Co-Reading as a Generative Ontology

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ABSTRACT

This paper discusses the immersive full body motion tracking installation Dark Matter, developed by the author and completed in early 2016. The paper outlines the conceptual focus of the project, including the use of the metaphor of dark matter to explore questions around interactive systems and assemblage. The primary technical considerations involved in the project are also outlined. 'Co-reading' is proposed as a framework for a generative ontology, within the context of assemblage theory, deployed within a multimodal multi-agent interactive system.

KEYWORDS

co-reading; generative ontologies; dark matter; hidden information; interaction; assemblage.

RESUMO

Este artigo discute a instalação imersiva com reconhecimento de movimentos corporais *Dark Matter* [Matéria escura], desenvolvida pelo autor e concluída no início de 2016. O artigo descreve o foco conceptual do projeto, incluindo o uso da metáfora da matéria escura para explorar questões relacionadas com sistemas interativos e montagem. São também descritas as principais considerações técnicas envolvidas no projeto. O conceito de "co-leitura" é proposto como ponto de partida para uma ontologia generativa, dentro do contexto da teoria de assemblagem, implantada num sistema interativo multimodal e para multiagentes.

PALAVRAS-CHAVE

co-leitura; ontologias generativas; matéria escura; informação oculta; interação; assemblagem.

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I. INTRODUCTION

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. In this context, employing multi-agent interaction, people are proposed as emergent 'co-readers' within the context of a dynamic assemblage of human and nonhuman agents (DeLanda, 2006).

The artwork employs the metaphor of dark matter; not only that of a physical character but also cultural. Just as dark matter is believed to bind the universe together it can be proposed that our society is bound by cultural 'dark matter.' This might be considered information we 'don't know we know,' referencing the widely reported statement by Donald Rumsfeld, concerning evidence linking the Iraqi government with weapons of mass destruction, in which he proposed a teleology consisting of the known knowns, known unknowns and unknown unknowns. As Slavoj Žižek has observed, Rumsfeld was erroneous in considering this a teleological set of relationships, a more appropriate framework being a logical (Boolean) matrix.

Connecting Rumsfeld's statement and psychoanalytic theory, Slavoj Žižek wrote:

> What he [Donald Rumsfeld] forgot to add was the crucial fourth term: the "unknown knowns," things we don't know that we know — which is precisely the Freudian unconscious. If Rumsfeld thought that the main dangers in the confrontation with Iraq were the "unknown unknowns," the threats from Saddam we did not even suspect, the Abu Ghraib scandal shows where the main dangers actually are in the "unknown knowns," the disavowed beliefs, suppositions and obscene practices we pretend not to know about, even though they form the background of our public values. (Žižek, 2005)

In *Dark Matter* textual material directly linked to events at Abu Ghraib and, more specifically, Guantanamo Bay, is employed to explore the nature of the things we don't know we know, representing a kind of cultural dark matter or collective unconscious.

Dark matter is a term used in physics to refer to the hypothetically larger part of what constitutes most of the matter in the universe. It is understood that dark matter, including dark energy, constitutes nearly 95% of all matter in the

universe (Ferris, 2015). Dark matter has never been directly observed but its presence has been deduced from its interaction with light, due to its gravitational effect, bending space and thus light, behaving in a similar manner to a lens. Similarly, we might imagine that 95% of that which constitutes our culture — that which shapes us individually and collectively — is never observed, existing without interacting with us in a manner that we would phenomenally comprehend.

The proposition explored in *Dark Matter* is that we exist as motile assemblages rather than stable individuals, part of a larger assemblage that could be considered a form of 'collective unconscious' or dark matter. That assemblage is explored here as shaped by the forces of dark matter, in the form of the cultural information and patterns that we don't know that we know. This is considered a generative ontology, manifest in the artwork through multi-agent interaction composed of liminal visual and textual elements.

II.THE WORK

Dark Matter utilizes the Microsoft Kinect motion tracking sensor, the SimpleOpenNI interaction library and open source Bullet physics engine (specifically prepared as a Java library for this and related projects by Hadi Mehrpouya), integrated and programmed with the Processing JS programming language, to create a 3D simulated space containing a (invisible) model of interactor bodies and numerous invisible objects. In this installation the manner in which we understand dark matter, as something we cannot measure that nevertheless mediates and modifies all that we can perceive, is inverted.

Dark Matter employs real-time motion tracking of the human body, within a very dark installation space surrounded by immersive, but visually liminal, projections. The interactor's body is collocated within the computer generated 3D space. Initially the material that makes up the objects in the virtual space is not visualized. Only the mediation of the space by dark matter, not the dark matter itself, is visible. The virtual model of the body of the interactor is never visible in the work. When the interactor is at a distance from the projections, and the interactive space between them, all that is visible are faint vectors of light that describe interactions between what appears to be a multitude of invisible objects.

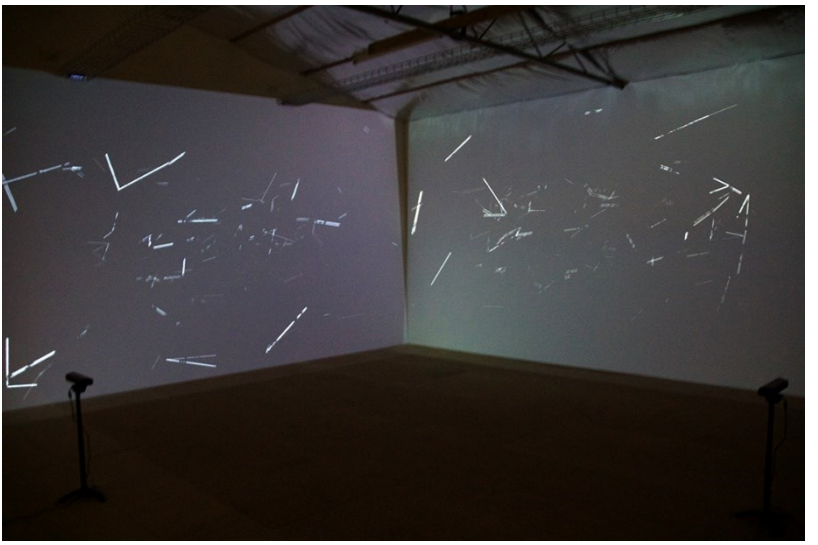

Figure 1. Dark Matter installation running with no interactors.

The vectors of light are not random but clearly arise from some kind of order. That order is the energy generated by the numerous invisible objects in the virtual three dimensional space colliding with one another, as determined by the calculations of the physics engine. Whenever one object contacts another object a frisson of energy is created, visualized as a fleeting laser-like flash of a vector of light, its brightness a function of the velocity and mass of the objects involved in the interaction and its direction a result of the angle of incidence between the interacting objects. The visual effect is reminiscent of an ever folding and refolding crystalline structure composed of dark material, invisible in an environment where there is no light source to illuminate the objects that are creating the phenomena.

Figure **2**. Screenshot of the right-hand screen when no interactors are present.

As the interactor approaches the projected images that comprise the visual aspect of the installation the quality of the projected imagery faintly changes. The closer the interactor gets to the projections the deeper they enter the virtual space that the projected imagery is comprised of. As the interactor moves through the space they can observe that their physical presence is directly affecting the vectors. The objects and the interactor's virtual body-model interact, objects ricocheting off the virtual body and each other in a complex cascade of interactions. The complex web of connections between these interactions are visualized, initially, as barely visible vectors of light that have a fluid and crystalline quality - fluid in their movement, flowing around the body of the interactor, and crystalline in the folding shapes that flicker in and out of existence.

As the interactor penetrates deeper into the space objects become visible, illuminated by a faint virtual light that emanates from their head (either a cyan, red, green, yellow, blue or purple light, depending on the order of the interactor's entry into the system relative to other interactors) in the virtual space. The interactor is able to see that the objects that have been generating the vectors of light are actually textual fragments, moving about as they collide with one another and the interactor's virtual body, in a gravity free three dimensional volume. At this stage the interactor is able to read the texts that comprise the objects in the space, although this is not necessarily an easy task, as individual texts fly, spin, float and tumble through the space, their trajectory and dynamics a function of their interactions with all the other objects in the space — including that of the interactor's virtual body.

This barely visible dark matter, that constitutes all the objects within the virtual space, is composed of a large number of textual fragments, consisting of short phrases of typically three to six words, although there are phrases consisting of fewer or more words. The phrases have been created by cutting-up[1] an interview with Fawzi al Odah, a prisoner, or so called 'enemy combatant,' held at the USA's Guantanamo Bay military complex in Cuba. The interview was undertaken at the request of the BBC by attorney Tom Wilner (Honigsberg, 2009: 107-112). In the interview the interviewee is asked questions about their detention and they respond with a detailed description of the torturous nature of incarceration within the facility and the psychological relationships that develop between torturer and prisoner.

1 As noted, in a discussion of Brion Gysin's use of the cut-up technique, the method is "a technique itself based on earlier experiments of the surrealists, which in turn had their origins centuries before" (Burroughs, 2003). As such, "there is nothing new under the sun (...) that they are not novel should not deter writers from use of these techniques" (ibid.). The key to the cut-up is the manner in which it allows new combinations of existing fragments to produce novel meanings. In *Dark Matter* the cut-up is navigated not by randomly selecting textual fragments from a hat or throwing the I-Ching (as John Cage liked to do) but by the interactor being an active participant in all the interactions occurring within the space.

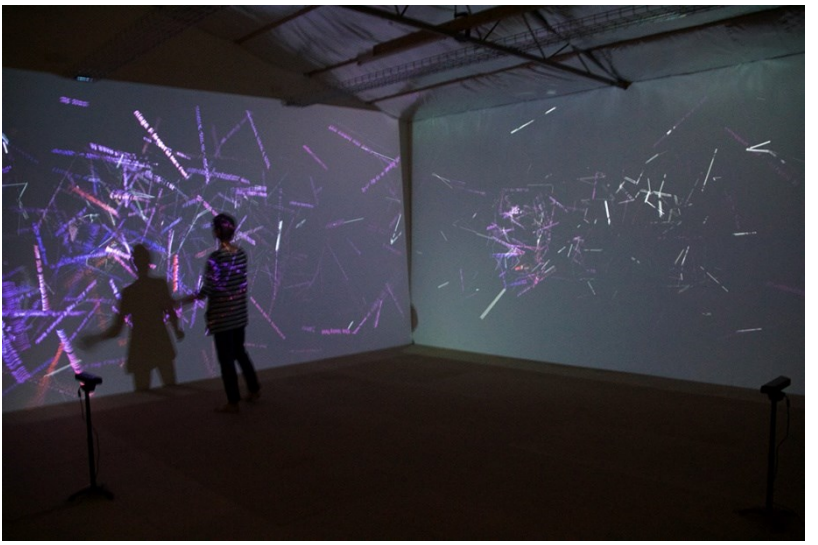

Figure 3. The interactor approaches the left screen, illuminating elements of the virtual environment with hands and head.

This text was chosen for use in *Dark Matter* as in many ways it represents the kind of knowledge we don't know we know. The topic it addresses — human on human inhumanity — is one that most people would consider dark cultural matter; information many of us know we don't want to know. Another key factor in selecting the interview as source material for the cut-up texts was the centrality of the human body in the discussion. The body is described as the site of interaction between torturer and prisoner, the thing that is acted upon and which is, through this process of abjection, disassociated from its person.

III.BREATH

A factor that the interactor within *Dark Matter* might have observed at this point, although it is a very subtle effect, is that the space, as a whole, seems to have a rhythm. There is a slight but regular alteration in the overall dynamics of the space, which seems to occur at a tempo not dissimilar to that of a slow human breath. An invisible force is being regularly applied to all the dark matter objects in the space. At regular intervals a force equivalent to the inverse of the momentum of each individual object is applied to each object. The effect creates something like a microcosmic version of the 'big-crunch,' the hypothetical corollary of the 'big-bang' — the theory that, ultimately, the mass of the universe will cause the process of expansion that eventuated from the 'big-bang' to cease and a process of contraction to begin, causing the universe to implode upon itself. In this manner all the objects in the space, whether visible or invisible, oscillate between an expanding and contracting dynamic that underpins and inflects all

the movement in the space. One side effect of this, which was intended, is that this ensures no object, no matter how intensely acted upon by another object or interactor, is able to achieve escape velocity from the space and thus all the objects within the space remain within the proximity of the interactor(s). Visually the effect creates a faint trace of waves through all the visualized elements in the space, which might be appreciated as a poetic form of 'dark energy,' manifest as waves of gravity — or human breath.

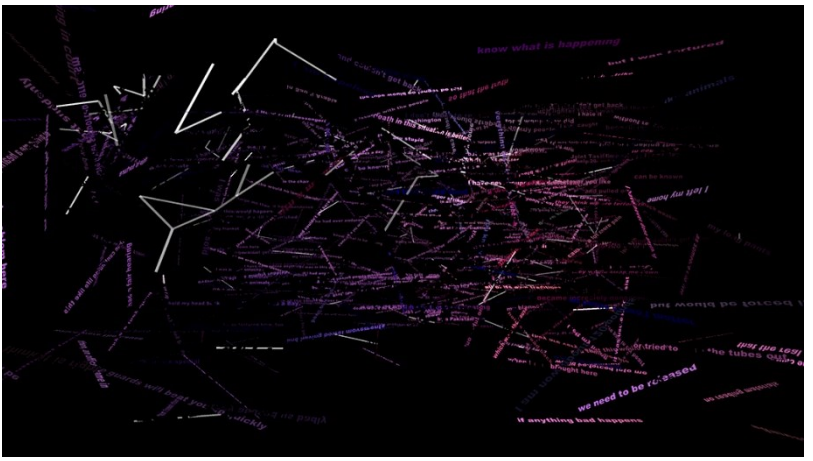

Figure 4. Screenshot of the right-hand screen with one interactor present.

IV.POINT OF VIEW

Whilst the installation has two modes of viewing when there is one interactor, initially distant (observing the environment from the outside and only able to see the light vectors describing the interactions between the invisible objects) and then immersed (illuminating the objects that comprise the dark matter inhabiting the space) there is a third mode of engagement. This mode is engaged when there is more than one interactor immersed in the interactive area of the installation. Each interactor carries their own light to illuminate what they see, attached to the head node of their virtual body in the virtual space displayed in the projections. Thus the more interactors present the more light is created and the easier it is to read the texts. However, another important factor is altered through having the presence of multiple interactors, and that is the point of view from which the virtual space is rendered for projection.

The default point of view for rendering the 3D scene is 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).

Figure 5. Installation shot with two interactors present.

In this situation 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. Not only does this mean that the texts are now all around the interactors, and appear much larger as they are immersed in the dense mass of textual objects that fill the space, but the entire geometry of the visualization becomes a function of the interactors' co-joined movements. In effect, the vector that determines what is rendered, and thus what is seen, is a function of both interactors' behavior.

This point of view resembles a first person point of view in that the three dimensional space is rendered and viewed from the point of view of a specific interactor but, significantly, what is seen (and read) is equally dependent on the second interactor, who co-controls the orientation of that point of view. Thus rather than considering this a first person reading of the installation it might be considered a 'first persons' reading.

In the first person multi-interactor mode it is possible for the interactors to work together to focus their joint attention on specific volumes of the space, or even specific objects. By co-organising their movement the interactors can bring into legibility various textual objects, allowing them to navigate and read the space. How the space is organized around the interactors is clearly apparent, both visually and physically, as even small head movements cause the camera location and orientation to shift and the entire visualization on both screens to

move. At times this can be quite disorienting, producing an effect of vertigo in the interactors.

When interactors leave the space, leaving one interactor alone in the space, the rendering of the visual field reverts to the 'distant' (third person) point of view. Other observers in the space can witness how the interactor, or interactors, interact with the space and its content without themselves entering the interactive space, and thus occupy this third person role.

Figure 6. Screenshot of the left-hand screen with two interactors present.

V.COLLABORATIVE READING

The implication here is that reading can become a collaborative and multimodal process. We are familiar with collaborative models of writing, whether in the form of the surrealist's 'exquisite corpse,'[2] in some examples of digital literature (perhaps most notably in Douglas Davis's collaborative sentence[3]) or as found in many academic articles, but collaborative reading is perhaps a less explored aspect of literary practice. It is significant, in the instance of *Dark Matter*, that the processes of reading and perception are one and the same — each a function of the behavior of the two interactors. It is the creation of this ontological complexity which is the key objective of the work.

In *Dark Matter* collaborative reading is not employed as it might be in a pedagogical technique, like Collaborative Strategic Reading (Klingner and Vaughn,

2 The surrealists "played a collaborative, chance-based parlor game, typically involving four players, called *Cadavre Exquis* (Exquisite Corpse). Each participant would draw an image (or, on some occasions, paste an image down) on a sheet of paper, fold the paper to conceal their contribution, and pass it on to the next player for his contribution" (MoMA, 2016). An example of this can be seen in the online collection of the Museum of Modern Art (ibid).

3 In 1994 Douglas Davis produced what was at the time described as the World's first collaborative sentence — an endless sentence composed of numerous contributions gathered from thousands of 'reader-writers' via the internet. The work has been restored and is in the collection of the Whitney Museum, New York. Davis wrote: "The Sentence has no end. Sometimes I think it had no beginning. Now I salute its authors, which means all of us. You have made a wild, precious, awful, delicious, lovable, tragic, vulgar, fearsome, divine thing." (Davis, 2000).

1998), but it does have certain similarities in how the interaction of readers affirm or deny particular interpretations or, indeed, the possibilities for emergent interpretation. The interactors have to work together to generate readings of the texts. This is a non-trivial activity. A similar method was developed by the artist in an earlier collaborative interactive performance environment, Crosstalk. As was observed by the authors of that work, the conjoining of perception and reading along a vector controlled by both performers is challenging, and

> ...allows the creation of a vector along which vision can be 'performed' by the two dancers. The movement possibilities of the performers in this section become highly contingent and interdependent. In order to read the words spoken by the other, one performer must adjust their position, and so then the other must move again. While making these constant readjustments of their relative positions, both must also attend to their position and facing relative to the Kinects, taking care not to occlude the other (...) the movement vocabulary is functional, determined by the practical requirement to see and to be seen and maintain a relative connection between people and technology. In an environment where the contingent relations between things is foregrounded we can witness the system making itself make itself. (Biggs, Hawksley and Paine, 2014).

Figure 7. Screenshot of the right-hand screen with two interactors present.

The proposition in *Dark Matter*, acted out in the codependent interactions of the interactors who are required to perform their co-reading of the work, is that this is how we read all texts and understand all phenomena. The suggestion is that we only see the world, and ourselves within it, along vectors of perception that are a direct function of our relationships with others, whether those others are human or other agents. A popular example of this is what is sometimes referred to as 'group think,' where like-minded people, in group discussions, have a tendency to converge in their thinking and arrive at shared outcomes (that implicitly exclude those who are not members of the group).

Another applicable example of this polymorphous ontology is Freud's notion of the superego; a hypothetical aspect of the self that operates as our moral conscience, established early on, through social interaction, in a child's development:

> ...they [others] regularly make important contributions to the formation of character; but in that case they only affect the ego, they no longer influence the superego, which has been determined by the earliest parental imagos. (Freud, 1933)

In science fiction we might also consider the fictional species known as the Borg, in the *Star Trek* TV series, as an example of self as an assemblage formed from our constant (contingent) interactions with things and each other. The Borg have the capacity to add others to their collective being, Captain Jean Luc Picard (a lead character in *Star Trek: The Next Generation* TV series) being subject to this process of assimilation.

Figure 8. Close-up of the left-hand screen with an interactor illuminating texts with their hand.

VI. CONCLUSION

Gilles Deleuze argues that the differentiation of the individual cannot be fully understood through the differences between persons but, rather, that difference be considered a condition of the individual. This shifts our understanding of individuation away from the concept of individual bodies and minds to one of vectors and relations, functioning as ontological dynamics, that flow through what we had considered separate persons.

> In effect, the essential in univocity is not that Being is said in a single and same sense, but that it is said, in a single and same sense, of all its individuating differences or intrinsic modalities (...) The essence of univocal being is to include individuating differences, whilst these differences do not have the same essence and do not change the essence of being — just as white includes various intensities, while remaining essentially the same white (Deleuze, 1994).

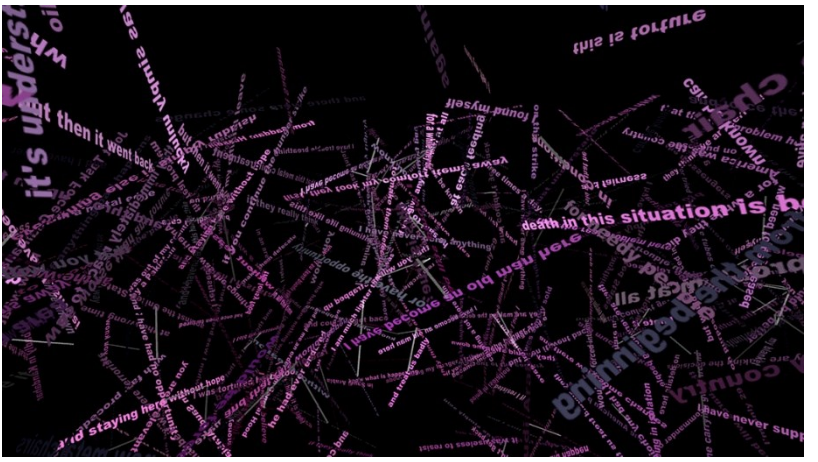

Figure 9. Screenshot of the right-hand screen with two interactors present.

In the context of *Dark Matter* what we perceive as difference, that which distinguishes us, becomes fluid, flowing through the porous boundaries of differentiation, our unknown knowns. In this manner we are seen to be interconnected with one another, as a meshwork, within the emergent social space we co-create. *Dark Matter* enacts and presents this process as a form of co-reading — not a shared interpretation but a co-construction of a world where interpretation and understanding are contingent on physical and social interaction. This is represented as vectors of interaction (and complicity in what is done, even when unaware — as at Abu Ghraib and Guantanamo) between various agents; people, information and dark matter.

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