from the udder of a Latvian cow to the mouth of the Dutch consumer. All participants involved got a GPS device for one day. We developed special visualization software which focused on appearing as recognizable as possible for the participants. At that point I was very interested in the simultaneous presentation of different media: GPS visualization combined with photography, texts or sound[7].

In *MILKproject* the participants where confronted with GPS visualization for the first time in their lives. Sound recordings of their direct and personal reactions, in combination with still images of them watching their own tracks and being engaged in their personal life, formed the heart of the project. It was telling that participants made comments on their daily life on both a micro and a macro level: comments on the path to the water well along with comments on how time goes fast, what their expectations had been 20 years ago and how life turned out now… Apparently this was the kind of reflection our current GPS visualization brought about.

NomadicMILK

For the recent, and not yet finished project, *NomadicMILK*[8] I wanted to focus on this idea of micro versus macro - which seemed so important to the MILK participants. I wanted to focus on people for whom mobility is an intrinsic part of their economy and daily life. Also I choose to work in a setting where the existence of the micro versus the macro was strongly present: economies that where interwoven in global and local structures. I found this situation in Nigeria, where two dairy economies exist side by side: Fulani nomadic cow herders and truck drivers transporting canned or powdered dairy products. They both depend on mobility for economic survival.

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[6] http://www.milkproject.net

[7] MILKproject: Sources of Inspiration, Esther Polak 2005
http://www.beelddiktee.nl/projects/GPS-projects/milk/Artist-statement-EP-eng.htm

[8] http://www.nomadicmilk.net

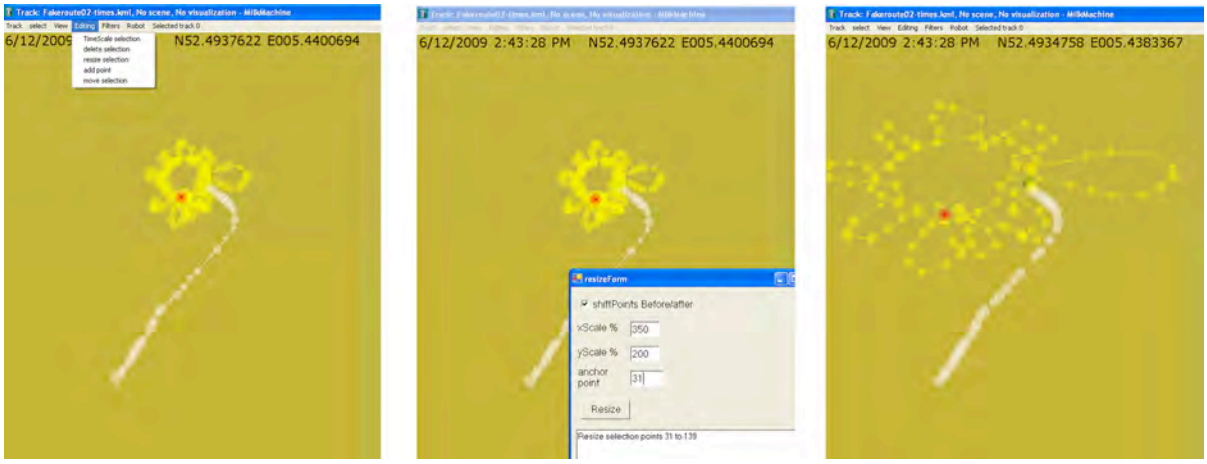
As the people I planned to work with lead a life along the road I needed a new visualization tool independent of indoor shelter or power supply. To meet those needs we developed a GPS sand-drawing robot. The robot draws pre-recorded GPS tracks directly on the ground by plotting them to a chosen spatio-temporal scale. In the previous projects I had wholly respected the GPS-data and their visualization as a form of realism. This now started to shift when working with the robot.

Figure 3. *NomadicMILK* Nigerian version (courtesy Foundation Beelddiktee)

I used the robot sand drawings to present the tracks to the participants in small workshops - on location in the camp, parking lot or beside the road. The robot functions as a performative tool, making the GPS tracks tangible and physically present and drawing the tracks took on an autonomous quality of its own: as a performance it began to stand on its own feet, to be independent and less in need of combination with other media.

Each time I make a robot-drawing like this the tracks need to be adjusted to the contexts: available space and social setting; how many people will be present; light conditions; colour of the ground and sand available. To be able to do this effectively I had to develop my experience with the way the robot draws tracks and the way people react to it. This approach brought about new needs in drawing. I found that radical manipulation (a

choreography) of the tracks was needed. The representation of both time and space had to be compressed, scaled and deformed in order to make the robot draw a sand line that could function as a representation to which the participants and audiences could relate in a direct manner.



Figures 4,5,6. *Milkmachine* screenshots. (Used track is fake for privacy reasons)

To give a practical example: one truck drove a long distance from one city to another, but also made very detailed movements within the city. This produced meaningful data, but it proved impossible for the sand-robot to draw it. I had to be able to enlarge the scale of the movements in the city and shrink the distance between the cities with a flexible morphing tool. I also I had to adjust the duration, as the city experience needed more time for its details to stand out. To my surprise, the manipulated tracks became even more 'real' in the experience of the participants … if being recognizable as belonging to the self is a criterion for realism ...

In this context I'd like to quote Jeremy Wood one more time:[9]

> Seeing the rhythms and patterns of one's tracks can have the affect of seeing your own ghost. The qualities of line in GPS drawings can reveal a great deal about movement and process. Just like a pencil drawing where smooth lines have a different speed to jagged edges, GPS drawings can detail the elegant lines of a railway and a squiggly walk to the local shops.

[9] Jeremy Wood; Synapse list July 25 2008
http://lists.synapse.net.au/pipermail/elist/2008-July/000150.html

Seeing your own ghost! How poetic and involved can you get - a GPS ghost! It exists by the grace of its movements. It can move through walls, grow and shrink if desired. Its appearance is related to routes, travellers, and it exists and does not exist at the same time …

For me this is a beautiful and inspiring metaphor and I believe the magic of GPS visualization peaks at the moment of personal identification with the tracks. In the *NomadicMILK* project the Fulani herder Idiris got very engaged when recognizing his track during our robot performance. This recognition seemed to happen time after time, as if the fact that it is *him* being represented repeatedly throughout the process: he slapped me and interpreter Aliyu on the shoulder in surprise, pointing to the same spots in the sand track again and again, and never stopping explaining what had happened.

Figure 7. NomadicMILK *Nigerian version (courtesy Foundation Beelddiktee)*

The truck driver Usman had a more analytical relation to his route during performance. At a certain moment he pointed to a small heap of sand representing a bridge where he knew never to stop because of the robberies which frequently occur there. He pointed to the sand heap, explaining, touching it and at that moment the sand line truly became the protagonist: the scary bridge. The story carried both Mr. Usman and myself away: we felt scared and I admired Mr. Usman for always having been able to avoid sbeing robbed, for being smart enough, and with the aid of God ...

Editing

I expect many different GPS-editing tools and interfaces will be developed to make drama, drama in sand lines, or otherwise but nonetheless, drama in location data. As soon as GPS data becomes subject to editing its meaningful forms can be emphasized, it can be composed, become song, not only by changing scale or colour or adding some additional data, but by changing and manipulating the 'true' data itself.

In the process of my project, I found myself conceptualizing and developing a basic editing software tool for GPS data and I find this extremely exciting. From here on I am able to adjust my data whereby their meaning starts to blur - between real time and memorized time. It gains artistic autonomy and poetic potential. This is comparable with 'rough' video or film footage which, no matter how real in itself, can tell a 'real' story more effectively after editing and manipulation.

Surveillance

From a conceptual level I think GPS editing is also a milestone. It undermines the 'trueness' of GPS data, its nasty side as an unchangeable record of surveillance, without denying the beauty of its realism. For the time being I explore the original data, with the goal of making the story or expression of this data more intense. It might construct a new medium, a means to construct space bottom up, from the actual step-by-step, human and personal perspective that these very special data bring about.

This brings me to another aspect that I am curious about, and which might be even more relevant - from an artistic point of view. This is whether GPS data will develop as a mature medium which can stand on its own feet: a medium that can have value by itself and be(comes) representational and/or an artistic or poetic tool for expression. Will we soon become so literate in personal/subjective mapping that pure location data can tell stories, or be used to write rather abstract spatial-temporal data-poetry?

Could there be a future where people hire professionals to GPS record their wedding day and afterwards do an edit so that it can be shared with friends and family? Could GPS data visualizations be part of news features? Could there be GPS-journalists, just as there are photo-journalists now? Could there ever be a GPS-Hollywood???

Cloud Car

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Project Description

Any conversation about the environment inevitably comes to the automobile. Necessary for the movement of people, goods and services, automobiles are essential to the lives of most urban residents, but with these benefits come serious consequences: polluted air, dangerous roads, noise and congestion. Increasingly, we look at the world through the window of a car, airplane, or other transportation vehicle, less and less aware of what's going on outside.

The connection between the automobile, life and the air in the city is explored through *Cloud Car*, a car fitted with special effects equipment that produces a cloud of mist, enveloping car and rider.

In-person guides stationed near the car distribute fact sheets and encourage passers-by to discuss the environment, automobiles and traffic in the city.

Cloud Car at the New York Hall of Science

Automobiles and air

The most devastating impact of the automobile is its effect on air quality. Automobile pollution causes cancer, respiratory problems and heart disease. Research suggests that air pollution is responsible for 310,000 premature deaths in Europe yearly (BBC News, Feb 21 2005).

Beyond the direct damage to our bodies from auto pollution is the fact that automobile emissions are contributing to global warming. Atmospheric concentrations of carbon dioxide (CO2), a heat-trapping gas, have increased by one third since pre-industrial times, and a majority of that increase is caused directly by the burning of fossil fuels. The effects of this global warming are widespread and are happening now: rising sea levels, habitat destruction, extreme weather conditions and the spreading of infectious diseases. According to the National Resource Defence Council, cars emit a huge amount of CO2, 20 pounds per gallon of gas burned.

Cloud Car as part of Transportation Alternatives Park(ing) Day, NYC

Significance of research to public architecture

In the 1950s and 60s, Yves Klein's idea of *Air Architecture* challenged the definitions of art and architecture. Klein was interested in the ways that humans can use science and technology to conquer the ephemeral, to the point of turning even air and fire into building materials. Klein sees science and technology as the saviour of architecture, promoting new forms and structures made from sculpting the air and other 'immaterial-materials'. (in Peter Noever and Francois Perrin's *Yves Klein Air Architecture*, 2004)

Klein's work was very influential. In the late 1960s several artists including Robert Barry started producing work questioning the limits of art. Barry's work, known as 'invisible' art included *The Inert Gas Series* (1969) in which a specific amount of gases such as neon, xenon and helium are released 'from measured volume to indefinite expansion' in the Mojave Desert. Lucy Lippard observed in *Six Years: The Dematerialisation of the Art Object* that 'novelty is the fuel of the art market', and at the time of *The Inert Gas Series*, this 'fuel' is was being burned at a rapid pace, constantly stretching the boundaries of the definition of art. These works paved the way for the contemporary use of ephemeral materials in public art and architecture, for example Diller + Scofidio's *Blur Building* (2002).

As a public artwork, *Cloud Car* uses immaterial-materials for aesthetic reasons, but also to focus attention on the issue of air and the automobile. By creating a cloud of mist, air is made tangible and visible to the public. *Cloud Car* presents the automobile as an object to be observed, but also highlights the car as not only a vehicle of transportation, but as a space of contemplation and exchange.

Artist's biographies

Andrea Polli is an artist, Associate Professor in Fine Arts and Engineering and Director of Interdisciplinary Film and Digital Media at The University of New Mexico. Polli's work has been presented widely in venues including the Whitney Museum of American Art Artport and The Field Museum of Natural History and has been reviewed by the Los Angeles Times, Art in America, Art News and others. In 2007/2008, she spent seven weeks living in Antarctica: www.90degreessouth.org

In 1985, Chuck Varga joined with a group of five like-minded individuals and founded the theatrical rock band GWAR. Varga created the character Sexicutioner, who starred in eight major productions of GWAR that toured the US and Europe in over 1000 shows. He also wrote scripts, designed and built costumes and sets, wrote and designed over a dozen graphic stories for the GWAR comic, and co-authored two feature-length films including the Grammy-nominated Phallus in Wonderland.

MY STORY photo project: pictures on the edge

Susan Tileston and Nathaniel Tileston
www.msppa.org
blog at: mystoryphotoproject.blogspot.com

A man washes his cow in a river. A spirit house stands alone in a field. Not the kind of images one would expect to see from the border area between Thailand and Burma. No photos of land mine victims, malnourished children, or burned out villages. Instead, images of daily life on this shared border taken by the Burman and Karen who live there: in refugee camps, as illegal migrant workers on the Thai side, or inside Burma, in IDP areas in Karen state.

Wherever they live, life is precarious: subject to harassment and deportation by the Thai authorities on the one hand - victims of sporadic fighting, forced labour, or, used as human shields by the Burmese military on the other.

The project

Since 2006, we have run the *MY STORY* photo project, giving entry-level digital cameras and basic photo instruction to small groups of young Karen and Burmese on both sides of the border.

Based in Mae Sot, Thailand, on the western border with Burma's Karen State, the project was conceived as a means of giving a voice to people who might not otherwise be heard. The idea is not new; while conducting a literacy study in Peru in 1973, Brazilian educator Paulo Freire asked people questions in Spanish, but the answers had to be as photographs. PhotoVoice, and the American Farm-Security Administration programs of the 1930's are just two of many examples where photography has been used as a means to visualize and give value to people's lives, identify social problems, express themselves creatively, and to have fun!.

The workshops, which run from 10 days to 2 weeks, involve a lot of looking at and talking about the pictures the students take. They are given assignments which are then downloaded onto a computer (or two, if we are lucky) and then we all talk... and

talk. Some recent assignments have included photographing someone at work, photographing someone or something from three different angles, photographing the same subject at different times of the day, photographing something you like/dislike, and building a photo essay as a group - where each student contributes an image to the narrative.

At the end of the workshop the students edit their work down to 2 or 3 images each which will be used for exhibition. The photographs are then professionally printed, matted, and framed for a travelling exhibition that begins at our home base, Mae Sot, in Thailand, then travels to Nova Scotia and wherever else we can find a venue.

To date, the *MY STORY* photo project has been exhibited in Vancouver, Prince Edward Island, Quebec, Seattle, San Francisco, New York City, and Bangkok. Prints from the exhibition are for sale, with half the proceeds going to the photographer and half going back to the project to purchase new cameras. The project has trained 115 participants, including Karen and Burman and also Kachin, Akka, Chin, and Shan. The youngest student was 15 and the oldest was 53. In 2009, seven former students took teacher training and will travel to IDP areas in Burma, after the rainy season, to run the project.

A little background

While teaching English to young Karen in 2005, I visited a refugee camp with a Karen activist. The camp was a five-hour, gut-churning drive up a mountain from the nearest town. Water came from the Salween River at the base of the mountain. In rainy season the road was next to impassable. He showed me the bamboo schools, the weaving shed, the tin working shed, and the clinic where a doctor visited once a week - possibly. It was a rough, dusty place, with a few generators, a few NGO's, the UNHCR, and not a lot of hope. Knowing my husband's and my background as photographers, he asked, 'Why don't you do a photo workshop with some of our young people?' 'They have nothing to do, so there are problems with drugs and alcohol.' His idea was for them to tell their stories to the outside world, through images and words.

After I came home, I spoke to my husband Nat, about the idea of doing some kind of photo project. He agreed, and in March 2006 we returned to Mae Sot with five entry-

level digital cameras. KYO picked five young people to participate in the program and we started.

A little history

Burma has a population of between 48 - 50 million people divided between at least 15 major ethnic groups. The Karen are roughly estimated to make up 6 - 7 million, living in the mountains on both sides of the border in western Thailand and eastern Burma.

The KNLA (Karen National Liberation Army, the armed wing of the KNU - Karen National Union) has been fighting one of the longest civil wars in history against the Burmese military regime, the SPDC (State Peace & Development Council) and its predecessors: forty-seven years is a long time.

Today there are nine refugee camps on Thailand's western border with Burma that house approximately 160,000 refugees. Many of these refugees know no other home than the camp. They are not allowed to work (legally), so spend their days in meetings, classes in leadership, management, English, computer programs and waiting for handouts of rice and fish paste from various NGO's

Some things we have learned over the past four years

While we expected participants to make images of the darker side of their lives this has not proven to be the case. They take photos of beautiful flowers and rivers and mountains, of children, chickens, cows, and dogs.

Place is very important to them, even though 'place' may be a bamboo house in a refugee camp with a leaky roof that will blow off during a big wind. They take photos of moms, dads, grand moms, cousins, and aunts; again, family is important and serves as an anchor, even though many of them have left family back inside Burma. They are very collegial with each other and with us. Editing their work for exhibition is done as a group; they all have to agree on the choices - and they do - albeit after sometimes, intense discussion. We don't see a lot of egos and they seem genuinely glad when one of them sells a print.

Frequently Asked Questions

Why do we do this?

We do it because it's a lot of fun for us and for the participants. The look on the faces of the photographers - when they are able to come to the opening reception of the *MY STORY* exhibition at Borderline Gallery in Mae Sot - is worth all the paper work, fundraising, camera malfunctions, and linguistic challenges we faced over the past four years. For a brief moment, they are artists, not refugees. For a brief moment, they are the centres of attention for the audience because they have made beautiful, funny, striking, narrative pictures. That is why we do it.

What do participants get out of the workshops?

They learn how to make a visual narrative and to look at their lives through pictures. The project gives them a means of creative expression. And they have a lot of fun.

What happens after you leave?

Each participant gets to keep and use his/her camera for as long as they remain in Thailand/Burma. If they resettle to another country, the camera must return to the sponsoring organization, e.g. Karen Youth Organization, Mae Tao Clinic, helpwithoutfrontiers. We do follow-up with as many students as possible after the workshop, continuing to look at their images by e-mail and uploading some of them to the project web site and blog.

What are your biggest challenges?

Aside from the language barrier (we speak very little Karen and/or Burmese) and our students' English is sometimes episodic, our biggest challenge is to find the money to buy cameras. We have had the support of family and friends and helpwithoutfrontiers, but this is an ongoing difficulty.

Conclusion

This is a small project that doesn't save lives, feed people, or give them a chance at higher education. What it does do, as one of our board members so aptly put it, is 'feed the spirit.' And we think that is important too.

If you would like further information on the project please visit our web site at: msppa.org or blog at: mystoryphotoproject.blogspot.com

The (Irish) Linen Memorial Soundscape:
a Gathering of Names

Lycia Trouton and Stephen Perrett

Introduction

The intention with the installation is to give visitors to The (Irish[1]) Linen Memorial - a dedication to those killed as a result of The Troubles (hereafter referred to as The Memorial) - an experience designed to exploit a psychological phenomenon known as the 'cocktail party' effect, achieved through the delivery of almost 4000 names of the dead (hereafter referred to as The Names List)[2] within a relatively short timeframe, approximately twenty minutes. Lycia Trouton's memorial[3] is that of an intervention of a 'modest witness' (Harraway 1997: 45) and is created in the medium of an historically iconic Northern Irish and globally traded, product, namely linen. This paper is about the 2009 digitization of The Memorial, with a new Soundscape, based solely on a reading of The Names List of those killed in the conflict. The Memorial is

[1] Irish in this case refers to the material culture of linen.

[2] The printed and embroidered Names List closely follows the chronological listing of 'victims' (all those killed directly due to the sectarian conflict from 1966 – 2000 with subsequent re-publications to present day) in *Lost Lives: the Stories of the Men, Women and Children who died as the Result of the Northern Ireland Troubles* by Brian Feeney, Seamus Kelters, David McKittrick, Chris Thornton and David McVea, 2000, albeit the names are in the public domain; many have been indexed by Malcolm Sutton, published 1994. My printed and embroidered handkerchiefs have been checked and re-checked for any and all errors by a team of three persons (with one discrepancy in the Names List corrected from a memorial visitor, a relative of a person killed corrected, June 2008).
I had an early 'nod' of approval to my creative proposal in March 2001 by email from Brian Feeney on behalf of the above authors. Yet last year, with great regret, I took on-board a July 2008 correspondence from Brian Feeney with a request that the authors of *Lost Lives* wished to distance themselves from The Memorial. Therefore, after July 2008, I reference simply a 'Names List', although their book is freely available to visitors of The Memorial. Many persons have appreciated the interactivity between the two 'texts': 1) a public art monument (or counter-monument, depending upon one's viewpoint) made in the material culture for which the colonization of Northern Ireland became famous throughout the world especially during since the industrial revolution and beyond (linen) – and 2) the other: a monumental tome of research and public service journalism, a text-book.
Trouton's visual/material culture doctorate studied the scholarly links between post-colonial literature (texts) and 'the art of textiles,' especially in regards to politicised arts criticism about the body and 'encoded forms of communication' in installation art since the mid-1990s.

[3] In recent years, there has been considerable debate about the possibility of, and appropriateness of -- in concept, form and possibility of neutral site -- about joint public mourning in Northern Ireland.

Internationally, commemoration and monumentation has been a highly controversial subject in the art/architecture field and in cultural history, such as 'memory studies' in psychology (trauma, Post-Traumatic Stress studies) and in other fields. Last year, the ***Healing Through Remembering*** (HTR) research organization in Belfast stepped up its formal processes around the topic and began another sub-group called ***Network of Commemoration***. [http://healingthroughremembering.info/index.php/network_of_commemoration/] I gave a presentation to Cate Turner in February 2007 and senior HtR member, Alastair Kilgore, about The Memorial, and subsequently to the ***Living Museum*** sub-group in mid-June 2008. I have filed reports on the viewing of the memorial to the ***Day of Private Reflection*** sub-group in 2007, 8 and 9. In 2008, I was invited to apply as a Research Consultant to the HtR; I am following up that application presently.

finally being used, as has been my intention since its inception almost a decade ago, to illustrate both a) serious public talking points which reference current political issues in post-conflict Northern Ireland, and b) the promotion of healing from trauma. For example, this past month, Belfast's Patrick Corrigan, Programme Director of Amnesty International, blogger and micro-blogger, illustrated his article on 'Truth versus Justice'[4] with a photograph of The Memorial and a digital version of The Memorial[5] was unveiled in The Canada Room, Queens University, Belfast, for the third 'annual'[6] Day of (Private) Reflection, June 21st to over sixty visitors, with the opening speech by journalist-broadcaster, Rowan Hand and Martin Dunphy, a grass-roots activist, and former member of The Peace People, from the mid-1970s.

This paper describes a new immersive, interactive sculptural installation as experienced with The Soundscape. This eight-channel soundscape uses a completely randomized Names List and is based upon contemporary auditory spatial localization research. This installation version helps fulfil the experience of visitors who come to the memorial in search of a loved one's name. The paper is in two parts: a description of the material culture of The Memorial and The Soundscape, and both works as based on art-sound concepts underpinning contemporary immersive-interactive sculptural installation.

[4] Corrigan stated, this past June 5th, he has always advocated that confronting the past is part of the move towards long-term stability. He also hopes that Amnesty International's body of comparative global research on immunity and impunity will be considered by public policy makers in attempting reconciliation, and investigating past injustices so as not to leave a legacy of bitterness amidst persistent controversy. Corrigan was, in part, advertising a Belfast-based conference on amnesties and truth recovery in Northern Ireland and other post-conflict transition countries on in late June 2009.

[5] Simply by converting images of the handkerchiefs into a Powerpoint slide show. This is appropriate for some settings, due to convenience, insurance issues and/or cost/length of time to install and host The Memorial. The Handkerchief plaque slides have begun to be published on the web, as of June 22nd 2009 (www.linenmemorial.org). An e-guestbook has been available on the website, since June 2006. In April 2009, I implemented a Facebook 'fan' page for The Memorial for more immediate updates for 'followers'.

[6] Each year, since its inception, The Private Day of Reflection is carefully monitored and it is still under debate whether or not it will become an annual event. Please see www.healingthroughremembering.info

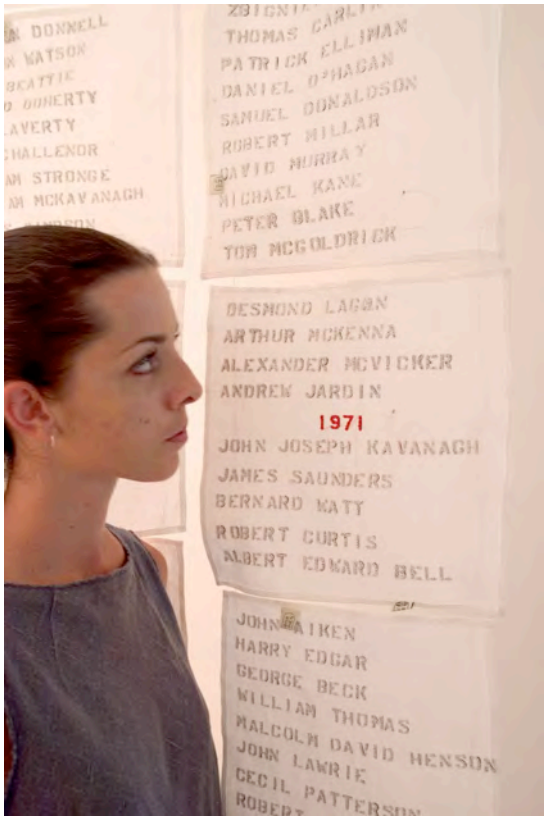

Figure 1. Wall of embroidered Irish linen handkerchiefs, 2005 memorial exhibition. Artist's modle: Jo Ann O'Dell. Photo Credit: Sean Maguire, Creative Image Photography.

Description of the memorial in linen, 2001

The Memorial is a site-conscious[7] sculpture consisting of almost 400 white, diaphanous Irish linen handkerchiefs. It lists the 'cost of The Troubles' in terms of human life: names from the almost 4000 deaths from 1966-2008. As such, the artwork is an 'alternative cultural history' of The Troubles, symbolically re-patterning hopes for more sustainable cross-community relations within Northern Ireland, as well as recognising community ties for the Irish diaspora, who have their own understandings, thoughts and feelings on The Troubles era and hopes for peace. There are ten names per handkerchief; these were first printed and then, in subsequent years, sewn over by hand, in simple chain stitch. The embroidery has been in progress since 2004 and has required the services of almost 40 crafts persons and a project coordinator. The Memorial performs an encoded[8] ritual of remembrance as a mobile monument/counter-monument. The Memorial was conceived as a non-permanently sited sculpture because there was/is no neutral site

[7] On this subject see: 1) *New Genre Public Art* by Suzanne Lacy, 2) *The Lure of the Local: Sense of Place in a Multicentered Society* by Lucy Lippard, 3) *Dialogues in Public Art* by Tom Finkelpearl and 4) *One Place after Another: Site-Specific Art and Locational Identity* by Miwon Kwon.

[8] See Linda Pershing's research on needlework as encoded communication, reference at end of paper.

in Northern Ireland for joint public mourning with a traditional sculpture. Small-scale handkerchief-plaques can be rolled up, folded, packed away and/or re-configured. Since 2001, the memorial has been mounted in many locations, from art gallery settings to Centres for Peace, and in Protestant and Catholic churches in four countries. The different configurations of hanging handkerchiefs can be quite dramatic. The first exhibition of the memorial included a ‘coffin’ configuration in compressed peat moss blocks (which mirrored the dimensions of the linen handkerchiefs and referenced Irish bog oak) as a gesture to my practice as an earth artist.

Figure 2. Sample handkerchief-memorial-plaque. This particular handkerchief, chosen to illustrate this article, was taken at random by the artist, Lycia Trouton. Materials: Irish Linen Handkerchief, approximately 11 inches square; printed in 2001 and embroidered from 2004. Photo credit and copyright: Lycia Trouton.

Figure 3. Horizontal (quilt-like) memorial exhibition of printed handkerchiefs, 2005. Photo Credit: Sean Maguire, Creative Image Photography.

Soundscape, 2009

The twenty-minute Soundscape is designed to create the acoustic conditions necessary for a phenomenon called the ‘cocktail party effect’ to occur. This involves the delivery of approximately 4000 digitally-recorded names through eight spatially separate loudspeakers to create a general babble, a confused mixture of eight voices simultaneously reading The Names List of those killed.

We created this work by hypothesizing that a visitor to The Memorial, who knows a person killed in The Troubles, will be able to easily distinguish the deceased person’s name when it is delivered even though it will be heard within a babble of other voices. Psycho-acoustic research has shown that several factors are involved in allowing listeners to hear a voice over background. The design of the installation takes advantage of contemporary understanding of human auditory localization as it relates to the ‘cocktail party’ phenomenon and hearing speech over background noise.

The 'cocktail party effect

In social gatherings of many people, numerous conversations can, and often do, occur simultaneously. Generally, normally hearing individuals may tune in to one particular conversation and then, at will, tune into another and be able to hear what the conversation is about. A person listening in like this can typically follow only one conversation at a time. Cherry suggested that spatial separation and auditory localization was one of several key factors involved in the ‘selective attention’ that could play a role in how the ‘cocktail party’ effect is achieved (1953: 976). The Soundscape will be presented via eight spatially separate sound sources so as to provide the optimal conditions for human auditory localization.

The enthralling extent of the cocktail part effect goes beyond being able to tune in to different conversations, as a typical example commonly appearing in first year psychology textbooks describes below:

> ... you are talking to someone in a crowded room, ignoring the other voices and general noise, when the sound of your own name in another conversation catches your attention. Clearly, you would not have detected your name in the other conversation if you had not, in some sense, been monitoring that conversation; you were not consciously aware of the other conversation until a special signal

> drew your attention to it. (Atkinson, R.L., Atkinson, R.C., Smith, E.E. and Hilgard 1987: 111).

The example above demonstrates that intelligible speech from more than one talking person is processed subconsciously and can become consciously available if it's meaning is striking to the listening individual.

The Soundscape will comprise playback of digital recordings of eight people reading the various names concurrently. If a person listening has knowledge of a person's name featured in the readings, the listener should be able to consciously hear and become aware of the vocalized name even if the listener was not paying conscious attention to the vocal stream delivering the particular name.

Spatial separation and hearing speech over background noises

Spatial hearing involves the use of various cues available in the acoustic energy of sounds like the human voice. Left-right information is derived from inter-aural time differences and inter-aural loudness differences. Front-back and elevation discrimination involves use spectral changes to the sound as it passes the outer ear and through changes in inter-aural differences as a person engages in head movements. For more information on the science of spatial hearing, please see: http://www.auditorylocalization.thegong.com.au/

Various experiments have been conducted to look into the ability normally hearing people have in hearing speech over background noise. As noted earlier, Cherry (1953) speculated that spatial information was utilized for this purpose. Yost, Dye and Sheft (1996) found that when there was a significantly larger benefit from spatial separation when three competing noises were provided rather than two, suggesting that when the task of hearing speech becomes more challenging, spatial cues become more important.

Noble and Perrett (2002) found that background noise, comprised of normal human speech, benefits from spatially separating the signal from the background noise and becomes greater when the background noise was non-speech. Their study suggested that the more confusing the background noise was, the more important spatial cues become in being able to understand speech, when there is background noise.

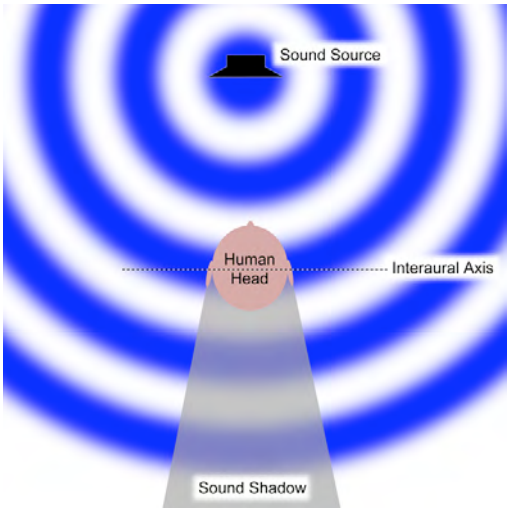

Figure 4. The sound source is directly in front of the listener, therefore the distance from the sound source is the same to the left and right ears and therefore sound waves arrive at both ears at the same time. Also, neither ear lies within the sound shadow produced by the head.

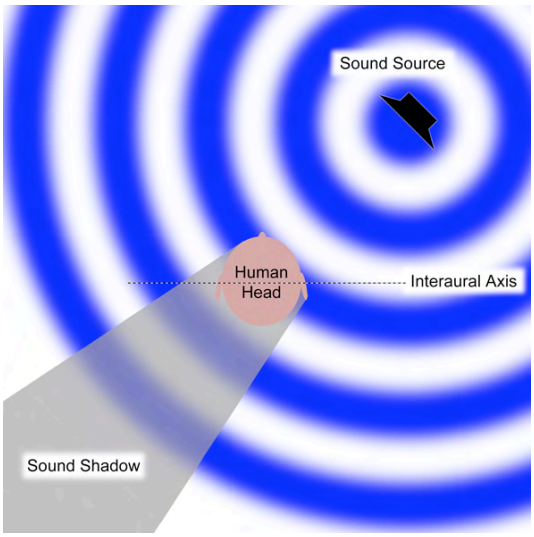

Figure 5. The sound source is in front and to the right of the listener, so the distance from the sound source to the left ear is greater than to the right ear, and so the sound waves arrive at the right ear earlier than at the left. The direction of the sound wave causes the left ear to lie within a sound shadow while the right ear is completely clear of the sound shadow.

Spatial hearing

The recordings

Eight lists of approximately 500 names were 1) completely randomised with Microsoft Access (by giving each name a random number and then sorting The Names List in

order of the random number) and then 2) produced with downloaded shareware, *Goldwave* sound editor. We have already uploaded a pilot to test-progress version to YouTube, with a slide show of imagery from the documentation of the hanging of The Memorial at Corrymeela's Centre for Peace and Reconciliation on the first and second Day of Private Reflection, 2007 and 2008.

The randomised Names List of those killed in The Troubles (1966-2008) was read by eight different invited Irish/Northern Irish readers. (Four male and four females volunteered for the task). Each read approximately one list of the almost 500 names; they were recorded digitally with an absence of background noise. Where errors in reading occurred, names were re-recorded. With digital sound software, names mispronounced were replaced with corrected pronunciations. Readers were asked to read the names at a respectful pace and tone. There was substantial variation in the speed with some readers completing the task in about fifteen minutes and one took as long as twenty-nine minutes. Through digital editing it was possible to adjust all readings to approximately twenty minutes by varying the length of silence between each name.

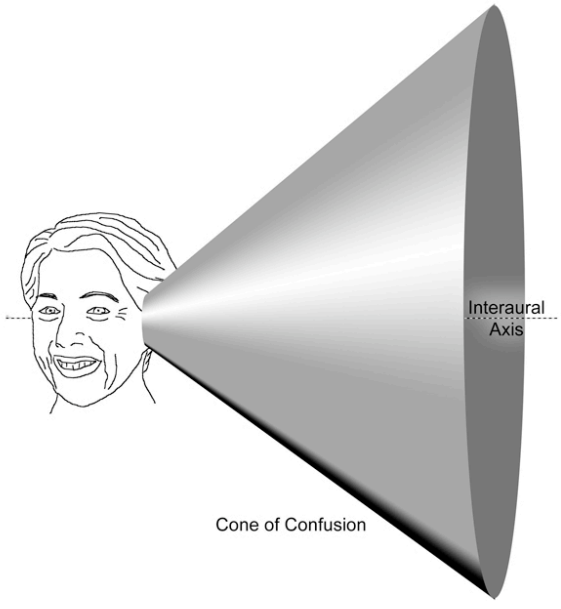

Figure 6. An area of auditory space sharing the same inter-aural differences, forms a conical shape. Relying on simple Inter-aural Differences of Time and of Loudness will produce what is termed as a 'cone of confusion'.

Presentation

Main exhibit

Four mini-stereo sound systems with detachable loudspeakers will be used to present the eight readings. The loudspeakers will be arranged around the inside perimeter of the exhibit room, at approximately equal distances from each other.

Four, two-track digital sound files will be produced - giving eight tracks in total. The eight resultant tracks will contain the digitally recorded data obtained for each of the readers (one reader per track). Each of the sound files will be transferred to digital compact disks (one sound file per disk).

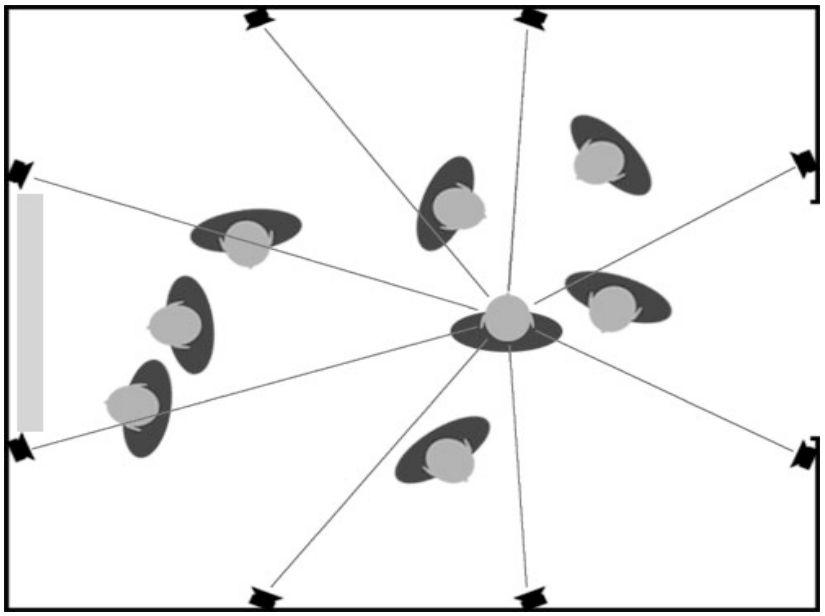

Figure 7. Proposed installation, a sample of which will be shown at the ISEA conference. The image shows The Soundscape as an array of eight loudspeakers presenting each listener with auditory signal from eight, distinct directions. The database projection screen (to the left in image above) would contain a PowerPoint slideshow of the almost 400 images of Handkerchief-Memorial-Plaques from The (Irish) Linen Memorial, a memorial conceived in late 1999 and implemented with Canada Council of the Arts funding in September 2001.

Pilot test on YouTube

Although it is not possible to spatially separate eight signals and present them via a personal computer through the medium of a YouTube video, the sound signal can be digital engineered to simulate eight spatially separate signals for listening over headphones. This can be achieved by introducing very short time delays between

signals delivered to the right and left ears. These time delays simulate the inter-aural time differences that would occur at the ears with signals delivered by spatially separate sound sources. Thus, a virtual impression of spatially separate voices may be gained using just two tracks and listening to them via headphones. Note: the full spatial experience does not occur and all sounds are experienced as being inside or very near to the listener's head. However, the voices still do sound as though they are spatially separate. Please see: http://www.youtube.com/watch?v=tyPTll_hZOk

Conclusion

To conclude, this critically-informed Soundscape of The total Names List reading produces an immersive experience of The Memorial, whether it is a projected PowerPoint display or the actual embroidered, linen handkerchiefs in a site-conscious sculpture. In this way, visitors' personal memories, ultimately, complete The Memorial[9]. Memorial visitors who experience The Soundscape may shift their grief and trauma as well as, perhaps, their understanding of relationships between persons-of-difference, and/or changing concepts of the community of the living and narratives of 'the community of the dead'[10]. Furthermore, such an experience may shape perceptions/experiences of emerging narratives of the past conflict, in the post-conflict (but still-conflicted) Northern Ireland. Thus, The Memorial and Soundscape, 2009, invite reflection upon plural public(s) and private ways of engaging citizenship, and, welcomes a 'parity of esteem' for difference[11].

Proposed Feedback Questionnaire for evidence-based outcomes

A short questionnaire will be given to participants of The Memorial to gauge their feelings as regards to trauma and other emotions from their experiences of The Soundscape at the ISEA (as well as other locations), thereby providing further research outcomes.

[9] Documentation in the e-guestbook of 115 entries since 20th June 2006 to June 22, 2009, see http://www.linenmemorial.org/memorial-book.htm.
[10] See Benedict Anderson on nation and imagined community, 1983, and Allen Feldman on Formations of Violence in Northern Ireland, 1991.
[11] See 'inter-communal' conflict and Tom Hennessey and Robin Wilson, 1997; also http://en.wikipedia.org/wiki/Parity_of_esteem (Accessed July 8 2009).

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Migratory: filmic exchanges and cinematographic weavings

Michiko Tsuda and Caroline Bernard

By resorting to filming resources such as cell phones, webcams and GPS, the *Migrateurs (Migratory)* project proposes and experiments with new filmic forms that replay and distort relations between space and time. The title Migratory is a tribute to the heterotopic qualities of the network whereby images, taken in a continuous movement, become unstable nebulas and are organized into constantly reshaped migratory streams. Forms of image editing and interlacing are updated by searching through reticulated patterns, for example, through offsetting, crossing or delegating the shooting. Thus, the scenario for *Switched Eyes* (2009) involves crossing operators: one person in Europe and one in Japan are equipped with two cameras. When the filmer in Japan presses the record button on their camera, they trigger not their own camera but their opposite number's in Europe. In a similar vein, the film *Reward* (2009) crosses territories. A still camera is found in the woods with a memory card full of pictures of persons unknown. By deduction, it would seem that these people live in the city of Grenoble in France. So an investigation is conducted to try and trace them, from Japan, by exploring the Grenoble area with the Street View tool.

In this logic of crossed territories, *Six Semaines de parallèles confondues* (*Six Weeks of Merged Parallel Lines,* 2008) is the outcome of six weeks of taxi rides between a woman patient's home and a medical centre. The forty-five minute drive is filmed each day from start to finish, both ways, with a mobile phone mounted on the vehicle's dashboard. A GPS simultaneously records the journey; the trips are then transferred onto Google Earth satellite images like so many coloured threads on top of each other. These images accompany a story written daily and published in the form of a blog. The title is a reference to the mathematical rule whereby only one straight line, and all its merged parallels, can pass through any two points. This work on territory is an analogy to the radiotherapy treatment prescribed by the doctors. Thus the body is precisely mapped, as under no circumstances must the machine's rays move out of line. The body is marked out like a territory; and the malignant point has precise coordinates that the machine homes in on. Gradually, the trace of its passage is printed on the skin and leaves an imprint. Although it is invisible, there is a contact between the machine and the body, which is of the imprinted form as

defined by Georges Didi-Huberman: 'the imprint excludes any distance from its referent, precisely because it needs adherence in order to function. Likewise, contact presupposes the reduction, the crushing of any mediation. Lastly, the "imprinted" form is obtained blind, in the inaccessible interiority of contact between the substrate of matter and its copy in formation'.

The landscape passing-by, in a way, leaves its imprint on the sampling tools, namely the mobile camera and GPS. To be able to speak of an imprint, it should nonetheless be noted at this juncture that there probably exists a distance between the substrate of matter and its copy, and that filming cannot be considered a blind process. However, wanting to capture these trips in their entirety indicates a real desire to apply a shroud and to roll it out over the passing landscape so as to absorb it completely. These arguments seem to extrapolate Georges Didi-Huberman's thinking, but they arise from a poetic necessity - essential to the work's composition.

Every three or four seconds (depending on the vehicle's progress), the film switches sequence, meaning it changes days and journeys, while maintaining visual continuity. Each journey spills over into the next one, the six week loop is completed in about thirty seconds, and then starts all over again. Nonetheless, the vehicle proceeds on its way to the medical centre in a forward traveling shot. Below the image, the date and GPS coordinates indicate the variation of sequences. Although from one day to the next it may rain or be dark, the sequences are interwoven with no visual interruptions of the landscape: a tree, an electricity pole, a signpost, all these elements present are used - by pasting them together they carry on the wallpaper. Filming every journey in full creates an adequacy between the spatial description and progress in time. The length of the film corresponds to the scanning of the space. The films form space-time monoliths, as though they were produced by the movement of a scanner. In Aspen MovieMap (1978-80), a work which foreshadows the Street View tool, Michael Naimark recourses to what he calls a camera car: a vehicle fitted with a set of cameras and a gyroscopic stabilizer films all the streets and intersections in the town of Aspen. In calling his vehicle a camera car, the artist includes movement as an inherent component of the filming - just like the lenses on the cameras, or the record function. In *Six Weeks of merged parallel lines*, the concordance between the physical movement of the vehicle through space, the camera's forward traveling shot and the duration of the film produce kinds of thread films. Both plastically and temporally identical in nature, the sequences are thus associated and woven together in the form of a continuous filmic ribbon.

Capturing movements from start to finish is of course an attempt to frustrate memory and forgetfulness. The aim of this systematic capture is to be able to preserve the memory by playing for instance on the ductility of the video material and by stretching it beyond the possibilities of the engram. Video time, captured time is, to quote Piotr Kowalski's expression, 'a material to be manipulated in the same way as space'. The film *Fonction Panorama LG KU990* offers a continuous panorama of fixed images, and underneath it, a conversation reduced to a single line. The images filmed in their successions are laid out flat in the form of a ribbon scrolling past. The past exits to the left, the future comes in from the right. The scrolling produces duration, and despite the fixity of the images, time is spatialized and metered, doubtless the same way as Paul Sharits's *Frozen film frames*. The project *Hachioji: Hole in gap, la traversée des temps zébrés* (*The Crossing of Zebra Times*, 2008) confronts two models of descriptions of time. Shooting is done in the first place in France via a webcam placed in the urban space in the Hachioji quarter of Tokyo. Shooting is done, in the second place, simultaneously on the spot with a VD camera. An urban webcam is a camera with a shared, delayed display. The images appear in a variable stream, often considerably slowed down. The webcam is not designed for recording but for observation. Due to its slow refresh rate, the temporal description is poor compared with the thirty pictures a second that a VD camera can handle. Without this being an optical issue, the VD camera describes the course of events more accurately than the webcam; in a sense, it sees better. The two time models are alternated; each time the webcam is refreshed, which is about every two seconds, the events it has missed are described again by the VD camera - with time enriched and the detail in all the movements is at last perceptible. Thus time seems to be examined by a microscope that reveals the subdivisions. The choice of a choreographic performance inserts a third model of a description of time - through movement. The density of the choreographer's movements enables a comparison between the time operations of the two shots; for the VD camera, a leap by the dancer caught by the webcam is as a series of several steps.

There is a metaphorical relationship between the slow webcam refresh and the distance in miles. From France, Japan is no more than an echo, whose beats are laboriously transmitted. So the screen refresh is viewed as a beat, a unit for measuring time. This beat refers to the notion of interval as described by Dziga Vertov, but it also refers symbolically to the experiments of Galileo on the fractioning of time into tiny slices. The *Migratory* films tend to model filming and editing to propose models of time and space caught outside the primary issues of

cinematographic narrative. The films are accompanied by diagrams that aspire to take over from them, or even to entirely replace them. They describe the filmic scheme in the form of scores, in which they are similar to the panels in Aby Warburg's *Mnemosyne Atlas,* the cinematographic aspect of which is described by Philippe-Alain Michaud, who says that 'even if nothing in Mnemosyne involves cinema technique, it nevertheless remains a cinematographic device, and that in Warburg's construction, the moment of projection during which phenomena of continuity, mergings and contradictions are deployed between images, has not disappeared; it has simply lost its diachronic dimension and requires an active intervention by the viewer'. The scores of the *Migratory* films describe the relations, organization and tensions between the different shots in the absence of images.

In terms of the time and space dimensions, like Janus, the *Migratory* films work their way out from the centre and can move out towards either past or future. They have the same features as webcams - constantly looking: they are streams, tensions, ribbons. The construction of these films is such as to take the divisions of editing to extremes and thereby fraction time indefinitely, making it impossible for it to move forward. For example, a quality in the *Voyage/Transmutation/Hybridation* project is that it has recourse to morphing. Thus, intermediate images are inserted between frames, and time becomes endlessly subdivided. Like Zeno's paradox, with the arrow always moving half the distance it still has to cover, any movement by the arrow becomes impossible. Time no longer passes, neither do the six weeks, and the vehicle never reaches its destination.

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Life cycle in digital system

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Abstract

In exploring a perception of life growing and digital visual art, these new short animation films create a new life cycle system which combine together biological life sciences, artistic imaginative vision and music. These art works were invited for exhibit in the 11th China ART Exhibition and Tsinghua University.

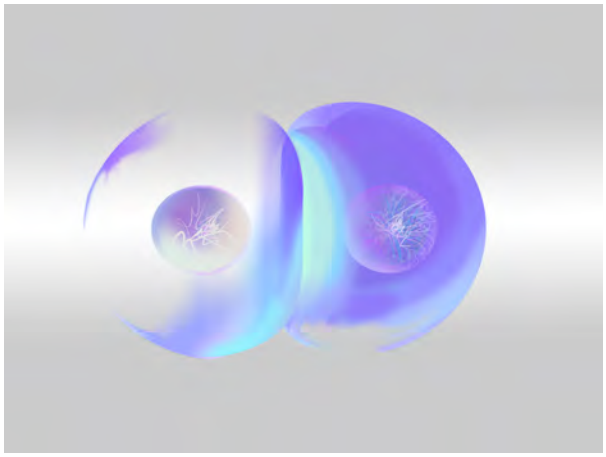
If only the clock of our life would never stop … if only we could stay forever young … if only our aged body could be reborn, like a new embryo in Spring, and to grow youthful again! Is this not the most dreamed dream we have been dreaming? Yet this dream could be fulfilled, when we understand the key to the cycle of life.

Do not say that it is death that gives meaning to life, because that is only the case when we have no knowledge to fight aging and no power to go against death. Of course we will all grow old in time and we will all disappear someday - each individual like a leaf on a tree - but new leaves will keep growing out from the tree of life, season after season, generation after generation. This has been the case and will continue to be case for millions of years. This great cycle makes our life beautiful and, in this sense, forever young. Yet within this cycle there is a vulnerable place we call the placenta - the place from which we all begin.

In these art works, 3D computer visualization techniques were used to create a scene that combined biological life sciences and artistic imaginative vision to create a serial of new life cycle system. We use MAYA 2008, AFTER EFFECT to create animation. And Sam created the sound for these art works.

Creative concept and visualization techniques

Many artists try to explore the notion of being behind physical surface using imagination, and some of their artworks can be helpful for contemporary science even pointing to future research. With the development of technology, artworks have been extended from paper to mobile forms, from two dimensions to three. What kind of technology might be used for a particular concept - is a common question and there always exist impossibility and possibility during the production process.



Lifecycle 001 Hui Zhu

Lifecycle Script Hui Zhu

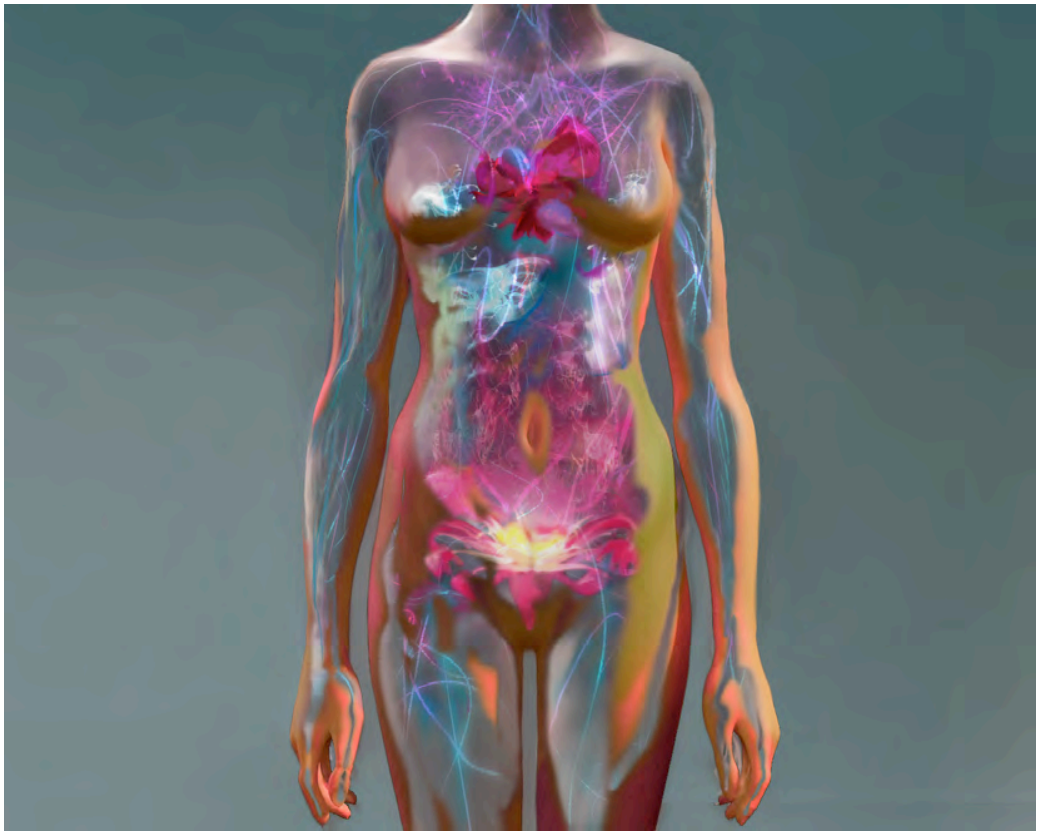
Even though China's animation has a decades-long history, it's animation industry can still be considered to be a young one. Despite the across-the-board expansion, approximately half of China's animation output is produced for other countries, and there is still a serious shortage of original content in animation and resources within the TV and film industry. The animation industry is mostly sustained by either government support or by jobs that are outsourced from other countries. And the number of firms with the ability to produce individual animation pieces that exceed thirty minutes falls drastically to the teens. Only a few Chinese animation companies that create original content animation can survive within this environment; most must rely on government support.

What might we consider a successful design? Successful design can act as a bridge connecting the art idea along with accessible technology. In this life cycle program, initially the art concept is an idea drawn from meditation. The idea is exciting but wispy. Based on our program investment, possibly 2D animation will be fit for such a phantasmagoric theme. But for the program deadline, possibly 3D animation is more controllable given the limited time. During the exploration of the theme there are some similar things found between life cycle with digital art, such as the 1 to 0 code. Based on viewers' expectation, 3D computer visualization techniques were used to create a serial of process that combined biological life sciences and artistic imaginative vision to creatively show a new life cycle code.

Everything in the world is in constant change, likewise our body, in the form of split and fusion. In exploring a perception of life growing, increasingly digital art work can create various life cycle systems combining biological life sciences and artistic imaginative vision together: from representationalism to abstract expressionism, different forms express different modes of sensory delivery. With digital technology, this programme shows different views of life cycle, from the inside to the outside, from microcosm cells to macroscopic universe, from end to a regeneration of life.

Individual and generation

One person can be considered as an individual or being the representative of his/her generation through nationality; the same can be said with this life cycle program. There is only one female character who experiences youth to old age and regeneration. She can be looked as one person or as human kind, and experience generation after generation: it depends on different viewpoints, from inside to outside, from local to international.



Lifecycle 002 Hui Zhu

We hope these digital images can contribute something to the gene project. Do not say that it is death which gives meaning to life because that is only the case when we have no knowledge to fight aging, and no power to go against death.