ISEA2015
Proceedings of the 21st International Symposium on Electronic Art
ISSN: 2451-8611
ISBN: 978-1-910172-00-1

Hybrid Ontologies: An Attempt to Define Networked Mixed Reality Art

Julian Stadon

Salzburg University of Applied Sciences
Salzburg, Austria
j.stadon@fh-salzburg.ac.at

Abstract

This paper provides an introduction to recent research that explores the psycho-topographical relationship between bodies of matter, embodied data and data bodies, presenting a contribution to the field of mixed reality art, with a particular focus on post-biological identity. The research presents an exploration of several theoretical discourses, along with introducing a number of new hybrid terms, in order to reposition current discourses relating to this field. Through this, a new speculative and flexible framework is proposed that disrupts existing mixed reality discourses, in order to focus specifically on networked mixed reality art in relation to post-biological identity. While there was a considerable practical contribution to the development of this research being presented, this paper focuses particularly on the development of a theoretical framework for speculatively understanding the field, articulating the background to this process and the resulting hybrid terms that have been established in order to better discuss the field.

Keywords

Networked Mixed Reality Art, Post-biological Identity, Embodiment, Speculative/Flexible Frameworks, Hybrid Terminology, Transinduvidual Ontology, Hypersurface Interfacing, Data Bodies

Introduction

This research offers a contribution to an emerging, culturally orientated discourse regarding embodied mixed reality interaction. Through a convergence of existing theoretical discourses and practical experimentation, it seeks to disrupt, challenge and merge existing analyses of hybridised agency and identity, particularly in mixed reality data transfer networks in art. The majority of specific research in mixed reality systems has come from Computer Science and this paper offers a new perspective, from an arts and philosophically based discourse, that aims to disrupt current linear models of understanding the field, through the application of various theories relating to embodiment, data and identity, within a flexible framework of media arts practice. While a clearly documented prehistory of contemporary mixed reality art exists, currently there is a lack of specific research in the particular field of networked mixed reality art environments. The field exists currently in an awkward position, within other broader fields, such a virtual art, or immersive/interactive art and this does not allow for an appropriate focus on the intrinsic qualities that specifically relate to the field.

The concept of mixed reality can be argued to be inherent in all representational spaces (such as art), however recent developments in bridging viewers with digital representation, through mixed reality interfacing, have brought about the need for further analysis of these new post-biological, hybridized states of being and identity that traverse contemporary paradigms of Being. With the advent of networked society, previous linear models of identity, consciousness and reality, such as Milgram and Kishino's Mixed Reality Continuum [1] are rendered obsolete and therefore new representations of these more complex states of Being are required. The practical component of this research experimented with such notions in order to demonstrate that mixed reality artworks often situate themselves across a number of different reality states and in the case of certain examples, also simultaneously networks with other realities and environments (for example merging a virtual environment with an augmented reality space).

Figure 1. Paul Milgram, Haruo Takemura, Akira Utsumi, Fumio Kishino (1994) Augmented Reality: A Class of Displays on the Virtual Reality Continuum, SPIE Vol. 2351.

"Obviously, mixed realities form an integral part of the prehistory of media evolution described here. Their combining of elements of physical and virtual spaces is leading to the emergence of a new cultural technique." [2]

This statement by Grau suggests that contemporary constructions of identity, rather than situating themselves somewhere on a linear model, follow a more rhizomatic evolution and existence, that is constantly integrated within a layered topology of other networks. This claim shares common ground (within rather different articulations) with the work of Deleuze & Guatarri, Latour and Ascott, along with several other discourses in one way or the other. This leads one to speculate that there is a need to disrupt and deconstruct these disparate, heterogeneous rhetorics, in order to reposition and integrate them within a flexible hybrid framework. Such an endeavour requires also, a redefinition of related terminologies, in combination with developing new hybrid terms for describing networked mixed reality in a homogenous way. Through experimental creative production, these theories relating to networked being can be merged, made tangible and played out, in order to pragmatically reposition them collectively. The pro-

cess of actuating hybrid theoretical propositions through creative practice also allows for new methods of art production, in particular, embodied mixed reality data transfer to be proposed.

It is important to note that this paper does not claim that there is *no* model or framework for understanding such research, but rather, that mixed reality is not currently recognised as a specific art medium in a networked post-biological context. While it is beginning to be a term used more in art, *mixed reality* has a particular established position in computer science already and this research attempts to define it as a unique field, situated in relation to the wider fields of media art, virtual art, embodied art, networked art and so on, rather than simply adapting a definition of the term from another field and then recontextualising it within media art. There is a rather unfortunate history of the humanities borrowing terms from other disciplines and being creative with them (and perhaps this paper joins the club also). All media arts fields can be considered to be rather problematic to classify, due to their tendency to be convergent discourses. In response to this problem, this research aims to define mixed reality art in a speculative, flexible way, in order to present a hybrid methodology for mixed reality art that focuses on augmentation of data bodies, in order to embody post-biological identity.

This endeavour offers a new contribution to a range of existing discourses and therefore it needs previous models of understanding to be articulated, addressed and rethought. From this process, a research position is established within a clear contribution from practice based research, [3] however a convergent practice that actually *relies* on transdisciplinary methods such as mixed and augmented reality arts discourse requires a succinct positioning within existing theoretical and practical frameworks, in order to appropriately progress discourse in the field. Currently there is no definitive text or terminology that focuses explicitly on the topic of post-biological identity in mixed reality art and this research aims to contribute towards the establishment of such a text.

Mixed realties " […] are making an important contribution to expanding the boundaries of visualization and the possibilities of visual intelligence, to differentiation of the degree of possible complexity and, thus, to amelioration of the bittersweet side of immersion. This may help virtual spaces cast off their reputation as surrogates sooner than expected and to aid their development toward a new role as augmenters of experience in the physical world." [4]

A Brief Overview of Practical Research Methods

While the practical component to this research is not the focus of this paper, it is important to understand its processes and contribution to the establishment of what is being presented. Through creating real-time data transfer systems that bridge representations of embodied data and data bodies in mixed reality environments, the practical outcomes of this research traverse related theoretical discourses in order to attempt to propose new notions of post-biological digital identity, through artistic practice. This process involved significant analysis of mixed reality data transfer processes (within computer vision science and philosophy) in relation to understanding of networks and interfaces (from a technical, art and design basis), based on a number of existing theoretical discourses, in order to analyse the field within a framework that acknowledges *all* previous research on the topic. In this process a wide range (and vast amount) of theoretical, technical and practical research was analysed and then furthered through experimental creative practice. The actuating of disparate theoretical discourses through arts practice focuses on five main objectives:

1. To define mixed reality art, as a legitimate transdisciplinary field in relation to the wider field of media art based research
2. To present theory relating to mixed reality interfaces, interactive networks, identity and the body in writing and to merge these discourses through creative practice.
3. To propose a new theoretical and practical framework specifically for mixed reality art, that focuses on representations of the body and post-biological identity.
4. To articulate post-biological identity as a relationship between embodied production and consumption of art and embodiment in regards to the representation of data and ideas in practice, through mixed reality art.
5. To provide better understanding of this relationship through the introduction of new hybrid terms to describe the field.

This process involved the creation of what one might term bridged non-autonomous digital agents. These agents are embodied through being, in some way, representations of real time data that are borne from physical interactions between bodies and mixed reality environments. These agents, or rather *data bodies*, take many different forms, based on the nature of the data in each iteration and are constructed according to a range of interface and content-based solutions that rely on viewer/user participation to function. In such works there are often a number of different options for viewers to access and participate in them, through the provision of a range of simultaneously integrated mixed reality interfaces, including physical, augmented, virtual and networked solutions. This holistic approach to representation across reality states aims to propose that an individual can no longer claim to exist in any one unique state, but rather, that we are in a constant fluxus state of reality, across a broad array of networks and different systems of engagement in which all existence is somehow integrated.

Initially a method was established that used networked augmented reality for real time visual data transfer of embodied representations into virtual environments. These representational forms of agency, while born of data, take on the appearance of bio-referential forms and thus *become* embodied. This method developed a new technique of presenting the real time relationship between embodied interaction and embodied data that focuses also on identity, data storage and ownership. From a series of practical experiments, a reassessment of the reviewed literature was made. This process followed an Action Research model of planning, implementation and review in order to evolve a set of hybridized terms that can be used to best describe the practice of mixed reality arts research. These terms seek to function as an

evolving framework that is flexible and speculative and will be introduced and defined later in this paper.

A Convergent Theoretical Background

Due to recent developments in mixed reality interfacing, interaction and networking technologies, new modes of representation have definitely emerged. The advent of this requires further development of previous research, in order to define how these new mixed reality systems of embodied agency impact on arts discourse and in a wider context, what the implications of such developments are in regards to identity and being.

Networked embodiment of physical interaction destabilises traditional orthodoxies of thought regarding mixed and augmented reality art, through challenging understanding of their representation, confronting materialism, accelerating and smoothing social engagement within them and most importantly, demanding participation in them. This furthermore challenges our understandings of consciousness and presence in way that requires rethinking current available frameworks for representing identity and the body [5]. To achieve this, the following sections attempt to present, merge and apply existing theory on the general topic of identity, the body and embodiment to specifically focus on mixed reality arts discourse. It also aims to validate mixed reality in regards to post-biological identity, interactive art and embodiment, while further establishing the field as a legitimate practice within the media arts.

Bruno Latour's articulation of Actor Network Theory (ANT) is an appropriate model through which to position the various elements within this research. Although it is called a theory, ANT does not so much explain why or how a network takes the form that it does, rather it functions as a method for exploring the relational ties within a network (which consists of many different material and non material elements). As Latour suggests: "explanation does not follow from description; it is description taken that much further." [6] In other words, it is not really a theory of anything, but rather a methodology for understanding such systems. Latour's approach is related to other versions of material-semiotics, specifically the work of Deleuze & Guattari, Foucault, Ascott and Haraway. The application of ANT to such research can also be seen as a way of referencing how common activities, habits and procedures sustain themselves within uncommon networked situations, such as embodied mixed reality interaction.

Through ANT, Latour attempts to explain the convergence of both semiotic and material networks into a shared system of engagement. In this process the various nodes of actors that are involved in creating meaning, consist of both material and semiotic entities that are embedded in the exploration of explicit strategies for relating different elements together into a network so that they form a perceivably coherent whole. These networks are often transient, existing in a constant state of flux, between creating and recreating. This means that connected activities need to be repeatedly performed or the network will eventually disintegrate. [7] Networks of relations are not intrinsically coherent, and may indeed contain conflicts. Social relations, for example, are only ever in process, and must be performed continuously, as is the case for both physical and mixed reality social environments.

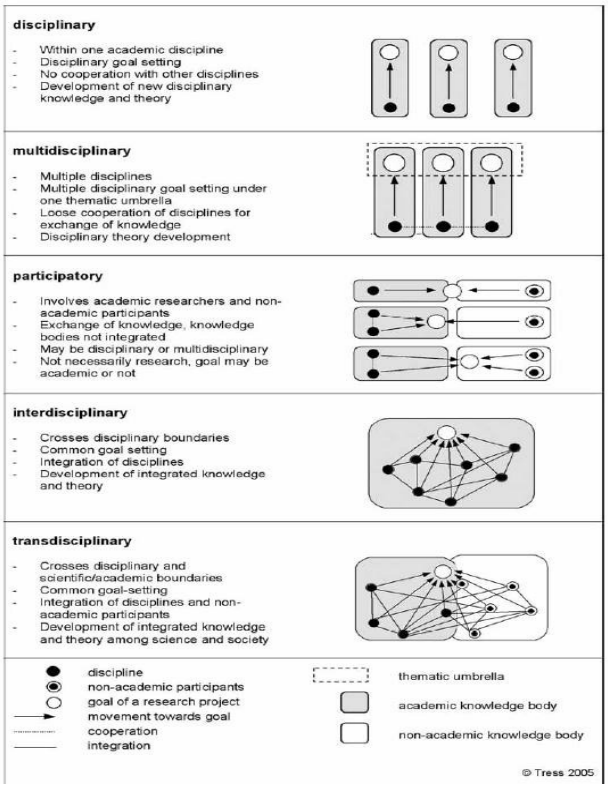

Figure 2. Bärbel Tress, Gunther Tress and Gary Fry (2005) Defining Concepts And The Process Of Knowledge Production In Integrative Research

The field of mixed reality art is extremely transdisciplinary and inclusive by nature and therefore rather broad as a result. Due to the constantly evolving range of interface, content, networking and interaction options available (along with the current lack of a defined structure of understanding this particular field) there are also no specific methodologies for mixed reality art practice. In order to bring the various manifestations of mixed reality art environments together, a network of salient relationships that are intra-active need to be created within this discourse. An ANT-based approach to both the processes and presentation of this research acts as a diagram for articulating the field. More importantly, it provides an established method for dealing with systems that might appear incohesive or unrelated, or the opposite of this.

ANT also provides a sound flexible method for understanding the disruptive relationships between human and non-human agency. ANT proposes the equal treatment of concrete human and non-human actors within networks and this also applies to their assimilated representation (for example real time embodied data in mixed reality art networks). ANT assumes that all entities in a network can and should be described in the same terms. This is called the principle of *generalized symmetry* [8]. The rationale for this is that differences between the various actors/agents are generated in the network of relations and therefore should not be presupposed. This approach allows for the ongoing evolution of a network (for example in the construction of a model for post-biological identity in mixed reality art).

Following the application of ANT to this research process, the development of an Action Research model (as previously mentioned) was established. This was designed in a way that addressed the need for new methods for developing further discourse in networked mixed reality art and embodiment, in order to focus on post-biological identity. Due to the novel and open nature of such a framework for the research, a range of other theories were explored and incorporated as considerations into the research process, such as Roy Ascott's reconceptualisation of Syncretism.

Syncretism has traditionally been regarded as an attempt to harmonise and analogise disparate or opposing viewpoints [9]. Throughout history syncretism has been used to merge different beliefs and views, however Ascott's (rather ambitious) approach to syncretism was developed as a means to further understand multi-layered worldviews, both material and metaphysical that are emerging from our engagement with pervasive computational technologies and post-biological systems. In the case of this research an attempt was made for Syncretism and Actor Network Theory to be integrated, in consideration of the collaborative work of Deleuze and Guattari, in particular reference to the 'deterritorialisation' of the human body through its dispersion into multiple reality manifestations, in relation to how mixed reality data transfer might constitute a 'reterritorialising' effect on our syncretic understanding of post-biological digital identity. [10] The texts of Deleuze and Guatarri, that in fact influenced both Latour and Ascott's work, were also considered in reference to their concept of Body Without Organs (BwO).

"When you will have made him a body without organs,
then you will have delivered him from all his automatic reactions
and restored him to his true freedom." [11]

One could say that participation in mixed reality networks (which are part of a contemporary post-biological condition) are by nature schizophrenic, shifting and often nonsense (through the novel nature of the technology and content) however, it is also functional within (social) systems. It is also literally surface orientated by nature, or as I propose: trans-topological through mixed reality hypersurfacing. Deleuze first mentions the phrase in a chapter of *The Logic of Sense* called "The Schizophrenic and the Little Girl". This text presents ways of encountering the world both distinctly and peripherally, at the same time. [12]

According to Deleuze, in schizophrenia words collapse into the bodies that produce and perceive them, rather than into superficiality. Deleuze defines the Body Without Organs as: "...a new dimension of the schizophrenic body, an organism without parts which operates entirely by insufflation, respiration, evaporation and fluid transmission (the superior body or body without organs of Antonnin Artaud)." [13] This body is also described as speaking an inarticulate language that is embedded more in the primal act of making noise, rather than in articulating specific data. The *Capitalism and Schizophrenia* series, written with Félix Guattari further explored Deleuze's concept of BwO, expanding the term to refer to actual (literal) bodies, in relation to a range of variant realities.

For Deleuze and Guattari, every physical body has a limited set of characteristics, habits, movements and affects, however every body also has a virtual dimension to it: a vast reservoir of potential traits, connections, affects, movements, etc. One might call this a data body, or data body bank. This collection of potentials "make oneself a body without organs" [14] or, in other words, a living, active, personified experiment that can activate virtual potentials. Often the potentials are activated through becomings: when they combine with other bodies (or BwOs), which is directly referred to by Latour in his *Reassembling the Social* text [15]. This particular articulation of the concept proves a very succinct metaphor to use when discussing the process of online (post-biological) identity contruction along with being a constant and direct point of reference within the practical exploration of post-biological identity in mixed reality environments. It is a rather easy concept to materialise/represent and also for the viewer to receive, as demonstrated in *organtrader2010* project, where the viewer literally fills an augmented body with organs that are representation of data from MRI scans of my (the 'artists') body and then these organs are transferred into a virtual organ trade network with a real monetary economy in Second Life. [16] I first discovered the term when researching the work of Australian artist Stelarc, who has also regularly referred to this concept within his cyber art practice. [17]

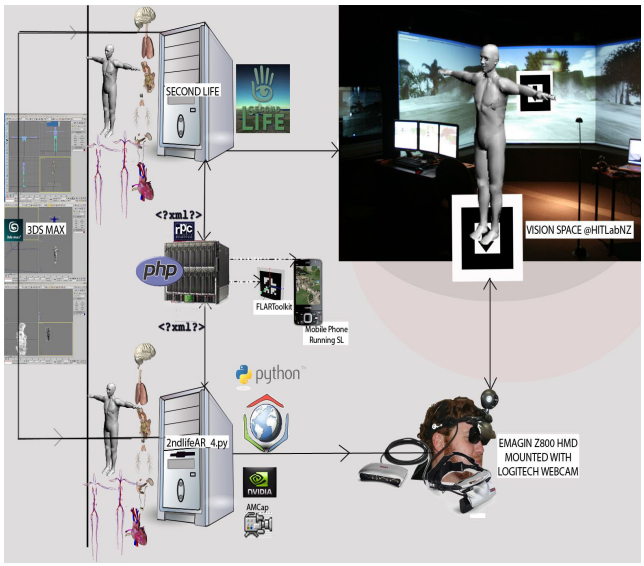

Figure 3. Stadon (2011) organtrader2010 technical diagram

This research trajectory focused on systems that allow for the bridging of the body with its virtual incarnations (BwO in a literal sense), in practice, through unique transfers of embodied data (data that refers to the body, such as 3D body mapping, microscopy biofeedback weather data, motion tracking). These processes involve interfacing artworks that allow for embodied interactions with data bodies (BwO). These are bodies of data in (Syncretic) networked systems that relate specifically to an individual's participation in the system (ANT). The outcomes from these processes, through a series of experimental representations of embodiment in juxtaposition with data bodies, proposes a new framework for understanding participation in such emerging systems, that repositions existing discourses in this field for a more focused post-biological perspective on identity.

The ways that agents are represented in the research outcomes are a differential embodiment of the 'bodies', which first generated that data in their everyday activities. This interrogates the meaning and consequences of data bodies and, in doing so, enables us to question the notion that information, once extracted from the embodied self and placed within a computer system, becomes an intrinsically linked post-biological augmentation of a visceral state. In posing this question we discover that, contrary to what we might at first assume, data is also embodied. The existence of 'embodied information', linked to and yet not the same as embodied selves, creates an interface through which humans negotiate their identities across the boundaries of different reality states, more or less virtual, and yet always involving the mapping or writing of that identity onto 'a body'. By having bodies both material and virtual, humans have become post-biological even as their biology remains the primary point of reference for the data gathering, which enables this transition to occur.

Figure 4. Stadon (2012) organtrader2010 Install Documentation

Humans, like all organisms, are part of a wider system of shared environments beyond the notion of self, including biological, social, political and digital ecosystems. These environments are becoming increasingly networked with individuals, through online identity archiving (data body banking) in social media, real time communication and data exchange, the continued development of big data integration to existing human systems such as political, social and environmental intervention. These systems act as networks that include a range of actors within them. As Latour suggests, these actors consist of not only a range of both objects (virtual and real), but also other phenomena, such as the weather and social exchanges, along with goods and services. This led the practical research to expand the notion of embodied interaction beyond the body and data bodies, to also include environmental conditions, in particular the weather. Atmospheric conditions are, like bodies, convergent within mixed reality environments, so a development of a research discourse in mixed reality art using weather data was also developed.

In mixed reality, a: "panoramic view is joined by the exploration of an image space that gives the impression of a ''living'' environment. Interactive media have changed our idea of the image into one of a multi- sensory interactive space of experience with a time frame. In a virtual space, the parameters of time and space can be modified at will, allowing the space to be used for modeling and experiment. The possibility of access to such spaces and communication worldwide via data networks, together with the technique of telepresence, opens up a range of new options. Images of the natural world are merged with artificial images in ''mixed realities,'' where it is often impossible to distinguish between original and simulacrum." [18]

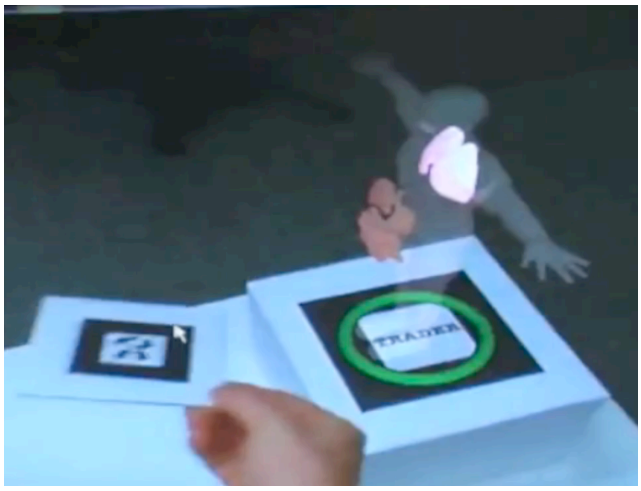

Figure 5. Stadon (2015) organtrader2010 mixed reality data transfer of virtual organs to a mixed reality 'trader' avatar that traverses augmented space (as seen) and virtual space (in the Second Life environment) depending on user interaction.

This strategy aims at producing a feeling of immersion and presence that are enhanced further through interaction with what appear to be living digital ecosystems. These environments represent the link connecting research on presence (technology, perception, psychology) and research on artificial life and bioinformatics, an art that has not only reflected on in recent years but also specifically contributed to the further development of image technology.

The practical outcomes from a range of experiments that create a range of artificial mixed reality real time data transfer environments constitute, in their own right, a flexible framework for research in the field of embodied post-biological identity in mixed & augmented reality & real-time data transfer art. Recent developments in bridging non-autonomous relationships with machines through mixed reality interfacing has brought about the need for further analysis of these new post-biological, hybridized states of being that traverse traditional paradigms of time and space. As previously mentioned however, in the context of art history, mixed reality is not a new field, however the particular mediums and methods of representation discussed in this paper are, and this is why there is a need for a redefinition (and more importantly a new analysis) of it's impact on society and art. This is particularly the case in regards to how we define such an emerging, volatile, if not transient field.

The main objective of the theoretical writing involved in this project was to situate the research within current theory regarding networked mixed reality transferal of embodied data (data relational to bodies) within a paradigm of post-biological identity. Relevant theories such as Hayle's Posthumanism, Bergson's Intuition as Method, and the previously articulated Body Without Organs, Deterritorialisation and Reterritorialisation, Syncretism and Actor Network Theory. Here an attempt has been made to juxtapose and merge these variant discourse, in order to create a hybridised framework of understanding for this field of mixed reality art, within the context of real time data transfer, in order to understand how this contributes to the genealogy of post-biological identity.

A (re) Definition and Explanation of Terms

While most of the terms that are explained in this section are already established, there is a need to contextualise their specific meanings in the context of this research Layout. Part of the new knowledge in this research is situated in producing a framework specifically for discourse in mixed and augmented reality and in accordance with this new terms have been established to better suit certain phenomena within the emergent field.

Post Biological Identity

By having bodies both material and virtual, humans have become post-biological even as their biology remains the primary point of reference for the data gathering, which enables this transition to occur. This research provides a new framework for understanding post-biological identity that focuses on the mixed reality nature of these ubiquitous, multi faceted networks of self. It extends current discourse to argue that Posthumanism exists inside the history of a post-biological reality. From the birth of human representation, for example prehistoric cave painting [19] and personal narrative (story telling) we have split our identities into two entities. Semiotics explains this as the signifier and the signified (though it does not directly address individual identity). Once we split into the actual and perceived, or (to put it rather arbitrarily) the virtual and real self/second and first self-etc. We became, as individuals, emancipated from our bodily confines and thus rendered post-biological in our understanding of identity.

Brian Massumi states, "The body, sensor of change, is a transducer of the virtual." Through existing in these virtual representations, that are directly linked to living bio-systems, we effectively sense, feel and think in a way that hybridizes the virtual with scientific inquiry, and therefore we require a discourse that addresses whether this does in fact make us post-biological. [20] Through the development of bridging techniques that use real time embodied data transfer to create mixed reality art networks, the practical research for this thesis has created a practical framework for not only articulating, but also contributing to the (until now hypothetical and speculative) theoretical discourses in this field.

Dividual Identity

The work of Gilbert Simondon has influence much of the discourse in this field, and as such; his work provides a foundation for the establishment of the discourse in post-biological identity throughout this research. [21]

One theorist heavily influenced by Simondon was Deleuze and in *Postscript on the Societies of Control,* a theory of dividual identity is presented as an articulation of the relational aspect of all identities, in regards to becoming and divisibility. For Deleuze: "in control societies . . . the key thing is no longer a signature or number but a code: codes are *passwords,* whereas disciplinary societies are ruled (when it comes to integration by resistance) by *precepts.* The digital language of control is made of codes indicating where access to some information should be allowed or denied. We're no longer dealing with a duality of mass and individual" from the modern era. Instead, "individuals become '*dividuals,*' and masses become samples, data, markets, or '*banks.*'"[22] He uses money as his example to explain this further, stating that in disciplinary societies (rather than societies of control, which he declares we have progressed into some time ago) money was always referred to as minted money, in relation to other physical resources, such as gold. [23] In today's societies, money is considered in relation to floating rates of exchange that are in a constant state of flux.

This particular late text from Deleuze seems rather unrecognized (unfairly so in my opinion): "Deleuze's sketch-like analysis has been influential for the way postmodern or late capitalist society has been mapped by critical theory." [24]. Unfortunately, it was written right at the end of Deleuze's life, and seems to have remained rather lost, amongst his other more prominent theories: "While this essay is both exciting, and disappointingly underdeveloped (..) " [25] Contemporary theorist Alexander Galloway frequently makes reference to this text, labeling it as "…at the beginning of something new" [26]. Mixed Reality research should incorporate this term within Galloway's framework to further understand the layered (or folded) nature of the post-biological condition.

Embodied Mixed Reality Art

"This is the basic concept of the mixed reality stage: a virtual space full of information, which is activated, revealed, re- organized and recombined, added to and transformed as the user navigates the real space." [27]

To define any art form as mixed reality is rather paradoxical. All art is representational and spatial and therefore all art is mixed reality. In this proposition, the term refers specifically to art that uses convergent digital environments to facilitate embodied and interactive participation with them. Embodied Mixed Reality Art is art that implicitly incorporates real time data, relating to those interacting with it, into the construction of explicitly post-biological content in the work. Embodied art creates a situation where the body of the viewer is implicit in the creation and continuation of the work through performative interaction with it and the subsequent documentation and archiving of these actions.

In *Parables for the Virtual* [28], Brian Massumi suggests that we need to reposition "movement, sensation, and qualities of experience" back into our understandings of embodiment: "Our entire

vocabulary has derived from theories of signification that are still wedded to structure even across irreconcilable differences" [29] This discourse engages with movement and continuity in regards to the body and interactive art environments.

Massumi suggests that, "When a body is in motion, it does not coincide with itself. It coincides with its own transition: its own variation". [30] Here the body moves beyond being a "known" structure, towards a "state of invention", or an "accumulation of relative perspectives and the passages between them . . . retaining and combining past movements" [31] continuously "infolded" *with* "coding and codification". [32] This research articulates embodied mixed reality art as relational, emergent and incipient: topological but not plottable and through acknowledging the problematic nature of describing it, present a framework for arts based research in the field.

Discussions of so-called mixed reality, a catchword that is still new and trendy, currently center on connecting real spaces, including their forms of cultural and social action, with image processes of virtual environments. One advantage of mixed realities is that in general, the observer is not obliged to wear a head mounted display, or enter into the computer- generated body of an avatar. Mixed realities make accessibility and orientation easier, while still allowing interaction with new fields of action. "Thus, the hermetic image strategies, as represented by previous virtual realities, have now been joined by a concept of hybrid spaces, part real and part virtual. They are dialectical connections of physically and media-communicated image spaces, where usually a darkened space is linked to a large format screen to form a mixed reality." [33]

Hypersurface Interfacing

Giannachi states, "The hypersurface is a zone of exchange between consciousness (language and text) and levels of the inorganic… Able to present dichotomous relationships, between representation and matter, inside and outside, organic and inorganic, the hypersurface is the site of virtual performance." [34] For the construction and exploration of mixed reality to occur interfacing is required to bridge the virtual environment with the physical so that both spaces can be mediated in an autonomous manner. The hypersurface is the site on which bridges are built: where the real and virtual, material and textual, author and agent can meet and interact with each other.

Networked Mixed Reality

While there are many previous examples of real time mixed reality data transfer within media art, interactive design and computer science, this thesis will present a range of unique practical solutions for this process. As part of the practical component of this research, several new methods of creating embodied real time mixed reality art were developed. The term was originally developed to describe one particular system that was developed in collaboration with Raphael Grassett at The Human Interface Technology Lab (HITLabNZ) for the organtradAR series. This system uses augmented reality as a bridge for data transfer from physical interactions with augmented environments, into online virtual environments. This system was the first of its kind and was accordingly recognised through multiple IEEE publications (a significant achievement, considering this is a heavily peer reviewed computer science publisher/organisation).

Current research in mixed reality and interactive workspaces that use the concept of a bridge for data transfer have continued the development of new knowledge in this field, however the majority of previous research in this area has been in the field of computer science. The application of cultural and philosophical discourse to recent developments in computer science will propose new modes of representation that concern themselves with the affective capacities of art in order to articulate a sense of dispersed embodiment. The concept of networked mixed reality data transfer became a significant focus of this research, in terms of medium and technics. The original method that incorporated augmented reality and a massively multiplayer online environment (MMO) was developed further for two more projects and then the concept was revisited in a number of other new solutions that explored particular mediums and messages in relation to particular topics and modes of representation.

Data Body Banks

These are bodies of data in networked systems that relate specifically to an individual's participation in the system and, more importantly, to personal data relating to a physical identity. This term was created to describe the relationship between contemporary data networks and individuals and their post-biological implications for understanding identity and the body. Emerging from discourses in post-biological identity, transdividuality, dividuality, ANT, BwO and syncretism, the concept of a data body bank was heavily influenced by Deleuze's concept of the 'super fold' [35] (different to the original 'fold'), a concept he introduces in his book *Foucault*. "In Deleuze's Appendix to Foucault, entitled, *On the Death of Man and Superman,* the concept of the Superfold is introduced in its relation to new configurations of life, labour and language, or biology, political economy and linguistics [35]

Through this concept Deleuze proposed a new image of society that goes beyond the diagram and beyond previous dichotomies of the organism and the digital, as a mechanism for understanding networked digital control societies and the implications of participation in such systems in regards to identity, privacy and ownership.

With the advent of representation (also personal archiving) came the creation of static data body banks: material archive networks of identities and identification systems. Server based online computing offers a dynamic replacement for previous systems that allows for fluidity of the size and shape of data, along with subjectivity for individual participants and the communities interacting with it. The recent convergence of networked computing and art has brought about a resurgence in interaction as a core communicative element within representation. The recent increase in embodied art calls for a review of how we language such systems of representation and meaning in the wider context of society. Traditional methods of physical involvement in communication

are now being integrated into modern technologies and text/image and this is creating possibly the most complex systems of embodied information exchange we have ever seen.

As many including Ascott and Stelarc have argued, the body is no longer wet as it is so intrinsically linked to data bodies. Wet and dry do indeed combine to create a moist media state, as described by Ascott: "Between the dry world of virtuality and the wet world of biology lies a moist domain, a new interspace of potentiality and promise." [36] This state is indeed post-biological and situated within a contemporary networked mixed reality. Today we exist as viscera and as data bodies, materialised through agency and avatars, forced back upon us by our social media interactions; data zombies borne out of our own personal archives that come back to bite us, to infect us further and further. Life and afterlife become the same hybridized being, that of the post-biological human and its network of data body banks

Conclusion

This paper has introduced a range of theoretical discourse with the aim to scope the field of networked mixed reality, in regards to post-biological identity. It has conducted a rigorous comparison of theoretical texts and authors with a focus on practical implementations in the field of mixed reality art, along with introducing a range of new and redefined terms in order to better understand the field of networked mixed reality arts practice. The research has been constructed to engage with real time mixed reality data transfer systems involving virtual environments, human-computer interaction, artistic representations of embodied agency (through data body banking) and simulated social, biological and ecological actor networks. This research is currently being further developed in order to strengthen the legitimacy of the proposed framework and terms for both understanding and educating in this field. Primarily, it strives to offer a specific contribution to a wider discourse in art, identity, embodiment and reality

References

1. Milgram and Kishino, "Augmented Reality: A class of displays on the reality-virtuality continuum" *Proceedings of Telemanipulator and Telepresence Technologies Vol. 2351* (1994) , 24
2. Oliver Grau, *Virtual Art, From Illusion to Immersion,* (MIT Press, 2002), 247.
3. D. P. Dash & Werner Ulrich, "JRP Subject Areas with Keywords Vol. 8 (2012)" Journal of Research Practice Website, accessed December 29, 2014, http://www.jrp.icaap.org/miscfiles/jrp_subject_areas_keywords.html
4. Oliver Grau, *Virtual Art, From Illusion to Immersion,* 248.
5. Roy Ascott, 2010. Syncretic Dialogues: Keynote address at *Proceedings of The first International Conference on Transdisciplinary Imaging at the Intersections between Art, Science and Culture.* Published by Transdisciplinary Imaging Conference 2010 Sydney
6. Bruno Latour, *Reassembling the Social: An Introduction to Actor Network Theory* (Oxford University Press, 2005), 121.
7. Bruno Latour, *Reassembling the Social: An Introduction to Actor Network Theory*,37.
8. Callon, M, *Power Action, Belief A New Sociology of Knowledge,* (London: Routledge and Kegan Paul, 1986), 223.
9. Roy Ascott, 2010. Syncretic Dialogues, Slide 39.
10. Deleuze and Guattari, A Thousand Plateaus: Capitalism and Schizophrenia, Vol. 2 of Capitalism and Schizophrenia 2 vols. 1972-1980. (Trans. of *Mille Plateaux)*. (Paris: Les Editions de Minuit), 66
11. Antonin Artaud, *Selected Writings* (University of California Press, 19760 ,571.
12. Deleuze and Guattari, *The Logic of Sense* (Les Éditions de Minuit, 1969) , 82.
13. Deleuze and Guattari, *The Logic of Sense*, 101.
14. Deleuze and Guattari, A Thousand Plateaus: Capitalism and Schizophrenia, 40.
15. Bruno Latour, *Reassembling the Social: An Introduction to Actor Network Theory.*
16. Julian Stadon and Raphael Grasset, Syncretic Post-Biological Digital Identity: Hybridizing Mixed Reality Data Transfer Systems", *IEEE International Symposium on Mixed and Augmented Reality, 2011,* 3.
17. Mark Fernandes, "The Body Without Memory: An Interview with Stelarc" ctheory.net Website (2002), accessed December 25th, 2014 http://www.ctheory.net/articles.aspx?id=354
18. Oliver Grau, *Virtual Art, From Illusion to Immersion*, 7.
19. Sean Cubitt, *The Cinema Effect,* (MIT Press, 2004), 6.
20. Brian Massumi, *Parables for the Virtual: Movement, Affect, Sensation,* (Duke University Press,2002),135.
21. Gilbert Simondon, *L'individuation psychique et collective,* (Aubier, 1989), 193.
22. Deleuze, *Negotiations 1972-1990,* (Columbia University Press, 1995) , 180
23. Deleuze, *Negotiations 1972-1990*, 181
24. Mikkel Bolt Rasmussen, "The Control Society After 9/11" in *Peer Reviewed Journal About Public Interfaces http://www.aprja.net/?p=696*
25. Alexander Galloway, *Protocol: How Control Exists After Decentralization* (MIT Press 2006), 87
26. Alexander Galloway, Deleuze *and Computers,*(UMAS Free Culture, 2011), https://www.youtube.com/watch?v=fBZPJNoJWHk
27. Oliver Grau, *Virtual Art, From Illusion to Immersion*, 248.
28. Brian Massumi, *Parables for the Virtual.*
29. Brian Massumi, *Parables for theVirtual*, 27
30. Brian Massumi, *Parables for the Virtual*, 4
31. Brian Massumi, *Parables for the Virtual*, 57.
32. Brian Massumi, *Parables for the Virtual*, 87.
34. Oliver Grau, *Virtual Art, From Illusion to Immersion*, 245.
34. Gabriella Gabriella Giannachi, *Virtual Theatres: An Introduction,* (Routledge, London and New York, 2008), 95.
35. Deleuze and Guattari, A Thousand Plateaus,127.
36. Roy Ascott, *Art, Technology, Conciousness: Mind@Large,* (Intellect, 2000), 2.