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Image [modified]: Example of tags overlapping and indicating historical associations – the category “white man” is mixed with “politician”. Portrait of Dom Pedro I, 1902, by Benedito Calixto. Credit: José Rosael/ Hélio Nobre/ USP Paulista Museum. Authors' archive.

Historical continuum and norms in art collections and datasets – Experiments with Artificial Intelligence at Paulista Museum*

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Bruno Moreschi; Amanda Jurno; Giselle Beiguelman**

ABSTRACT

This article presents a set of experiments in the field of History of Art with Artificial Intelligence technologies (computer vision), carried out within the scope of demonumenta, a university outreach and research program that seeks to critically and creatively tension public memory policies. From the understanding that datasets and artistic collections are analogous practices, we questioned how to work in this intersection to subvert the normative assumptions that characterize the arrangement of art collections, databases and the discourses that their tools enunciate. We believe part of this answer lies in the critical activation of public holdings to reshape the way we train machines today. For that, we created a dataset, based on art pieces of the São Paulo Museum of the University of São Paulo (USP) available in its GLAM (Galleries, Libraries, Archives & Museums) in the Wiki projects. The systematization of this dataset was the foundation for carrying out five analytical experiments with Artificial Intelligence algorithms, namely: Numerical Natures, Possible Landscapes, Archeology of Colors, Affirmative Album and Animated Ignorance. Those experiments evidence the colonialist continuum that elaborates the historical narrative based on normative visual patterns and parameters.

KEYWORDS

History of Art. Artificial Intelligence. Machine learning. Computer vision. Museu Paulista.

RESUMO

Este artigo apresenta um conjunto de experimentos no campo da História da Arte com tecnologias de Inteligência Artificial (visão computacional) realizados no âmbito do demonumenta, um projeto de pesquisa e extensão universitária que busca tensionar

crítica e criativamente políticas públicas de memória. A partir do entendimento de que *datasets* (conjuntos de dados organizados) e acervos artísticos são práticas análogas, questionamos como trabalhar nesta intersecção para subverter os pressupostos normativos que caracterizam a organização de coleções de arte, bancos de dados e os discursos que suas ferramentas enunciam. Acreditamos que parte desta resposta está na ativação crítica de acervos públicos para reformular o modo como hoje treinamos as máquinas. Para tanto, elaboramos um dataset, com base nas obras do Museu Paulista da Universidade de São Paulo (USP) disponíveis no seu GLAM (Galleries, Libraries, Archives & Museums) nos projetos Wiki. A sistematização desse dataset foi a base para a realização de cinco experimentos analíticos com algoritmos de Inteligência Artificial. São eles: Naturezas Numéricas, Paisagens Possíveis, Arqueologia das Cores, Álbum Afirmativo e Ignorância Animada. Tais experimentos evidenciam o *continuum* colonialista que elabora a narrativa histórica a partir de parâmetros e padrões visuais normatizantes.

PALAVRAS-CHAVE

História da Arte. Inteligência Artificial. Aprendizado de máquinas. Visão computacional. Museu Paulista.

1. Introduction

At first glance, the fields of History of Art and Artificial Intelligence (AI) are so distinct that it would not be possible to identify any intersections between them. However, we argue and demonstrate that these fields share similar worldviews, that are expressed in their formalizations and ways of organizing information. Both art collections and datasets for machine learning carry categorizations that perpetuate norms built on epistemologies at the core of historical colonialism.

In this article, we highlight the intersections between collections and machine learning datasets (organized databases) from experiences

with works of the Museu Paulista (Universidade de São Paulo, USP)¹, based on the pictorial and iconographic pieces incorporated to the collection during Afonso Taunay's the administration (1917-1945). From this *corpus*, we constituted a dataset that was explored in five analytical experiments (Numeric Natures, Possible Landscapes, Archeology of Colors, Affirmative Album and Animated Ignorance). These experiments are described and analyzed in a historical perspective, assuming that “the normative power of AI in the 21st century has to be scrutinised in these epistemic terms” (Pasquinelli; Joler, 2020).

This theoretical framework is one of the axes of *demonumenta*, a transdisciplinary project of the School of Architecture and Urbanism of the University of São Paulo (FAUUSP) that proposes a debate on the coloniality that is embedded in public institutions and collections², without losing sight of the emergent colonialism of data (Couldry; Mejias, 2019). From this confrontation between History of Art and AI, we not only high-light, but also “unblackbox” (Latour, 1994) their practices. In this article, we also summarize a series of open and collaborative practical experiences that, in addition to stimulating a critical look at computer vision technologies' actions, offer alternatives to the machine learning process and, consequently, to its categorization of the world. Registering these experiences here means, furthermore, to contribute to the construction of non-hegemonic practices in the fields of Art History and digital technologies.

2. The dataset as a collaborative, contextualized and non-opaque practice

AI presumes a process that engineers and programmers call machine learning. In this process, the algorithms of a given system are trained to learn pattern recognition, so they can be able to reproduce those when presented with new input data. For this training territory construction, it is necessary

to organize data in datasets in which the information about images, texts or any other type of digital media is systematized through the selection of specific parts of their discourses. These information are therefore selected and categorized according to the standards and norms that are expected to be reproduced. For images this process is called tagging, and consists of selecting elements through their naming and categorization.

The AI experiments on demonumenta would be impossible to carry out without that procedure. However, unlike the commercial processes of creating and maintaining machine learning datasets, our training experience provided an opportunity to subvert their traditional methods, as from a pedagogical experience. Besides involving students in the process that is usually masked by technology's "magic trick" (Finn, 2017), we were also able to subvert hegemonic logics of categorization, drawing attention to details that interested us in the scope of the demonumenta project. Three layers/practices that characterize the normative process of creating datasets for AI were subverted in this project: the tagging, the practice of decontextualization and the opacity that so characterizes this system.

Although often presented as autonomous, AI relies on the work of many humans inserted in several stages of its acting. On platforms like Amazon Mechanical Turk (MTurk), underemployed humans called turkers perform Human Intelligence Tasks (HITs), small tasks that are used for various purposes, including dataset building. This remote work is marked by a logic of not belonging to what is built and very low remuneration – whereas the minimum wage in the US is 7.25 dollars an hour, these workers receive, on average, no more than 2 dollars an hour.

On Amazon's platform alone – one of several that perform this service – it is estimated that 500,000 people are registered to execute this type of remote work. It is difficult to measure the total number of people due to the various characteristics of the platform (Irani, 2015), but it is known that, at any given time, it is possible to find there between 2,000 and 5,000 turkers able to perform any type of online service (Difallah et al., 2018). According to

a survey carried out by the same authors, most workers declare themselves as US residents (75%), followed by Indians (16%). Therefore, geopolitical issues also mark this type of global work. Up to a few months ago, Indians and Brazilians were unable to receive their payments directly, and were forced to consume their earnings as purchase vouchers on Amazon's own website.

Our first subversion in creating an AI dataset was to rethink precarious ways of these kinds of jobs. Rather than enforcing unfair rules like MTurk's, we created our own network of people to do the tagging process. We gathered around 30 undergraduate students from FAUUSP in a very different context. First, the decisionmaking process about the categorization and the elements that would be systematized in the tagging was collective. The students were able to exchange knowledge and information, questioning and rethinking choices throughout the process. The openness to interchange, alone, is something radical in an industry where workers are named with alphanumeric codes on platforms, with various barriers aimed at preventing them from knowing each other and/or establishing contact with their peers. In addition to that, those workers do not receive information about the purpose of the services performed (e.g. military, scientific, industrial) or, much less, can question or give an opinion in the categories pre-established by the applicants.

Exchanges between the numerous individuals involved in the processes of building exhibition modes of History of Art and art collections are also rare. Museum employees are in charge of preparing the exhibition space and keeping it running, but in an ethereal way. The white cube, a synthesis of the modern art exhibition space that is still striking in contemporary art, systematized by O'Doherty (2002), is not so called only for its characteristic color. Moreover, it is because in this emblematic whiteness are masked the countless workers involved in the conception and assembly of an exhibition that emerges as the exclusive result of the creative work of the artist and, sometimes, of the curator. Therefore, each exhibition only exists due to a

complex network of actors and agencies that permeate the generic idea of an art market, as Fetter (2018) points out. Assemblers, producers, cleaning staff do not stand a chance in the space they help create, the same way as remote AI workers in the datasets they enable.



FIG. 1. Composition of tagged areas in images of Museu Paulista's works that are part of the training dataset collection collectively constructed in the demonumenta project. Here we see representations of indigenous peoples as rebels and violent, and of black people as manual laborers. Authors' archive.

In this way, looking at part of the overlooked by technology and the artistic system, we created a dataset in a collaborative and open way that highlights how this work is not an alienated mechanical process. It is a tying-and-untying the knots, an opening-and-closing networks practice, associating and dissociating oneself in complex agencies, in a practice that confirms Latour's (1994) concepts presented in section 4 of this article. Such a process allows us to question not only the ways of tagging, but also the categorization and standardization *per se*. When we choose to categorize a particular man in an image as white, are we doing so because we see a representation of a white man or because we are used to seeing white men in portrait paintings? Why are most of the indigenous people in the

paintings of this collection portrayed in a combat posture, as subjects to be domesticated? It also does not seem coincidental to us that almost all the black men that were tagged in our dataset are portrayed in a working position, since we are dealing with strong colonial-minded material [Fig. 1].

For the demonumenta dataset, we jointly and critically chose 50 categories to graph the museum's artworks. Amongst them, we defined more broad categories such as "sky", "fauna", "flora", along with other more specific and thought from a decolonial perspective such as "white man", "indigenous man", "black man", "white woman", "indigenous woman", "black woman", "indigenous child", "black child", "white child", "enslaved", "former enslaved", "bandeirante"³, "military", "coffee grower", "farmer", "wealthy residence", "poor residence", etc. This choice of specific categories also helps us to deconstruct some historical impositions by defragmenting categories based on their interrelationships of gender, class and social categories. That choice also led our tagging to often be a process with overlapping layers, revealing historical correlations⁴. For example, the category "white man" is mostly associated with categories such as "bandeirante", "coffee grower", "politician" or "military", while the same is not true for "indigenous man" or "black man" [Fig. 2].

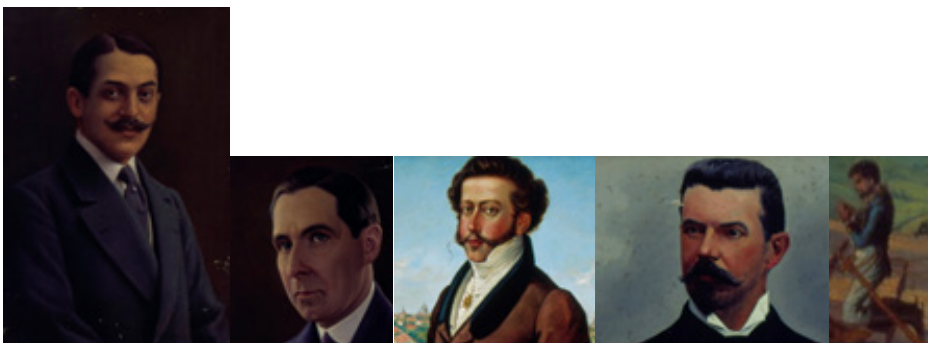


FIG. 2. Composition of some of the selected areas that show part of the representations of white men from the collection: pompous portraits or soldiers in official clothing. Author's archive.



FIG. 3. Example of tags overlapping and indicating historical associations – the category “white man” is mixed with “politician”. *Portrait of Dom Pedro I*, 1902, by Benedito Calixto. Credit: José Rosael/ Hélio Nobre/ USP Paulista Museum. Authors' archive.

Far from being universal, the categories chosen for the construction of the dataset aimed to highlight the items that we were interested in observing from the theoretical scope of the demonumenta project – namely, the creation and replication of patterns related to historical colonialism.

And even though it is composed of only 50 categories, several questions were raised throughout the whole process to better adapt it to the research needs and the imagery samples with which we worked (the Museu Paulista's collection). Such an effort indicates that this is not a dataset along the lines of the AI industry. It was made to be thought and rethought, opening itself up to embody more than just some partial views of the world. It was made consciously about its own limitations – these, inherent to any categorization and standardization process.

Our dataset was also built in order to rethink several practices of decontextualizations that mark machine learning. This way of classifying, displaced from its origins, is a historical strategy of the taxonomy practice of the world itself: choices are highlighted, but rarely who measured them. According to Crawford (2021), this is part of a larger enterprise not exclusive to AI, but powered by it, “in order to make the world more computable” (2021: 148) and, in the same way, to use this same classification practice to “encode power” (*Ibidem*: 128). If, on the one hand, the classification process removes the voice of the classified, summarizing it to an element in an image devoid of complexity and context, on the other hand, classification imposes on the image the political position, the voice, and the ideals of the one who categorized it.

In the AI industry, that categorizer is, historically, a white male programmer from the Global North, specifically located in Silicon Valley, U.S.. According to a report published by Whose Knowledge? (2021), technologies linked to the internet – which largely include AI – are created from a very specific local context and worldview, reproducing biases and powers historically consolidated as being global: “(...) the design, architecture, and governance of the internet’s “global” platforms and tools rarely include women, people of color, and people from the Global South (Africa, Asia and the Pacific Islands, Latin America and the Caribbean) (*Ibidem*: 1).

In the History of Art, this categorizing subject can be represented

by the figure of the artist. The main works considered part of this official history not infrequently include:

Woman is present as an image (...) passive, available, possessable, powerless. Man is absent from the image but it is his speech, his view, his position of dominance which the images signify (Parker e Pollock, 2013).

In other words, the representation of the world we find in the works that constitute the History of Art also arise from a very specific worldview, linked to a subject who is male, white and with a Global North's perspective. When the subject does not belong to the North (to the rich Europe, more specifically), he aspires to a representation close to what is considered superior in official artistic circles, as we can see in some of the works that compound the collection of the Museu Paulista.

Manifest works such as the one by the Guerrilla Girls point out that, in 2017, only 6% of the artists in the São Paulo Museum of Art collection were women, even though they are represented in 60% of the nudes exhibited there. It is also worth mentioning that this universe of male authors and female objects is not only present in museums, but also in History of Art textbooks. According to the survey "A História da _rte" (Moreschi et al., 2017), from the analysis of 5516 images from 11 History of Art books commonly used in art teaching in Brazil, it was observed that 1060 of them contain the representation of women, with almost half (44.3%) being naked or semi-naked⁵. In the same set of images, there are fewer men represented (765), with 18.9% of them being naked or semi-naked – in fact, almost half of these nude men (48.2%) are representations of Jesus. That is, History of Art also reproduces historically consolidated structures, such as the lack of women's voice resulting from a structural chauvinism⁶.

There are plenty of data and surveys to disclose who has a voice (and who has not) in technology and History of Art. And it was from the perspective of trying to highlight the classifying subjects (ourselves) that we made the dataset of our experiences with AI possible. Therefore, based

on the notion of complex networks of actors inserted in the chains of technical mediation (Latour, 1994) and the process of leveling subjects in the classifications proposed by Crawford (2021), we identified an opportunity for action: to be openly collaborative, transparent and contextualized. Unlike traditional datasets, we constantly point out the origin of the choices we have made. We are aware of our own limitations and the worldviews we have brought to this classification. That is why such categories were created to be temporary and revised according to the specific use of the dataset in question.

The “quilombo” category is a good illustration of this non-fixed tagging process. Initially, we created it because it was an element of black resistance against slavery in the Brazilian territory. However, precisely for this reason, we did not find any representation of quilombos in the works of art in the collection of the Museu Paulista. Even without any tagging correspondents, we consider it important that it remained present, signaling a possibility to be contemplated with visual representations in other contexts. And, even if this correspondence is lacking in other data collections, such an absence is not a blank space for our dataset. On the contrary: it is a revealing informational absence, capable of highlighting both the figure of the white artist/categorizer, and what and how he decided to represent/categorize.

In the contextualization process, we also went beyond the systematization of the obtained results – we highlighted the difficulties in this process. Assuming the fallibility of our dataset is to say that it is not finished, that it can always be improved based on the problematics reported by the participating students and that, probably and ideally, it will never be finished. After the two months of effort to tag specific parts of the works of the Museu Paulista, some of the members of this front of the demonumenta project held a meeting to discuss the experience. Reporting the main points discussed there reinforces the idea of an open and contextualized dataset.

At this meeting, graduate student Amanda Vargas pointed out

that, even with the preparatory meetings with specialists, there were difficulties in the process of categorizing the images due to lack of specific knowledge about the art pieces and the contexts in which they were made. That observation leads us to something that seems fundamental in the constitution of less problematic datasets: the need to understand that the data organization process begins long before tagging. And so forth, it seems urgent that we think about ways of qualifying people who do the categorization so that they not only indicate what they see in the images, but put the knowledge acquired before that classification into practice. This also invites us to rethink the fetish term “intelligent machines” for “machines with intelligent humans”, radically shifting the larger process of understanding and knowing not to the tool, but to those who operate and program it. An example of this activation via questioning beyond the expected use of the tool was offered by graduate student Catherine Calognomos, who more than once raised the debate on the relationship between our tagging process and decolonial practices.

Likewise, graduate student Luisa Vasconcellos speculated on the exercise of keeping more than one person involved in tagging the same image. According to her, this could make it possible to cross-classify and identify the analyzes that most differ, avoiding possible gross (and often violent) classification errors, and sensitive areas that may require other categories. Some of the aspects of the joint categorizations thought by her already occurs at MTurk, since the same action is frequently performed by more than one remote worker, helping to scrutinize which answer is in fact the most pertinent one. The difference within Vasconcellos speculation is that workers should be able to exchange impressions during the concomitant cataloging process – which is currently not allowed by the platforms. Furthermore, it is not a matter of finding the most accurate result, like in MTurk, but of pointing out divergences. Vasconcellos also brought up how the remote work during the demonumenta project was not an issue. In fact, according to her and other students, it was a positive point,

as the digital context made it possible to speed up the process of dividing tasks. This seems significant, as it indicates that remote work is not in itself something to be avoided, but rather its possible modes of alienation and precariousness.

Finally, Marco Christini, highlighted that, because the group is composed of students from different areas of programming science, mistakes common to beginners in image tagging processes were made. Also according to him, the lack of understanding quick ways of selecting parts of the images, and the lack of skill with the software that was used, prolonged the working time. But this was not perceived by him as a problem. Mistakes, new attempts and pauses for reflection, made the process not something instantaneous or non-critical, partially avoiding the transposition of biases to the categories that could have occurred in more rushed and less reflective processes.

The tagging and decontextualization practices that were carried out in the construction of demonumenta's dataset offered speculations for new ways of categorizing images and contextualizing their authors, choices and difficulties, in addition to subverting the opacity that marks AI and History of Art deeply. Having a hands-on approach creating our dataset made us go against the black box rhetoric that is often used as a limiting factor for studying AI (Pasquinelli and Joler, 2020). On the contrary, the black box within the scope of demonumenta was our index and incentive for empirical stages, from its unknown and its multiple mediations.

The black box as a space of experiences to precisely unveil it, also put the AI processes in our project in a broader perspective than the search for machine performance. Efficiency was exchanged for experience, in a broad and open sense of the term. In this way, in addition to making machine learning something more ludic, this experimental logic was able to reveal the historical marks and the complex mediations embedded in AI, as we will see in the actions executed, from our collaborative, contextualized and transparent dataset, reported in the next two sections.

3. The taxonomic continuum in AI and bugs as normative indices

AI is far from being “a view from nowhere” (Haraway, 1988). Beyond the marketing of a fully automatic future or the alarmism that we will be victims of our own tools, the important thing to notice is how the practices made possible by AI are part of a larger project. This enterprise is leveraged from a Western scientific positivity from the 18th century and takes on more power from an increasingly “data-centric” notion of rationality (Ricuarte, 2019). In this sense, AI is part of a continuity of colonial modes proposed by Quijano (2019) from the concept of “coloniality of power”, which indicates how the relations and discourses imposed in the colonial period linger beyond colonization, as they are updated from new packaging.

Therefore, from vector spaces and statistical processes, AI frames collective knowledge legitimized as standards. This standardized collective knowledge did not emerge from the machine, but from historical contexts such as that of modern France and the statistical methods put into practice in the institutions of their time (including museums and their collections). Hence, for Pasquinelli and Joler (2020), the great paradigm of AI is not the invention of a new way of classifying the world, but the displacement of the norm: from an institutional norm (the State and its institutions), to a computational norm (which uses previous legitimized data to extract more correlated data, now via large technology companies). In this process, as we will see from our experiments, the institutional becomes computational, but there was no rupture regarding normalization. It remains the main base.

Archeology of Colors⁷, one of the experiments made with our collaborative dataset, indicates this by highlighting how computers do not actually see, but rather transcode visual information into notation systems that refer to the same color palette, for example. In this experiment, we extracted, from a Python code library (Extcolor), the most striking colors in

three categories of the dataset created from the works of the Museu Paulista (skies, fauna and flora). As seen in the produced videos, the representation of nature in the academicism that is dominant in the Museum's collection orbits around a standardized palette based on a set of chromatic choices, which suggests a historical continuity of modes and choices.



FIG. 4. Example of part of the striking colors found in the categories sky, fauna and flora from the Archeology of Colors experiment, in the context of the demonumta project. Authors' archive..

Even more evidently, our Numerical Natures experiment points to more limitations and patterns. For this deed, we started from the idea that the academic painting built and sedimented ways of representing nature from formal rules that constitute patterns of idealization of the landscape, which are reflected in the assemblage of works of art of the Museu Paulista. This portrayal is associated to the action of the museum's director at the time (Taunay) who, under the pretext of the commemorations of the first centenary of the Independence of Brazil (1922), dedicated himself to the assembly of exhibitions that intended to reconstitute the urban past

of São Paulo. As shown by Lima and Carvalho (1993), Taunay not only commissioned these paintings, but also “directed” their contents, ranging from the modeling of the sky, to the elements' distribution in the pictorial space. These actions transcoded the political idealization of a particular type of nature and character of people from São Paulo, consolidating standards and visual rhetoric.



FIG. 5. Clouds and vegetation created via algorithms from an AI trained with skies and flora tagged in the works of the Museu Paulista collection. Part of the Numerical Natures experiment of the demonumenta project. Authors' archive.

The identification and gathering of those patterns in the same dataset, conducted in the demonumenta project, were used in the construction of an algorithmic model that, through machine learning, creates new images replicating the ways of representation of nature in the collection of the Museu Paulista. Those images, presented in videos on the project platform⁸ [Figure 5], demonstrate how the processes of defining and naming things

are also processes of controlling and systematizing their contents in such a profound way that they permeate the works of this specific institution and integrate with an even larger set of visual rhetorics – the ones of historical colonialism. This would not be possible without someone directing these modes of representation, pointing to specific parts of the works and listing what and where each of its elements should be, as Taunay and so many other agents of the art system did.

In this manner, academic paintings and their nature representations, and AI and its datasets, are part of the same historical process guided by the greater logic of taxonomy. Foucault (1999) explains that the practice of taxonomy is not about discovering the names of things, but making the world contain only things with names. In the words of Foucault, taxonomy implies “a certain continuum of things (a non-discontinuity, a plenitude of the being) and a certain potentiality of the imagination, which makes what it is not to appear, but allows, for that very reason, to bring to light the continuum” (*Ibidem*: 100, free translation).

Also making use of Foucault, Crawford (2021) reminds us that this classificatory continuum of taxonomy is not just a movement in itself, but an instrument of power, in which the “definition of categories and ideas of normality” define, once again, an “abnormality”⁹. Classifications are powerful technologies because they are instilled in infrastructure, making them fundamentally invisible, but without losing their power. They disappear within the infrastructure, in the habit of use or because they are taken as naturals: “We can easily forget that the classifications that are casually chosen to shape a technical system can play a dynamic role in shaping the social and material world (Crawford, 2021: 128).

The author argues that the history of classifications shows us how the most harmful forms of categorization (from Apartheid to the pathologization of homosexuality) do not just disappear in the face of scientific research and ethical criticism. According to her, “classificatory schemas enact and support the structures of power that formed them, and

these do not shift without considerable effort" (ibidem: 149). In this process, more important than seeing the choices involved in AI programming, is to understand that we are facing the perpetuation of a classification system that involves social, cultural and political views that reproduce structures of oppression that already exist in society (see also O'Neil 2017; and Noble, 2018).

In the last decade, several studies pointed out how algorithms based on machine learning discriminate people based on phenotypes (Buolamwini and Gebru, 2018) and offer perspectives of the world based on normative standards (Crawford and Paglen, 2019), coming from hegemonic cultures (Mintz *et al.*, 2019). What does not fit into this strict logic is the unexpected, a type of data that is not welcome for traditional AI, as it does not enhance the content already named there.

What is interesting and revealing is that some of the processes in our experiments resulted in outcomes that the machine learning field could classify as something to be fixed, like a bug. For us, they were enlightening because we saw these machine performance problems as part of the language of normative perpetuations discussed here and, since we want to encourage a more historical perspective, an index of the limitations of the language of colonialism itself.

Coordinated by graduating student Guilherme Bretas, curated by Ana Paula Rodrigues Borges and research by Rodrigo Augusto das Neves, in the "Affirmative Album" experiment, we invited the Malungo Collective from FAUUSP and the Preta Lab's team (all black researchers) to record videos documenting their emotional reactions to a specific set of images from the Museu Paulista. Those were 28 very rare photographs of ex-enslaved people that are part of the "Photographia Americana", a collection with more than 12,000 portraits, by photographer Militão Augusto de Azevedo (1837-1905), that currently belongs to the collection of the Museu Paulista at USP¹⁰. Using deepfake techniques¹¹, we gave movement to these static portraits from the faces of black people who presently work in the technology context in

Brazil. To do so, we worked with the First Order Motion Model For Image Animation code to generate deepfakes, in a sort of reverse engineering. Instead of aiming to create a *Trompe-l'oeil* of a past that was not, we sought reverberating a central question: how to use contemporary technology to give voice to the silenced, respecting the silence of its pain and going beyond a simple visual fetish?

With the consolidated results of 28 deepfakes made from these photographic portraits of black people¹², we noticed that some of these faces do not move as well as deepfakes made from videos of white people. We emphasize that in order to affirm that we are not facing an error in the code to be improved via a system calibration, but rather a clear proof of how the logic of representation and registration, historically, did not include black people. AI and limitations like these are not specific programming errors, but one of the results of a historical practice long before computers, and that was fundamental for the construction and maintenance of the bases of specific social, cultural and political visions. This base is the one that produces the “error” of the machine, in intentional quotation marks, since the real error is the lack of representative data on black people in this and so many other historical collections.



FIG. 6. Stills of deepfakes made with photographs of black people, which are part of the Photographia Americana, a collection by photographer Militão Augusto de Azevedo. These are some of the many situations AI could not handle black people's faces very well. Authors' archive.

The Archeology of Colors, Numerical Natures and Affirmative Album experiments place AI within a larger panorama that we are not simply dealing with technological processes, but historical ones. In fact, where does the boundary between technology and history in these processes end and begin? According to Latour (2019), no discipline can be purified as the moderns intended to. Contemporary philosophy contests the dualistic view of the culture/nature pair and proposes “a reflection aligned with the emergence of devices that no longer fit into pure definitions of what is human and what is not” (Beiguelman, 2021, free translation), of what is technological and/or historical. Therefore, our contemporaneity is “mediated by the experience of objects and situations that are a complex dynamic of elements of nature and culture” (*Ibidem*, free translation). And so, such experiences show us how technology and socio-political and cultural contexts are extremely intertwined and cannot be thought of separately.

They also point to active and emancipated possibilities facing the problematic that mark the computational vision. It is a kind of refusal of part of its tools and results, but in a sense far from technophobia, because it involves a generative act (Barabas, 2020), as it provokes actions, reflections and debates. This idea of proactive refusal, fortunately, appears more and more frequently in the digital humanities field. Like in the investigations by Pereira (2021), who discuss the idea of saying "no" to computational vision as a counter-hegemonic practice that, in addition to the simple negative, also includes critical and technological actions to change the system.

4. Frictioning the mediations in AI to highlight actors, spaces and times

In addition to results that seek machine performance, our experiments,

made viable by the dataset of the Museu Paulista, allowed us to shed light on intricate and difficult to comprehend processes that mark AI. All five experiments carried out are characterized by revealing what Latour (1994) considers difficult to measure: the mediating role of techniques. Precisely because such an action "is subject to "blackboxing", a process that makes the joint production of actors and artifacts entirely opaque" (*ibidem*: 36). Still according to the author, via "blackboxed" assemblies in techniques and technologies: "the relative ordering of presence and absence is redistributed – we hourly encounter hundreds, even thousands, of absent makers who are remote in time and space yet simultaneously active" (*ibidem*: p. 40).

Through these "deviations" (*detours*, in Latour's terms), we can count on diverse delegated actions that lead us to act on behalf of others that no longer are present, that we do not have called upon, and whose course of existence we can not even imagine. And so, technical mediations vary in time and space, transport us to the past or into the future, and to different geographic regions. A single algorithm contains a series of thoughts, ideas, choices, people who were part of its construction and continue to act through the actions of the algorithm. By making invisible these chains of actions and actants that compose them, technologies hide the transformations and norms they carry out.

At a first glance, an algorithm appears to be the result of and operated by a single action, when in fact no actor acts alone, nor is it possible to say to whom belongs the action, as it "is a property of associated entities" (Latour, 2001: 209). This perspective adopted by Latour's Actor-Network Theory is inspired by the philosophical perspective of Deleuze and Guattari (1995: 24), for whom "an assemblage is precisely this increase in the dimensions of a multiplicity that necessarily changes in nature as it expands its connections" (free translation). Thus, behind the dynamics that are transfigured in AI, in an apparently unique figure centered on the vague technical concept of "algorithm", we see a complex sociotechnical network that mobilizes (and

conceals) the work of countless humans.

For the *demonumenta* project, one of the main issues was to think about how to promote experiments that could reveal these complex sociotechnical networks, highlighting the various layers of mediations, including the tracks of choices and normativities that help in the standardization of the results obtained via computational vision processes. In other words, we were also concerned with showing that the experiments carried out through algorithmic processes, should not be seen as a single isolated action – but with the complexity of the sociotechnical networks that they mobilize.

In *Numerical Natures* and *Affirmative Album* we were able to indicate part of the "blackboxed" mediations in AI. Via standardized results or distortions in the images, we were able to see the various mediations of actors that are beyond the visible. Both experiments produced images that can be understood as the result of the action of techniques and technologies (AI, but also those that sedimented the choices of Art History) and that synthesize what Latour (1994: 40) calls "congealed labor" of dozens of actants that are part of this complex network of mediations.

Law (1992) explains that when dealing with complex techniques and technologies we can "punctualize" them, we can disregard some actions and agents that constitute their networks packages because such actions can be taken (relatively) for granted. In other words, "punctualized resources offer a way of drawing quickly on the networks of the social without having to deal with endless complexity" (*ibidem*: 385). However, this punctualization can also help to hide the complex processes that make an AI and its algorithms.

The standardized skies and fauna, made by AI, that we produced, therefore, not only carry the work of the machine, but are also an index, a way of "punctualizing" the historical continuum discussed in part 3. Contrarily, but also complementary, the machine bugs regarding black faces

from the Affirmative Album experiment evidence part of the absences of this network. However, treating complex networks of assemblies as a single actor – a single point in another network – does not erase the processes that constitute them. The deeper you look into a technology, the more networks of assemblies you will find.

Aiming at highlighting the detours created by the action of different actors, in different times and spaces, we decided to complexify the information inputs in the machine learning process proposed from the dataset of the Museu Paulista. In the Possible Landscapes experiment, AI also acted in confluence with networks mobilized by another dataset: WikiArt. Available online, WikiArt has about 250,000 cataloged works of art from 3,000 different artists, divided into categories such as surrealism, architecture, sacred painting and landscapes. To this end, we used the virtual machine VQGAN + CLIP created by Katherine Crowson¹³. As a result, we produced sort of a dialogue, a “dance” (as the programmer of the project, Bernardo Fontes, called it) between these two networks of “congealed labor” present in different datasets, but adventing from the same way of visual representations: the History of Art one. By crossing the cataloging parameters of our database with the one from Wikiart, it was possible to generate new works that show what is most generic in the aesthetic formulations of landscapes [Fig. 7].

Furthermore, in order to summon more actors in this process, in some cases we inserted textual descriptions to complexify the work of the AI and show that, like our dataset, this experiment is also based on our choices – evidencing our roles as mediators in this algorithmic process. These descriptions ranged from inserting keywords in Portuguese such as “coffee plantation” and “hills”, to textual descriptions such as “view of a colonial-looking city (Santos), with a public building and a long street in the foreground, and a more distant church”.



FIG. 7. Outcome example from the Possible Landscapes experiment. First, the base image coming from the demonumeta dataset from the Museu Paulista. Then, the result of its confluence with the WikiArt dataset and, sometimes, with inputs in the form of texts inserted by the students participating in the project. Authors' archive.

By calling those various actors into the “dance” between datasets and discourses, our intention was to produce images that allowed breaking up part of the opacity of the blackboxed assemblages in technology. The images produced also have a video that shows the modifications over time¹⁴. And so, the videos and images show us the action of actors that are not visible, but that we can perceive from the transformations that are being made.

In this way, as they are not fixed or isolated processes, technologies such as computational vision are not neutral intermediaries, but actors that agenciate and shape the other actors with whom they come into contact. For example, AI algorithms imbricated in their codes the values and power relations of those who program them and who created the datasets that served as the basis for their learning. When an algorithm learns what to see, how to see it and why to see it, it learns from a particular worldview that, in turn, is loaded with symbolic, political and power dimensions. And therefore, when the algorithm acts, it reproduces that vision and shapes the world around it.

Starting from the understanding that action is a property of associated entities and that responsibility must be shared among the various actors involved, we reinforce a non-anthropocentric, non-dichotomous and symmetrical point of view of the action of humans and non-humans, in which ideals of objectivity and neutrality of technique are incongruous. For Latour (1994), action is synonymous with mediation and transformation. That is, at each assemblage, entities are transformed, and what results from this encounter is never a simple sum between the parts: it is a different third party.

Finally, we also call for mediations from the past to the present in the Animated Ignorance experiment, coordinated by undergraduates Guilherme Françoso and Ana Paula Rodrigues Borges. In this series, *demonumenta* takes the imaginary of the past to read the absurdities of the political present in Brazil and, unlike the other reported actions, is part of a

discourse related to the viralization of networks and memes.

In this experiment, videos made with deepfakes practices animate specific historical figures, represented in the collection of the Museu Paulista, with the speech of some of the everyday absurdities produced by the current president of Brazil, Jair Bolsonaro, his ministers and supporters¹⁵. These materials do not intend to create a continuity between the worldviews expressed by the paintings and Bolsonarism. But they suggest something less direct, but no less revealing: that, perhaps, only memetic languages are capable of handling the updates of conservative thinking that we are experiencing at the verge of the 100th anniversary of the Brazilian Week of Modern Art and the Bicentennial of the Independence of Brazil.

Besides, the exercise of animating paintings from the beginning of the last century with current discourses acted as a trigger for the debate on the persistence of colonialism present in Brazilian politics and its updating procedures. Discourses that hurt ethics and attack constitutional rights appear repeatedly in the recent political scenario of Brazilian society. Sexist, racist, homophobic and genocidal speeches are identified with increasing frequency. The Animated Ignorance uses this universe to reflect on the ideological anachronism of such arguments, through the appropriation of contemporary dialogues and their juxtaposition to figures from the past.

From jocular results, these experiments seem to validate our hypothesis of linking the past and its official images with the present, and the human-machine vision that characterizes computational vision. The connections between contemporary hate speech and portrait paintings of official figures from yesterday only occur because we are dealing with different formalizations of the same set of mediations, including those that relate the idea of representation to the social and historical context.

5. Computational vision speculated as a pedagogical experience

By offering a “whole” computational vision experience, the AI-powered phases of the *demonumenta* project were able to highlight two little-discussed layers in processes related to data and algorithms. The first is to show how it is possible to build datasets from non-commercial logics that do not show themselves to the world as “magic tricks” (Finn, 2017), but as sedimentations of historical speeches that their data carry – in our case, the works and discourses of power present in the collection of the Museu Paulista.

Likewise, the actions resulting from this dataset maintained the idea of transparency. The experiments *Numerical Natures*, *Archeology of Colors*, *Affirmative Album*, *Possible Landscapes* and *Animated Ignorance* have in common the fact that they were thought of as experiences that enable processes of empowerment of students participating in the *demonumenta* project in regard to technological tools. By questioning the hierarchies of teaching and stages of machine learning, we carried out these experiments as proposals of literacy for the opaque field of AI and its multiple mediations that are almost never evident.

By relating AI to the History of Art, we highlighted the historical continuum that marks the broad narrative that historically builds normative parameters and standards and that, today, enables complex mediation networks such as those of algorithms. With experiments interested in revealing layers, actors in different spaces and times, we also proposed something that the field of AI can make use of some achievements and transformations of the art system. Since the *avant-gardes* of the beginning of the 20th century, with more emphasis from the 1960s/1970s with conceptual art, the art system has been increasingly questioned by part of its own actors.

Perhaps AI needs to take advantage of this historical continuum that

associates it with History of Art to also have a greater ability to undress itself, instead of just being a (almost automatic) propagator of problematic and hegemonic visions. This will only be possible from alternative practices that make use of something so valuable for art: the power to speculate on new modes and reality, even if for that it is necessary to question itself.

There are indices in the official history of AI that can contribute to that. Alan Turing, the mathematician who created the operational foundations of AI, spoke about learning machines, and not machine learning (the official term in the field today). The differences between the terms are not details, as they indicate that Turing envisioned not a machine of fixed responses, but a complex process in which the responses alternated from a learning process of a less decisive and more ephemeral type (Turing, 1950). Here we try to demonstrate that experiences with art can help the field of AI in this rescue of less definitive processes, to deal with a complexity that is hardly in the markings imposed by traditional datasets.

References

- BARABAS, C. To Build a Better Future, Designers Need to Start Saying ‘No’, *One Zero*. 13 out. 2020. Available at: <https://onezero.medium.com/refusal-a-beginning-that-starts-with-an-end-2b055bfc14be>. Access on: Nov. 26, 2021.
- BEIGUELMAN, G. *Políticas da imagem: vigilância e resistência na dadosfera*. São Paulo: Ubu Editora, 2021.
- BUOLAMWINI, J.; GEBRU, T. Gender shades: Intersectional accuracy disparities in commercial gender classification. In: *Conference on fairness, accountability and transparency*. PMLR, 2018. p. 77-91. Available at: <https://proceedings.mlr.press/v81/buolamwini18a.html>. Access on: Nov. 26, 2021.
- COULDRY, N.; MEJIAS, U. A. *The Costs of Connection: How Data Is Colonizing Human Life and Appropriating It for Capitalism*. Stanford: Stanford University, 2019.
- CRAWFORD, K.; PAGLEN, T. *Excavating AI*. Available at: <<https://www.excavating.ai>>. Access on: Sep. 23, 2020.
- CRAWFORD, K. *Atlas of Ai: power, politics, and the planetary costs of artificial intelligence*. New Haven: Yale University Press, 2021.

- DELEUZE, G.; GUATTARI, F. *Mil platôs: capitalismo e esquizofrenia*. São Paulo: Editora 34, 2000.
- DIFALLAH, D.; FILATOVA, E.; IPEIROTIS, P. Demographics and Dynamics of Mechanical Turk Workers. *Proceedings of the Eleventh ACM International Conference on Web Search and Data Mining - WSDM '18*.
- INTERNATIONAL CONFERENCE. Marina Del Rey, CA, USA: ACM Press, 2018. Available at: <<http://dl.acm.org/citation.cfm?doid=3159652.3159661>>. Access on: Sep. 24, 2020.
- FETTER, B. W. Das reconfigurações contemporâneas do(s) sistema(s) da arte. *MODOS: Revista de História da Arte*, v. 2, n. 3, p. 102-119, 11 set. 2018.
- FINN, E. *What algorithms want: imagination in the age of computing*. Cambridge, MA: MIT Press, 2017.
- FOUCAULT, M. *As palavras e as coisas*. São Paulo: Martins Fontes, 8ª edição. 1999.
- HARAWAY, D. Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective. *Feminist Studies*, v. 14, n. 3, p. 575, 1988.
- IRANI, L. The cultural work of microwork. *New Media & Society*, v. 17, n. 5, p. 720-739, maio 2015.
- KOUTSOUKOS, S. S. M. *Negros no estúdio do fotógrafo: Brasil, segunda metade do século XIX*. Campinas, SP, Brasil: Editora Unicamp, 2010.
- LATOURE, B. *A esperança de Pandora: ensaios sobre a realidade dos estudos científicos*. Editora da Universidade do Sagrado Coração, 2001.
- LATOURE, B. *Jamais fomos modernos*. Editora 34, 4ª edição, 2019.
- _____. On technical mediation. *Common knowledge*, v. 3, n. 2, 1994.
- LAW, J. Notes on the theory of the actor-network: Ordering, strategy, and heterogeneity. *Systems practice*, v. 5, n. 4, p. 379-393, 1992.
- LIMA, S. F. DE; CARVALHO, V. C. DE. São Paulo Antigo, uma encomenda da modernidade: as fotografias de Militão nas pinturas do Museu Paulista. *Anais do Museu Paulista: História e Cultura Material*, v. 1, n. 1, p. 147-178, 1993.
- LOBATO, P. *Modos de ler, Modos de Desaprender – Os Livros e o Ensino de Arquitetura no Brasil*. Dissertação de Mestrado, Escola de Arquitetura, UFMG. Belo Horizonte, 227 p., publicação prevista para 2021.
- MINTZ, A. et al. Interrogating Vision APIs. *Relatório do Smart Data Sprint*. disponível em <https://smart.inovamedialab.org/smart-2019/project-reports/interrogating-vision-apis>, 2019.
- MORESCHI, B. et al. *The History of _rt*, 2017. Available at: <https://brunomoreschi.com/Historyof_rt>.
- NOBLE, S. U. *Algorithms of oppression: how search engines reinforce racism*. New York: New York University Press, 2018.
- O'DOHERTY, B. *No interior do cubo branco: a ideologia do espaço da arte*. São Paulo:

Martins Fontes, 2002.

O'NEIL, C. *Weapons of math destruction: how big data increases inequality and threatens democracy*. First edition ed. New York: Crown, 2016.

PARKER, R.; POLLOCK, G. *Old mistresses: women, art and ideology*. New edition ed. London: I.B. Tauris, 2013.

PASQUINELLI, M.; JOLER, V. *The Nooscape Manifested: AI as Instrument of Knowledge Extractivism*. Disponível em: <<http://nooscape.ai/>>. Acesso em: 20 set. 2020.

PEREIRA, G. Towards Refusing as a Critical Technical Practice: Struggling With Hegemonic Computer Vision. *A Peer-Reviewed Journal About*, v. 10, n. 1, p. 30-43, 13 ago. 2021.

QUIJANO, A. *Ensayos en torno a la colonialidad del poder*. 1a ed ed. Buenos Aires, Argentina: Ediciones del Signo, 2019.

RICOURTE, P. Data Epistemologies, The Coloniality of Power, and Resistance. *Television & New Media*, v. 20, n. 4, p. 350-365, maio 2019.

TURING, A. M. I.—Computing Machinery and Intelligence. *Mind*, v. LIX, n. 236, p. 433-460, 1 out. 1950.

WHOSE KNOWLEDGE. Re-imagining and re-designing the internet to be for and by us all. *Report*. 01 jan. 2021. Available at: <https://whoseknowledge.org/wp-content/uploads/2021/04/WK-Prospectus-2021.pdf>. Access on: Nov. 26, 2021.

Notas

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- 1 Even with the Museu Paulista closed for renovations since August 2013 – with a reopening scheduled for 2022 – its policy of gradually making images and metadata of the works of its collection available in Wikimedia projects, under free license, allowed us to act in the official discourses of the institution. More at: https://pt.wikipedia.org/wiki/Wikip%C3%A9dia:GLAM/Museu_Paulista.
- 2 More at: <http://demonumenta.fau.usp.br/sobre>.
- 3 Descendants of Portuguese who, from the beginning of the 16th century, penetrated into the interior of South America in search of gold and silver, engaging in genocides of indigenous communities. References to the bandeirantes are not just in the paintings at the Paulista Museum. In Brazil, they also usually name parks, schools, streets and highways.
- 4 In the IAPiranga section of the demonumenta online platform, we detail the categories and methodology used in the construction of the dataset, including a video that shows some of the works and their respective tagging. More at: <http://demonumenta.fau.usp.br/iapiranga>.
- 5 More at: https://brunomoreschi.com/Historyof_rt.
- 6 Many projects focus on revealing exclusions and absences in official fields of knowledge. In the architecture field, for example, we indicate the dissertation written by Lobato (2021), that investigates books and the teaching of architecture in Brazil, and presents alarming data about the materials we are using to teach this field.
- 7 More at: <http://demonumenta.fau.usp.br/iapiranga/arqueologia>.
- 8 More at: <http://demonumenta.fau.usp.br/iapiranga/naturezas>.
- 9 See also how Michel Foucault develops the idea of categorization as an instrument of power in his works *The History of Sexuality* and *History of Madness*.
- 10 Regarding the presence of black people in photographs from this period, we indicate the study by Koutsoukos (2010), which investigates the photographic studios in Brazil in the 19th century and the record of black people.
- 11 Deepfake is a technique that synthesizes images and/or sounds from AI processes. It is commonly used to create fake videos, especially of celebrities, as there is a lot of data available about them, which facilitates the process of this synthesis.
- 12 More at: <http://demonumenta.fau.usp.br/iapiranga/album>.
- 13 More at: <https://colab.research.google.com/drive/1go6YwMF5MX6XM9tv-cnQiSTU5oN9EeT#scrollTo=CpplQlPhhwhs>.
- 14 More at: <http://demonumenta.fau.usp.br/iapiranga/paisagens>.
- 15 More at: <http://demonumenta.fau.usp.br/iapiranga/ignorancia>.

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