

**The Sixth International Conference on
Transdisciplinary Imaging at the Intersections between
Art, Science and Culture**

DARK EDEN

Sydney, AUSTRALIA: 6 - 8 November 2020

Conference Chair: Professor Paul Thomas, Art and Design, UNSW Sydney
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**A shadow zone, a spectral landscape, a cemetery, zombieland.
The debris of an old image culture, or compost for a new one?**

The cultural moment now dubbed “Contemporary” is defined by the networked saturation of images. By the diffusion, dissemination and inundation of frictionless image production. By image hacking, image consumption and image commerce on social media and in platform capitalism. By 24/7 crisis news, doom-scrolling and misinformation spread by web influencers. By CCTV and drone surveillance. By massive multiplayer online gaming. By “deepfake” hoaxes and simulations that augment reality and contribute to the relentlessly cynical campaigning of our 21st century political twitter “newspeak”. Is not this cornucopia and unprecedented availability of mediated imagery a kind of Eden? If so, it is a dark Eden. Metaphorically fertile as a forest that is so thick with its tentacular edicts that the light that penetrates cannot escape its web; or perhaps, and more likely, that its mutated growth is now dependent on a black rather than bright light. Its darkness might be that of the pall of ash-filled smoke shrouding a burning continent.

Conference papers addressed the general topic from any angle (direct or oblique), but were asked to consider at least one of the following areas:

- Expanded image
- Remediated image
- Hypermediacy
- Expanded film
- Imaging science
- Computer vision
- Networked image
- Immersion
- Speculative realism
- The invisible, the subliminal, the inaudible or subaudial
- Infraworld
- Enlightenment and the post-truth era
- Augmented reality
- Artificial intelligence, or intelligent systems



Machine Learning and the Mediating Tendencies of the Image

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Abstract

The technological mediation of human perception that occurs through images influences not only how images are produced and experienced but also how they are interpreted and theorised. The present incorporation of machine learning (ML) into various forms of visual media offers particular insight into this issue by highlighting the tension between images informed by the interpretive processes performed by machines and traditional notions surrounding the production and reception of images. This paper addresses several ways in which current notions of image production are challenged by visual artefacts of ML. It seeks to clarify the mediating role played by visual technologies and to demonstrate how images produced using ML offer new ways of approaching theories of the image. This investigation considers how the participation of highly technical systems in visual media ultimately contribute to a critical re-evaluation of the image.

Introduction

Visual technologies play an important role in the mediation which occurs both in the production and the interpretation of images, due to technology's role in not only expanding human experience and ability, but also influencing how those are interpreted. This is especially relevant as highly automated visual systems grow in terms of technical capacity but also become increasingly ubiquitous. Current forms of algorithmic media, such as images produced using machine learning (ML), demonstrate the interrelation between visual perception and the production and interpretation of images in a particularly relevant way. And as a paradigm of image production, ML raises several important, unresolved questions about the interrelation between human and machine forms of visual processing.

ML refers to both a field of artificial intelligence (AI) research and an approach, 'in which machines "learn" from data or their own "experiences".' (1) When applied to visual tasks such as the generation or analysis of images, ML enables complex visual processing tasks to be performed by computers, often in a highly-automated fashion. Familiar applications of ML include facial recognition, influencing the display of online content and the generation of images based on analysis of existing data.

In addition to becoming increasingly prevalent in visual media, ML has also recently experienced a surge of interest from artists as well as theorists, who have been working with ML in a practical capacity, as well as reflecting critically on its significance to visual culture.

The appropriation of ML by artists enables novel aspects of ML to be explored in terms of humanistic discourses, but it also brings with it historically charged ideas concerning the role of technology within art and artistic practice. While the widespread use of ML in visual media is a recent phenomenon, how it is theorised often links current forms of visual media to ongoing narratives about the role of machines in image-making. This has the benefit of contextualising newer forms of media in relation to their ‘old media’ (2) precursors, but also brings with it several unresolved issues, especially regarding the autonomy of machines from human intentionality or perception.

Methodology

This paper gives an overview of discourse surrounding the generation of images using ML, examining this topic through a survey of artistic examples employing ML, which are contextualised in relation to theory. The perspective of this research is influenced by postphenomenology, (3) which emphasises the role played by technoscientific instruments in mediating humans’ experience of reality. Ihde importantly argues that such mediation not only mediates but also qualitatively alters perceptual experience, playing a hermeneutic role in the process. The approach of media archaeology (4) is also influential to this research, seeking insights about current media artefacts through related historical and technological developments. A contextual understanding is especially relevant to theorising ML because it enables us to see how it is indeed novel, in addition to how it remains connected to established ideas regarding art and technology.

Mediation of the Visible

In recent years, increasing attention has been paid to the algorithmic qualities of images, what has been referred to as an ‘algorithmic turn’ (5) in visual media. The contrast between what is visibly apparent on the surface of images and what goes on in their subfaces is highlighted especially well in visual applications of ML in which the process involved may be highly opaque (6) to viewers. For example, it has been proven that ML systems are capable of producing highly unpredictable, surprising results (7) and adversarial approaches have demonstrated how images may be processed in significantly different ways by humans and machines. As a result of the particular modalities that ML brings to image production and analysis, many artists have been captivated by the possibility for machine vision to act as a metaphor for an alternative to or an extension of human vision.

An especially notable example of the discrepancies that may arise between human and machinic forms of visual processes can be found in the cross-disciplinary work of Harun Farocki. (8) Several of Farocki’s artworks and an influential essay entitled *Phantom Images* (9) probe the engagement of highly automated imaging systems with non-visual processes. Operative—or operational—images, Farocki says, “are images that do not represent an object, but rather are part of an operation.” (10) Farocki also points out that visual technologies thus enable us to “monitor process(es) that, as a rule, cannot be observed by the human eye.” (11)

Expanding upon Farocki’s ideas, Trevor Paglen’s explorations with the concept of the operational image (12) often seek to visualise the invisible (13) aspects at work in ML-produced images. This may be seen, for example in *Machine Readable Hito*, (14) in which numerous portraits of the artist Hito Steyerl are displayed with labels indicating an emotion

analysis of her facial expressions with a score for various categories: anger; contempt; disgust; fear; happiness; neutral; sadness; and surprise. This connects to the tradition of portraiture seeking to capture something of a sitter's internal world through a visual representation of their face. It is also suggestive that the analysis of emotion in images by machines entails a paradox. In a slightly different approach to the idea of the invisible in visual media, *Training Humans* (15), a collaboration between Paglen and Kate Crawford, exhibits examples of ML training data, especially focusing on facial recognition systems. By making the image data that is typically obscured behind such systems available to viewers, the exhibition calls attention to the interplay between what is made visible or hidden away in visual processing tasks.

In complement to Farocki's and Paglen's exploration of the non-visual in images, Hoelzl and Marie (16) emphasise the 'softness' of images, referring to the capacity of images to be highly variable, while adhering to strictly defined algorithmic procedures. This led, they argue, to a change from images acting as representations of the world to taking the form of a database. (17) In complement to this view, Steyerl encourages giving attention to what she refers to as the 'poor image', epitomised by networked media: 'a copy in motion. Its quality is bad, its resolution substandard. As it accelerates, it deteriorates.' (18) Championing data, procedure and transmissibility over the visual qualities of images is reminiscent of Farocki's account of operative images as entailing spatial, temporal and task-based qualities. This approach enables images to be defined in ways in which go against the grain of traditional image paradigms such as painting and, to a certain extent, photography, (19) which have typically championed the visual, material and humanistic qualities of images.

The works covered thus far in this paper each touch on the substantial rift that may exist between how images are produced and interpreted by machines as opposed to by humans. The participation of machines in the production — and more recently, the interpretation — of images has fuelled ongoing speculation about the potential for nonhuman forms of vision, as well as attributions of authorship to machines. Not only has it been the source of controversy questioning the authorship (20) and value of technically produced artefacts, such as issues of materiality, seriality and labour, (21) but also the position of machines as interpreters of visual information. This goes beyond McLuhanian (22) perspectives of media as extensions of human ability and perception, with Farocki calling attention to the capacity of machine vision (MV) to act as a 'displacement of the observer's point of view'. (23) Phantom shots, for example, are 'film recordings taken from a position that a human cannot normally occupy.' (24) In such cases, an apparatus may act as a stand-in for the human eye may, which be used for cinematic effects, but also takes on increasingly distanced forms such as the navigation of drones or mass surveillance.

The mythologisation of machines is a common theme in art and theories associated with the use of technology in artistic production. For example, the myth of the machine as artist (25) is often invoked in efforts to encourage the overestimation and fetishisation of machine autonomy in image production. In the case of Harold Cohen's *AARON*, (26) the infamous sale of a generated portrait by the group, Obvious (27) and the work of artists including Mario Klingemann, (28) it is apparent that the participation of machines in image production is greatly overstated, as though it occurs autonomously from human intentionality and vision.

Another form of ML myth can be found in the anthropomorphising language and comparisons often applied to art involving ML, such as the use of MV as a metaphor for nonhuman vision. This frequently involves the development of adversarial strategies to evade detection from

biometric surveillance, as can be seen in Adam Harvey's *CV Dazzle*, (29) Zach Blas's *Facial Weaponization Suite* (30) and Steyerl's *How Not to be Seen. A Fucking Didactic Educational .MOV File*. (31) Others treat AI and ML systems as characters that participate in the production of the work, such as in Amy Alexander's *What the Robot Saw* (32) and Memo Akten's *Learning to See*. (33) Each of these works relies heavily on metaphorical comparison of human artistic authorship and visual perception with the automated imaging processes performed by machines.

In a step away from these anthropomorphizing tendencies, Joanna Zylińska's nonhuman photography (34) questions who or what images are *of*, *by*, or *for*, (35) underscoring the capacity for machines to produce images in the absence of direct human participation. Nonhuman photography also demonstrates how images may be inaccessible to humans to varying degrees—produced without human perception, agency or subjectivity playing a significant role in the process. This means that a given image may exceed its instantiation in forms tangible to humans, but it also entails the potential for highly automated imaging systems to displace the importance of the viewing subject. But despite its intentions, the idea of nonhuman photography faces the paradox of humans attempting to envision how nonhuman perception, agency and subjectivity may be materialised in image form. It nonetheless speaks to a recurring curiosity as to how technology may afford mediation between not only visual and non-visual but also between human and non-human, in such a way that it remains anthropocentric.

Mediation as a Tendency in Images

Beyond merely mediating human intentionality and the perceptual experience of both producer and viewers of images, technology also contributes to a view of technically produced images as the product of technoscientific methods. This, too, has a longer history than the use of ML in image production, for example, having a notable effect on how photography has been theorised in comparison to painting. While visual verisimilitude had been an ideal in pictorial representation until the advent of photography, the apparent efficacy of the photographic process to faithfully capture visual likenesses of the world made it subject to scrutiny in comparison to the laborious and skilled nature of painting. Photography therefore struggled to gain legitimacy as an art form. But on the very same grounds, the presumed distancing of the photographic process from the intentionality of the photographer, photography also came to be seen as inherently truthful, scientific form of visual representation.

Technical and scientific methods offer particular ways of mediating the visible, but these do not ensure the accuracy of the images which are produced as a result. This is especially apparent in situations of error in ML systems, such as their demonstrated tendency toward inherent bias (36) as well as the examples made visible by adversarial approaches. But in the same way that the myth of the machine as artist continues to haunt technical forms of image production, so too does the idea of such methods imbuing images with a technoscientific perspective of the world. Many artists, as well as theorists, have criticised this kind of assumption, yet much like the paradox inherent in the concept of nonhuman photography — the inability to escape the human perspective — it appears equally difficult to take the empirical worldview out of highly technical approaches to image-making, such as the generation of visual content using ML. In this sense, the very mediating capacity which enables technical methods of visualisation to function also makes them subject to interpretation on the level of that visualisation, but also in regards to their apprehension by viewers.

Conclusion

What is especially significant about the questions that current discourse on algorithmic methods of image production pose to us is how they contribute to acritical re-examination of the value systems that underpin theories on visual culture. The ideas and practices covered here may on the one hand more faithfully capture the nuances of current contexts than older conceptions of images as primarily visual, materially fixed, the product of a sole—human or machine—author and intended for a human audience. But they also make the image extremely hard to define by unsettling entrenched ideas concerning the ontological, communicative and mediating nature of current visual media. In this way, the application of ML to visual processing tasks does not constitute a distinct break with existing image paradigms, such as photography and painting, but builds upon these traditions, including their surrounding narratives. This underscores the wealth of not only mediating processes but also historical discourses, which may now be embedded in and behind images.

Notes

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