

Ultra-Processed Images

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Trevor Paglen, *How to See Like a Machine: Images After AI*

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Around the time of the Cuban missile crisis, in an elaborate and costly psyops intervention, the CIA flew objects over the island that were designed to look like alien spacecraft. In previous psyops experiments, UFOs were found to be one of the most effective consumers of mental bandwidth, driving the targets to obsession and even insanity, and the aim here was to distract and unnerve the Cuban government and military. Launched from a submarine, evading fighter interception and seeming to vanish in an instant, they served their purpose.

This striking episode is one of many in Trevor Paglen's new book about images made by and very often for machines. Psyops looms large in his account because machine imagery is above all meant to be operational—to produce an effect in the world, just as cognitive warfare manipulates people's perceptions. In bringing together essays written over the past decade, Paglen has produced an entertaining, digressive and unconventional book which vividly illuminates its subject, and contains a strong argument about the unprecedented character of the new image regime as in the last fifteen years or so computers came to reliably 'see' the world and identify what falls within their visual field, and how in the last ten years those techniques were turned towards image generation. While the book is called *How to See Like a Machine*, it rapidly becomes evident that humans can do no such thing, and can at best become more aware of how machines generate images, and use them to alter mental states and the wider world alike. The illustrations, a mix of archival and computer-generated images, are captioned only at the end of the book, appearing cryptically on their pages as an indication of how often human observers find themselves completely at sea.

Paglen is an extraordinary figure—a highly successful artist, writer and curator whose work has critically addressed secret military operations, state surveillance, and more recently machine-learning image algorithms and AI classification systems. He took an MFA from the Art Institute of Chicago and a Ph.D. in Geography from Berkeley. Paglen is one of those artist-theorists whose practice informs their thinking and vice versa, and who have contributed some of the most acute analyses of the image world and its place within the wider system of capitalism and its states. We may also think of Allan Sekula, Coco Fusco, Martha Rosler and Hito Steyerl (it is no

accident that the last two appear among Paglen's illustrations). As with all those figures, in Paglen the status of his writing productively oscillates between pure theorisation and artist's statement, which allows greater freedom of association and expression in the former, and much greater specificity and sophistication than is usual in the latter.



Control Tower (Area 52); Tonopah Test Range, NV; Distance ~ 20 miles; 11:55 a.m., 2006

Paglen first became known for turning very long lenses, designed for astronomy, towards secret military bases in the deserts of Nevada. When he was able to photograph from a mile distant, scraps of useful information were revealed, such as the tail numbers on planes, but the greater the distance the more impressionistic the images became as aircraft, buildings and figures dissolved in heat shimmer and atmospheric haze. The photographs pointed towards all that ordinary US citizens pay colossal sums for but are forbidden to know. Around the same time, he wrote finely researched books, including *Blank Spots on the Map: The Dark Geography of the Pentagon's Secret World* (2009) and with A.C. Thompson, *Torture Taxi: On the Trail of the CIA's Rendition Flights* (2006), laying out what could be gleaned from the various signs that this vast apparatus leaked into the public sphere from the uniform badges of secret military units, to

erased areas in satellite ground imagery, and the assiduous efforts of amateurs to track military satellites and the planes that the US state used to transport the people it had kidnapped. He also contributed to the research and cinematography on Laura Poitras' film about Edward Snowden, *Citizenfour* (2014).



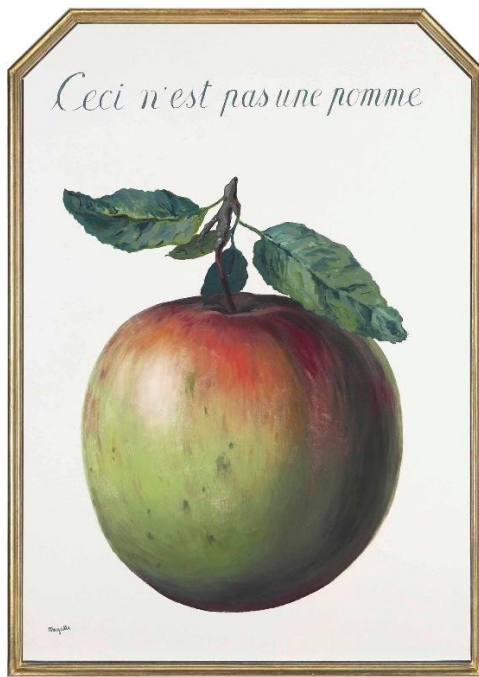
DMSP 5B/F4 From Pyramid Lake Indian Reservation (Military Meteorological Satellite; 1973-054A), 2009

As an artist, his work is critically and commercially successful. Paglen makes visually appealing, complex and cryptic photographic, graphic and sculptural objects, along with NFTs. These include an ongoing photographic series tracking secret satellites which takes the form of alluring

large-scale scenes of the evening or night sky, often seen above landscapes familiar from old colonial photographs of the West made by Timothy O'Sullivan or Carleton Watkins. A winner of the MacArthur 'genius' fellowship in 2017, and this year of the LG Guggenheim Award, he is represented by one of the world's most successful commercial galleries, Pace. This year, he has also co-curated the digital section of the major art fair, Art Basel. As is common with those artists whose work is critical of the wider systems it is forced to inhabit, his work has a double aspect, serving both to enlighten the ordinary gallery goer and to act as conversation pieces when hung in the homes of the super-rich.

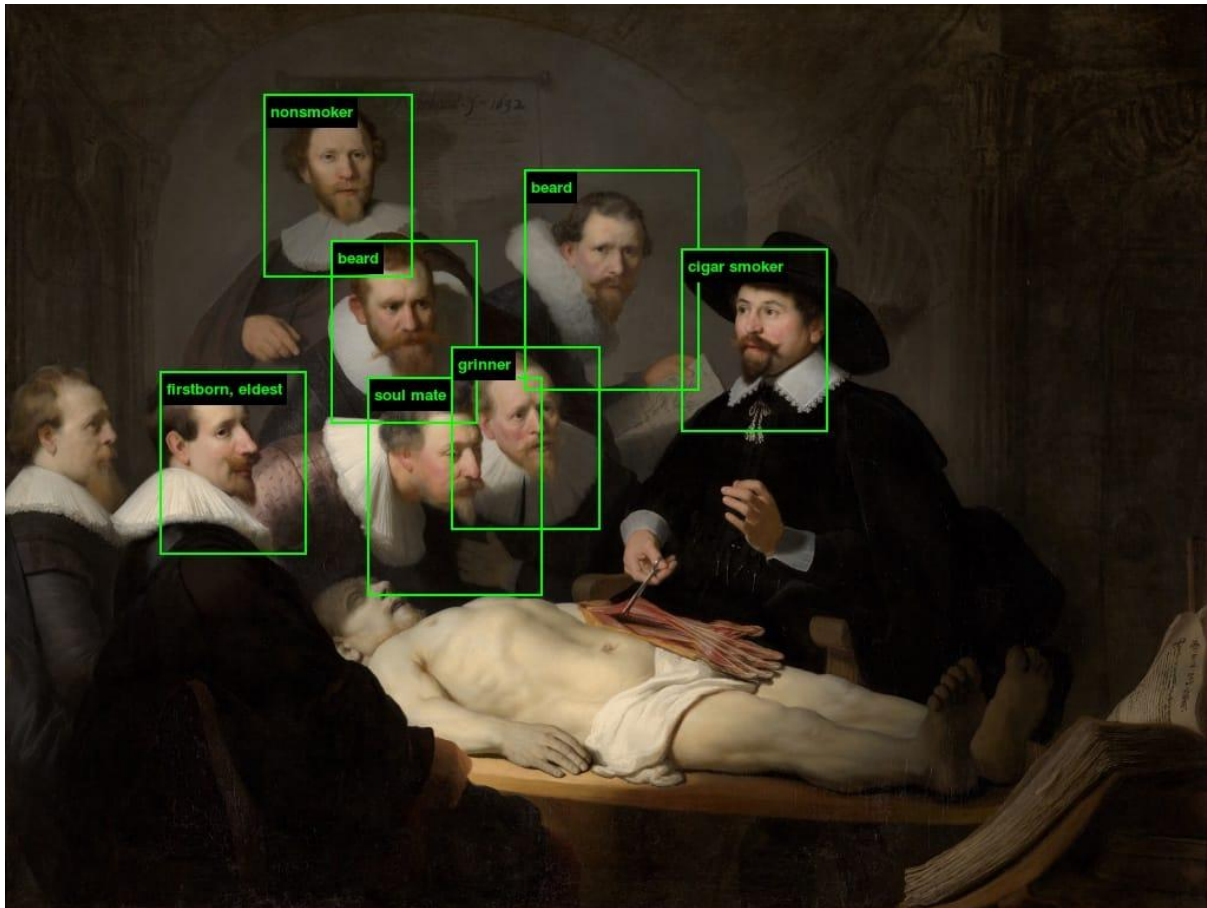
How to See Like a Machine tracks what Paglen rightly sees as an epoch-making development which is superficially marked by the recent inability of people to reliably distinguish machine images from those made by cameras or humans, and more profoundly that over the last ten years or so the condition has been reached in which 'The overwhelming majority of images are now made by machines for other machines, with humans rarely in the loop.' The computer file that is used to display a screen image may be thought of as a latent image, rather like an undeveloped photographic negative, unreadable to the human eye. Yet machines can read these files directly. Regardless of whether anyone attends to the two billion photographs uploaded each day to social media sites, machines scrutinise and operate on them for purposes of data mining, classification, and manipulation.

There is little point, Paglen claims, in using old critical tools to analyse the meaning of such images, and we should ask instead how they act on the world: 'Using traditional semiotic or iconological frameworks to think about image classifiers is like using art history to study military logistics.' While the machines may operate on images in ways that are utterly alien to human attention, they are turned to all too familiar purposes: surveillance conducted by states and corporations, and steering people towards buying commodities and services. One remarkable example, highlighted by Paglen, shows that social-media monopolies sell data from the images 'shared' on their sites to insurance companies, so that you can expect, if you post images of yourself enjoying extreme sports or on drunken evenings out, to pay more for your individual insurance policy. Little wonder that people are becoming increasingly cautious about what they post online and how they are photographed.



René Magritte, *Ceci n'est pas une pomme*, 1964

A crucial aspect of such AI systems is their ability to identify objects and people in images. ImageNet, the pioneering system first launched in 2009 by teams from Stanford and Princeton, aimed to establish a visual classification for every noun in the dictionary. It makes its identifications by subjecting visual elements to a strict classification in nested hierarchies so that an apple is identified in the chain Object, Plant Part, Plant Structure, Plant Organ, Reproductive Structure, Fruit, Edible Fruit, Apple. Such systems may appear to be a revival of rigidly empirical ways of ordering the world, which Paglen contrasts with a surrealist view of signification in which, following Saussure, the link between signifier and signified is an arbitrary one. As Paglen shows, ImageNet identifies the image of an apple in Magritte's painting, *Ceci n'est pas une pomme* (1964) as an apple, unsurprisingly, but also uses deeply ideological forms of classification which categorise images of people on racial, gendered and moral grounds so that individuals may be labelled 'Closet Queen', 'Call Girl' or 'Melancholic Nonperson'. In collaboration with the AI researcher, Kate Crawford, Paglen designed *ImageNet Roulette*, an online tool and impressive gallery display designed to show just how bizarre, arbitrary and invidious some of these identifications can be. In her book, *Computational Formalism*, the art historian Amanda Wasielowski pointed the roulette tool at Rembrandt's *The Anatomy Lesson of Dr Nicolaes Tulp* (1632) which identified some of its various figures as 'Soul Mate', 'First Offender' and 'Cigar Smoker' (no one in the painting is smoking). Paglen and Crawford's work caused ImageNet to remove some of its worst classifications.



One instance of *ImageNet Roulette* results based on Rembrandt's *The Anatomy Lesson of Dr Nicolaes Tulp* (1632)

ImageNet is trained by scraping the entire Internet, including social-media posts, so that as Paglen writes: 'All of these moments—from the intensely intimate to the wildly, foolishly public—were appropriated, decontextualised, labelled, and repackaged as fuel for AI models.' Their inventors may strive for objectivity but, given their training, such systems hold up a skewed mirror to prevalent social trends, stereotypes, prejudices and hatreds. Paglen reproduces a manipulated image of Obama wearing Nazi uniform, leading a similarly clad army, which ImageNet captions 'Bolshevik', and claims that its architecture 'has become so absurd it accidentally achieves surrealism'. Perhaps, or here it may be drawing upon commonly held far-right paranoia.

Paglen sees such systems as tightly geared into a capitalist flattening of the world, so that an archetypal sign and its object should always align without ambiguity, just as supermarkets favour apples of a standard appearance, weight, size and flavour. This points us towards the most extraordinary feature of these unprecedented, sophisticated and incredibly costly technologies: their purpose is to use machine imagery, taken from surveillance systems in streets, workplaces and homes, and from the self-advertisements of social media, to classify in order to manipulate. And for what? Mostly the banal and tawdry business of selling more stuff, and also to feed data to the police and the military. The latter, of course, regularly use algorithms to determine who—in Gaza or Yemen or Iran—should be murdered.

In an expanded version of an essay originally published in *October*, Paglen draws on neurological descriptions of pre-conscious image-processing systems in the brain to explore their strange and anti-intuitive characteristics—for instance, the extent to which expectation guides perception, and their many vulnerabilities to manipulation and trickery. For those seeking to exploit such weaknesses, social media constitutes a remarkable training ground, and its managers conduct continuous experiments on users to test for the most effective means to achieve their desired ends. If, as Paglen puts it, a dorito—designed to stimulate neurological ‘bliss points’—is ‘psyops in the shape of food’, then the AI-powered algorithms at work here create the mental equivalent of ultra-processed junk food with similarly addictive and harmful effects.

This image junk food has done much to transform society. In Spike Jonze’s prescient film, *Her* (2013), there is a moment when the protagonist looks up from his screen-based paramour to see everyone around him ignoring each other as they too are absorbed in their digital lovers—and it seems happily so. It is an eerie if commonly experienced feeling, as so many people in public places appear caught up in their devices. Yet the aim is certainly not happiness. Geert Lovink, in his book, *Sad by Design*, shows how social-media platforms sets out to create needy, fragile, resentful, impulsive and addicted people who are open to the blandishments of advertisers. Paglen describes this realm in which ‘electrode-like media injects minds with continuous jolts of cheap joy, outrage, cuteness, schadenfreude, titillation and dopamine’. Those who serve that realm, and many have little choice but to do so, take on the characteristics of the engagement algorithm and become ‘living memes’.

How to See Like a Machine contains a long three-part essay, first written for *e-flux*, on UFO imagery and the early history of the CIA’s MKUltra programme and experiments with psyops. Paglen argues that there is a direct lineage from this cognitive warfare which—like stage magic acts, exploits foibles in human perception—into our manipulative present. Whereas early psyops operations, such as that in Cuba, were extremely costly and labour intensive and could only be staged rarely, the use of machine imagery has created a cheap automated version which can be incessantly deployed against almost everyone.



In this new visual landscape, there is also an affinity between AI images and those of UFOs since both—and here Paglen lifts a metaphor from quantum theory—are ‘superpositional’, and will not be resolved into one state or another before a particular act of observation. UFO images may be studied for empirical data or be the subject of psychical and even mystical projections. Similarly, AI imagery may be interrogated to identify fakery or be the vehicle for an evidence-proof faith. Paglen writes, for example, of a prominent Republican politician lightly setting aside the fakery of a flood victim image—posted as emblematic of the Biden administration’s response to Hurricane Helene—c claiming that nevertheless it spoke to the pain and trauma of ‘the people’. The UFO world, which as described by Paglen, is infamous for its ‘intense infighting, backstabbing, narcissism, disinformation, charlatanism and tribalism’, casts its character into the present war of images.

All of this may bring to mind a very different book that also proclaimed the advent of a new era of image-making, and did so by looking back to a previous transformation in the nineteenth century (just as Paglen does with early psyops)—Jonathan Crary’s *Techniques of the Observer* (1992). For Crary, the current sea change was computer graphics:

The rapid development in little more than a decade of a vast array of computer graphics techniques is part of a sweeping reconfiguration of relations between an observing

subject and modes of representation that effectively nullifies most of the culturally established meanings of the terms *observer* and *representation*.

In analysing the change in the nineteenth century, Crary begins with Goethe's observations of after-images caused by viewing a bright light in a darkened room, an effect that was not produced by any object in the external world but was a quirk of human perception. He then went on to describe profound transformations in views of images and observers as the reigning model switched from the camera obscura (a monocular and objective mapping of the world) to the stereoscope (which exploited the specific character of human vision). In Crary's brilliant description of the uncanny character of stereoscopic images, in which things seem vividly tangible yet are set not in perspectival space but in a dislocated sequence of discrete planes, we may also find an affinity with the hyper-realist yet disjointed quality of many AI images. It was certainly so of the images of flowering trees, shown by Paglen at Pace, London during the pandemic lockdown, in which strangely attractive large-scale photographs visualised through colour coding the way that an AI system differentiated spatial arrangements when confronted with these complex, fractal images of foliage.

The differences between the two accounts are also stark. For Crary, the exploitation of perceptual quirks led towards an appreciation of the arbitrariness of images, detached from any referent, just as they were in early computer graphics—in the generation of fractals, for example. In Paglen, as we have seen, it has been the occasion for a reassertion of hierarchal classification and order. For Crary, in a dialectical reading which draws on Marxism (which is occasionally in tension with his use of Foucauldian theory), the changing image regime produced two opposed effects: the most familiar was a move towards subjective autonomy which found expression in avant-garde art; the other was a concerted set of experimental attempts to exploit human perceptual systems so as to control the viewer.

Is there, then, a dialectic also at work in the present to set alongside the manipulative systems that Paglen so effectively describes? We may see elements of an opposing force in Paglen's art itself, and in others who work critically to expose AI operations. In the book's first essay, written in 2016, Paglen offers a warning about the likely efficacy of direct opposition in which artists or cultural activists seek to disrupt AI systems (for instance, by designing dazzle-camouflage face paint to confuse surveillance systems): since many of the machines are trained by adversarial systems which are specifically designed to trick them, and continually evolve to counter them, no single ruse is likely to be effective for long. Furthermore, it is evident that many artists who use AI-generation reproduce the frenetic tempo and memetic character of the social-media sites, drawn—as so many are obliged to be by the gravity of monopoly allied to algorithm—into the maw of the attention economy.

Paglen's solution was to create autonomous 'safe houses', removed from market and police surveillance: 'It is in inefficiency, experimentation, self-expression, and, often, lawbreaking that freedom and political self-representation can be found.' There are also, of course, strong reactions against AI caused by the vast environmental costs of its datacentres, its use to herd people on social media, and the depressing and draining nature of much AI 'slop'. Beyond that, there is a deep-seated fear of what AIs will be used for in the future. In a cogent book about AI and Marxist theory, *Inhuman Power*, Nick Dyer-Witheford, Atle Mikkola Kjosen and James

Steinbock writes of the fundamental dialectic that the technology embodies: its potential for universal liberation from alienating labour, and its equally universal and perilous potential to make human labour redundant to capitalism.

Crary saw a profound break in the image world with the coming of computer graphics. Paglen, as we have seen, puts the break much later with machine imagery, and indeed sees an essential similarity between the old 'fleshy' technologies of painting, print-making and photography with passive screen images because they were all made by people and for people. How new, then, is the new? And how escapable is it?



Trobriand Islanders' wooden canoe prow, British Museum, collected by Bronislaw Malinowski

A radical uncertainty befogs the entire field because of commercial secrecy, so that much detail about the algorithms that are directed against us is withheld from us; and because of the black-box character of many machine-learning systems, the internal workings of which are obscure even to their makers. Yet certain aspects of this present may give us pause—above all, the uses to which AI is put. Images have long been used to sway viewers, more often perhaps than to produce meaning among rational, conscious and enlightened observers. A prominent line of thought, especially associated with the work of Alfred Gell, sees images as social agents, acting on people and the world. In *Art and Agency* (1998), Gell famously claimed that the intricate carvings on the prows of Trobriand canoes were designed through their ungraspable complexity to demoralise would-be opponents. The same effects of awe and intimidation are at work in much large-scale contemporary art, as it hangs in corporate lobbies, penthouses and private museums.

Advertising works as a social agent in this sense, as Paglen acknowledges, pointing to the work of Edwards Bernays in the invention of public relations, and the early accounts of such activity in the work of Daniel Boorstin and Jacques Ellul. However, Paglen claims, ‘the efforts of the propagandists of yore are prehistoric by today’s standards, where the circulation of images is a largely automated circuit that reinforces itself through feedback built into its systems’ so that ‘*All media consumption is reinforcement learning with human feedback.*’ The result is increasingly effective addiction, and precise tailoring to individual weaknesses as the boundaries between perception, reality and manipulation erode. Precedents for machine images may be found at a small scale (psyops) and large (advertising) but its technology, reach and automation, its processing of trillions of images and its saturation of everyday life are entirely without precedent.

Other aspects of the new are more than familiar. Paglen sees the surveillance, data-mining and manipulation of private moments and acts of distraction at work and in the home as another act of primitive accumulation and enclosure, which have a history as old as capitalism itself. Some of the psychological effects also seem to be intensifications of those experienced in earlier modernisations. Crary quotes a remarkable passage from Nietzsche:

Sensibility immensely more irritable; ...the abundance of disparate impressions greater than ever: cosmopolitanism in foods, literatures, newspapers, forms, tastes, even landscapes. The tempo of this influx prestissimo; the impressions erase each other; one instinctively resists taking in anything, taking anything deeply, to ‘digest’ anything [...] A kind of adaptation to the flood of impressions takes place: men unlearn spontaneous action, they merely respond to stimuli from the outside.

It could almost be a description of the digitally dazed nomads from Vincenzo Latronico’s novel, *Perfection*.

Given the fog of uncertainty, though, it is hard to know just how efficient these systems are. The bosses of the social-media monopolies are certainly not going to tell you. Certainly, they are effective in occupying the attention of many people, and in making them miserable, although there are signs of disaffection and disengagement with the overtly manipulative social-media feeds (the victims of psyops should not, of course, know that they are being operated upon).

While AIs rapidly evolve, the absurdities that ImageNet throws up, and frequent AI errors and (to put it kindly) ‘hallucinations’ point to endemic shortcomings.

The monopoly character of the social-media giants is also an established and integral part of our capitalist era, as are its paradoxical effects in which an intensive technological modernisation produces at best snail-pace advances in economic growth and productivity. The old is laid to waste yet the new is dominated by negative ‘externalities’ from the crisis in mental health to decaying social bonds and the draining of the water table to feed datacentres. In his book on techno-feudalism, Cédric Durand reverses Joseph Schumpeter’s famous phrase to characterise this activity as ‘destructive creation’. Here, perhaps, is a dialectic of the new era in an intensification of old contradictions.