Reading Big Data as a Heterogeneous Subject

The infra-ordinary

Big data is big. It isn't meant to be read or analysed by humans. Big data is data for machines - computer systems that are capable of sifting through, ordering and analysing petabytes of information to identify patterns and connections that no human could ever hope to compute. Our expectation of big data is that it orginates at a cosmic scale, beyond the sensorium of the individual human being. We associate big data with disciplines such as astronomy, computer science or meteorology. Big data evokes the sublime, heroic and romantic.

We know art is capable of evoking the sublime, whether heroic (as in the work of Caspar David Friedrich), the everyday, as we find in the work of contemporary photographer Andreas Gursky, or the abject (as in the paintings of Francis Bacon). We will return to Bacon, and the question of the sublime in art, in our conclusion.

Caspar David Friedrich, Wanderer above the Sea of Fog, 1818

Although most often associated with cosmic scale, big data can be found in ordinary quotidian contexts; in what George Perec referred to as the infra-ordinary. Rather than considering big data as the evocation of the cosmic sublime we might consider how it depends upon, and reveals, the subjective and trivial and, in that process, offer insights into the reality of our daily lives. The habitual, the everyday, the mundane rhythm of the infra-ordinary renders us unaware of the potentialities of things around us. Perec considers how the headline grabbing event can distract us from the details that really matter,

> The daily newspapers talk of everything except the daily. The papers annoy me, they teach me nothing. What they recount doesn't concern me, doesn't ask me questions and doesn't answer the questions I ask or would like to ask.

Perec continues,

> What's really going on, what we're experiencing, the rest, all the rest, where is it? How should we take account of, question, describe what happens every day and recurs everyday: the banal, the quotidian, the obvious, the common, the ordinary, the infra-ordinary, the background noise, the habitual?
>
> To question the habitual. But that's just it, we're habituated to it. We don't question it, it doesn't question us, it doesn't seem to pose a problem, we live it without thinking, as if it carried within it neither question nor answers, as if it weren't the bearer of any information. This is not longer even conditioning, it's anaesthesia. We sleep through our lives in a dreamless sleep. But where is our life? Where is our body? Where is our space? (Perec 1973)

This raises the possibility, perhaps counter-intuitively, as to whether the reading processes associated with big data, such as distant reading (Moretti 2013) or machine based pattern recognition, might actually help us to gain insights into the infra-ordinary; to lift the anaesthetic veil of the everyday to allow a more vivid engagement with the iridescent ambient 'noise' that concerned Perec. The principle here is not that we are concerned with large data-sets (although, by its nature, noise is composed of large numbers of elements) but, rather, multiplicitous ways of viewing that data, diverse points of view.

Big data exists at the core of our culture. It presents as part of the knowledge systems that underpin our collective being. Information, knowledge and data, at this scale, exist as black boxes - units or entities of information or knowledge that, whilst we have a sense of what goes in and comes out, we have little comprehension of what is going on inside the box. This is knowledge we don't know we know - the collective subconscious at work. In this sense there is nothing new about big data. Our social apparatus has, since its origins, been built as a series of black boxes. Our daily experience of things is pervaded by black boxes. If we were to spend our time deconstructing the understandings and conventions that determine our daily lives, Perec's quotidian, we would have little time to get on with other things. Reverse engineering the black boxes that constitute our culture is an epic task - as you would expect of something that is dimensionally big data.

Andreas Gursky, Amazon, 2017

But isn't such deconstruction the task of the artist? Aren't the novels of George Perec attempts to experiment with methodologies that will allow the quotidian black boxes of daily life to be de-sublimated, turned inside out, so we may examine their contents and reveal things about ourselves we would otherwise remain oblivious to. Or are we damned to be subject to our ignorance, to repeat ourselves without ever understanding how our behaviour and sense of the world is determined by the black box? The photographic images of Andreas Gursky, revealing bland repetition whilst encapsulating vivid detail, present our ignorance of our own inner being as played out in plain sight - we all know that we don't know we know (including our guilty collective secrets). Foucault's Panopticon might be considered as the model mechanism for the black box - the super-ego regulator at the heart of our culture, the centre of our individual and collective being, which operates in plain sight and which we remain oblivious to, as if we cannot afford to accept that we don't know we know. We are blind to our all-seeing panoptic eye.

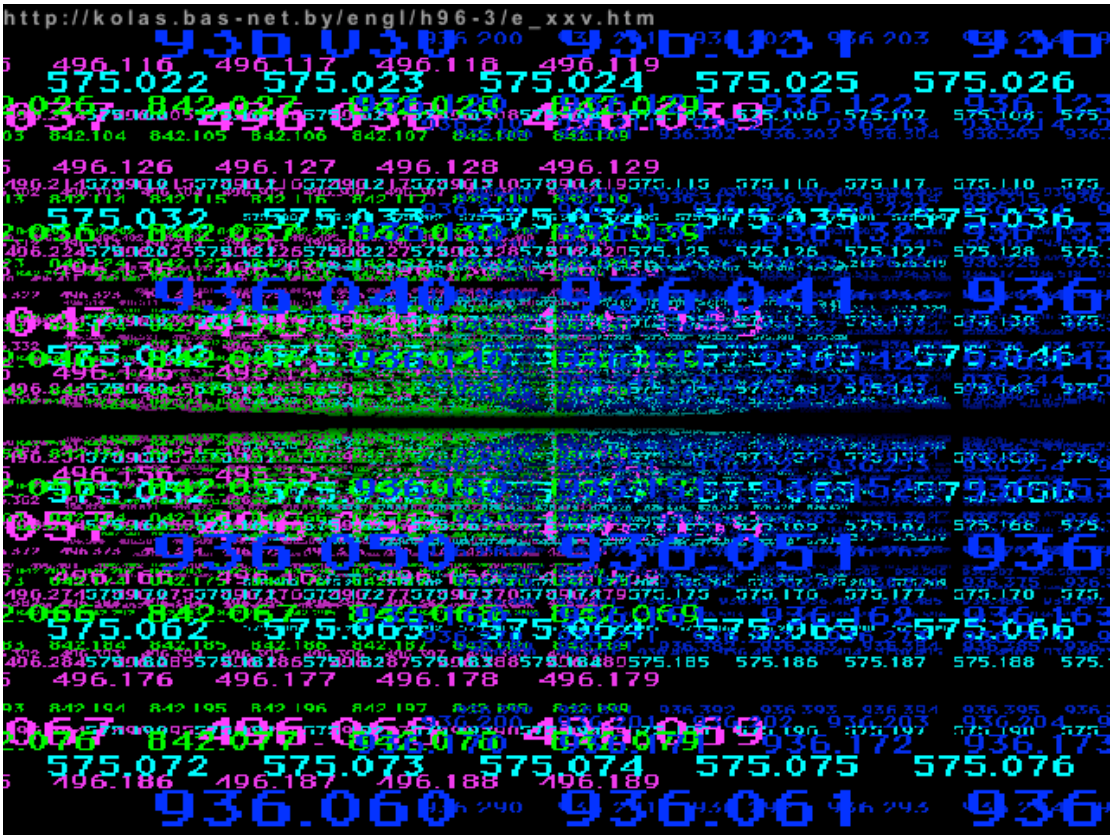
Butterflies and data sets

Iridescence is a property of things, such as butterfly wings, that is only perceivable if one assumes, through continuous movement, multiple points of view. It is in shifting between variable loci of perception that the spectral range of colours a soap bubble or a butterfly's wing may reflect become visible, revealing the object's iridescence. This offers the possibility of a heightened sense of reality, where our own difference, in time and space, reveals the many aspects of something that otherwise appears homogeneous, singular and static. The proposition is that the multiplicitous and heterogeneous properties we associate with big data can also inform the ontology and perception of the observing subject; a form of heteropticon (a complement to the concept of the panopticon), an eye composed of numerous states and instances that permits an iridescent engagement with things. An eye of difference.

The Butterfly's wings are iridescent due to their being multilayered, consisting of multiple surfaces that each reflect light, and therefore colour, at different wavelengths depending on viewing angle. Butterfly wings are structured as a "lattice of scales that cover both sides of the wing substrate" and create the variations in colour that leads to iridescence "by the interaction of light with the scales' optical materials" (Giraldo and Stavenga 2016).

Butterfly wing iridescence

In earlier artworks I have explored how complex and simple things might be viewed from multiple points of view, often in the form of layered three dimensional images of data. Projects such as Babel (2001), Tristero (2002) and Stream (2003) employed multiple point of view renderings of three dimensional datasets to create complex layered and heterogeneous readings. In Babel a three dimensional Dewey Decimal map is employed, by multiple people browsing the system simultaneously on the internet, to navigate the World Wide Web by subject. The visualisation of the web in Babel is presented as a complex set of layers of Dewey Decimal numbers, each user of the site generating their own three dimensional array as a number range that is rendered in a unique colour. All the users of the system can see what the other users are seeing, from their various perspectives - a form of visual ESP. This results in a layering of the number sets that creates a pseudo-iridescent effect, not unlike how this occurs in the structure of a butterfly wing.



Simon Biggs, Babel, screenshot, London, 2001

Babel functions by using the mouse-location of web-users to generate a perspective view of a specific Dewey Decimal number range. The software does this for all users of the interface simultaneously, such that the database is viewed, by each user, from all the users' points of view at the same time.

I have been exploring this potential for heterogeneous points of view, which are defined by multiple subjects, proposing the notion of the constructed hybrid subject, or co-reader (collaborative reader), through a series of subsequent artistic projects, such as Crosstalk (2014) and Dark Matter (2017). This approach is also apparent in a current project, Heteropticon (2018).

Dark Matter

Dark Matter is a fully immersive, physically interactive, three dimensional video projection environment. The artwork explores whether the body might be perceived as an absence, inferred from the physical and cultural information around it (something we don't know we know). A key consideration in Dark Matter is that of the problem of the point of view in three dimensional virtual space. This problem has also been explored by the author in other projects, such as Crosstalk (Biggs, Hawksley, Paine 2014).

Simon Biggs, Dark Matter, installation view, Cherryville, 2017

In Dark Matter, similar to Crosstalk, the point of view (the position from which the three-dimensional scene on the screen is rendered) is dynamic. If there is one viewer (interactor) of the work then the scene is rendered

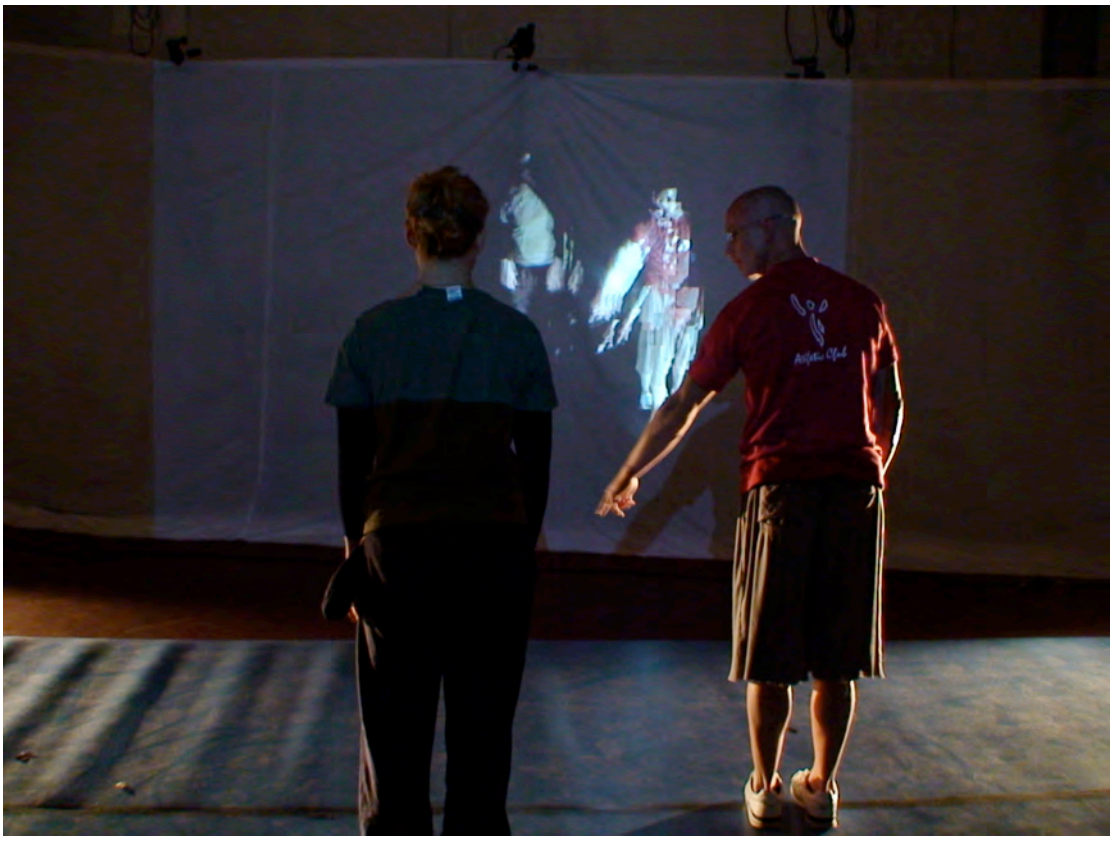
> ...from a point outside the interactive space, where the virtual camera is located, roughly where the interactors first enter the installation space. This point of view is static and produces a conventional outsider's viewpoint of the three dimensional scenario (an idealized third person point of view). However, when more than one interactor is in the interactive area of the installation the position of the virtual camera is relocated to the head of the first interactor (the interactor who has been in the environment the longest) and its focal point becomes that of the second interactor (the second longest person to have inhabited the interactive space). (Biggs 2018)

Using this technique produces a situation where "what is rendered in the surrounding three dimensional projections is a function of a point of view determined by the position of the heads of two of the interactors." (ibid.) In Dark Matter the conventional unitary subject we associate with the concept of the reader is reconceived as that of the co-reader, where the engagement with an object by multiple subjects requires that they operate as a heterogeneous super-subject, or collaborative reader, "thus rather than considering this a first person reading of the installation it might be considered a 'first persons' reading." (ibid.) The proposition of the work is that "reading can become a collaborative and multimodal process" (ibid.), problematising the subject as plural and heterogeneous.

Heteropticon

Heteropticon is an interactive artwork currently in development. Heteropticon draws on an imaging technique developed by myself during the CIRCLE research laboratory Scale (CIRCLE 2008). During the Scale project an algorithm was developed that allowed the real-time capture of live video data to be mapped to stored motion capture data of participating dancers. The video image was cut-up, by the algorithm, into small rectangular image-maps

which were subsequently mapped to the recorded three dimensional dataset of dancer's movement. The live dancer would then dance before the projected motion capture data, like a dancer dances in front of a mirror during rehearsals, and would see themselves visually mapped onto the motion data of the recorded dancer. So long as the live dancer's movements resembled those of the recorded dancer's data the correspondence of datasets would allow the numerous tiny images of the live dancer to appear at the corresponding motion-capture coordinates in the projection, affirming the dancers movement as congruent with that of the recorded dance.



Simon Biggs, Laboratory still from CIRCLE Scale laboratory project, Edinburgh, 2008

Whereas the technique used in the Scale project involved mapping live two dimensional video data to recorded three dimensional motion capture data in Heteropticon the mapping involves both live video and live motion capture data. In the Scale project the point of view from which the imagery was rendered was static. Similar to Dark Matter, Heteropticon employs a dynamic point of view so as to enhance the spatial perception of the layered imagery. Distinct to Dark Matter, in Heteropticon the viewpoint is not entirely defined by the interactors physical position and activity. Rather, Heteropticon employs the concept of drift, or dérive. Guy Debord conceived dérive as an activity undertaken by the subject, defining a relationship between the subject and the object of their contemplation (typically, the city).

> ...the dérive, a technique of rapid passage through varied ambiences. Dérives involve playful-constructive behavior and awareness of psychogeographical effects, and are thus quite different from the classic notions of journey or stroll. (Debord 2006)

In Heteropticon the relationship described by Debord, between subject and object, is reversed. The interactor sees themselves in a projected image that appears to be an electronic mirror. However, this is a distorted mirror, where the image reflected back to the

subject is tessellated and fragmented in three dimensional space, resembling the compound-eye vision of the common house fly.

Simon Biggs, Heteropticon, screenshot, Cherryville, 2018

Heteropticon functions by acquiring a live video image of the interactor(s) who is located in a dark space where only the central area is illuminated (so that whilst the body of the interactor is visible in the video feed the environment they are in is dark and invisible). At the same time, employing a Microsoft Kinect motion tracking sensor, an infra-red three dimensional model of their body is acquired. This allows the software to determine the interactors joint locations (25 joints in all, such as head, neck, hips, hands, thumbs, ankles, toes, etc.).

These virtual three-dimensional joints are then employed as 'attractors' for hundreds of invisible objects that occupy the three-dimensional volume of the projected image space. These objects exist within a physics engine which calculates the collisions, forces, ricochets and subsequent trajectories of the objects. This results in a situation where the invisible objects are simultaneously trying to join with the virtual joints of the interactor(s) and ricocheting chaotically off one another and the interactors' joints, within the volume of the projected space. This creates a fluid set of three dimensional coordinates which are closely related to, but not the same as, the coordinates of the joints of the interactor(s). In a sense this could be considered a heteroptic representation of the interactor(s) body.

The three-dimensional coordinate of each of these invisible objects, in the mathematical form of a PVector, are determined and subsequently converted to the corresponding two-dimensional coordinate the object occupies in the projected image (although the object is not visible in the projection itself). This delivers a simple two dimensional x and y coordinate which is used to determine the origin of a rectangle, 36 by 36 pixels in size. The rectangle is employed to define and capture the corresponding region of pixels in the live video-feed. This rectangular region of the video's memory map is copied to memory, creating a small tile-like image of what is in front of the screen at that location (the space, with its interactor(s)). This small image fragment is mapped onto a similarly sized 3D rectangular plane that is subsequently co-located with the three-dimensional coordinate of the object

that provided the two dimensional origin point for the acquisition of the video tile. This allows a two dimensional video fragment to be mapped into three dimensional space.

The tile's scale is fluid, determined by the z-offset of the three-dimensional tile from its original location, amplifying the apparent depth position of the image fragment in the three dimensional volume (a form of digital zoom). This process is all done in real-time, for hundreds of coordinates, and allows the mapping of the two-dimensional video feed of the interactor's image into the three-dimensional space occupied by their (invisible) skeletal model. Thus, when the interactor waves their hand towards the screen the corresponding image of their hand is seen moving in three-dimensions relative to the rest of the interactor's body, creating an enhanced sense of how the interactor occupies space. This process is executed for all the objects attracted to all the joints of the interactor's body, effectively cutting up the live video feed into numerous small tiles and reconstructing the entire interactor's mirror image onto the skeletal model in the virtual space that constitutes the rendered image. The effect is a bit like a 3D animated cubist painting.

To render a three-dimensional scene on a two-dimensional screen a 'virtual camera' is required. This consists of the location of the camera, its orientation and its field of view (determining what the camera can see and thus what is rendered by the software to the screen). In Heteropticon the camera exists in three states. Its first state is the default state, the camera located at a static location behind the projection screen, looking from the screen towards a point in the centre of the interactive space in front of the screen (an area roughly 6 metres wide and 6 metres deep). When an interactor enters the installation the virtual camera is relocated to a second-state, a position that corresponds to the head position of the interactor in the virtual three dimensional volume, projected into the virtual space in front of the screen and focused on the centre point of the interactive space, where the interactors are located. This creates a second-state camera, with parallax. Thus the interactor observes their own reflected image on the screen. When the interactor moves laterally in front of the projection they see subtle shifts in their angle of view, revealing the fragmented image of their body as a three dimensional construct composed of numerous small images of different body parts, as the various components of the construct shift their relative positions as a function of their spatial distribution and the shifting point of view of the virtual camera.

If there is one interactor in the installation then the camera remains co-located with their head's virtual coordinates in the three dimensional space, thus allowing the system to render the image from the point of view of the interactor. However, when more interactors enter the space the camera drifts to a coordinate located equidistant in three-dimensional space between the interactors' virtual heads, with the camera oriented so it remains focused on the centre of the space, where the interactors are located. This creates a point of view detached from the interactors, although affected by them all. If any interactors move then the location of the virtual camera also moves, drifting so as to be located at an equidistant point between the locations of the interactors virtual head joints.

As the camera is detached from any one interactor's point of view, drifting between them all, and is focused on all the interactors, who are rendered on the screen as three-dimensionally fragmented constructs, what the interactors see, from a place other than that they occupy, is their own bodies as tessellated and exploded structures floating in a dark undefined spatial volume that is the projected image upon the screen.

Iridescence and the Sublime

Heteropticon explores the subject as an iridescent object, shifting through its heterogeneous instances as it is deconstructed in a virtual space viewed from multiple shared, subjective, but detached, points of view - a folded place of collective drift. The work seeks to offer

viewers, as interactors, insights into how they might be, or become, heterogeneous and iridescent. Paul Cézanne reflected upon how subject and object may emerge as a relationship in the experience of making, and experiencing, a work of art, stating "...I am one with the canvas. We are an iridescent chaos. I come before my motif, I lose myself there... we germinate." (Bogue 2003, p.164)

Gilles Deleuze observes that "In painting, Cézanne's landscapes of "iridescent chaos" are percepts, Bacon's portraits of heads-becoming-animal are instances of affects." (ibid.) Percepts and affects are considered as "pure being of sensation" (Deleuze 1994 p.167) and he notes that "one is not in the world, one becomes with the world, one becomes by contemplating it. Everything is vision, becoming. One becomes universe. Becoming animal, vegetable, molecular, becoming zero." (ibid. p.169) Here Deleuze evokes a sublime state of consciousness attained through a heightened awareness engendered by the experience of the work of art as "pure sensation". Bacon's portraits, as sensation, can be read as iridescent, demanding of the viewer that they adopt multiple simultaneous points of view, just as the artist did in their creation.

Francis Bacon, Three Studies for the Portrait of Henrietta Moraes, collection of the Museum of Modern Art, 1963

In this sense we might conceive of how we, with our limited human senses and finite neural tissue, might be capable of engaging big data - not in the sense that machines can, with their unrelenting capability to crunch the numbers to arrive at precise determinations, but as a form of sensation, apprehension and appreciation. We know this intuitively, from when we look up into the heavens to contemplate the cosmic bodies above our heads on a clear, dark and cold Winter's night, even if we can't determine, from our own senses and intellectual capabilities, how those bodies might interact with one another in the future. We rely on our technical systems to augment our capabilities and forecast cosmic events.

The machine, reading big data, has its unrelenting capacity to consider every detail equally and from this it can determine probable future emergent patterns of data (events) that have not yet occurred. On the other hand, people can call upon their imagination to envisage possible futures less deterministically. The determinism of machine forecasting is fine when the future is likely to be similar to the past. However, as we know from our own human experience, the future has a capacity to defy such prescribed expectations. Without the cosmic accident, which may never have happened if the smallest of factors differed, the asteroid that wiped out the Dinosaurs and led to the rise of mammals would never have occurred; we would never have arrived at the situation where we find ourselves the dominant species on Earth. We, as a species, may never have been. Could a machine have forecast this relying on past data, no matter how big?

Machines do not deal with the past alone. They also deal with the present. From a current state computers are reliable at forecasting probable future events. They are not perfect (our weather forecasts are often incorrect, sometimes with dramatic results) but they are statistically reliable. We depend on such computer systems to track the cosmic bodies that may or may not be on a trajectory that could bring them into contact with the Earth. If a future asteroid is likely to impact our planet we will know in advance because of a computer's capacity, based on big data, to forecast the event - and perhaps do something about it. The Dinosaurs were not forewarned.

As observed earlier, big data can be considered as being less about the sublime and more closely related to the infra-ordinary, where everything is of equal value to everything else or, perhaps more pertinently, without value - just data (although data is never without value, being information created at the juncture of socio-technical relations). Similarly, the heteroptic eye, that envisions the world in a constant state of iridescence, is of the infra-ordinary. In this regard Heteropticon is not an attempt to create a sublime work of art. It is, rather, an experiment that seeks to identify how we might find ourselves becoming (germinating) as other - not a specific other, in the form of another subject, but as a heterogeneous other, constructed in the form of a collective (distributed) subject.

The image of the observing subject, in Heteropticon, appears as iridescent and motile. It is the product of a visual logic that sublimates difference (and value) between subjects and amplifies internal difference. The subject, in its experience of the everyday, is disrupted, not in order to achieve a utopian condition (Lefebvre 1947) but to reveal the infra-ordinary multiplicitous subject. Heteropticon continues an interest, shared with many artists, in how we might know ourselves, otherwise.

Simon Biggs, May 2018

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