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The Ambiguity of the Deepfake

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This paper argues that generated photographic media, such as "deepfakes," intensify the ambiguity of the digital image causing widespread shifts in perceptual orientations. The operational structure of the generative adversarial network suggests that the dataset is a central component to the development of this type of face-to-face image translation. Analyzed both from a photorealistic standpoint, and from the perspective of the mutability of digital imagery, the dataset is found to be the key element in understanding the ambiguous nature of the deepfake. It is proposed that an embrace of the plasticity of the image can offer a new approach to combating problems that have emerged in regard to deceptive visual media.

1. Introduction

In this paper, I argue that the deepfake intensifies the ambiguity of the image in digital space. I first outline the current problematics surrounding the emergence of the deepfake. Though most of this discourse focuses on the development of measures to weed out counterfeit images using detection technologies, some suggest preventative tactics and regulation. I then explain the contours of basic machine learning architecture, and explain the specific components of the generative adversarial network (GAN), the formulation responsible for the deepfake. Then, the structural makeup of the *generated photograph* (a computer-generated photorealistic image produced using a dataset of digital photographs) is detailed by noting its deviations from preceding photographic media. The deepfake marks an evolution into a new paradigm: images that are built in the form of an approximated dataset. An analysis of the data required to generate the deepfake follows, first, a reading of the data as analog photographs—images that preserve a perception of fixity and objectivity; second, as digital images—images that are radically mutable. Here I claim that the deepfake reimagines the notion of hyperreality, and resonates with paranoid and apophenic logics. It is conclusively argued that the structural composition of the deepfake indicates an evolution of the image where ambiguity defines its form and content. By appreciating this evolution as an inevitable consequence of technological advances in image production, an embrace of visual ambiguity is proposed as a more realistic orientation for approaching problems surrounding the emergence of deceptive visual media.

It is important to note that the term "deepfake" has been used to reference a broad spectrum of deceptive audiovisual media. In this paper, however, I use this word exclusively for media in which a machine learning algorithm performs face-to-face image translation. Here, the pattern of a face is "learned" and grafted onto that of another's to create the illusion that one engaged in activity that they did not. One of the reasons this version of the deepfake is startling is because it automates and democratizes an ability to doctor moving images in the same way Photoshop did for the still image. Though important, the use of video will not be directly addressed: In the context of this essay video is considered to be a lens-based media that holds equivalence with the photographic process and is therefore technically bracketed as such.

2. Control Measures

In 2017 a user on Reddit with the handle "deepfakes" uploaded a series of pornographic videos of what appeared to feature a handful of famous actors. In fact, they were "fakes" wherein the faces of the actors in the videos were replaced with the faces of celebrities, appropriating their facial identity to simulate an event that never occurred. Since then, the deepfake has been

a popular topic of discussion in technology studies and adjacent fields as well as the mainstream media. As the technology continues to improve on inconsistencies and glitches, and becomes packaged and shared for public use, the growing unease about its potency as a tool of disinformation has provoked the involvement of government agencies, technology companies, and academics. For instance, the US Congress has requested a formal report on these new technologies from the Director of National Intelligence; and the Defense Advanced Research Projects Agency (DARPA) has sought partnership with academic and corporate institutions to conduct research into detection techniques. Likewise, both Facebook and Google have produced and released open-source manipulated videos for the purpose of crowd-sourcing procedures for detection. Facebook even launched a "Deepfake Detection Challenge" offering cash rewards for the best methods. The problem with developing detection technology is the unlucky paradox of fortifying its quality by revealing its faults. In other words, because detection requires locating error in the code, programmers can use this information to update and improve on the system to evade exposure by future detection technologies. As well, it is becoming apparent that educational approaches to increase media and image literacy are no longer sufficient for providing the public with isolated means of detection.

Some believe regulation and prevention are better solutions. A start-up out of San Diego called Truepic aims to supply verified digital originals. Photographs taken with Truepic's smartphone app are instantly uploaded to a locked server to prevent tampering and manipulation. Ultimately, the company hopes to integrate the software into smartphone camera components so that "verification can begin the moment photos enter the lens" (Rothman 2018). Other suggestions include: (1) legislation that limits use to a pre-chosen selection of voices or faces; (2) restriction of access by carefully vetting those who are granted privilege to the technology; (3) requiring watermarks be added to all images, or (4) demanding that metadata indicate whether an image has been altered or synthesized. These methods are imaginative, but may be difficult to implement on a large scale. Furthermore, its hard to imagine an architecture of regulation that could practically circumvent problems like identifying culpable users and the origin of production; and the use of screenshots which weaken and eventually render both watermarks and imbedded metadata ineffective. It seems that containment of image manipulation through regulation is opportunistic at best and myopic at worst.

Though if these approaches are faulty, certainly the urgency behind them is not. Understanding new visual formulations is critical not only because they threaten to amplify the spread of disinformation, but also because they are increasingly being used to affect people of less high-profile status in the general public. Already an online market has been established for the manufacture and sale of deceptive videos. Even though the consequences of these

prospects are gloomy, the "apocalyptic" rhetoric used in mainstream media to anticipate their effects does little to offer a deeper understanding about how they function and impact broader visual regimes. Alarms sounded by publications like the *Atlantic*, have claimed that "we'll shortly live in a world where our eyes routinely deceive us [...] we're not so far from the collapse of reality" (Foer 2018). In an attempt to put these claims into context, a report from Data & Society in New York reminds that deceptive media belongs to a long lineage of media manipulation. Furthermore, the relationship between truth and media has been a point of contention throughout history. While it is true our visual landscapes have always been riddled with ambiguities (the history of image doctoring and photography's illusory claim to objectivity are topics that have been exhausted in numerous visual disciplines), the deepfake uniquely brings into awareness an enhanced state of ambiguity that is consistent with a more general gravitation of the visual experience toward confusion and uncertainty.

Indeed, at a conference back in 2014, artist Hito Steyerl diagnosed confusion to be one of the main characteristics of mass data circulation. She suggested that this confusion stems from a condition she names a "code without contract." That is, a recognizable "code" circulates, yet a "contract" that provides directives on how to interpret it has been implicitly lost or dismantled: "There is a sign, but anyone can understand it from their point of view," she stated (2014). As outlined above, there is a scramble to re-instate old iterations of this contract: disentangling or keeping separate the unaltered image from the forged one—fact from fiction. The line of thinking goes, if we can filter out deceptive images or prevent the production of them we can stymie the spread of confusion and restore some semblance of clarity to our media institutions. At the basis of many of these approaches is a familiar solutionist refrain: the development of *more* technology will provide answers to correcting difficult circumstances caused by other technological inventions. Yet, instead of employing solutions to curtail the evolution of the image into unfamiliar terrain, perhaps it's more useful to understand where the trajectory of this evolution is leading. Further, rather than spending resources to contain or reverse it, maybe there are better ways to adapt to it.

The intention of this essay is not to advocate for better alternatives to the tactics outlined above, but to provide a foundation for thinking through problems surrounding the deepfake in terms of visual literacy rather than disinformation. Though the exact parameters of an effective literacy remain unclear, the following analysis suggests that the impulse to preserve a true/false dichotomy must be replaced with an appreciation of the inevitable drift of image-based media toward an increasing ambiguity. To apply Steyerl's maxim, the following sections attempt to "de-code" the deepfake's unique visual "code" (the image) in order to understand how it contributes to an absence of "contract" (a common mode of interpretation). This is achieved by analyzing how the structural makeup of generated images differ from, but

also assimilate, preceding forms of imagery. In her book *Programmed Visions* Wendy Chun notes that the more sophisticated one's understanding of how computational systems operate the more readily they're able to decode the operations of the most abstract and invisible processes. Therefore, given that it is not visually apparent how the structure of the deepfake deviates from previous versions of the photograph, a decoding first requires an understanding of its computational system of production.

3. Perceptron to GAN

Artificial intelligence emerged as a way of automating human perception. The first artificial neural network, invented by cognitive scientist Frank Rosenblatt in 1957, was called the Perceptron. An analog computer with an input device called a "retina," the Perceptron operated almost like a kind of camera wherein a grid of 400 photoreceptors replaced the optical lens. This grid of photocells, connected to a layer of artificial neurons, was not only able to record simple shapes or letters like the photographic camera, but had the ability to recognize them. That is, this camera-like computer had the ability to "learn" a pattern by making a decision to classify it into a binary output (0 or 1), with a margin of error. In a recent paper, media philosopher Matteo Pasquinelli identifies the first Perceptron as marking a revolutionary turn in the field of computation: the development of a new paradigm that was both spatial and self-computing.

> "This turn introduced a second spatial dimension into a paradigm of computation that until then maintained a linear dimension [...]. This topological turn can be described also as the passage from a model of passive to active information. Rather than having the information of a visual matrix being processed by a complex top-down algorithm (like in the case of an image edited by Photoshop, for instance), the disposition itself of the pixels in the visual matrix dictate the rules for their computation bottom-up. Data themselves shape the algorithm for their computation according to their relation" (Pasquinelli 2019a).

This bottom-up self-computing structure provided the foundation for a subset of machine learning known as "deep learning," a more complex configuration of the neural network that emerged in the early 21st century.

In the most simplistic terms, machine learning systems are made up of three components: the training dataset, the learning algorithm, and the model application. The learning algorithm "learns" a pattern in the training dataset by reading the association between, in the case of visual datasets, the image (input) and its label (output). In the case of face-to-face image translation (the generated photograph or deepfake), a type of system is used called a generative adversarial network (GAN). Therein, the association between image and label forms a statistical description that comprises

a model application called a discriminator. A second model application, called the generator, attempts to generate data that fits within the statistical parameters of the discriminator model. In short, the generator produces images that guess the pattern of the face, which is then corrected by the discriminator. Put simply, the generator model attempts to produce an image that appears genuine enough to fool the discriminator into thinking it is "real." The image cycles through the generator and discriminator until it has reached a sufficient error rate at which point, in theory, it looks realistic enough to deceive the human eye.

The quantity and quality of the training dataset is critical in determining the quality or "realism" of the visual outcome. The process of collecting and preparing the data involves multiple steps: production of an image, translation of image into data, encoding data into a machine-readable format, and, finally, labelling the data. With so many stages to the collection of a dataset, it is intuitive that they are prone to biases and ambiguities, which Pasquinelli has taken on the task of identifying. Adding fuel to the flame, the dataset used for face-to-face image translation requires a dataset of digital photographs, which are fundamentally ambiguous in form. *Digital photographs* (a photorealistic image in the digital format) are photographs in digital formats that are perceived in the tradition of analog photography but function as digital images. In order to understand the unique character of this medium, it is useful to delineate a brief history of the structural evolution of photographic media.

4. Analog, Digital, Generated

Advancement from analog to digital to generated reveals a progressive increase in the ambiguity of the image. In *Toward a Philosophy of Photography*, Vilém Flusser acknowledges that images "are not 'denotative' (unambiguous) complexes of symbols (like numbers, for example) but 'connotative' (ambiguous) complexes of symbols: They provide space for interpretation" (Flusser 1983, 8). When the camera was first invented, the *analog photograph* (a chemically-based, lens-produced image) was thought to replace the ambiguity of other mimetic media with an accuracy of representation perceived by many as objective. Though its subjectivity has always been acknowledged, the photograph has long enjoyed close ties to realism and truth. Susan Sontag writes, "despite the presumption of veracity that gives all photography authority, interest, seductiveness, the work that photographers do is no generic exception to the usually shady commerce between art and truth" (Sontag 1977, 10). Though just as ambiguous as other manual methods, the mechanical photograph provided the illusion of certainty. However, with the arrival of digital media, this misperception has begun to wobble. Digital affordances have provided new tools that make image manipulation, construction, and sharing faster and more accessible. In consequence,

the *digital image* (any image in the digital format) is perpetually in flux, susceptible to alteration, corruption, cropping, remixing, and vulnerable to variations in ownership, context, or format. In constant transition of form, meaning, and placement in digital space, it is subjected to the persistence of change as a result of circulation. The recognition of this instability and turbulence has naturally increased perceptual doubt and ambiguity.

Theorist W. T. J. Mitchell identifies the basic distinction between the analog photograph and the digital image as a move from a continuous form to a discrete one: "In [digital] images, unlike photographs, fine details and smooth curves are approximated to the grid, and continuous tonal gradients are broken up into discrete steps" (Mitchell 1992, 4). The digital photograph, therefore, straddles the boundary between the two: its unstable form (discreteness) is understood in the abstract and reads as having relative stability (continuity). A perceptual lag is a consequence of this shift—the bewildering malleability of the new is disguised by the old comforts of easy, objective representation. Scholar of visual media Fred Ritchin writes, "Photography, as we have known it, is both ending and enlarging, with an evolving medium hidden inside it as in a Trojan horse, camouflaged, for the moment, as if it were nearly identical: its doppelgänger only better" (Ritchin 2009, 15). As the digital turn transforms images into a state of universal ambiguity, the perception of relative certainty is a welcome default.

If the analog photograph is continuous, and the digital image is discrete, the generated photograph is manifold. It is an amalgamation, a multiplicity, a variation. At its most foundational level it is a series of digital photographs—multiple data points. Although it does not present in three-dimensions, its two-dimensional form can be understood as a flattening of a hidden dimension of images (the dataset): the generated image enters the n-dimensional space, a multi-dimensional vector space. Imagine that the single plane of the pixelated, digital image is expanded into a stack of multiple planes, one layered on top of the other like a deck of playing cards. The images of this invisible stack are the substantive elements of the resulting picture, which is an approximation of all faces on the "cards." Similar to the evolution of the computational paradigm in the Perceptron, a new spatial characteristic is introduced, at least in the abstract.

This construct aids in visualizing the generated photograph as a composite of its progenitors. Marshall McLuhan's claim that the "content" of any medium is another medium manifests literally: like Russian nesting dolls, the digital photograph—a digital image camouflaged as an analog photograph—is housed within the generated photograph. To understand how its components aid its production, it is necessary to study the relationship between the dataset and the resulting deepfake image. Because the perceptual lag of the digital photograph still suspends us in a pending hermeneutics, two separate analyses of the digital photograph are essential to comprehend how the deepfake operates. The dataset made up of digital

photographs is first regarded as a composite of analog photographs, and second of digital images. Taken together, these dual manifestations begin to elicit an appreciation for the complexity of ambiguity in the deepfake.

5. Multiplicity and Hyperreality

Viewing the collected dataset of images as analog photographs is to perceive the deepfake as traditionally photographic, that is, in the category of realism. The dominance of this perspective has been in effect since the medium of photography was first introduced. Emerging alongside ideas of scientific rationalization and positivism, photography was originally tied to practices of systematically collecting empirically verifiable and measurable facts. An early writer on photography, Lady Elizabeth Eastlake, said, "([the camera's] studies are 'facts') . . . facts which are neither the province of art nor of description, but of that new form of communication between man and man — neither letter, message, nor picture — which now happily fills the space between them" (Eastlake 1857). The invention of photography ushered in a new way of thinking about images as units of information, as both curriers of facts and as facts themselves. For Eastlake, the photograph functions as factual due to its inability to choose and select the objects within the frame. To put it differently, in the absence of intervention there is impartiality: the camera succeeds by producing an index of visual facts.

The perceived outsourcing of human agency automates the practice of representing the world in visual form. However, the photograph as factual representation is limited by the "centrality of the eye." Owing to the origins of the camera within normative models of vision, photographic aesthetics are situated in traditions of Western two-dimensional art where the centered perspective dominates. Leaving aside for now the illusion of objectivity, the photograph fails as representation if for no other reason than the limits of its singular frame of reference. Writing on the gesture of photography, Flusser claims that the photographer is confronted with a form of "phenomenological doubt" when taking a picture:

> "Photographers have doubts, but these are not of a scientific, religious or existential sort; rather, they are doubts in the sense of a new sort of doubt in which stopping short and taking a decision are reduced to grains — a quantum, atomized doubt. [...] They discover the multiplicity and the equality of viewpoints in relation to their 'object'. They discover that it is not a matter of adopting a perfect viewpoint but of realizing as many viewpoints as possible. Their choice is therefore not of a qualitative, but of a quantitative kind. [...] The act of photography is that of 'phenomenological doubt', to the extent that it attempts to approach phenomena from any number of viewpoints." (Flusser 1983, 38)

The "doubt" of the photographer, as Flusser names it, is based on the constraints of the singular viewpoint and the recognition that conveying

an "object" is impossible with only one perspective or one decisive position. Flusser continues, "no decision is really 'decisive,' but part of a series of clear and distinct quantum-decisions, likewise only a series of photographs can testify to the photographer's intention" (Flusser 1983, 38). The photographic gesture fails to communicate an idea unless it incorporates all viewpoints—a series of atomized decisions. Though perhaps precise as a subjective act, the singular decision of the photograph is ambiguous in its representational form.

If the single photograph fails, can multiple perspectives succeed at the task of representation? To be sure, the deepfake solves the quantitative problem of Flusser's "phenomenological doubt" by combining the decisive positioning of many photographers. In a manner of speaking, the "doubt" of the photographer reverses the inadequacy of the singular signifier (two-dimensional) back into the multiplicity of the signified (n-dimensional). The generated photograph ends up being, theoretically, more certain, "real," and accurate as a representation. In confronting what Flusser calls "the invisible hurdles of space-and-time categories," the deepfake succeeds in transcending the authority of the single photograph (Flusser 1983, 37). Moreover, its structural makeup surpasses all known modes of representational production. The dataset is comprised of variant spatial perspectives (positions of the camera in space, and even the spatial context of the subject), but also different temporal states: pictures from different times (i. e. assorted dates of capture). Instead of being serial, these multiple viewpoints are expressed finally as an approximation. Exceeding the realism offered by the camera, the artificially-generated deepfake can be understood as a reimagining of the Baudrillardian concept of the "hyperreal."

In *Simulacra and Simulation*, Baudrillard defines hyperrealism as a simulation "[generated] by models of a real without origin or reality. [...] Whereas representation attempts to absorb simulation by interpreting it as a false representation, simulation envelops the whole edifice of representation itself as a simulacrum" (Baudrillard 1994, 6). Transferred into computational terms, the discriminator model learns a pattern from a dataset of representations (model of a real) which then aides the generator model in mapping a face (simulacrum) without origin or reality. While tempting to name the deepfake as a false representation—a form of disinformation—what it ultimately succeeds at is dissolving the idealistic illusion of the representational gesture. What Flusser observed about the photograph, namely that "the traditional distinction between realism and idealism is overturned in the case of photography: It is not the world out there that is real, nor the concept within the camera's program — only the photograph is real," is finally evident in the deepfake (Flusser 1983, 37). The generated photograph promotes an awareness that the interpreted, the manufactured, the simulated has always been the only "real." As philosopher Gianni Vattimo put it: "Under the pressure of today's media construction of reality we comprehend that

reality was always a construction" (Vattimo 1989). The deepfake simulates a face that is "deeply" constructed and profoundly hyperreal. On the surface, it is a displacement of a real event by a simulated one; but on a deeper level, it indicates an additional dimension of representations spanning multiple spaces, times, and subjectivities. The end result is an aesthetic pattern that is hyper-constructed, yet, paradoxically, remains fettered to the illusion of photographic realism.

Since this category of image has come into common awareness, there has been a shift in thinking about imagery: an intuitive understanding of the hyperreal condition, but a hold on perceptual habits moored to the photorealistic perspective. Confusion about the truth-value of the digital photograph has resulted in generalized skepticism, or, indeed, something more like paranoia. The deep-rooted contract that dictates how a photographic image is read is in danger of breaking. With the invention of more powerful and pervasive means of post-production, the long-standing agreement that a photographic image is innocent until proven guilty is being turned on its head. In other words, the dominant approach for interpreting a photograph has always been to assume it is real until proven to be counterfeit. But with the awareness of quicker, democratized image manipulation, the image is now thought to be guilty until proven innocent. This attitude is not limited to the visual realm: it is a more widespread symptom of disinformation. A good example of this shift is the infamous recording of Donald Trump speaking crudely about taking advantage of women. First declared by the US president to be "locker-room talk," it is now presumably forged: "we don't think that was my voice," he claims.

The deepfake has created a perfect condition for plausible deniability, which Hany Farid, a scholar who specializes in digital image forensics, has recognized to be a danger especially if used for political deception. If a fake image is now seamless, and detection is difficult if possible at all, any image or video can be reasonably declared false. "Deepfakes do pose a risk to politics in terms of fake media appearing to be real, but right now the more tangible threat is how the idea of deepfakes can be invoked to make the real appear fake," echoes Henry Ajder, a researcher from Deeptrace Labs, a company focused on detection of deceptive media. As a result of abounding confusion, attitudes err on the side of paranoia. The digital photograph has taken on the status of a conspiracy theory: without the means to access evidence for corruption, paranoid assumptions surface as plausible explanations. Though the realism of the photograph is still functional in institutions such as journalism, law, and science, a doubt is creeping in. The use of image manipulation for malicious intent is breaking down the image's true/false binary, but in institutions dependent on this premise, there is an active fight to keep it intact. Detection, regulatory, and preventative tactics hope to uphold an old contract for interpretation, but the question becomes how long that is possible to sustain.

6. "Dirty" Data and Apophenia

In the previous section, the digital photographs used to generate photographs are assumed to be analog—an image belonging to the tradition of photorealism. Importantly, this position also assumes that the dataset is "clean," that is, untampered with. Though "dirty data" can refer to any number of errors and inconsistencies in a set of data, in this context the dirtiness of the images refers to their digital condition, defined by a susceptibility to post-production. Put differently, the plasticity of digital images make for a notoriously dirty media. In her article "Sea of Data" Steyerl notes, "Veracity is no longer produced by verifying facts. It's a matter, as one big-data expert put it, to cleanse 'dirty data' from your systems" (Steyerl 2019, 5) If the deepfake is perceived as fact, its deceptive veracity is dependent on ensuring that manipulated or post-produced images are cleared from its dataset. Yet, the impossibility of arranging a set of clean or untouched data is becoming more apparent. With new technological developments, most influential of these being artificial intelligence, there are increasing chances that the images compiled for training datasets have already been post-produced. How does the configuration of the deepfake change if we assume the dataset is inherently dirty—that it is comprised of digital images?

The definitive quality of the digital image is a perpetual change in content and form. Though image manipulation is not new, the affordances of digital tools have drastically democratized the ability to modify and annotate images. As soon as the image enters digital circulation, its form and content is presumably altered. The digital image is remixed, cropped, collaged, compressed, doctored, filtered, and reformatted. Practices of digital bricolage, poaching, and collaging treat visual material less as an object to interpret passively, and more as an object to affect actively. Mirroring the evolution in computation that began with the Perceptron, data-as-image moves from a passive to active mode. Increasingly viewed as a "found image in waiting," this attitude has effected participatory cultures that use images to engage in complex visual conversations. Active participation allows users to contribute individual interpretations or "takes" on the visual material they encounter inviting communal engagement on a level that was out of reach in analog formats. Researcher Ryan M. Milner writes, "new types of information become easier to create, circulate, and transform. The participatory barriers are lowered, and new forms of communication can be encoded and decoded by a broader group of individuals" (Milner 2016, 25). The digital photograph now relies on an "expanded linguistic fluency," Ritchin notes, "its role becomes that of a less proximate signifier like words, paintings or drawings, but with the background duality of its surviving role as direct trace" (Ritchin 2019, 15).

Most commonly expressed in meme culture, this form of communication has drastically tipped the ratio of overtly post-produced content to "clean"

content, in favor of the latter. The meme is defined by Limor Shifman as digital content that shares the same basis of form, content, or stance; is created in awareness of each other; and is circulated, imitated, or transformed via the internet. To put it in simple terms, digital memes are "pieces of content that travel from person to person and change along the way" (Mina 2017). They embody the mutability of the image, novel visual structures for conversational exchange, and, most interestingly, a new aesthetic. In the age of the meme, an aesthetic emerges that is defined by its blatantly "Photoshopped" quality. The more one is exposed to this aesthetic (the higher volume of memes one is exposed to), the more one acclimates to a digital environment wherein images are mutable, constructed, and "unreal." In consequence, meme culture is encouraging a relation to the image wherein literacy is no longer a matter of detecting whether images are real or not, but, to a degree, seeing all images as constructions a priori.

Meme production engages in cultural collaging that shares some similarities with apophenic vision: participants draw what sometimes is read to be arbitrary connections between circulated imagery based on perceived associations.[1] As memetic imagery becomes more pervasive, collaged images eventually become available for manipulation themselves. These layers of alterations can be thought of as a form of metadata that is then collaged together on a meta-level.[2] Put differently, the re-constructed image is used for further constructions: the manipulation, manipulated boundlessly. Just as more and more images in digital circulation are resembling this memetic logic, so too might the deepfake as its datasets become "dirtied" by altered imagery. Steyerl describes pattern recognition as apophenic: "in order to 'recognize' anything, the neural network must be fed what to recognize. Then in a quite predictive loop they end up 'recognizing' the things they were taught" (Steyerl 2019, 8). Face-to-face image translation is very different from the mechanisms of apophenia, however, the production of the deepfake is based on the same premise: the discriminator is fed a dataset that marks the parameters of recognition, then, quite intuitively, the generator ends up "recognizing" this pattern after producing countless faulty versions. Though deepfakes do not resemble the eerie aesthetics of commonly-cited examples of visual apophenia like Google's deep dream generator, the effects of participatory cultures may be pushing generated photographs toward types of distortion that are equally disturbing.[3]

From the perspective of those whose visual field is dominated by constructed, remixed, collaged, and forged images, the true/false dichotomy is inching closer toward irrelevance: the traditional contract with photographic material has already largely dissolved. Though photographic impressions still hold indexical value when experienced in certain institutionalized contexts, the truth-value of the digital photograph becomes secondary to its symbolic and aesthetic value. Rather than focusing on the photograph as a document of truth, there is an embrace of its ambiguity as a creative force.

1. In "Sea of Data," Steyerl references Google's blog entry that explains the idea of "inceptionism," the act of creating a pattern or image from visual noise: "The results are intriguing—even a relatively simple neural network can be used to over-interpret an image, just like as children we enjoyed watching clouds and interpreting the random shapes" (Google Research blog, 2015).

2. Image memes are created wherein other memes are referenced. A knowledge of these meme premises is necessary for interpreting these "meta-memes."

3. Apophenia entails an apparatus of perception that is narrowed and sees patterns in data where there is no correlation. A comparison to face-to-face image translation cannot be made in this sense, yet apophenic attitudes can be thought of as a symptom of a larger migration away from the true/false dichotomy of the image and toward different forms of hermeneutics.

This results in a fundamental shift in perception where digital photographs are not necessarily either real or fake, but instead become the basis for new interpretive approaches based on individuated projections. In the place of photorealistic truth, new contracts for visual interpretation have the potential to lead to broader truths. With an unprecedented amount of images in circulation ("truckloads of data" as Steyerl calls it), apophenia, which Benjamin Bratton defines as "drawing connections and conclusions from sources with no direct connection other than their perceptual simultaneity," may eventually replace paranoia as a reigning cultural logic (Bratton 2013). With so much visual material moving so fast with no way of detecting whether it signifies what actually happened in reality, viewing all images through a loose, more individuated lens may prove to be a more "realistic" orientation.

7. Conclusion

The emergence of generated deceptive media forces us to ask how we might grapple with an image that is almost instantly produced, has the ability to preserve high standards of realism, evades detection, and presents a condition where we no longer know if images are true, false, malicious, or merely expressive. It compels us to question whether our collective cultural orientation toward visual hermeneutics is outmoded. Or, as Steyerl might phrase it: is it necessary to develop a new contract that adheres to new visual codes? To put it most plainly, how can we deal with images that are profoundly ambiguous? It is not enough to recognize that new forms of imagery are challenging our traditional perceptual modes, it is important also to understand their operative structures so that myopic and futile points of view are discarded for an informed reorientation toward images that, with time, can render destructive uses inert.

The image has moved from its status as objective representation to one that is in motion, mutable, and inherently uncertain. The progression from analog photograph to generated photography has led to an ambiguity that induces a major collective adjustment. In the face of uncertainty, paranoia about truth and falsity will allow for people in power to capitalize on anxieties about photographic representation. If we are being confronted with a collapse of photojournalism, then perhaps we must rely less heavily on the photograph's duty to provide a representational truth and more on a function that offers symbolic and aesthetic truths. In adopting this reorientation, the power of the constructed image, the meme aesthetic, the corrupted digital object is recognized as a means of recovering authority over our visual landscapes—over our images-as-data. The deepfake is a visualization of the "neoliberal subjects coming to understand their *selves* to be aggregated statistically. [...] Individual particularities remain latent in data systems, lying dormant until called forth in the service of an externally

imposed narrative," writes theorist Steve Anderson (2017, 17). No doubt an externally imposed narrative like the deepfake has an alarming potential to cause sweeping political confusion, but equally ominous is its use use on smaller scales, where all events and past actions are at risk of becoming as ambiguous as the image. In the face of these potential futures, an embrace of new visual regimes that relinquish realism for radical subjectivity may be the best means of combat.

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