COLOURBLIND: MACHINE IMAGINATION, CLOSED EYE HALLUCINATION AND THE GANZFELD EFFECT

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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 and psychology to explore how interpretation in shared machine-human environments contributes to the construction of our worlds.

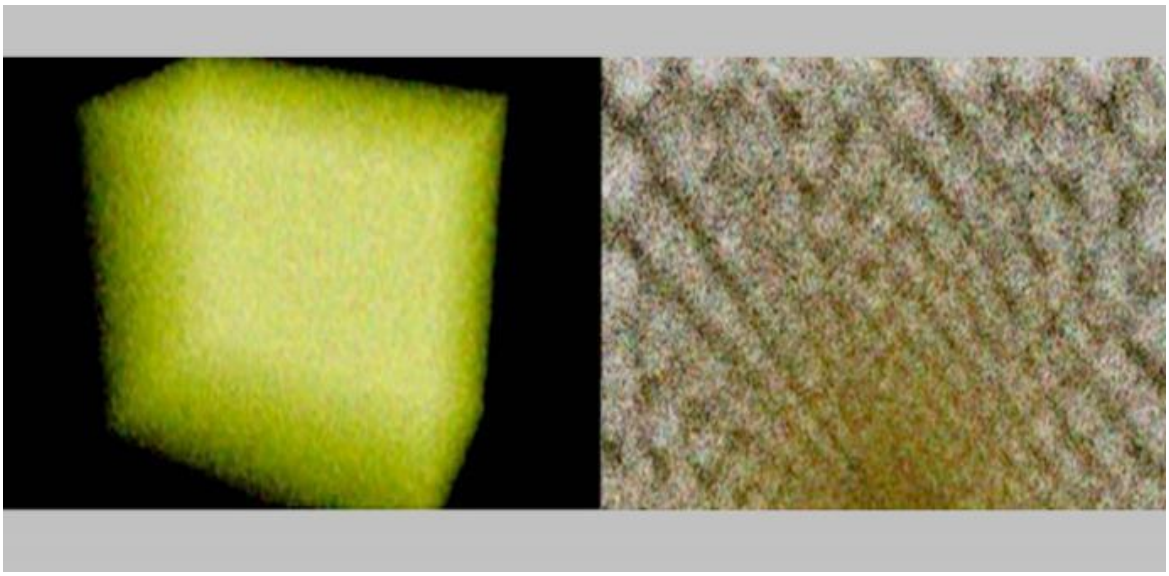

Fig 1. ColourBlind, 2010, installation View, © Alan Dunning

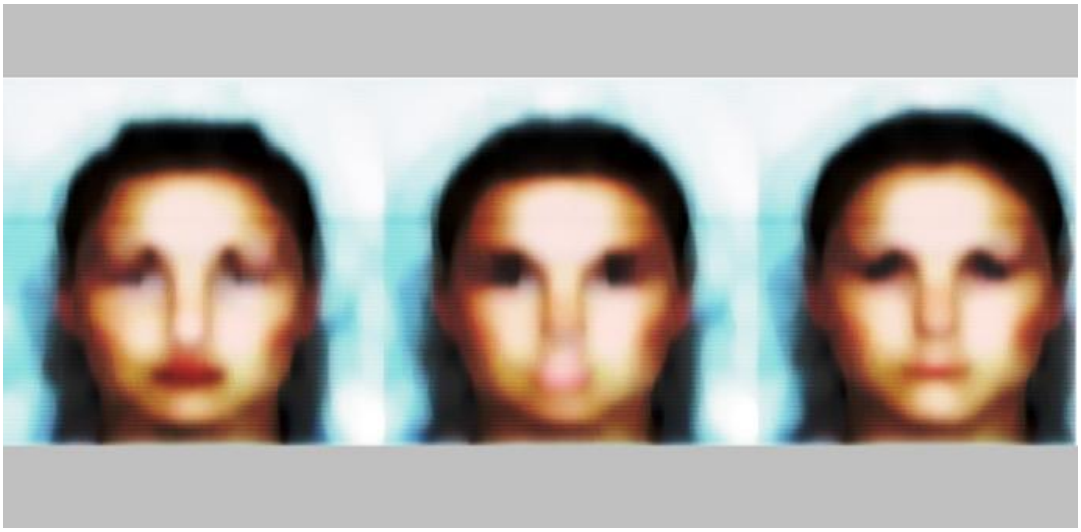

Fig 2. Doppelganger, 2011, installation view, © Alan Dunning

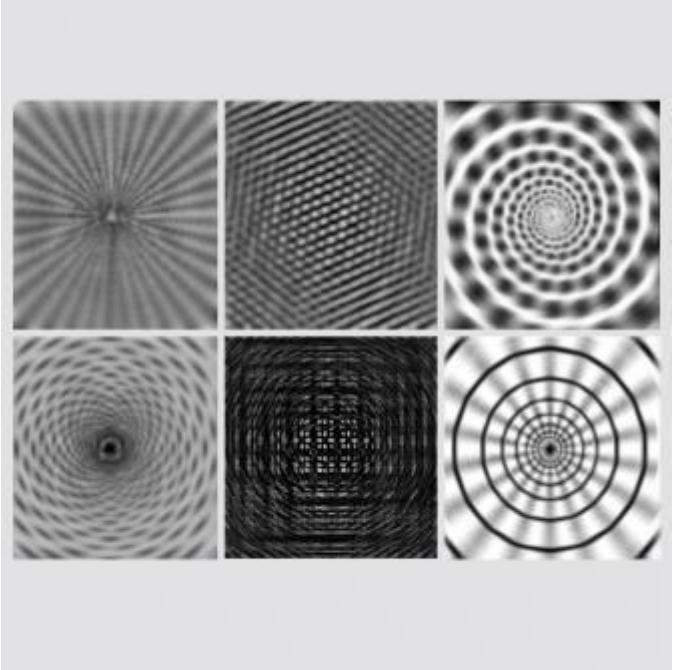

Fig 3.Typical patterns seen in CEH, © Alan Dunning

This paper introduces and contextualizes a series of new works – ColourBlind - that explores the internal workings of a machine through an implementation of the Ganzfield Effect and Closed Eye Visualisation insofar as they relates to ideas about hallucinations in human and machine hybrids. The work explores ideas about machine vision and how hybrid interpretation gives rise to unbidden and unexpected colours, images and patterns in streams of unstructured data, and how undifferentiated monochrome colour can affect interpretation imagination. Through an examination and analysis of visual system noise expressed as spatial temporal voxel volumes, the work explores these investigations as machinic hallucinations.

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. 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 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.

In recent times the development and dissemination of computer generated imagery has made commonplace constructed visual spaces that are fundamentally different from the mimetic and naturalistic representations of traditional media like painting, photography and film. But it is the increasing prevalence of machine and computer vision, and seeing machines, which has produced the most radical shift in the manner in which the world is perceived and constructed. This habitual employment of technological devices and programs has reconfigured both our conceptual and perceptual frameworks to the extent that what might be called natural vision is beginning to be superseded by machine vision. This suggests that vision is becoming disengaged from human needs and is now transferred to a technological plane.

The Project's exploration of hybrid perception and interpretation in shared machine-human environments concentrates on the idea that any visualization is a complex manifestation and indication of internalized machinic activity. In previous work we have been forced to acknowledge 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 its immediate functional value. The 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 techno-subjective restructuring of the body.

The Ganzfeld (complete or open field) effect [1] is a phenomenon of visual perception caused by staring at an undifferentiated and uniform monochrome field of color. Usually this is accomplished by the subject wearing tight fitting goggles that block out all but one colour of the spectrum. In the 1930s psychologist Wolfgang Metzger, investigating gestalt theory, established that when subjects gazed into a featureless colour field they were unable to see anything after even a few seconds. In further experiments subjects that are immersed in the monochrome field for extended periods of time consistently hallucinated and recorded distinct EEG patterns of activity.

It is a well-known phenomenon with historical precedents in the followers of Pythagoras entering dark caves to gain wisdom through visions, [2] and in reports of trapped miners hallucinating and seeing ghosts. Similar experiences are often cited by Arctic and Antarctic explorers who report altered states of mind while traveling across large featureless landscapes. It is thought that the hallucinations in extended Ganzfeld experiments are the result of the brain amplifying neural noise in order to look for the missing visual signals, and it is this noise that is interpreted in the higher visual cortex, giving rise to hallucinations.

A ganzfeld experiment is a technique used in the field of parapsychology to test individuals for extrasensory perception. In the context of ColourBlind its similarity to scrying – an ancient system of revelation through prolonged observation of an object - should be noted. Martin Howse's experiments in scrying, in so far as they relate to our electronic environment and the revelation of a hidden city [3] have a particular resonance, as does Friedrich Kittler's exposition on the electro-mysticism of Thomas Pynchon's novels. [4]

In Closed Eye Hallucination an individual sees blobs, colours in motion and sometimes objects, even though the eyes are closed. Closely linked to the experiences of subjects in Ganzfeld experiments there are often patterns discovered within the blobs – most cited are webs, grids, honeycombs and other geometric and repeating structures. CEH experiences can take a number of forms: visual noise - seemingly

random noise of pointilistic light/dark regions with no apparent shape or order; light/dark flashes - regions of intense black or bright white that appear in the noise; patterns – highly organized motion and color forming complex geometric patterns and shapes; and finally objects and things.

In the ColourBlind works a camera is turned on, and covered with a single Ganzfeld goggle [5] and bathed in a pure yellow light. The only light passing to reach the camera's CCD is yellow light of 570 nm. The video stream is sent to a computer where the input is cropped and adjusted for fall-off at the edges of the camera so that the monochrome colour field is undifferentiated by tone or hue. The camera image is processed in Max/MSP to construct a voxel volume that is analysed for optical features within a specified region of interest. Tiny inconsistencies in the colour field, invisible to the human eye, false positives if you will, are tracked as they pass across 3 planes in the x, y and z dimensions of the volume. These inconsistencies are amplified and rendered as pixels on a video plane that becomes increasingly densely populated through additive blending. These pixels are streamed to a projection on the wall. Over time patterns gradually emerge as the video frames are accumulated and multiplied together. Two other screens show in turn the light that is seen by the camera and the voxel volume of data passing across the analyzing planes.

What starts as pure noise gradually resolves itself into patterns with structure and form. Sometimes these form rapidly, but usually these are the results of layers of noise blended together over long periods of time. The patterns that emerge bear a striking resemblance to patterns that are normally associated with those seen in closed eye hallucination and Ganzfeld effect experiments in which subjects stare at monochrome uniform fields of colour.

The inconsistencies in the field come from the image sensor itself, in part thermal noise, and in part amplified background electrical noise that is present in the system, but the work suggest some other possibilities. The installation is a generative, closed system. An algorithm looks for any disruption on a uniform field of colour, which is stacked additively on previous instances of disruption. Over time there are many, many instances of the tiniest of ruptures in the visual field that together begin to organize the previously vacant colour field. These patterns are nothing more than the chance interactions and collisions of one another, but our interpretation of them hint at an analytic that forms in the interstice between machine and body within pattern and information flows, as the brain's cenophobic response to absence and randomness.

Earlier work used ideas found in Electronic Voice and Video Phenomena to explore ideas about presence and absence, and pattern and randomness. Installations took the form of blinded cameras that sent visual and audio noise to a computer that analysed it for patterns that looked like human faces and sounded like human speech.

In these installations the computer did the hard work of analyzing complex data, but the task of meaning making was left to the observer. Algorithms that found faces or human speech in the data stream found many barely meeting the requirements. The interpretation of noisy pixels as faces, or noise as speech was left to the observer.

On occasion these faces and voices were utterly convincing. They were, to all intents and purposes, real faces, real voices. They were not images of people, but another kind of image loaded with meaning, which arose accidentally, but irresistibly, from the hybrid interaction between machine and body. To all intents and purposes when these patches of pixels looked like faces, they were images of faces.

The faces and voices that emerged from the random flickerings in a machine hinted at an immaterial hybrid body that existed in the pattern and information flows that were fusion of body and machine, suggesting that there might be real information contained within the random noise of the work. Later work extended these ideas by organising noise and its visual equivalents as spatio-temporal volumes to enmesh an observer in a stack of noise slices, delivered by directional speakers. These works used pattern recognition algorithms to identify unusual repetitions, noticeable clusters, loops and so on, in concert with a moving observer who gave form to shapes and sounds. It is this work that informs the recent exploration of pattern emerging from a monochrome colour field sampled across time.

The very latest work draws upon current neurological research that acknowledges visual perception as a form of symbolic interaction in which information is gathered by the brain, but which bears no physical resemblance to the objects, and events of perception. According to VS Ramachandran, '…the brain creates symbolic description. It does not recreate the original image, but represents the various features and aspects of the image in totally new terms. "This activity is manifest in encapsulating behaviors and inferences, such as change blindness, selective attention, energy measurement, imagination and hallucination, in the construction of an image. The work uses images and sound conjured by machines in response to missing or incomplete information. Using the interpolation present in all media spaces to build imaginary presence, the work creates forms out of incomplete data drawn from cameras and microphones. The work looks at the possibility and consequences of invented images arising out of the discrepant and unstable representations that form our media constructed and electronically surveilled world. False positives, false bodies, false entities inhabit our media spaces, not only changing our inhabited world, but also our bodies and our being in the world.

In the work series Doppelganger (2011), in which interlaced image fields are separated and re-interpolated again and again until only the interpolations remain, it is possible to see how images constructed in media spaces must unavoidably generate presence from absence and how this happens through a symbiotic relationship between machine and human, suggesting in the end that there are unseen, unstable representations generated within the medium itself. ?Doppelganger creates a copy of an original made up of entirely machine–imagined data. Looking like degraded images of dolls or action figures, or twins, or Jeckylls and Hydes, or merely sadder or happier version of themselves the duplicates are built on the digital DNA of the original, but have moved away from a stable state, reinvented by a machinic, algorithmic dreaming to take on a life of their own. The brain/body interpolates the absent information, filling in the missing gaps. It is possible to characterize images as contingent unstable, entropic zones. Even as the viewing subject assumes that what is viewed is a stable phenomenon, on closer inspection the image is an entropic event which is always receding, riddled with micro-discrepancies that play an important role in the construction of a world.

The work explores how images are constructed in media spaces, how absence is uniquely and unavoidably attached
to presence, and how this is manifest through the symbiotic relationship between human and machine. Using the model of the Doppelganger–a tangible double or look–a–like, or an image of oneself impossibly glimpsed on the periphery of vision, new forms, looking or sounding like someone or something, but having no index in the real world, are constructed by machines in response to incomplete data gathered by cameras and microphones.

All of the Project's pattern recognition work has much in common with the psychic spectres of Abraham and Torok, [6] Jonathon Crary's bodies, [7] and with recent explorations into sonic hauntology, [8] par-

ticularly in its investigation into changing ideas about what constitutes authenticity, and with earlier explorations into EVP, [9] but its lasting impact is to acknowledge an ontological anxiety that imagines a body so enmeshed with its surroundings and the technologies that support it, that it becomes indistinguishable from the mechanisms of its representation and disappearance.

Increasingly our machines see and discriminate much as we do, and in turn change our perception of the world. ColourBlind explores ideas about how machines and we see and experience the world, and raises questions about the capacity to discriminate between what is important and what is not. In the search for pattern in randomness, for colour where there is none, when faced with the horror vacui of sensory deprivation the brain, and in this case the machine, continues its processing regardless, creating its own colours and forms as interpretative hallucinations.

References and Notes:

1. *Ramesh, B, Ganzfeld Effect, http://www.shvoong.com/exact-sciences/biology/1671321-ganzfeld-effect/ (accessed April 2009).*
2. *Yulia Ustinova, Caves and the Ancient Greek Mind: Descending Underground in the Search for Ultimate Truth (New York: Oxford University Press, 2009).*
3. *Scrying, http://1010.co.uk/org/scrying.html (accessed November 2006).*
4. *Friedrich Kittler, "Pynchon and electro-mysticism," xxxxx [reader], ed. xxxxx (Westminster: Mute Publishing, 2006).*
5. *Simple ganzfeld goggles can be made from the two halves of a ping-pong ball.*
6. *Nicolas Abraham and Maria Torok, The Shell and the Kernel (Chicago: University of Chicago Press, 1994).*
7. *Jonathan Crary, Techniques of the Observer (Cambridge, MA: The MIT Press, 1990).*
8. *Since 1995, 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," The Wire, March 1995, and David Toop, Haunted Weather: Music, Silence, and Memory, 2004. The term has been used by k-punk, Woebot, Simon Reynolds and Pádraig, amongst others, to discuss varius dubstep artists.*
9. *Numerous artistic explorations over the years, include the Rorschach audio project, and work by Leif Elggren, and Carl Michael von Hausswolf. Ghost Orchid (compiled, edited and produced by Justin Chatburn and Ash International) provides an in-depth look at EVP.*