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Galton Reloaded

Computer Vision and Machinic Eugenics

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As we all know, computers do not see. When we refer to computer vision, we point to a system that can read, interpret, and extract data from digital files. Its application encompasses OCR (optical character recognition), medical images, search engines, 3D modeling, surveillance, biometrics, self-driving cars, and various image editing techniques (Szeliski 2011, 3–8). Present in various activities, computer-vision systems operate as filters and lenses of our daily lives or as apparatus. In Michel Foucault's terms lately updated by Giorgio Agamben, the apparatus concerns "a heterogeneous set, linguistic and nonlinguistic, which includes virtually anything under the same title: discourses, institutions, buildings, laws, security measures, philosophical propositions," which results "from the crossings of relations of power and relations of knowledge" (Agamben 2009, 29; reverse translation by the author).

It is through this crossing of relations of power and relations of knowledge that computer vision is discussed in this essay. While "interpreting" the visible, computer-vision algorithmic models shape fields of visibility and invisibility, producing new forms of exclusion and control. Interpretation, in this case, does not involve

any hermeneutic operations. In the same way that computers do not see, they also do not understand images at any level of representation. The image for the computer has no semiotic or aesthetical meaning. In computational terms, it is just a matrix of points and blocks that allow an A.I. to identify patterns such as edges, shapes, textures, curves, corners, and colors and group them through filters. This seems obvious, but the recurrence of metaphors around computer vision tends to blur this primary instance.

This kind of metaphor refers structurally to the anthropocentric paradigms of artificial intelligence. First, there is the basic assumption that to be intelligent is to be human and that intelligence must mirror human attributes like human vision or natural language processing (NLP), where language means human vernacular language, with American English as a default paradigm. Not less relevant is the supposition that intelligence is an exclusive attribute of the human brain, despite different multispecies approaches, such as those by Donna Haraway, Anna Tsing, Eduardo de Castro, and James Bridle, among many others. The association of deep-learning algorithms and neural networks departs from this set of assumptions, aiming to mimic the human brain, from a neurological point of view, through multiple layers of interconnected nodes.

This is the case of convolutional neural networks (CNNs), a type of machine learning commonly used in computer-vision tasks—designed to process data with a gridlike structure, such as an image. The process of training a CNN involves presenting it with a large dataset of examples and adjusting the weights of the connections between the nodes in the network so that it can learn to recognize patterns and features in the data. Once the CNN has been trained, it can be used to make predictions or classify new data based on its learned features. Nevertheless, vision is not just a physiological attribute mobilized by neurology; it is inseparable from the subjectivity forms shaped in different historical condi-

tions and one of the layers of the body's social production, topics extensively reviewed by Jonathan Crary on more than one occasion (Crary 1991; 2000). Therefore, when referring to computer vision, computer sciences express the worldviews that modeled their approaches to technology.

It would be unfair to assume that computer scientists are unaware that human vision is relational, integrated with other senses and thoughts, and "does much more than just recognize objects." However, despite recognizing the immense differences between human vision and machine, they usually understand these differences as problems to be solved by improving the data-training process, a prerogative of machine learning (Goodfellow, Bengio, and Courville 2016, 366–67).

Machine learning involves the development of algorithms and statistical models that allow computers to learn and make decisions or predictions based on data without being explicitly programmed to perform a specific task. From a contemporary educational point of view, machine-learning principles would be considered a failure even considering the complexity of the operations involved in models for visual data, such as convolutional neural networks. They reproduce what educator Paulo Freire defined as a banking model of education (*educação bancária*). Based on operations of deposit, accumulation, and reproduction of knowledge, this pedagogical model is hierarchical and supposes the superiority of the professor and not partnerships between its agents. Because of this, according to Freire, it suppresses the emergence of alterity and narration, neutralizing critical points of view and creativity (Freire 2018, 79–83). The analysis of machine learning from a pedagogical perspective falls beyond the scope of this essay. However, it reinforces that artificial intelligence is not an abstract framework that plays out its rules in an autonomous parallel universe. It is a cultural construct firmly assented in historical dynamics of power, in which the anthropocentric reference, based on the white man's superiority, plays a central role.

Several studies show how biased data reinforce stereotypes and make Black individuals more vulnerable in surveillance systems (Buolamwini and Gebru 2018; Silva 2022). However, the "discipline and punish" relationship is only one of the many current racist biopolitical strategies of domination. In what concerns healthcare, a terrain where the role of A.I. is essential and increasing its prominence rapidly, biased datasets impact diagnosis predictions and priority in the access to services (Owens and Walker 2020, 1327). Of course, improving the quality of data that feeds the computer-vision models is possible. This may include different strategies of data review, like public information about the data collected (Zou and Schiebinger 2018, 325), and the development of technologies to depurate the biased information (Steed and Caliskan 2021).

Developing a computer-vision model demands vast amounts of data and a preliminary labeling process of thousands of images that will allocate data in different categories or classes and feed the machine-learning process. Nevertheless, algorithms do not execute their tasks spontaneously. Analyzing ImageNet, a dataset used by many computer-vision systems, Crawford and Paglen showed the genealogy of the prejudices they embed. For example, the "human body" category is in the Natural object > Body > Human body branch, and its subcategories are distributed between males and females according to their age profile (adult or juvenile). "As the 'adult body' includes the subclasses 'adult female' body and 'adult male body,' we find an implicit assumption here: only 'male' and 'female' bodies are 'natural'" (Crawford and Paglen 2019).

Labels, as we see, play a pivotal role in the social production of biased data-embedding prejudices in the hierarchies and in the identification of the images that will be used in machine-learning tasks. Workers hired for specific tasks on remote platforms such as Amazon Mechanical Turk (AMT) usually begin the labeling process. These workers constitute an emerging global precariat, performing decontextualized and atomized tasks in a global system of

platformed labor. Underpaid and unprepared for image interpretation, they reveal what Marx defined as alienation in the labeling processes, the disconnection of labor from the worker experience (Moreschi et al. 2020; Grohmann et al. 2022).

Other important factors for understanding how data becomes biased are economical and geopolitical. For economic reasons, unsupervised systems are becoming more relevant, amplifying the problems of the social production of data. These use pretrained models through *transfer learning* to images not previously labeled, multiplying their identification mistakes and biases. Pretrained models feed facial analysis applications, which can be used in security systems but also in many other contexts. They can also be used in the hiring process with software that conducts video interviews, examines them, and sorts the job candidates based on machine decisions, combining natural language processing (NLP) and computer-vision models. One of the most recurrent complaints of users of this kind of service is about the obscure methodology of the sorting process and the role of biased data in the process (Harwell 2019; EPIC 2019).

Finally, another factor in the production chain of biased data is geopolitical. Concerning the computer-vision field, 45 percent of the 14 million labeled images from ImageNet come from the United States, a country that constitutes 4 percent of the global population. In contrast, China and India, which together represent 36 percent of the global population, account for a mere 3 percent of the images in the same database (Zou and Schiebinger 2018, 325). In short:

> Several commercial computer-vision systems (Microsoft, IBM, Face++) have been criticized due to their asymmetric accuracy across sub-demographics in recent studies. These studies found that the commercial face gender classification systems perform better on male and light faces. Various unwanted biases in image datasets occur due to biased selection, capture, and negative sets. Most

> public large-scale face datasets have been collected from popular online media—newspapers, Wikipedia, or web search—and these platforms are more frequently used by or showing White people. (Karkkainen and Joo 2021)

Algorithmic Racism

The profile and amount of data are essential to understanding the architecture of algorithmic-based biases. Within the scope of historical colonialism, a broad spectrum of scientific theories supported racism, ranging from Linnaeus's classification of the different profiles of *homo sapiens* to the phrenological, phisionomical, ethnographic, and eugenicist studies. Those theories, which hierarchized white men's superiority, played a crucial role in naturalizing the routines of appropriation, subjugation, and extermination of Blacks and Indigenous peoples during the nineteenth and twentieth centuries (Schwarcz 1999). Today, data colonialism reinforces those excluding practices.

The notion of data colonialism assumes "the social relations embodied in data are part of a broader colonial (and not merely capitalist) legacy" (Couldry and Mejias 2019, 85). Performing dynamics of power, those relations do not replace the traditional forms of expropriation. However, they include data appropriation and its transformation in corporate capital and social resources. The nomination of the new James Bond to succeed Daniel Craig, the protagonist for the fifth and last time in the famous spy film series (*No Time to Die*, 2021), elucidate those data relations. It was the first case of "assisted casting" by artificial intelligence, and the chosen actor was Henry Cavill, famous for the role of Superman in *Batman vs. Superman—The Origin of Justice* (2016) (LargoFilms 2020).

Like any prediction supported by data analysis, conclusions depend on the amount of data and their quality. Even though it is a nomination and not the definitive choice, the selection reveals the dynamics of algorithmic racism. Furthermore, the data profile that trained the algorithms explains why it was not a woman or a

Black actor or actress selected to replace Craig. To find the new James Bond, Largo Films developed a system fed with thousands of attributes of the character, from physical features to narrative elements, to identify his "DNA footprint." The development of the program results from a machine-learning process that computed analyses of metadata from more than 400,000 films, 1.8 million actors, and 59,000 scripts.

The numbers are gigantic ("robust," to use the jargon). However, it translates into data the American film industry profile, which includes the incipient participation of Blacks and other ethnic minorities among its protagonists. At the time of the historic #OscarSoWhite campaign in 2016, statistics showed that between 1928 and 2015, only 1 percent of nonwhite women and 6.8 percent of nonwhite men were Oscar winners. This number quadrupled in 2019, reaching 27.6 percent, which shows that even with this increase, the movie industry is far from reflecting race and gender social diversity (Bruce-Lockhart, Faunce, and Burn-Murdoch 2020).

Black protagonists are few and do not correspond to the metadata associated with James Bond's attributes. Therefore, the "so white" character of this cultural economy sector implies the impossibility for Largo Films' A.I. to match the expectations of nominating a Black woman or man for the role of James Bond. Datasets compiled for the selection are poor in these references reflecting the presence of structural racism in society and expanding it in new directions. After all, when looking for a new Bond based on what has always been the old Bond, one could hardly expect a result very different from confirmation of the same James Bond pattern. A white man with a beautiful woman with decorative functions.

This is not "natural" of the algorithm itself (a set of mathematical rules that inform an action) but of its modeling. Some of its harmful consequences include targeted search results, such as hypersexualized images for "black girls" and automatically tagging Black people as gorillas on Google. Another example is selfie "beautification" apps through the whitening of pictures, as shown by studies by

Safiya Noble, author of *Algorithms of Oppression* (2018). In the same direction, research conducted by two Brazilian scholars, Tarcizio Silva and André Mintz, analyzed the performance of pretrained computer-vision models from Google, IBM, and Microsoft, investigating their interpretations of 16,000 images related to Brazilians, Nigerians, Austrians, and Portuguese. One of the questions of the study was to understand how these computer-vision systems label phenotypic characteristics of nonwhite people and non-Western symbols, emphasizing Indigenous and Black peoples. The study revealed, for example, that Google Cloud Vision assigns the tag "wig" to black women with curly hair or turbans, explicating its cultural limits (Silva et al. 2020).

It is not by chance that so many errors in the identification of Black people occur with face-recognition systems; this was the argument of the documentary *Coded Bias* (2020). Shalini Kantayya's film premiered at the Sundance Film Festival and focused on the artist Joy Buolamwini, at the time a student at Massachusetts Institute of Technology (MIT). For an art project at MIT, Buolamwini tried to develop a mirror that would put other faces over hers. Nevertheless, the facial-recognition software could not detect her face until she decided to put on a white mask. It was the beginning of an activist investigation into how algorithms mainly affect Black women. Although the documentary focuses on the political dimensions of computer vision in our daily lives, those technologies are far from impacting only the quotidian. They also affect the perception of the past and the politics of memory, contributing to historical denialism via different sorts of deepfakes.

Deepfakes Trues

The term *deepfake* is a neologism that appeared in November 2017 on Reddit. It was initially the user's nickname and the forum's name dedicated to applying deep-learning technologies to swap the faces of porn actresses for celebrity faces (Cole 2018). Reddit banned the group one year later, but the spread of A.I. technologies on the Internet consolidated the deepfake routines available in different

apps and social media, allowing anyone to be a pop star or a politician for a few seconds.

It is a commonplace to say that after Photoshop nobody is surprised by image manipulations anymore and that image appropriation of politicians is not new. Stalinism extensively used adulterated photos, and Nazism and fascism defrauded countless others. Nevertheless, it is worth emphasizing that deepfake is neither collage nor editing and dubbing. A deepfake is an algorithmic image without human mediation in its processing. It uses thousands of stored photos in datasets to learn a person's facial movements, including lip-synching and voice modulations, to predict and depict how that person would say something they never said. One of the technologies used for creating deepfakes is the StyleGANs (Generative Adversarial Networks for Style-Based Generation of Faces), a neural-network architecture specifically for face generation. Unlike the CNNs process, which is oriented to classify and predict behaviors, StyleGANs images are trained to incorporate aesthetic attributes, such as lighting, curves, and contrasts. They also distribute a face's elements from other images, adopting its characteristics and looking more convincing (Karras et al. 2020; Altuncu, Franqueira, and Li 2022).

One of the most well-known uses of this technology is the *This Person Does Not Exist* project. The pictures on the project website are initially intriguing and vivid, making one believe that the portraits it hosts are of real people. However, they are also intriguing because they prescind the gaze, as algorithms trained by machine-learning systems synthesize (generate) them. Thus, they write a new chapter in the history of postphotography, which had already discarded the need for a camera, a topic addressed by several thinkers, such as Joanna Zylinska (2017), and photographers, such as Joan Fontcuberta (2007). However, beyond the discussions about the veracity, appropriation, and clashes between humans and machines, an eternal issue of technical image, we should consider deepfakes in the political realm of alt-right and creationist movements, as shown in the artwork *In Event of Moon Disaster* (Panetta and Burgund 2020).

112 In this video installation, President Richard Nixon reports, directly from the White House Oval Office, the Apollo 11 disaster. His speech was written by William Safire and would be read in the event of an accident with the 1969 Lunar Mission. For that, an MIT team used Richard Nixon's filmed speeches to transfer his facial expressions and lip movements to his clone, with his voice, diction, and facial expressions, saying words he never said about an event that never occurred. The artwork draws attention to the potential damage of deepfakes in terms of historical revisionism, a particularly relevant topic nowadays, given the increasing manipulation of the past by different denialist far-right movements.

No less relevant are the recurrent historical appropriations for commercial purposes, which have been transforming cultural memory into a commodity. Concerning this, art critic T. J. Clark wrote that, if previously capitalism used to sell promises of the future, today it produces objects "to invent a story, a lost time of intimacy and stability, which everyone claims to remember, but no one ever had." Clark identified the need to fictionalize the past with a time crisis, marked by the "attempt to expel the banality of the present from consciousness" (Clark 2007, 322–23; reverse translation by the author).

Before him, Umberto Eco showed that this type of movement also paved the way for "a philosophy of immortality as duplication." As if we could not experience the past anymore, it was only possible to reproduce it, not preserve it through memory. This approach fosters a thematic approach to institutions and social spaces that consolidate the past's permanent setting as architecture or an image (Eco 1984, 12–19). The scenographic approach to the past tends to transform the lived moment into a monument to the present that was not. On the one hand, we could say we live in a state of documental overdose, compulsively recording our daily lives with the camera phone, which became a kind of third eye in the palm of the hand, continually scanning life. On the other, we submerge in the impossibility of accessing memory, following

the timeline logic of social media, ordered according to the more recent event.

Instead of contributing to new archival models, the documental overdose pasteurizes history through trivializing images, as shown in *Yolocaust.* In this work, Shapira (2017) explored "our commemorative culture by combining selfies from the Holocaust Memorial in Berlin with footage from Nazi extermination camps," the artist explains on the project website. The pictures came from social media and dating apps, and all received new captions, like "Jumping on dead Jews @ Holocaust Memorial," but keeping their original "Likes."

The same phenomenon of neutralizing traumatic experience via social media surrounded *Barca Nostra* (2019) but for different reasons. An artwork by Swiss-Icelandic artist Christoph Büchel, who rebuilt the fishing boat that sank in the Mediterranean in 2015, killing 800 people, it was presented at the 58th Venice Biennale. In few days, it became an Instagram cliché, despite the artist's intention to focus on the greatest tragedy of the current migration crisis. The insertion of the same Barca Nostra and its tragic memories in an appealing scenario, such as the city of Venice, transformed the idea of mobilizing the political awareness of the Biennale visitors into a "beautiful" background for smiling faces and banal images.

The forms of image production and circulation today say a lot about memory status in digital time. There is a compulsion for archiving today. Everything is registered in the eagerness to "save" a moment, and one cannot ignore how "saving" memories are symptomatic of digital-culture ambivalences toward archiving. Everything must be recorded, captured, and posted, even if it is to be erased in twenty-four hours. However, this archiving fever parallels the pop culture of remakes. As music critic Simon Reynolds says, we live in an age where everything is "re" (remakes, re-records, reprints, revivals) and is entirely for sale through the "new" add-on. "Instead of being about itself, the 2000s have been about every other previous decade happening again all at once" (Reynolds 2012).

There are Formica kitchen designs, mini-scooters, cars inspired by famous 1930s models, rockabilly hairstyles, and hippie and punk clothes for all. Retro design is everywhere, and the "user experience" (UX) legitimizes the demand for memory as a consumer good. Anthropologist Arjun Appadurai calls this phenomenon "imagined nostalgia," a result of merchandising techniques, which creates experiences of losses that never happened (Appadurai 1996, 76–77). It is possible to locate this movement in the 1990s when the frontiers of the debate on collective memory transcended academic boundaries and gained contours of transnational and media events. Some remarkable moments of this process were the celebration of the fiftieth anniversary of World War II, the one-year celebrations of the fall of the Berlin Wall, and the ten years since the end of Latin American dictatorships. Newspaper supplements covering all those events, TV specials, commissions for new architectural landmarks, public artworks, and a large production of books and films are all icons of that "memory boom" of the 1990s (Huyssen 2009, 15; 2014, 39).

Nevertheless, thirty years after the boom of memory as a commodity so typical of the 1990s, we face a different situation. The Anthropocene erodes old prospects for the future and what prevails is the uberization of life, constricted by the norms of techno-financial automatism. The proliferation of cell phone apps to three-dimensionalize, colorize, and animate old photos, giving "life" to the past, indicates that we have expanded the idea of memory as a commodity to one of history as a gadget. An emblematic case of this search for a mythic past was the launch of Deep Nostalgia in 2021. A powerful combination of "gadgetization" of history with deepfake technologies, Deep Nostalgia allowed animation of old photos, from personal ancestors to historical personalities, giving them expressions through smiles and blinking eyes and movement with head turns, amusing millions.

The Deep Nostalgia algorithm is built with several deep neural

networks trained with datasets of thousands of videos. It searches prerecorded videos from the database and calculates its movements to interpolate its pixels onto the static photo. An occlusion map synthesizes the missing parts in the picture and adds them to the system, revealing teeth, the side of the head, and other aspects absent in the original image. This computational odyssey produces, in seconds, the natural look of the animations. The success of computer-vision models like those used by Deep Nostalgia is symptomatic not only of the potential of A.I.s for creating "deep faked pasts" but of the ambivalences of our relationship to the experience of history.

The proliferation of applications for aging one's face thirty years, or those that remove wrinkles, is a sign that we have abolished the "past as past" (Pelbart 2007, 70) or at least the past as we knew it. In tune with this approach, 3D models of "revitalization" projects designed for historical areas present urban sites processed, as it were, with Botox injections applied to city landscapes. They incorporate the anti-aging techniques of human bodies in the urban realm, "giving tourists the impression that they are in the eternity of a postcard" (Jeudy and Berenstein 2006, 9).

On the one hand, "tomorrow is now," as we learned from the Museu do Amanhã (Museum of Tomorrow) slogan at the time of its construction in Rio de Janeiro. On the other hand, given the increasingly recurrent ecological catastrophes, climate changes caused by human action, and the exponential increase in technological waste produced daily, we may not have something to conserve. In this sense, "what would be driving conservation for the future is no longer the anguish of the loss of traces, but the fear of not having anything to transmit" (Jeudy 2005, 46; reverse translation by the author).

The Privatization of the Gaze

It goes beyond the limits of this essay to discuss the role of technology companies in environmental degradation. However, one

cannot ignore that the same corporations monopolizing numerous sectors of contemporary social life are behind the software and hardware of all those systems. Google, Meta, and Amazon cross the most diverse social life activities. StyleGAN was developed in the laboratories of Nvidia, a leading company in graphics processing units (GPUs) and the artificial intelligence market. Microsoft, the owner of the cloud computing service Azure, is one of the main investors of OpenAi, responsible for the new revolution in using NLP techniques in creative activities.

The contemporary politics of the image refers to the possibility of corporate control of the gaze on an unprecedented scale. Even though partnerships do not necessarily imply affiliations and these agreements go back to the history of photography, no photographic company had a monopoly on some of our basic infrastructures (Goldenfein 2020). The pioneer *Logo.Hallucination* (2006), by artist Christophe Bruno, anticipates some possible political and cultural developments from the corporate control of computer-vision technologies, infrastructures, and products. For its realization, Bruno used image-recognition technologies "in order to detect subliminal forms of logos or emblems, hidden (involuntarily) in the visual environment or in the whole of Internet images" (Bruno 2006). As a result, a Vermeer painting would already contain the Atari games logo; an African mask would be the original McDonald's; a bikini would be the original shape of the Mercedes-Benz brand, among other bizarre cases documented on the project's website.

Bruno showed how the new features of pattern recognition in images became a fertile field for copyright management, as they could reach such a degree of hallucination that would culminate in the privatization of the gaze. This is made explicit in the ways social media platforms block supposed immoral content according to their rules. Images portraying nudity are usually understood as sexually suggestive, no matter if they are historical materials, contemporary art, or an affective moment of a mother breastfeeding her child. Interpreted as sensitive content, they tend to be automatically removed from the users' profiles. How giants like Instagram

make these identifications is unclear to their users. It is not the point here to try to discover how Instagram algorithms work (one of the most hidden secrets of the digital industry) but to stress how their monitoring practices enunciate a new kind of censorship, one that does not forbid it. Instead, it defines algorithmically the right of what can be seen and how. This dynamic essentially refers to the role of patterns in today's visual vocabulary.

> Most of the contemporary applications of machine learning can be described according to the two modalities of classification and prediction, which outline the contours of a new society of control and statistical governance. Classification is known as pattern recognition, while prediction can also be defined as pattern generation. A new pattern is recognized or generated by interrogating the inner core of the statistical model. (Pasquinelli and Joler 2020, 13)

It is no coincidence that all the deepfake images in *This Person Does Not Exist* have the same look and a poker-face smile. Built with images scraped from the Internet, they mirror how people present themselves online, usually as heroes of their own lives. Nevertheless, deepfakes illuminate other intricacies of the standardization of visuality. These intricacies refer to the production chain involving cameras, less dependent on lenses and sensors and more on artificial intelligence, to image-processing programs and the channels through which they flow (mainly social media).

Together they respond to and model the standardized formatting of perspectives, colors, and points of view that multiply on networks and spread in common cellphone camera resources like auto-alignment. Some people will undoubtedly say that countless times the pattern does not correspond to what was intended to be registered, and it is possible to revert it. However, given the path of the digital market, we can say the forthcoming cameras, increasingly "smart," will learn to capture "corrected" photos, making it difficult to disobey their prefabricated designs.

This denotes the presence of computer vision in our daily lives and how we naturalize its rules in cultural expression. We live in the paradoxical situation of potentially creating the wealthiest and most plural visual culture in history through access to media and diving into the limbo of gaze uniformity. However, uniformity here is intrinsically related to predictability. So, artificial intelligence puts us in front of a new machine/eye operation, an inseparable binomial in contemporary times, as shown by the work of artist Harun Farocki (1944–2014).

With the increasing amount of data and more efficient mathematical models in development, machines can achieve higher accuracy levels in terms of capacity to preview the results. This predictability profoundly affects our ways of seeing, perceiving, and figuring out reality. It is enough here to recall the selfie phenomenon to corroborate this statement. After all, it has permanently changed the self-portrait's angle, which is no longer frontal, corresponding to the camera on the tripod. It has adapted to the available angle for capturing with a cell phone, from 7 to 17 degrees, as seen in the *Selfiecity* project (Manovich 2014).

The selfie standard cannot be dissociated from the algorithmic rules that conditionate visibility in social media and project it to the social realm. The liberal economy of "Likes," and its successful formulas, tends to homogenize everything we produce and see. It standardizes angles, frames, scenes, and styles. What is behind this are the criteria for organizing the data so that it is more quickly "findable" in online searches and how the algorithms contextualize the contents in the specific bubbles to which we belong (something that we do not control but that controls us). In this sense, paraphrasing Foucault in *Discipline and Punish,* algorithms are the disciplinary apparatus of our time, which gains efficiency as people try to respond to their rules to become visible. From this perspective, it is possible to understand how the platformed society operates as a social Darwinist device of exclusion that may be pointing to new forms of eugenics: machinic eugenics of the gaze.

Eugenics is a word derived from the Greek *eugenes,* and it means "well-born, good stock, and noble race." British scientist Francis Galton (1822–1911) coined the term *eugenics* in 1883 in the book *Inquiries into Human Faculty and Its Development.* His motivation was to offset the "slowness" of the processes of natural selection that Darwin, his cousin, theorized about, granting, in *The Descent of Man*, that, "At some future period, not very distant as measured by centuries, the civilized races of man will almost certainly exterminate and replace throughout the world the savage races" (Darwin 1896, 156). Nevertheless, for Galton this was too much time, and he dedicated himself to creating technologies to improve the human species. Looking to change the composition of populations and favoring the reproduction of certain types to the detriment of others, Galton dedicated himself to adapting the ideas of artificial selection Darwin explained in the first pages of *On the Origin of Species,* studying the selective breeding practiced by farmers.

Proposed as a science, eugenics soon became a social and international movement. In 1907 the Eugenics Education Society was founded in Great Britain. The same year marked the approval of the first laws on sterilizing Blacks and the prohibition of interracial marriages in the United States. There, the American Eugenics Record Office existed with this name until the end of the 1960s. In 1913, dermatologist and psychiatrist Iwan Blocht founded the Medical Society for Sexology and Eugenics in Germany. Another country on the vanguard in this field was Brazil, whose Eugenics Society dates to the 1920s. The new science spread worldwide within a few years, followed by laws and governmental acts targeting Indigenous and Black populations. In Nazi Germany, eugenics became the official policy of the state starting in 1933, with the aim of exterminating mainly the Jewish people but also other groups considered "undesirable" by the Nazi regime. This delirium resulted in the alarming number of deaths: 6 million Jews, 250,000 Sinti, at least 200,000 mentally ill, an unknown number of Black people,

and many thousands of homosexuals, communists, and political opponents, classified as 'antisocial' (Beiguelman 1997; Eugenics Archive, 2015).

For the development of his theories about eugenics, Galton created composite portraiture, a photographic method superimposing several faces from multiple exposures onto the same plate. He erased all individualized features from the result to get a generic face identifying a specific biological and social profile. As Galton said, the aim was to reach "with mechanical precision" a "generalized picture [. . .] that represents no man in particular but portrays an imaginary figure possessing the average features of any given group of men" (Galton 1879, 132–33). He inferred this supposed precision from interpreting his methodology as "pictorial statistics" (Galton 1883, 233).

Galton's composite portraits thus indicate the belief, as Allan Sekula (1986) says, in the confluence of methods resulting from statistics with optics. This belief is not exclusive to Galton and brings him closer to another famous character in the history of photography, Alphonse Bertillon (1853–1914), and his criminological image. Both scientists shared the belief in the existence of the "average man" (*L'homme moyen*), a concept by one of the pioneers of statistical science, the Belgian Adolphe Quételet (1796–1874). This quantitative method legitimizes, for Galton and Bertillon, the passage from the purely optical to the purely datafied, or from the empirical to the irrefutable scientific proof of the criminal biotype (Sekula 1986, 18–22; Lee-Morrison 2019, 95).

In *The Normalizing Machine* (2018), an interactive installation by Mushon Zer-Aviv, each participant is presented with four previously recorded videos of other participants and should point at the "most normal" among them. Algorithms examine the selected person and add their image to a database projected on a wall reproducing Bertillon's anthropometric boards. It is surprising to see, in seconds, one's image scanned into measurements of eyes, mouth, and ears and computed with hundreds of other participants. However,

the face treated as a computational model (Kember 2014, 186) determines new models of standardization of bodies following the A.I.'s assumptions.

Zer-Aviv defines his project as an experiment in machine learning and algorithmic prejudice. He recalls, however, that the founding father of computing and artificial intelligence, the English mathematician Alan Turing (1912–1954), "hoped A.I. would transcend the kind of systemic bias that criminalized his deviation from the norms" (Zer-Aviv 2018). In his now classic article "Computing Machinery and Intelligence" (1950), Turing proposed that computer-based machine learning should be based on the child's brain and not the adult's (Turing 1950, 456).

Not by chance did Turing discuss learning machines and not machine learning, meaning machines that can learn instead of the machinic process of learning. The challenge, he said, would be to design computers with unlimited storage, capable of dealing with random programming, assuming that "the rules which get changed in the learning process are of a rather less pretentious kind, claiming only an ephemeral validity" (Turing 1950, 458). The contextual mutability of rules breaks the hierarchical-learning model based on errors and successes. Moreover, its random performance confronts the aimed homogeneity of highly repressive societies, intolerant of otherness, such as the one in which Turing himself, as a gay man, lived. In some ways, as Zer-Aviv speculates, his thought expressed a reaction to a social model and an attempt to respond to the oppression of his person through a mathematical notation.

In its beginnings, we can also say that artificial intelligence was much closer to technodiversity and the recursive model of which Chinese philosopher Yuk Hui (2020) speaks than to the normalizing model that Zer-Aviv's work criticizes. *The Normalizing Machine* discusses what and how society sets as the standard for normality and how A.I. and machine-learning processes can amplify the discriminatory tendencies that ancient anthropometric theories underpinned centuries ago.

The links between the history of photography and biopolitical control have been widely discussed and directly or indirectly refer to Michel Foucault's seminal analysis of the panopticon (Foucault 1995, 195–228). In the colonialist realm, photography played an essential role in legitimizing scientific racist discourse, intertwining studies of visual representation with sciences, as shown by different scholars (Machado and Huber 2010; Fischer 2019; Azoulay 2019, 36). However, no discriminatory scientific discourse had the influence and longevity of the ideas and methodologies created by Galton, which had impacts from face recognition to the eugenics revival in biotechnologies.

From Pictorial Statistics to Statistical Photography

Face recognition is an application of computer vision that involves machine-learning algorithms and statistical analysis to examine and identify faces in images and video. The system requires the ability to detect and analyze facial features, such as the shape of the face, the distance between the eyes, and the structure of the cheekbones, as Bertillon did. With those elements, a facial recognition system creates a unique numerical signature or "template" for each face, compares this template to a database of known faces, and determines the person's identity in the image.

In a tentative genealogy of the machinic gaze, face recognition marks an aesthetic and political encounter of computer vision with the nineteenth-century imagination. It is noteworthy how the numerical signature used in face recognition systems resembles Quételet's "average man" concept in that it is a statistical summary of specific characteristics of a face. Quételet used this concept to describe the standard of a population's features, such as height and weight, which could describe the "typical" individual in that population (Grue and Heiberg 2006). However, the template used in facial recognition systems is specifically designed to identify individual faces rather than to describe the average characteristics of a population, as Galton's, expanding Quételet's, ideas did.

Despite all the terrible consequences eugenics had in the Second World War, some researchers recovered this background, acclaiming face recognition's promises to identify criminal biotypes. Like the father of criminal anthropology, Cesare Lombroso (1835–1909), an early adopter of the composite portraits, these studies assume that it is possible to identify the profile of the criminal individual through the analysis of facial characteristics and the emotions they express. In a controversial article published in 2016, two investigators from Shanghai Jiao Tong University announced a computer-vision model for inference on criminality using face images. Based on the analysis of 1,856 photos, the authors say, "the most important discovery of this research is that criminal and non-criminal face images populate two quite distinctive manifolds" (Wu and Zhang 2016). The publication includes illustrative scientific images of the most common biotypes of criminals and noncriminals in the best Galtonian style. Contested by many and still a reference for others, its approach is far from being an exception, as we can see in an article published in 2020 in the *Journal of Big Data,* one of the top-rank of journals in its field (Hashemi and Hall 2020).

Another polemic article must be cited here. Published in the *Journal of Personality and Social Psychology* in 2018 and written by two Stanford University investigators by this time, it sought to demonstrate, based on 30,000 images extracted from a dating site, that computer vision could reveal, from facial analysis, who were the gay people, with 81 percent accuracy (Wang and Kosinski 2018). "Essentially, it [the article] suggested that computers could have better 'gaydar' than gay humans themselves, with an accuracy rate 'comparable with mammograms or modern diagnostic tools for Parkinson's disease'" (Belden-Adams 2020, 215).

These scientific texts share the belief that face recognition results are neutral and trustworthy because they are based on algorithms and statistics. Galton called his composite portraits "pictorial statistics" not for the rhetorical effect of the definition but because he is the founding father of regressive statistics, a paradigm of any

machine-learning process and pivotal for understanding the relations of pattern recognition and eugenics. From Galton's point of view, his composite technique that looked for coincident patterns, erasing individual traces, would contribute to the "betterment" of the British population. Given the abstraction of those methodologies, it is difficult here not to agree with researcher Daniel Novak when he says that Galton created a scheme that "would make photographic fiction into photographic science—a non-existent body into a type derived with scientific accuracy, a photographic science fiction" (Novak 2004, 58). However, as consistent as Novak's statement may sound, some computer-vision experiments show an ongoing revival of the British scientist's ideas and methodologies with significant social and political implications.

Eugenics Never Ended

By the end of the 1990s, the activist collective Critical Art Ensemble pointed out that some biotechnological findings refer to the conceptual and political realm of a "second wave of eugenics" due to its "promise to rationalize the gene pool in a way that seems economically and socially productive to capitalist forces" (Critical Art Ensemble 1998, 127). Their prognostics can be confirmed in basic searches in scientific databases for uses of Genetic Algorithms, which express positive ideas toward their machinic eugenics powers.

Genetic algorithm is a term that refers to the use of artificial intelligence to enhance or alter the genetic makeup of living organisms. This involves using A.I. to analyze an organism's DNA, identifying specific genetic variations that could be targeted for modification or enhancement. It may also include using A.I. to design and synthesize new genetic material. These technologies could improve the health and well-being of humans and other living organisms by eliminating inherited diseases and disabilities or enhancing certain traits that benefit the individual or society. All those possibilities involve ethical decisions, and because of this, many scientists expressed concerns about the potential ethical and social implications of such technologies.

One can remember the reactions to the announcement of the first designer babies by Chinese scientist He Jiankui in 2014 (which later proved to be a fraud). This case was debated in the scientific community and widely reported in the media, showing that "molecular scissors" is far from consensual. It also showed that biotechnologies demand ethical and political debates beyond the possibility of creating a "genetic divide" between those who have access to these technologies and those who do not. They refer to human rights discussions and the prospect for abuse or misuse of these technologies by governments or other groups (Heritable Human Genome Editing 2020).

At the height of the Human Genome Project, a series of works were published addressing the expectations of human improvement, designer children, and a brighter future, free of diseases and sick people. Some of these works became bestsellers, such as that of Gregory Stock's *Redesigning Humans: Our Inevitable Genetic Future* (2002), published at the time he was the director of the Program on Medicine, Technology and Society at UCLA's School of Medicine. The book defends gene selection for the improvement of future generations and designer children, among others. Because of those positions, it is considered by many a defense of eugenics (Shaw n.d.).

Numerous statements by the geneticist James Watson, codiscoverer of the structure of DNA and a Nobel Prize laureate, in defense of "traditional" eugenics, are well known and aroused all sorts of protest. Watson had been the director of Cold Spring Harbor Laboratory since 1968, where the American Eugenics Record Office was founded in 1912. Given his known positions in favor of eugenics, his nomination as the director of the Human Genome Project (1988–1992) aroused concerns, linking biotechnological achievement with the eugenics past (Wilson 2017, 33–34). In the field of the humanities, the work of the philosopher of transhumanism, Nick Bostrom, openly argues in favor of a "new eugenics," aimed not at genocide but at the longevity and intelligence of posthumanity (Bostrom, Harris, and Savulescu 2018).

The Human Genome Project (HGP), the most significant scientific collaborative project in history, is not potentially eugenic. However, the myth of perfection many of its followers believe in is eugenic, not expressing scientifically what the genome is. As Armand Marie Leroi states:

> The human genome, the one whose sequence was published in *Nature* on 15 February 2001, is not a standard; it is merely a composite of the genomes of an unknown number of unknown people. As such, it has no special claim to normality or perfection (nor did the scientists who promoted and executed this great enterprise ever claim as much for it). This arbitrariness does not diminish in the slightest degree the value of this genomic sequence; after all, the genomes of any two people are 99.9 percent identical, so anyone's sequence reveals almost everything about everyone's. (Leroi 2005, 15)

Several factors could contribute to the development of machinic eugenics in the future, but no one is so relevant as the changes in societal attitudes. Nevertheless, in a biopolitical approach, positions, as summed up above, reveal an epistemology of the pattern reinforced by the role of A.I. technologies in defining new modalities of production of the normal, the average, and the standard, which point toward an age of machinic eugenics.

As discussed in the previous sections of this essay, A.I. technologies, particularly computer-vision models, amplify biases present in the data they are trained on, making decisions that reflect that bias, affecting our ways of seeing and perceiving the world. It is unlikely that A.I. will be able to control our gaze in the sense of physically forcing us to look at something. Still, A.I.-based computer-vision techniques can influence what we see and pay attention to, and can shape visuality. If machinic eugenics refers to the use of technology or machines to implement or facilitate eugenic practices or policies, machinic eugenics of the gaze refers to the ways of seeing following the standards established by the A.I.s.

Fictions of beauty play a crucial role in this process, mediating social interplays in popular platforms like Instagram and Tik Tok. It is commonplace to associate their algorithms with marketing profile analysis, but they are not less relevant concerning their users' subjectivities. The exponential growth of beautification apps contributes to idealizing specific standards that are difficult, not to say impossible, for most people to attain. Offered (actually sold) as filters and editing tools that allow users to alter their appearance, they function as pressuring devices to conform to certain beauty ideals, promoted and marketed on the same social media platforms.

Popular apps like Facetune, AirBrush, Perfect365, and YouCam Makeup, have among their primary tools filters to lighten skin tones, reinforce traditional gender roles like long eyelashes for women or a strong jawline for men, and for smoothing out wrinkles. Besides provoking feelings of inadequacy or low self-esteem, especially among young people (Chaderjian 2022; Rowland 2022), those beautification apps embody eugenicist assumptions that deserve some consideration in the scope of this essay. They rely mainly on the association of beauty with perfection and youth based on racial, gender-oriented, and ageist prejudices.

The correlation between racist standardized beauty ideals with youth is remarkable, given the role it played in the Aryan mythology of Nazism. Indeed, that kind of "cosmetic gaze" does not express itself in the politics of racial cleansing of the past and is not a result of, or specific to, social media. However, it stresses a constant repacking of oppressive cultural standards that used to target women (Wegenstein 2012, 151) but today encompasses many other social actors, adding new layers to the discussion of the eugenic imagination of our time.

The assertion about the eclipse of eugenics after the Second World War is recurrent, but it is not valid. Eugenics never ended. The discovery of structure of DNA by Francis Crick, with James Watson, in 1953, for which he received the Nobel Prize, "'emboldened' geneticists with eugenic sympathies. Crick was among the vanguard of

this new interest in eugenics. In 1961, he called for a large-scale eugenics program" (Grue and Heiberg 2006, 243). Crick was far from being a lone voice. As can be seen in the book *Man and His Future* (1963), the chapter "Eugenics and Genetics" brings together several scientists, besides Crick, who argued for the reasonability of trying to improve the human species with eugenics techniques (Wolstenholme and Ciba Foundation 1963, 274–98).

Yet, the vitality of eugenics transcended the scientific debate. In the Nordic countries (Denmark, Finland, Iceland, Norway, and Sweden), eugenic sterilization laws were abolished only in the 1970s. In Sweden, they lasted until 1976, and in Norway until 1977. Applied for four decades, they resulted in more than 170,000 involuntary sterilizations (Nordstrom 2019). In Alberta and British Columbia (Canada), these laws were valid until the 1970s. The focus there was mostly on Indigenous women (Stone 2019). In India, forced sterilization laws were in effect from 1970 to 1977. However, they continued until the first decade of the 2000s, 4.6 million women were victims. In Australia, a country with a long history of eugenics, the separation of children from interracial marriages was systematic until the 1970s. Finally, in the United States, eugenics laws were in force from 1907 to 1970, resulting in 60,000 sterilizations, 20,000 of which were in California, particularly affecting Black women ("The Eugenics Archives" 2015).

From the 1970s onward, there was a shift from genetic studies to other disciplines such as psychology and social sciences, focusing on hereditary motivations for phenomena such as mental illness and criminality, as Tory Duster remarks:

> A review of the *Readers Guide to Periodical Literature* from 1976 to 1982 revealed a 231 percent increase in articles that attempted to explain the genetic basis for crime, mental illness, intelligence, and alcoholism during this brief six-year period. Even more remarkably, between 1983 and 1988, articles that attributed a genetic basis to crime appeared *more than four times* as frequently as they

> had during the previous decade. This development in the popular print media was based in part upon what was occurring in the scientific journals. During this period, a new surge of articles (more than double the previous decade) appeared in the scientific literature, making claims about the genetic basis of several forms of social deviance and mental illness. (Duster 2003, 92)

These studies gained powerful impetus in the 1980s, and Duster (2003, 95–96) highlights the investments made by Ronald Reagan, then governor of California, in research related to the "genetics of criminals." The significant mediatic impact of those assumptions also intensified contrary positions, associating the eugenics past with emerging biotechnologies. In the context of the launch of the genome project, the defense of the improvement of specific traits replaced population improvement associated with racial extermination policies. Philosopher Robert A. Wilson calls those claims "newgenics" (2017, 86), given that, for historians, social scientists, and geneticists who defend its updating, the only problem with eugenics is the ghosts of mass extermination, not the reinforcement of the normal paradigm (Wilson 2017, 415).

The wide dissemination of artificial intelligence technologies has updated the controversial concept of normality in the mythology of the pattern, a prerogative, as discussed throughout this essay, of any process involving machine learning. Such normality is an abstract concept that refers to the sum of generic characteristics of a specific population group. It refers directly to the studies already mentioned here by Quételet and his conceptualization of the average man. This moral and physical construct became the rule (the norm) for eugenicists (Grue and Heiberg 2006, 234).

The biopolitical aspect of this notion of normal/pattern attribute allows consideration of the possibility of machinic eugenics of the gaze. As conceptualized by Foucault, modern biopolitics targeted the control of the workforce in the horizon of the demands of the industrial economy and the birth of modern urbanism. However,

in the contemporary realm of the digital economy, biopolitics is a technology of power and control of the informational territories and its forms of occupation (Virilio 2012). Because of this, the biopolitics of the digital can target molecularly the bodies, going from the emotional sphere, based on individual performance in social networks, to physiological control. It is a kind of biopolitics that mobilizes technologies that penetrate bodies without touching them, a dynamic that Covid-19 made explicit through the proliferation of computer-vision tools, such as thermal cameras, to scan bodies all over the world continually. Nobody questions the need to use those technologies in a global sanitary crisis such as the coronavirus pandemic. Yet the opacity of its possible future uses shows that one of the big questions today is not *if* data is collected but by whom and for what purpose.

Computer-vision automation is far from being fair and neutral. It embeds prejudices of race, gender, and nationality and expresses ideological approaches to history. Because of this, it is an apparatus and not just a tool. Its increasing presence in almost all sectors and activities of our daily lives may transform it into the hegemonic visual apparatus of our time. This shift could be announcing an age of machinic eugenics of the gaze based on artificial intelligence regimes of vision. The hypothesis is plausible, given that Western vision regimes still refer to some rules of frames and windows inherited from the Renaissance. Although several technological experiences since the 2000s point to flexible displays and screenless projection systems, we are still attached to the classical canon of the rectangular format for our screens and reading devices (Friedberg 2009).

It is not a matter of adhering to a linear history of vision and the gaze that would assume the perspective device as the foundation of the hegemonic vision model since the Italian Quattrocento. Instead, this essay assumes that when we talk about vision, we are talking about ways of seeing, which imply their forms of social fabrication. If vision is a biological attribution and visuality a social fact (Foster 1998, ix), the gaze is the interplay of both. Nevertheless,

this interplay considers the politics of aesthetics, "which defines what is visible or not in common space," and who can have or not a share in that space (Rancière 2004, 12–13).

The gaze, in this sense, goes beyond the field of vision. As we rely more on A.I. systems to process and interpret visual information, they may shape our perception and interpretation of the world to the way these systems see and understand it. The potential of artificial intelligence to shape fields of visibility will not imply genocide or racial wars, as the eugenic movements of the first half of the twentieth century did. Following computer-vision models, the machinic eugenics of the gaze may establish new forms of invisibility and social exclusion, thereby determining "the ability or inability to take charge of what is common to the community" and defining "what is visible or not in a common space" (Rancière 2004, 12–13).

The alternatives to improve computer-vision models via data curation and improvement in machine-learning processes may solve punctual problems, but not the pattern-based model of current A.I. systems, and therefore not its dynamics of power and forms of the distribution of the sensible. New questions, and not answers, will come from counterhegemonic frameworks and not models. Those counterhegemonic models refer to feminist and queer studies, Standpoint and postnormal theories approach, and different educational systems, toward a "post–machine learning" culture and practice, as stated by Dan McQuillan (2022, 104–18). However, beyond this, reframing the A.I. standards will be possible only by considering backgrounds beyond the anthropocentric realms.

We may find different histories of algorithmic antagonism in marginal forms of knowledge based on everyday practices, and their strategies for tactical ruptures, (Pereira et al. 2022, 125). As in the famous map by Uruguayan artist Joaquin Torres Garcia (*Inverted America*, 1943), this approach may allow accomplishing the rich repertoire of the informal technologies. Typical from Brazil, Colombia,

Peru, Cuba, among other countries marked by colonialist legacies, those technologies are forged by "architectures of necessity" and address technology from the point of view of dissidence, as artist Ernesto Oroza defines in his theoretical and artistic work.

As suggested by anthropologist Eduardo Viveiros de Castro, we have a lot to learn from the Amerindians' perspectivism (Viveiros de Castro 2017), understanding, first of all, that each culture or society has its own unique perspective on the world, shaped by its history, values, beliefs, and practices. One aspect of "Amerindian perspectivism" refers to the way Indigenous peoples have a different concept of the self and the natural world than do Western societies. This leads to fundamentally different ways of understanding and interacting with the world, viewing animals and other natural phenomena as possessing their agency and consciousness, and not merely as a passive and inanimate collection of objects to be exploited and controlled.

This approach does not mean that modern forms of knowledge are unnecessary. As anthropologist Arturo Escobar argues in his famous article "Pachamamicos versus modérnicos":

> On the one hand, critical modern forms of knowledge have been beneficial, for example, in understanding domination in its materiality and ideological aspects. Nevertheless, pachammamico's knowledge could be more important today to understand what is emerging and what points toward the constitution of "worlds and knowledge" in another way. (Escobar 2011; reverse translation by the author)

This agenda is quite suggestive for thinking in different approaches to artificial intelligence beyond the human–machine opposition and its eugenic prerogatives based on conceptions of the 'standard' and the 'abnormal'. Following the not-regular and not-predictable path, such an alternative agenda points to multiple ways of seeing and worldmaking, taking what falls outside the pattern not as its model but as its point of departure.

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