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Body from the Machine: the spectral flesh

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ABSTRACT

The Einstein's Brain Project is a group of scientists and artists working together to develop installations and environments exploring ideas about consciousness and the new constructions of the body. Recent work has used strategies taken from paranormal science to explore how pareidolic and apophenic impulses might contribute to the construction of our worlds.

The paper considers the unbidden emergence of phantoms (the felt yet absent body) in systems of meaning making that rely on pattern recognition, and explores consequences for the flesh, in shared machine/human constructions of the body.

Categories and Subject Descriptors

J.5 [Arts and Humanities]: Fine arts

General Terms

Performance, Experimentation, Theory

Keywords

electronic voice phenomena phantom, spectre, art and science, pattern recognition, mediated body

1. INTRODUCTION

The Einstein's Brain Project is a group of scientists and artists working together for the last thirteen years, using the analysis and visualization of the bioelectrical output of the human body as a means to examine and develop understandings about consciousness and the new constructions of the body. The project develops systems and installations using analog and digital interfaces to direct the output of the human bio-envelope to environments that are constantly being altered through feedback from a participant's biological body.

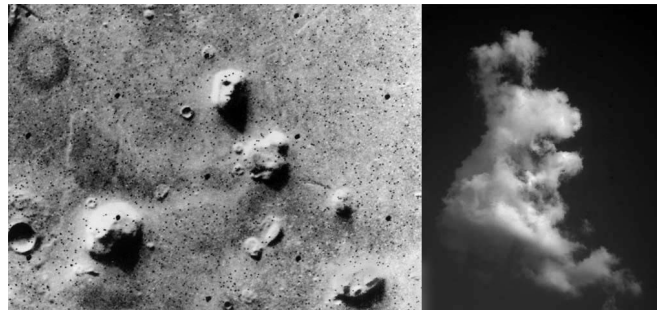
The Project's work is focused on how new representations of the body can conflate the virtual, symbolic and imaginary through the use of interactive performances, environments and installations that promote a high degree of disorientation and an awareness of the moment-to-moment construction of a self.

Using the coincidences of science, culture, technology and art, the Project examines the fundamentally contingent nature of meaning. The work has grown out of an interest in bodies in motion, worlds in flux, and in the endlessly recombinant nature of our worlds; and out of an interest in the seen and unseen, the half perceived and misperceived at, and beyond, the normal limits of our perception, and in the reanimation of the lost bodies and past events that constitute these invisible world. The world is never entirely what

it appears to be. At the core of the Einstein's Brain Project is a discursive space that engages with ideas about the resituation of the body in the world and its digital cybernetic and post-human forms.

2. BODY FROM THE MACHINE

Recent work has developed generative systems in order to reference ideas inherent in EVP (Electronic Voice Phenomenon) to examine ways in which we construct worlds, and bodies in worlds, through pareidolia (the psychological phenomenon involving a vague and random stimulus, often an image or sound, being perceived as significant), and apophenia (the seeing of



Pareidolia - face on Mars, bunny cloud

connections where there are none).

This work has used, amongst other strategies, face tracking and feature recognition, to explore the felt presence of absent bodies, using intelligent symbiotic systems, comprising both machine and human vision and analysis, to reveal patterns – the shapes of faces, the sounds of voices - in apparently random visual and audio noise. These works explored the construction of a world delineated by presence and absence, and pattern and randomness, locating the body through a construction that is both machine and human

New work in this series, uses very dense, spatialized, randomly generated noise, delivered through multi-channel, line source, directional speakers projecting sound as vertical bars, stretched throughout architectural spaces to form stacks of sound, that can be navigated by a body moving in space, much as one might move through the slices of an MRI volume.

As a participant moves purposefully across these slices of sound, voice-like sounds at the very edge of perception emerge, establishing a spectral presence - another body, seemingly absent,

but represented here by fragments of sounds, words and phrases. The sounds produced in these environments are only occasionally reminiscent of human voices. More often than not the sounds produced are recognized only as indistinct and indeterminate, but fail to resolve themselves into anything recognizable. But occasionally, sounds are produced that are strikingly like human utterance; although in actuality they contain only the barest possibility of being so. Whether these voices exist or not, the effect establishes a felt and present body that is convincing and disturbingly real.

These works set out to consider the unbidden emergence of the felt body in systems of meaning making that rely on pattern recognition, and to explore its consequences for the flesh in shared machine/human constructions of the body.

2.1 Electronic Voice Phenomena

The effect that computers have had on human perception and thinking is immense. The status of the image, in all its contemporary forms, has been brought into question by the computer's capacity to reconfigure data, and has problematized our notions of truth and reality. The distinctions between reality, artificiality and the imaginary have collapsed into a world of simulation, where the speed of change transforms our very sense of stability and identity. Metaphorically speaking our flesh has already become data.

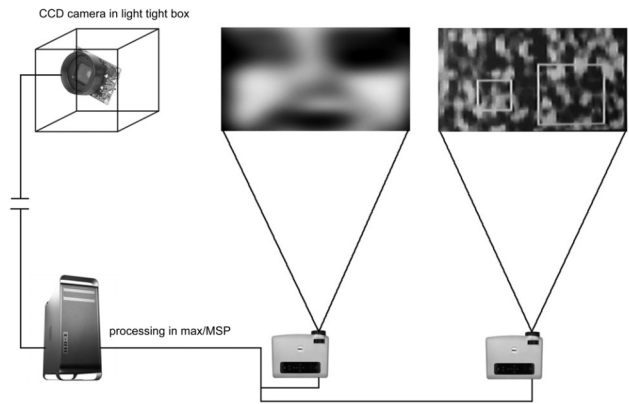
Recently the project has employed these notions to develop works from a wide range of processes, systems and allusions, using algorithms and randomized autonomous processes that reference the ideas of EVP and other paranormal exploratory methods, and resituates them within new ideas about consciousness, to analyze ways in which worlds, and the bodies within these worlds, are constructed. The works uses a combination of thinking in neuroscience, information visualization, film, popular culture, and media and art theory as pataphysical recontextualizing tools.

EVP is the recording of errant noises or voices that have no satisfactorily explainable source. These recordings are made when a sound recorder is isolated, or under controlled circumstances, together with white or pink noise used as a medium that can be acted upon by external electromagnetic forces. This electromagnetic medium produces waveforms in the noise stream that are eerily like human speech. For many the voices are simply arbitrary interpretations - hearing imaginary voices in random patterns of sound, just as we recognize images in random visual patterns or clouds. For others, the voices open up the possibility of communication with the dead.

2.2 Ghosts in the Machine

The series of installations entitled *Ghosts in the Machine*, and its accompanying works, creates environments in which participants able to listen to noises and see images generated from apparently silent and empty spaces. The work use the ideas found in Electronic Voice and Video Phenomena to explore ideas about the construction of a world delineated by the engines of presence and absence, and pattern and randomness.

A camera and a sensitive microphone are turned on, but enclosed in a completely light tight, anechoic box. They record no image, receive no light and sense no sound. The camera input is adjusted with maximum gain and brightness to reveal the video noise inherent in the system. This noise provides the medium that can

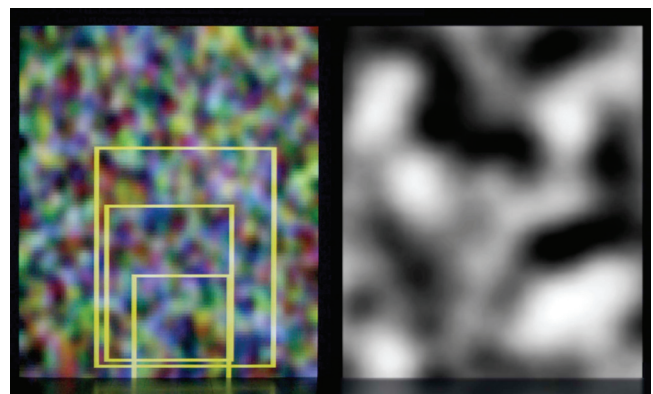


Technical set up: Ghosts in the Machine

potentially be modified by external electromagnetic forces. The video noise is mapped to audio by sampling pixels in a QuickTime matrix and using the values to manipulate a stream of white noise. Face tracking algorithms using a cascade of Haar classifiers scan the random noise in each video frame and look for any combination of pixels that form the most basic characteristics of a human face - areas that can be loosely characterized as eyes, nose and mouth with a sufficient degree of symmetry. When the software finds such a combination of pixels and symmetry the area is zoomed to full screen, its contrast and brightness adjusted, blurred and desaturated to clarify the found image.

The images produced are only occasionally reminiscent of human faces. More often than not the images produced are recognized as indeterminate organic forms with some suggestion of volume, depth and space, but fail to resolve themselves into anything remotely recognizable. But occasionally, images are produced that are strikingly like a face, although in actuality containing only the barest possibility of being so.

A *Ghosts in the Machine* installation is a generative, closed system. Random noise from a CCD camera or white noise generated internally by a software program is analyzed for patterns. An algorithm looks for patterns that match the basic



Ghosts in the Machine, Spain, 2008

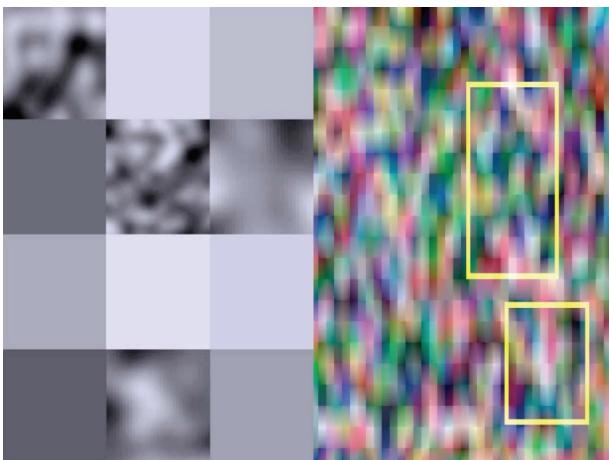
geometry and physiognomy of the human face. What it actually finds are pixels on a screen forming blobs and patches of colour that have no actual relation to a real world face. They have no

indexical relation to an object. They are not images of people, but another kind of image loaded with meaning, which arises accidentally, but irresistibly, from the hybrid interaction between machine and body. To all intents and purposes when these patches of pixels look like faces, they *are* images of faces. That such obscure images resolve themselves into faces without conscious effort, and that remain even when attending closely to them, suggests that it is paradoxically their lack of objective meaning that generates their form. It is the very ambiguity and indeterminacy of the images that allows the brain to reconfigure them as indexical.

In these installations the computer does the hard work of analyzing a complex visual field data, but the task of meaning making is left to the observer. The algorithms find face images in the video field that barely meet the requirements of a facial arrangement. The structuring of these pixels as faces, consisting only of blobs and indeterminate grain, is left to the observer. Seeing, representation and interpretation of external phenomena has never been a matter of objectivity. Seeing is a complex activity and the perception of visual forms, aesthetic experience and cognitive interpretation are more at home with the aleatory, the misperceived and phenomena of indeterminacy than with the notion of the world as a fixed reality. It is these that drive *Ghosts in the Machine*.

While apophenia and pareidolia may be the twin engines of *Ghosts in the Machine*, the forms that emerge suggest something else. Neither the images nor the sounds in ghosts have an indexical relation to reality, as does a photograph or a recording. They emerge from the random flickerings of pixels on a screen. They have neither substance nor form other than the chance interactions and collisions of one another. If they are to be thought of as faces and voices then they hint at an immaterial body that exists in the interstice between machine and body that exists in patterns and information flows.

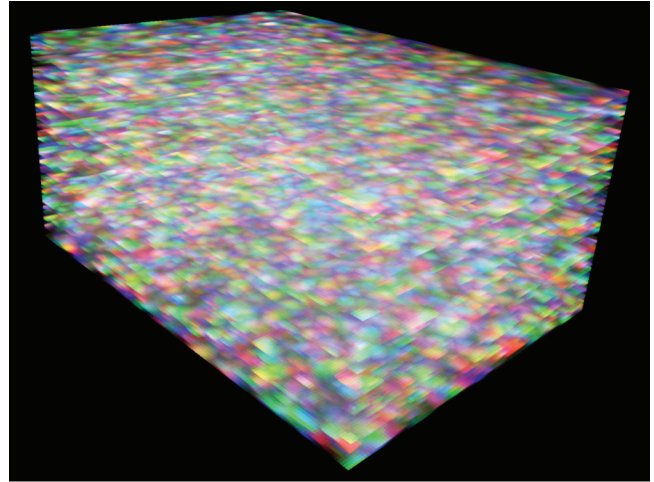
Generated in the interstice between subject and object, they are data made incorporeal flesh through the dematerializing fusion of body and machine. These are true ghosts in the machine – images born out of pattern and randomness. They are true images of the absent body. Thought of this way the work moves away from ideas about apophenia and pareidolia to suggest that real



Ghosts in the Machine, Mexico, 2008

information is contained within the random noise of the work, that is always on the point of becoming.

All perception is embodied, and experience and consciousness involve complex material processes. The location and constitution of images within these works confer their existence as forms of material hallucination.



Noise sequence in three dimensions

2.3 New Work

New work has organised noise and its visual equivalents as spatio-temporal voxel volumes in which the temporal component is expressed in the z dimension. The word "voxel" is a combination of "volumetric" and "pixel". Essentially it is a three-dimensional cube. Such a form allows voices and patterns to emerge that are no longer limited by the arrow of time.

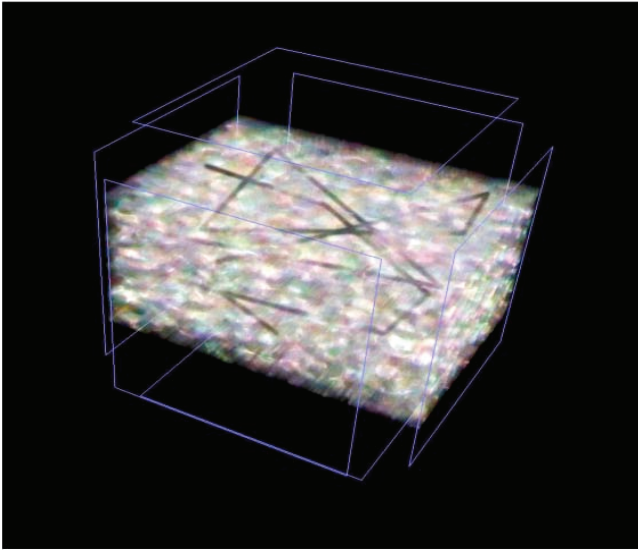
Enlarged to architectural scale an observer is enmeshed in a stack of noise slices, delivered by directional speakers, these volumes form the beginnings of a new means to develop installations and visual systems that use the relationship between an observer actually within the data to build a picture of the machine/human that is the mediated body.

These works use pattern recognition algorithms to identify unusual repetitions, noticeable clusters, loops and so on, in concert with an observer who gives form to shapes and sounds that have an attenuated indexical relationship to the data.

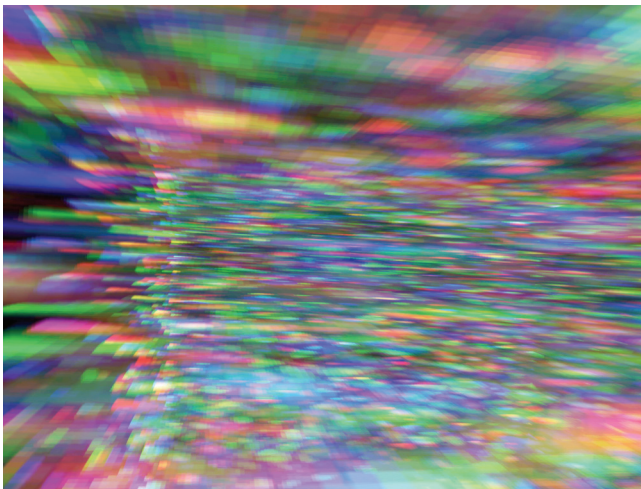
In previous work we have seen that our visualizations are constructs that are not uniquely related to the information that generates them. They are a complex hybrid of machine analysis, human interpretation, and scientific and artistic vision, which promotes a remapping of information beyond any functional value [1]. This powerful drive to fill in the spaces opened up by those parts of an entity that resist their informational links, produces what we might only think of as false positives, but in doing so brings into focus acts of cognition that are inextricably linked to the building of meaning, the understanding of narrative, and, in turn, to the structuring of the body. While earlier work used well-characterized forms for analysis, this new work develops processes that use a combination of machine vision and the apophenic and pareidolic impulses to recognize kinds of pattern

that are not so easily linked to prescribed index or information, but are instead unavoidably open to interpretation. The structures we create are a function of the cyborg body used to observe them.

These works implicate the participant as performer, as she moves through the space to discover the patterns of sounds. Sounds in this space are a function of movement through space and time. Without this dance these sounds remain embryonic. While this physical performance is essential to the formation of sounds, the work cannot be seen as limited to physical movement through a dimensional space. The performance takes place *in* the body as



Path through a noise matrix



Interior of noise matrix

much as *through* the body, as the participant, remade as cyborg, is able to understand random noise as pattern and form. The works embody our belief that the new technologies have not only altered our traditional understandings of observer and representation, through the development of visual spheres that are now structurally and conceptually different to the mimetic zones of film, television and photography, but also, and much more importantly, through what Virilio [2] describes as:

“the splitting of viewpoint, the sharing of perception of the environment between the animate (the living subject) and the inanimate (the object, the seeing machine).”

Virilio’s statement suggests that the body is suspended between a technologically mediated, seen world, and a biologically felt world. In response to its separation from the events of real space and real time, the body constructs a new space necessitated by the changes to its perceptual apparatus.

Complications in the installations are situated around what is real or true, what is believable, for at each turn the body is faced with a dilemma: is what I am feeling truly sensed or is it an imagined sensation? In the EVP works, what is real or true and what is merely imagined is blurrily similar. In these worlds, feeling states lead easily to beliefs. Afferent feedback takes the place of observation, as stimuli affect the body/mind even as they are not directly noticeable or observable.

The felt presence in the project’s works is not entirely generated by the recognition of sound and form. The newest work has revealed that there are frequencies in the sounds generated, which are beyond the threshold of human hearing. In particular, there are very low frequencies between 5 and 20 Hz that might account for the feelings of unease that some find accompany the work.

Infrasound – sound that is lower in frequency than 20 cycles per second, the normal limit of human hearing - has long been associated with feelings of discomfort, unease and even hallucination. Frequencies around 19 Hz have been associated with spectral and ghostly apparitions, and 18 Hz have been indicated as close to the resonant frequency of the eye – an organ most properly thought of as an outcropping of the brain [3]. While none of the installations cited above used large enough subwoofers to generate sufficiently powerful sound waves, each was tuned to drive the resonant frequency of the installation space, and as such might produce sufficient sound pressure to the extent that participants might sense this as additional proximal bodies.

2.4 A Body In Crisis

The rapid development of technology in the past decade has put the status of the body in crisis. Stelarc talks of a body immersed in uncertainty, anxiety, and ambivalence - a body exhausted by itself. He suggests that even though the body might be enabled and accelerated it consequently exposes and amplifies its obsolescence [4]. Erin Manning defines the problem in another form. She poses the question concerning the relationship between bodies and technologies as a question of where the concept begins and ends [5]:

“The challenge, technologically, is of course that technology as we know it does not encompass and cannot move-with the virtual (as Bergson/Deleuze define it). Technology, in its deployment in software programs, requires pre-established parameters. This need not mean that the body-technology interface cannot create virtual openings (immanent preaccelerations). It simply means that the technology cannot in and of itself either recognize them or work with them. Technology cannot work with what is not actually at hand.”

Both these versions of the relationship between a body and technology relationship suggest, perhaps unintentionally, a familiar privileging of the physical body over the machine. For

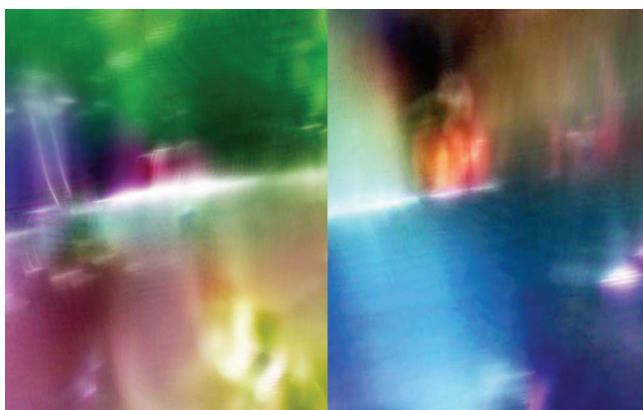
Stelarc the body's disappearance and consequent absence is immanent. Manning's notion of "at hand" suggests the ever presence of parameters - in other words an ongoing and implied separation between the bodies and technology. In the visible world of appearances and in the world of the tangible Stelarc and Manning's positions make sense. In future worlds that are less tangible, and consequently less visible - where distinctions between the limits of the body and the beginnings of technology are actually indistinguishable, they will make no sense at all.

Through an interest in systems of meaning making that rely on pattern recognition, and the relationship between meaning and the meaningful, the project's work suggests a world dependent on increasingly, yet seemingly infinite, complex recursive and recombinant loops between meaning made and meaning found, and increasingly indeterminate limits of a super-distributed and polymorphic body. In these loops the external and internal worlds are indistinct, each acting upon the other in the construction of a new self/space forever suspended at the point of becoming, that is hidden and revealed simultaneously.

Zoltán Dragon in his work on Hungarian filmmaker István Szabó, puts it succinctly [6]:

"The uncanny quality of this showing and hiding is perhaps best expressed in Lacan's rendering of Freud's German term, Unheimlich, to the French: extimité, which has been appropriated in English as the extimate or extimacy. The term refers to a blurring of the boundary between inside and outside, between the kernel and the shell. As Elizabeth Bronfen argues, the concept is essentially useful, since it can "designate the phantomatic, encrypted presence of kernels of the real traumatic knowledge in the Symbolic," where this encrypted nescience "returns not only as a hallucination but as an embodiment with both psychic and somatic reality."

The EVP work has as much in common with the psychic phantoms of Abraham and Torok [7] and Jonathon Crary's marginalized and problematic body [8], as with recent theoretical explorations into sonic hauntology [9], particularly in its desire to reanimate lost bodies and worlds, and in the phantoms' psychic and somatic affect, and with earlier explorations into EVP [10]. But its eventual resonance remains as an unstable ontological anxiety that cannot do otherwise than imagine a body so



Images forming in deep interior of the matrix

inextricably enmeshed with its surroundings and the technologies that support it, that it becomes indistinguishable from the mechanisms of its representation and erasure.

The effort to restabilize the self in a world that changes moment-to-moment where everything is in play and is questioned and negotiable, is unavoidably revelatory and re-problematizes current and preceding models of authenticity and resistance.

The spectral bodies in the EVP work are a felt presence suspended between belief and disbelief. They are paradoxes - something seen, heard, and sensed, but having no possibility of physical reality. As such, they are impossibilities. They are disembodied voices and insubstantial auras, shedding flesh even in advance of their bodies, but still with immense psychic and somatic power.

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- [7] Abraham, Nicolas and Torok, Maria. *The Shell and the Kernel*, Chicago: University of Chicago Press, 1994.
- [8] Crary, Jonathan. *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century*, Cambridge: MIT Press, 1990.
- [9] From 1995 onwards, the term hauntology has featured prominently in the British music press and blogosphere. The first to use the term were Ian Penman in *The Phantoms of Tricknology versus a Politics of Authenticity*, in *the Wire*, March 1995, and David Toop in *Haunted Weather: Music, Silence, and Memory*, *Serpent's Tail*, London, 2004. The term has been used by k-punk, Woebot, Simon Reynolds and Pádraig, amongst others, to discuss dubstep artists such as Kode9 and Sam Shackleton. The *Hauntology Now!* symposium took place in 2008 at the *Atmospheres2* festival at the *Museum Of Garden History* in London.
- [10] In addition to paranormal investigations there have been numerous artistic explorations over the years, including Joe Banks' Rorschach audio project, and work By Leif Elggren, and Carl Michael von Hausswolf amongst others. *Ghost Orchid* (compiled, edited and produced by Justin Chatburn and Ash International) provides an in depth look at EVP.

