

**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 inscribed 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 its 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.

Deleuze 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 dynamically *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 its '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 incorporeality 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 physiological 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, potentiality 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
<b>Data-Ecology:</b>	Representation of the data ecology as a <i>closed</i> 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.	<u>They rule</u> , Josh On. <u>subscapePROOF</u> . Waterson and Richards
<b>Data-Eco-net:</b>	Representation of the data ecology as an <i>open</i> 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.	<u>We feel Fine</u> , Harris, and Kamvar.  <u>33°south/sur</u> . Waterson and Salazar  <u>subscapeBALTIC</u> . Waterson and Richards
<b>Data-Borg:</b>	Representation of the data ecology as a <i>closed</i> or <i>open</i> 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.	<u>Cardiomorphologies</u> , Khut, George (Poonkhin).  <u>Pockets Full of Memories II</u> , Legrady, George.  <u>Hyperbolic Crochet Reef</u> , Institute for Figuring.  <u>Rider Spoke</u> , Blast Theory  <u>Running the numbers</u> , Chris Jordan  <u>subscapeUTOPIA</u> . Waterson and Richards  <u>Bystander</u> . 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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