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Augmenting Reality

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Better Than Opiates

To assume that immersive “VR is dead” is premature. It belies a lack of cultural, historical and technological knowledge, or signals the peculiar foggy hangover that results from a common conflation, frozen in time – entanglements of a giddy technological imaginary with attendant utopian and dystopian visions, disappointments born of early technophilic hyperbole and the twinned forces of technological imperatives that march arm-in-arm with knowledge regimes that privilege the always-ever-new (Lyotard, 1985). Although research in VR has waned in the realms of Computer Science and Interactive Art, a diversity of other disciplines have quietly but significantly expanded its scope and everyday use. Further, ideas derived from early work in VR continue to inform other practices in ways that remain invisible and under-examined.

Our current work involves immersive VR, primarily because it has been shown to be consistently more effective than opioids in alleviating pain (Hoffman, 2009). That a specific form of media can be used to alleviate pain at all, and can consistently trump the widespread, centuries-long use of opioids is exceedingly provocative. Research in VR as a non-pharmacological form of analgesia appears to be limited to shortterm, acute pain. Though the reasons for why VR works to reduce acute pain is unknown, it is discussed in terms of “pain distraction.” Our work is distinctive because it addresses not acute but long-term, chronic pain – recently defined as a disease that is so widespread it is referred to as ‘the silent epidemic.’

Eschewing the more common perspectives that focus on teleological histories or on immersion and presence, we build on our experience in creating well-known virtual environments for artistic, cultural heritage and medical applications. We examine specific affordances of VR through the lens of a fundamental human experience – pain. As in disability and animal studies, to understand pain necessitates a radical questioning of ways of knowing and being – described by Cary Wolfe (2009). Pain teaches us that bodies do not respond in some “objective” manner (Scarrey, 1985). It brings to the foreground embodied perceptual and sensory roles in experience,



Fig. 1: Virtual Meditative Walk

The biofeedback signals – indicators of inner processes – continuously change the visuals and multilayered sounds, helping immersants learn to meditate, and thereby to better modulate their own sense of pain intensity.



Fig. 2: Dancing with the Virtual Dervish: Virtual Bodies, 1992-2003, Diane Gromala & Yacov Shair.

The more literal form of the body, derived from MRI studies of Gromala's body, continuously moves, according to immersants' physical movements. Not depicted are organs; though they appear to be small, vast, non-rectilinear, abstract spaces unfold, provoking proprioceptive disturbances.

many of which are usually beneath conscious experience (Leder, 1990), and underscores the mediating role of culture (Gatchel, et al., 2007). Thus, the inextricable interplays of artistic intent, immersant experiences and ascribed meaning, and “technical entities” (Simondon, 1958) are crucial in our work. Both VR and pain are boundary conditions that bring inner and preconscious processes into awareness, and scramble embodied perceptual processes and normative ways of thinking and being in the world.

References

- Lyotard, Jean-Francois (1984) *The Postmodern Condition: A Report on Knowledge*. Minneapolis: University of Minnesota Press.
- Gatchel, Robert J., Peters, Madelon, Fuchs, Perry N. & Turk, Dennis C. (2007) 'The BioPsychoSocial Approach to Chronic Pain: Scientific Advances and Future Directions', in *Psychological Bulletin*, 133:4, 581-624.
- Hoffman, Hunter (2009) 'Virtual Reality as an Adjunctive Pain control during burn wound care in adolescent patients', *Pain*, Vol. 85, No. 1, 305-309.
- Leder, Drew (1990). *The Absent Body*. Chicago: University of Chicago Press.
- Scarrey, Elaine (1985) *The Body in Pain: The Making and Unmaking of the World*. New York: Oxford University Press.
- Wolfe, Cary (2009) *What is Posthumanism?*. Minneapolis: University of Minnesota Press.

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The Bit Expansion.

Origin of Augmentation Operations
in Mixed Realities.

INTRODUCTION

In the context of the Mixed Realities (MR) paradigm (half atoms, half bits), mixture is related to augmentation operations that bring new dimensions into our experience, a whole that cannot be thought of as a purely physical or purely virtual environment.

Is it possible to conceive augmentation as arising only from the mixture between the physical and the virtual? Or are other factors necessary for augmentation to happen and for experience to be perceived as a unified whole?

DEVELOPMENT

The Metaphor of the World as a Palette

The virtual rests on a numerical materiality characterized by abstraction and intangibility. The metaphor, with its capacity to establish analogies, i.e. to transfer a literal meaning to a figurative one by means of a tacit comparison, acts as a bridge to give substance to the intangible, making abstract realities concrete. Given the heterogeneity of the elements involved in augmented experience (atoms and bits), the metaphor acts as a common substance that merges and dissolves ontological differences. It favors a symbiosis between symbolic production and reality, facilitating the dissolution of the limits between these two instances.

The Metaphorical Interface as a Bridge for Acting in the World

The interface, the space where three heterogeneous elements converge (a person, an action and a device), allows the user to act upon the mixed environment. The greater the analogy between the interface design and

the grammar of the possible actions related to a specific phenomenon, the greater the possibility of fusion and the consequent perception of a real phenomenon with new properties.

The metaphor is the figure that favors fusion by transferring the logic of acting upon the everyday world semantizing devices and the behavior that these make possible (actions) in the constructed environment.



Fig. 1: Schema about the role of the metaphor in mixed environments.
Photo: Andrea Sosa & Laura Maiori 2009.

Immersion or the Illusion of Being inside a World

Immersion as an experience takes place when the impossibility to distinguish real and symbolic space, the behavior that is analogical to the laws of the physical world, and the environment transparency tend to make users feel they are within a modeled world.

Representation limits, scale modeling, sensory stimulation, interactivity levels and behavioral scopes are key dimensions for the construction of an immersion effect.

Augmentation Theory

In order to understand augmentation operations, we need to systematically relate the four variables mentioned before: matter, metaphor, interface, immersion.

For augmentation to take place, we must enter the illusion of a unified space with new properties (immersion level). The immersion effect is brought about by a precise articulation between (mixed) matter and interface (with its three components). Precision derives from the metaphorical approach, particularly from the degrees of analogy the metaphor absorbs from real, everyday life, and its subsequent transference to all levels of the work. The greater the level of semantization in the articulation of matter and interface, the greater the possibility that the appliance will become transparent and, therefore, that augmentation will take place.

CONCLUSION

In the definition of MR, special emphasis is placed on the degree of presence of the real and the virtual. From our perspective, the augmentation operation goes beyond a simple addition and exceeds the level of gradualness. Even though mixture is a fundamental operation, augmentation takes place

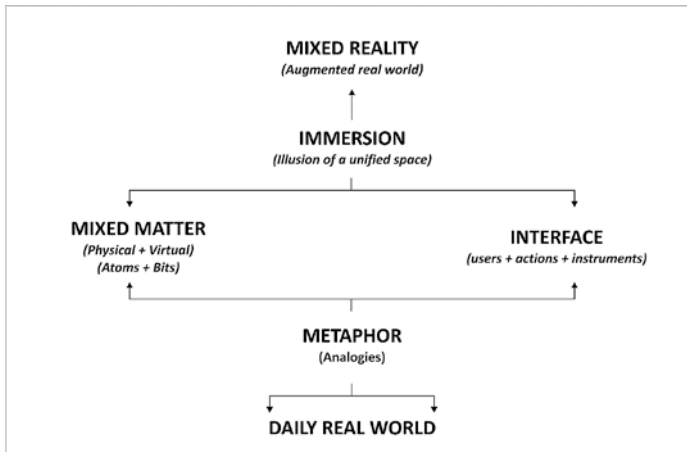


Fig. 1: Schema representing a proposed theory about the links between metaphor, matter, interface, immersion and mixed realities augmentation development.
Photo: Andrea Sosa & Laura Maiori 2009.

with the combination of other factors of articulation: the interface as a bridge between two worlds, the metaphor as a link between the concrete and the abstract, and immersion as the illusion of being within a unified environment. All levels must be present and interrelated for augmentation to happen. Without atoms and bits, mixed reality is not possible. In the same way, without metaphorical mediation to merge different components, the mere articulation of physical and virtual instances does not seem to guarantee the emergence of augmentation and the perception of a unified space.

(Full version of this paper: <http://www.scribd.com/lauramaiori>)

References

- Bonsiepe, Gui. (1998). *Del objeto a la interfase*. Buenos Aires. Ed. Infinito.
- Ishii, Hiroshi; Ullmer, Brygg. (1997). *Tangible Bits: Towards Seamless Interfaces between People, Bits and Atoms*. [Online]. Retrieved from: http://tangible.media.mit.edu/papers/Tangible_Bits_CHI97.php. [Accessed 12 March 2009].
- Maiori, Laura; Sosa, Andrea. (2004). *Aumentando lo Real*. [Online]. Retrieved from: <http://www.scribd.com/lauramaiori> [Accessed 12 March 2009].

Brass Art

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Digital Doubles

Replication of the self and engagement with liminal spaces has informed our collaborative practice. 3D body scanning, processing and digital printing proffered new methods of engagement as yet uncharted to capture ourselves faithfully. (<http://www.brassart.org.uk>) Test body scans suggested the potential to reveal public and private aspects of 'the self' – representing both the physiological and psychological aspects of a subject.

Digitised Doubles was a practice led enquiry funded by the Arts and Humanities Research Council (UK). The aim of the investigation was to examine how artists might creatively engage with the possibilities afforded by advances in 3D scanning, 3D software applications and 3D rapid prototyping to achieve self-portrait exploring the poise and unique character of an individual subject.

The enquiry was informed by two non-invasive 3D body scanning sessions in which the artists explored the creative potential of this technology. Imagining how each artist's body would fold around or into a virtual counterpart enabled us to individually enter a state of reverie where the real and the imagined could co-exist in this liminal framework. This performative process was determined by the dimensions of the booth and our ability to hold a position for the requisite 8 seconds.

Cloud data, derived from the two sessions, was collected, converted and exported into 3D modeling environments where it was painstakingly repaired and manipulated. This retained the faithful representation captured by the reflected light which was closer to a photographic image or cast than a portrait modelled from observation.

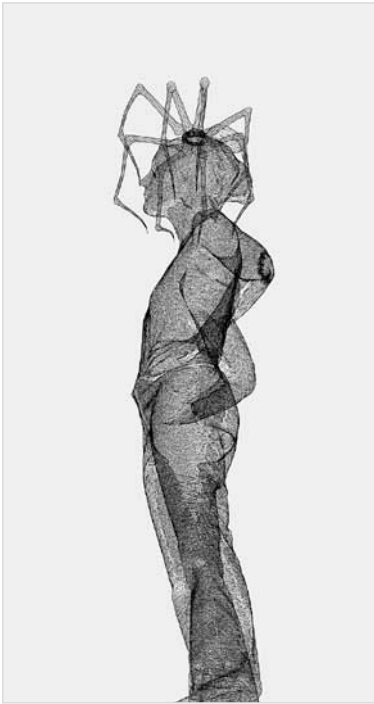


Fig. 1: Brass Art: Inside the Invisible

Nothing has made me realise the perceptual change between a sculpted figure and a 'real' print, formed from the coordinates of the artists' bodies, more than these semi transparent figures. They appear to be miniature facsimiles of the artists and at first sight make you blink in disbelief; more super-real than any Duane Hanson, Ron Mueck or waxwork sculpture. (Lilley, Clare, 2008, p11)

Virtual 3D objects were physically incorporated into each portrait to occupy the predefined spaces articulated in the scanning booth. The playful manipulation of the body's anatomical boundaries through metamorphosis coupled with the evolution of individual narrative tableaux, enabled the artists' portraits to shift between the real and the virtual – as they had in our imaginations. It is this virtual suturing that informs our practice and has led to a series of installations including *Moments of Death and Revival*, *Inside the invisible* and *Rooted and Established*.

An uncanny feeling is evoked by the digital doubles. This is true both for ourselves and those who know us, as well as strangers who often describe the memories they stir. The digital doubles enable us to occupy a place outside and beside ourselves. Our 3D replicas are a literal outworking of our narcissistic capabilities for self observation, rendering new meaning for the idea of the double.

As Freud observes,

The double was originally an insurance against the extinction of the self or, as Rank puts it 'an energetic denial of the power of death', and it seems likely that the 'immortal' soul was the first double of the body. (Freud, Sigmund, 2003, p 142)

In the kinetic work *Moments of Death and Revival 2008*, the 3D artefacts produced through this process became props in an expanded shadow play, where the artists were presented as replicated and morphed hybrids engaging in a mythical danse macabre. A travelling light allowed transformations to appear and disappear, the metamorphic elements to spring to life and the shadowy tableaux to unfold.

[...] in Brass Art's phantasmagorias, animated shadows have the quality of spatial singularities; they open another dimension inside the photographic world, a dream-like register. (Milne, Louise, 2008)

The desire to further explore the out-of-body experience of our virtual selves resulted in the three screen video installation *Inside the Invisible*. In this work each screen represents the space occupied by one of the three artists – their wire frame images brought to life, in turn, by the journey of a virtual camera. The resulting data field re-imagines the conjoined body of artist and animal as a grid like carapace, navigable as both an external and internal landscape, and through this passage an intimate and shifting relationship between each of the artists and their counterpart is revealed. This is emphasised as the sonic composition by Monty Adkins traces the visual exchange between their data and resonates with the unfolding narrative.

References

- Brass Art <http://www.brassart.org.uk> [accessed 02-06-2010]
- Freud, Sigmund (2003) *The Uncanny*, London, Penguin p 142
- Lilley, Clare (2008) Introduction. In: *Brass Art: Skyscraping*, Yorkshire Sculpture Park p11
- Milne, Louise (2008) *The Broom of the System: On the Quarrel between Art and Narrative*, Tramway, Glasgow
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From the sonArc::project to C_plexus solaris

From In-forming Plasma in Vitro to
Transforming the Solar Storm in
2012 in Vivo

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In 2012 NASA scientists expect the next solar super storm, an “electromagnetic tsunami”, like in September 1859 when auroras could be seen all over the world and the new technology of electric telegraphy was disturbed by natural radio – decades before our radio had been invented.

In 2003 I have started my sonArc::project. Since then I have been exploring the question of the “domesticability of lightning” with the sonArc cycle – the coding or forming of high-frequency high-voltage plasma as a pure electrical / electronic interface, a direct yet bodiless connection to an electrical system and its medial-epistemic roots and changing formats. sonArcinterfaces are high-voltage-DC-arcs based on the studies of Duddell and Poulson or AC-arcs based on the inventions of Tesla around 1900. It is a reversal of de Maria’s “Lightning Field”. The system, an amorphous sculpture of electromagnetic waves, is scalable. When the lightning’s impulses connect in order to form long waves that resonate with the ionosphere, the weather becomes modelable.

Thus, the most important medium in the 21st century, that is electricity, has physically no materiality in its heterogeneous manifestations. Materialism has lost its material. “Electricity is the pure purpose of the form that frees itself from it, the form that begins to sublimate its indifference”, writes Hegel. Ever since electricity began to be systematically investigated. It has raised an ontological problem – alongside with Hegel, Marx and Engels who also attempted a definition of this “fluidum” in order to leave no scope for metaphysical speculations. (Meanwhile, ontology founders upon electricity, and it, immaterial, increasingly vanishes from the collective consciousness over the course of the century: electricity has become nothing more than a

crude carrier of energy that drives locomotives and kitchen appliances. In its wake the electronic disappears, giving way to the digital. But what is numbered and calculated there and what does it flow upon or is it transmitted by? Where are the transitions?

Thinking the media in art can mean letting the “at-hand-ness” of their medial apparatuses and their simulation enter into their form, or integrating the paradox of their medial materiality, for example that of the electrons and their interactions, into the form – plasma as an amorphous state.



Fig. 1: 1 sonArc::ema, WKV, Stuttgart 2007 Photo: artist / 2 WHITEph, Bethanien, Berlin 2004 Photo: A. Messmer / 3 C_plexus solaris 2012, Modell



Fig. 1: 4 sonArc::ion, TESLA, Berlin 2005 Photo: S. Vidè / 5 sonArc::ema, ars electronica, Linz 2008 Photo D. Gelfand / 6 sonArc::ema, WKV, Stuttgart 2007 Photo: de Waha

Selim Lemström built the first and only machines on a mountain in Lapland which created artificial induced aurora borealis. In 2009 I acquired the rare original three volumes of Lemström’s scientific studies from 1886/87. Based on inventions and ideas of Nikola Tesla, explorations of Lemström and the actual NASA and ESA research on SPRITES (= transit luminous events in between the tropo- and ionosphere) and their radial echo in natural electromagnetic ELF (Extremely Low Frequency) waves, we are transforming atmospherical plasma live stream data from spaceweather labs into ultrasonic and plasma-modulated air and high frequency electrical fields within space which let fluorescent substances and tubes glow. You can perceive this for example in my current blackcube installation at Laboral in Gijon, Spain. “Sferics” are the radiosignals from northern lights transformed into sound. Their hearable soundfigures are “whistlers” and “cracklers.” The inuits

could hear the aurora borealis which Alexander von Humboldt in the 18th century also mentioned. “The whistling crackling noise which sometimes accompanies the aurora is the voice of these spirits trying to communicate with the people of the earth,” the anthropologist E. W. Hawkes reported about the “heavenly regions” of the Inuits in 1916.

With sonArcs, huge spherical horns and HOSOC, a hovering sound architecture Thomas Reinke and I have patented last year, we are going to transform the solar storm in 2012 – natural radio music – live into an space weather opera during the solar storm at night on an open field: C_plexus solaris – “victory of the sun!” – 99 years after Malevitch, Matyushin and Kruchenykh’s nihilistic futurist opera.