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Decolonial AI: A perspective on the imperialist states' colonizing quest for labor applied in the development of artificial intelligence

IA decolonial: uma perspectiva sobre a busca colonizadora de mão de obra aplicada no desenvolvimento da inteligência artificial por estados imperialistas

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RESUMO: O processo de exploração de outros países em continentes distantes começou na era colonial, e o imperialismo ainda persiste hoje em diferentes formas. O desenvolvimento da tecnologia relacionada à inteligência artificial também sofre esses impactos, onde existe uma forma colonial de seleção de corpos e mentes que precisa mudar. O objetivo deste trabalho é tirar a venda de um processo ultranormalizado de superexploração de mão de obra em inteligência artificial no Brasil por empresas norte-americanas, criando um perfil mais cobiçado, para embarcar em um processo de descolonização da IA.
PALAVRAS-CHAVE: Decolonial, colonialismo e imperialismo; trabalhadores imigrantes; inteligência artificial; chatGPT.

ABSTRACT: The process of exploring other countries in distant continents began in the colonial era, and imperialism still persists today in different forms. The development of technology related to artificial intelligence also undergoes these impacts, where there is a colonial form of selecting bodies and minds that needs to change. The objective of this work is to remove the blindfold on an ultra-normalized process of super-exploitation of labor in artificial intelligence in Brazil by U.S. companies, creating a more sought-after profile, to embark on a process of decolonizing AI.
KEYWORDS: Decolonial, colonialism and imperialism; immigrant workers; artificial intelligence; chatGPT.
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INTRODUCTION

The process of exploitation of other countries presents in distant continents began in the colonial era and is still perpetuated today, taking different, and more subtle forms. Imperialist ventures arose when the internal market of great empires became too small for their own nations, forcing them to seek resources to exploit in other condescending regions, mainly on the African continent by England and other European nations, in which the slavery trade dominated the economy.

Already in contemporary times, the United States adhered to such strategies of domination, when in 1898, at the end of the Spanish-American War, between the United States and Spain, through the Treaty of Paris, Spain recognized the independence of Cuba and ceded Puerto Rico, Guam, and the Philippines to the United States, as discussed by Lynn Doty (1996). Through this, the United States achieved the status of a global power, most notably with the annexation of the Philippines. In this sense, Hobson (2005) states that U.S. imperialism was a natural product of the economic pressure of capitalism, where the domestic market was limited and needed international markets for goods and investments.

Imperialism has in its structure a great adaptability, favoring the permanence impregnated in the capitalist structure, so if there is capitalism there is imperialism, present in the asymmetrical relations of power between nations. Hobson (2005) adds that imperialism has been a bad business for the exploited nation, but within it has been a good business for certain classes that benefit from international trade.

According to the work of Luiz Carlos Bresser-Pereira (1977, 2014, 2019), contemporary imperialism consists of four key elements: 1) informal imperialism; 2) appropriation of economic surplus; 3) prevention of peripheral countries becoming technologically sophisticated; 4) economic liberalism ideology. A fifth is suggested by this work where imperialism does 5) appropriation of existing technical knowledge from the periphery.

During the 20th century, the imperialism practice got more sophisticated, culminating with informal imperialism or ideological hegemony after the Second World War. According to Bresser-Pereira (2014), imperialism is evaluated from explicit to implicit, letting go the colonial mercantilism and adapting to a new era. This new era was known as, the Cold War, according to Cano (1996) by polarizing the world, forcing Imperialism also to practice "aid" and reconstruction policies, however, the attempt at a new world order (Bretton Woods) was insufficient and precarious, not considering the international financial equation.

Whereas the world was organized in this new order, imperialism refreshed the way to operate in the '70s with the economic imbalances in developed countries what became known as the "external debt crisis". Now the state has the power to control what is produced for whom, according to Bresser-Pereira (1977) the state is now primarily responsible not only for the appropriation of the surplus by the ruling classes and the state's apparatus but also for the accumulation of part of this surplus. The imperialist countries, like the United States, understood and stimulated this movement, exploiting (appropriating the economic surplus) of the under-

developed world exporting capital and maintaining unequal exchange. For Cano (1996) given that the supremacy of financial surplus accumulation cannot avoid, for long, the inevitable crisis brought about by the weakness of real accumulation, culminating in the speed required to seek channels that could convert those surpluses into productive investments demanded. Resulting in the U.S. campaign exploring these underdeveloped countries.

The technology had an important role in this process. Bresser-Pereira (2019) concludes that Brazil is an industrialized underdeveloped country marked by contradictions and instability with a strong industrialized economy, but technologically dependent, is making great strides so that its most modern and developed sectors form a part of the world capitalist center. This technology dependency is created directly by contemporary imperialism, which seeks to prevent countries from the periphery becoming technologically sophisticated to maintain this double form of appropriation of economic surplus and prevent them from becoming competitors in the future. It is all about trade. Bresser-Pereira (2019) states that Brazil needed to transition to a model of mature industrialized underdevelopment to avoid an economic crisis, but this means will depend upon Brazil's capacity to export goods that are technologically sophisticated yet labor-intensive, to compete directly with the central countries.

This never happened. Imperialism used the instrument of economic liberalism to extract the resources needed. According to Bresser-Pereira (2019), economic liberalism in Europe, for example, was a commercial and industrial businessmen ideology, but in Brazil liberalism was a rurally based aristocracy ideology, which supported the open trade for international products imports. For the author economic liberalism thus becomes an arm of those economic groups that are more efficient in the short run and can compete in the domestic as well as the foreign market. And there is no one to protect the market from this international threat. Especially, in the United States the economic liberalism ideology permeated even more passing through the business elite, political parties, financial institutions, think tanks, academic economists, and media.

This ideology produced by the United States generated another form of contemporary appropriation carried out by imperialism, not of the economic surplus that is being produced, but of the technical knowledge existing in the population on the periphery of capitalism that emigrates or is hired online. This form of exploitation is also present in labor relations today, the advancement of technology has allowed the adoption of remote work accelerated by the Covid-19 pandemic. As a result, U.S. companies have advanced the search for technological labor in Latin America and consequently in Brazil. These hires have a direct relationship with the super-exploitation of labor, as part of the Marxist theory, proposed by Ruy Mauro Marini (2017), where workers in the technology area in Latin America, when they accept job proposals from companies in the United States, the surplus value generated by them is appropriated by the U.S. employers in the form of profit.

This relationship becomes even more complex when the development of technology related to artificial intelligence is addressed, where there is a colonial way

of choosing bodies and minds that needs to change, as addressed by Fanon (2022) in his work *The Wretched of the Earth*, we will see that for the engaged man, it is urgent to decide the means, the tactics, that is, the conduct and organization, apart from that, there is nothing but voluntarism blind to the terribly reactionary risks it entails. You may be wondering why this article is titled "Decolonial AI?", and the answer is simple and linked with the AI decolonial Manyfesto proposed by Moon *et al.* (2021), AI Decolonial or Decolonial AI term, serves as a provocation and invitation to envision a decolonial future for AI technologies, challenging the Western-dominated language and assumptions that frame AI discourse.

This is my contribution and engagement on the topic. Therefore, the objective of this work is to remove the blindfold on an ultra-normalized process of overexploitation of labor in artificial intelligence in Brazil by American companies, creating a more sought-after profile, to find ourselves in a process of AI decolonization.

IMPERIALISM AND DECOLONIAL AI

Imperialism has been an influential factor in the development of artificial intelligence (AI), shaping its narratives, applications, and global implications. However, the emergence of decolonial AI seeks to question and subvert this dynamic by challenging Western hegemony. Therefore, in this section, the relationships among these elements will be deepened.

A Historical Context

According to Boron (2020) there were three waves in the world in the imperialist movement, the first was dated shortly after the Industrial Revolution with European nations seeking to expand their territories and means of production divided Africa during the Berlin Conference 1884-1885, impacting the entire continent. The first expansion did not end until the end of World War I, culminating in the fall of the Tsarist, German, Austro-Hungarian, partially Ottoman and Ottoman empires. The Industrial Revolution brought the first signs of the impact of technology on industrial production, with the implementation of steam engines there was the scale of production, but there was an increase in the demand for labor to work on these lines, evidencing the relationship between the bourgeoisie and the proletariat.

The second wave, still according to Boron (2020, p. 97), presented itself at the end of World War II, with the formidable performance of capitalism, incited by the United States, in the reconstruction of world peace, accelerating globalization, but from the 1960s onwards the United States perceived the rise of other imperialist nations, such as Japan, South Korea and intensified competition with already established France. In this historical context, Bourdieu (2003) comments on the competitive relations between two imperialist states, in this case, France as an empire in decline and the United States as an empire in rise, in this competition the United

States began the process of disseminating its cultural universality, taking away from France this *status*.

This is the driving force of imperialism because once the culture of a country becomes universal, all other exploited countries already have elements in their culture that make them admire such exploitation by the imperialist, as Fanon (2022) states that the colonized is envious and the settler knows this, because when he is surprised by the invasive gaze, He notes bitterly, albeit in a state of alert: "They want to take our place". In this same period, the United States began to expand American culture to Latin American countries through the popularization of *rock as* a musical style, the films of the golden age of Hollywood, the *hippie* movements, and of course fashion. Imperialism is present even today, when the pride month of the lesbian, gay, bisexual, transsexual, queer, intersex, asexual and other sexual and gender orientations (LGBTQIA+) community is celebrated in June by addressing the transgressive movement of the search for rights to be and exist of this community that revolted against the police in a gay bar called the Stonewall on the night of June 28, 1968, followed by protests for days on end, originating in the following years the first LGBTQIA+ pride parades. How can an LGBTQIA+ person who knows the history of the movement not be proud of these American individuals? How can we not proudly tell the story about this important day for others? And, of course, always with a backdrop reflecting the United States. This, in a way, is imperialism acting through cultural universality. To sum up: even when imperialism gets it wrong, it gets it right.

The third movement of expansion of imperialism identified by Boron (2020) began in the 1990s with the fall of the Soviet Union and the rise of China, in a globalized market with economic and financial freedom, also the notable arms race. In this decade, there was the scale and cheapening of computers, favoring the development of automation and robotics, where people were replaced by machines with much more automated systems. There was the development of home computers that, from a military technology that gave rise to the internet, dominated software applications in the world. Current *software*, such as Zoom, Canvas, Microsoft Word, Netflix, Amazon Prime, among others, has a business model called *Software as a Service* (SaaS), that is, CDs and licenses are replaced by monthly fees. Thus, with only a monthly fee, you can use the *software* as a service over the internet. Technology is an artifact of the imperialist mechanism, as scaling and dominating the international market is the main strategy of *startups* and tech giants that were once *startups*.

Imperialism and technology

Large empires protect and regulate national technology so that no other nation benefits without the prior approval of the *hegemon*, especially competing nations that are not part of the group of allies. This has been happening in the United States with the actions taken in 2017 by then-President Donald Trump, who created sanctions against China in the case involving the social network TikTok. The U.S. gov-

ernment claimed that the developing country held the personal information of the American people and could use it as a political weapon, then forced the management of the U.S. subsidiary to be transferred to a national company and the databases to be based in the country, without China having access to them. Another case that happened in the same period was the involvement of the U.S. government forcing the sale of another social network owned by the Chinese, in which it was founded in Los Angeles and acquired by Chinese corporations. This social network is the LGBTQIA+ dating app called Grindr. In this case, the deal was closed at $ 608 million, returning control to a U.S. company. In this case, the government claimed national security concerns, as there was a fear that content posted by politicians and conversation histories would be used as a weapon of war, as presented by Ferek (2020) in a publication in the Wall Street Journal.

The conflicts between China and the United States ignited a new era of imperialism, in which the imperialist government feels threatened by a competitive force, becoming aggressive, especially in a digital and technological world. The author Boron (2020) exposes how the United States is dealing with threats and implementing its national security strategy. Thus, in 2017, The White House (2017), or the White House, presented a new version of its national security strategy based mainly on how to protect its technologies, these being the new contemporary challenges.

Currently, the market presents a free trade in services related to the liberalization of *software*. But the United States is taking even tougher actions to protect its technologies against buying from non-allied countries on the international stage, taking for example Artificial Intelligence (AI) as a component of national security. In February 2022, the National Science and Technology Council (NSTC) released an updated list of critical and emerging technologies (CETs), which includes Artificial Intelligence as a subfield. The NSTC is the main means by which the Executive Branch coordinates science and technology policy in the various entities that make up the federal research and development agency (NSTC, 2022).

This release highlights the potential beginning of export control of this technology, regulated by the Bureau of Industry and Security (BIS), as well as the application of commercial cryptography through law enforcement. The use of encryption – the process of transforming information to disguise its meaning – has interfered with this ability, giving individuals and organizations the means to protect the confidentiality of their data, but history shows that government efforts to subvert encryption would negatively impact individuals and businesses (Castro, 2020). That is, the government in the U.S. is looking for ways to control access to its technologies by other competing countries. In addition to controlling the export of solutions that contain AI, it also seeks to require corporations to follow a standardized way of encrypting their computer codes so that control entities can access the information and data of what is being exported. The United States fears that it will not keep up with the evolution of technology with the necessary speed and increasingly complex encryption systems, thus losing control over transactions.

The challenges faced in the search for the implementation of such control are

evident, but this movement is taking shape. The difficulty in finding an appropriate balance between national security and export competitiveness has made the topic of export controls controversial for decades (Fergusson; Kerr, 2020). In this sense, policymakers are often unsure of how to balance economic freedom with protecting U.S. national security from Chinese influence (FEULNER, 2019). But the central point in these actions is that in a world supposedly based on democracy and a *laissez-faire economic strategy,* it does not seem to be as liberal as it is defined: there is freedom as long as it does not affect data and technology because then it easily becomes a case of national security.

While we see big imperialist countries protecting their technologies, we see the over-exploited countries providing full access to their most precious commodity in the 21st century, which is technology. There is no discussion of how to predict that technology made in the global south will not be usurped to the north. In the case of Brazil, for example, there has been no change in the economy to become a technology-producing country. The Brazilian government still perceives its country as a major servant of commodities based on natural resources, such as agriculture. It is in this scenario that imperialist governments and corporations' benefit.

Mind Mining, a New Way of Exploiting Commodities

In the past, for an imperialist state to explore other territories it was necessary to mount its frigate and sail to distant lands. Today, however, with just a few emails, a strategy of domination can already be created, showing the invisible power of digital imperialism. The large multinational corporations play an important role because although they do not follow a recommendation from the United States as a nation, they exert imperialist forces by exploiting skilled labor in technology in the global south.

Kwet (2019) argues that U.S. multinationals exert imperial control at an architectural level within the digital ecosystem, concentrating *software, hardware,* and internet connections, fostering different forms of domination. In 2022, the well-known tech billionaire, Elon Musk, visited Brazil to launch his internet broadband product called Starlink. According to Nicoceli (2022), Starlink is a project born within SpaceX, famous for developing rockets that make space travel possible, placing different satellites in Earth orbit and it plans to provide internet to remote areas of the globe through its network of more than 4 thousand satellites circulating in low orbit 483 kilometers from Earth.

During the visit, he was received with honors by the President of Brazil and the Minister of Science and Technology in a large entourage, all praising such technology and the entrepreneur, completely ignoring the fact that they were allowing the entry into the country of a foreign technology. Not to mention the high costs associated with it, which will be mainly applied in the digitalization of Brazilian agribusiness, which suffers from the lack of internet connection in the countryside. Today, agribusiness is one of Brazil's main export agendas, and important data from this sector will potentially be transferred through an American technology, they will

then have access to the main data of Brazilian production. At the time of the visit, did anyone from the government think about this? Or even invested in the development of its own technology that would solve a challenge in the main export agenda? These are difficult questions to answer, but it is in this scenario that the imperialist multinationals act, evolve their actions of domination through *glamour* and a lot of red carpets.

Once the digital ecosystem is controlled by these Big Techs, they, according to Kwet (2019), exert control over immersive experiences through computers, acquiring direct power over people – be it political, economic, and cultural power in all domains of individuals' lives. But this form of domination can also be used in a shady way for exploitation, looking in the global south for cheap labor, as is the case with the hiring of people in Venezuela paying only a few cents to perform functions within the AI market, such as the *data-labeling*, as stated by Hao and Hernández (2022) in an article for MIT Technology Review. Many AI applications use *computer vision*, or computer vision, which is nothing more than the use of images from cameras as a basis for algorithmic decision-making – for example, self-driving cars have a series of cameras that indicate if the car is centered on the track, if there are other cars around it, or there are people and a series of other objects.

The function of *data-labeling* is to teach the algorithm code that a certain image is a certain object, transferring people's knowledge to the machine. Thus, it is necessary to teach the difference between a person and an animal, because when the car is driving and an accident occurs, in which the system must choose between running over a person or a dog, it must choose the dog. It is a manual work in which people must open image banks to define what each thing is, so later the knowledge is transmitted to the algorithm. Hao and Hernández (2022) present some examples of companies that exploit labor in Venezuela in the *data-labeling* sector, such as Appen, Glassdoor, and Instacart, that is, if you have a cell phone that uses facial recognition to unlock it, there are high chances that people from the global south have performed the *data-labeling* work, to differentiate your face from an animal's face.

The constant search for profit maximization, or even for the scarcity of labor, legitimizes Big Techs to seek labor in technology in the global south, but when it comes to these American corporations, the main destination is Latin America and consequently Brazil. Well, the labor force is in countries with a very close time zone and that have already gone through the implementation of the cultural universality of the USA, in addition to the friendly relations on taxation among the countries. This new era of domination and exploitation is based on the newly emerged commodities, the developing minds of technology and AI. Being the process of raising them is close to mining, but a digital mining, where through social networks the workforce is contacted, scope is closed, hires and adjusts the means of payment as Paypal and that's it. In a matter of days, Mind Mining has already been finalized, not caring about the creation of labor shortages in the exploited country.

Decolonial AI

To begin this section, we need to review the main concepts related to decoloniality. According to Quijano (1992), the colonial power structure generated social discriminations codified as "racial", ethnic or national, that is, these intersubjective constructions, the result of European colonial domination, perpetuate inequalities in global power and in the distribution of resources among colonized populations.

Still for the author, coloniality is the predominant form of domination in the world today, even after the end of colonialism as an explicit political order, although it does not encompass all forms of exploitation and domination, it has been the main context for about 500 years.

The liberation of Latin American peoples from coloniality must be based on the knowledge generated from social movements. This liberation must encompass all areas of knowledge as well as all cultural areas. For Quijano (1992), the liberation of intercultural relations from the prison of coloniality brings the freedom of choice among different cultural orientations, it is part of the process of social liberation from organized power such as inequality, discrimination, exploitation and domination.

Mignolo (2008), on the other hand, argues that coloniality, seen as an oppressive logic, generates an energy of discontent, distrust and detachment among those who react to imperial violence, and this energy translates into decolonial projects. The process of breaking this colonial matrix of power, which we can call decoloniality, must also be present in the structures of domination that guide technology and, above all, must be present with regard to artificial intelligence. Decolonial AI is an up-and-coming area that seeks to address the historical and persistent impacts of colonialism in the field of artificial intelligence.

The forces of colonialism can be evidenced in the lives of people in the global south, this way of acting can be present as algorithmic colonialism, thus defined by Downey (2021) as the ambition to "fix" the other as an objectified, calculable and later marketable entity is the link with colonial discourse in the 18th and 19th centuries and algorithmically quantifiable through surveillance technologies today.

Based on the concerns generated by the use of AI through the lens of colonialism, a group of twenty-four scientists in the field signed a manifesto called "Decolonial AI", which Moon *et al.* (2021) assert that the team behind the Manifesto has coalesced around a shared desire to move beyond Western-centric biases by globally pushing technology forward as we move into the algorithmic era. The authors also complete the objective of the study.

> But this draft is just the beginning – the group's goal is to provide this text as a basis for workshops, articles, and policies, all designed to manifest awareness that for technology to be "fair," "trustworthy," or "responsible," it cannot encompass only the biases and interests of a region or people. Epistemic asymmetries around AI translate into social and economic asymmetries.

Based on this epistemic perspective, the authors Moon *et al.* (2021) identified some aspects that should be considered in the AI decoloniality process, as listed below. The language that has emerged is white men's English, that is, all the models and the way of building the technology is based on English. It needs to be decolonialized because it should be for everyone, indigenous peoples and black people live under the pressure of colonialism these days. There is a need to implement a strategic decolonial governance framework for AI. And finally, the classic contradiction regarding the use of ethical and responsible AI, which appears a lot on the websites of big tech companies, but very superficially.

The ethical use of AI is shrouded in a series of abysses that make it difficult to control, in addition, because it is a new technological exponent, regulatory entities do not have the necessary knowledge to propose regulations. UNESCO (2023) released an article on the biases related to AI and its ethical challenges, such as:

> Lack of transparency of AI tools: AI decisions are not always understandable to humans. AI is not neutral: AI-based decisions are susceptible to inaccuracies, discriminatory outcomes, and built-in or embedded bias. Surveillance practices for data collection and privacy of users of the judicial system.

In a search carried out on the website of Open AI, the company that created Chat GPT, there is no area dedicated to the governance of ethical AI treated by the company, this shows how companies are dealing with the topic and not caring about the impact of their technology. Recently, Microsoft invested a few billion dollars in Open AI, and at the same time that the partnership between them gains scale, the initiatives related to the ethical use of AI at Microsoft are modified. In March 2023, Microsoft laid off an entire team of employees and closed a department called *Ethics and Society* that led the fronts on Ethical AI, as reported by Bellan (2023) in Tech Crunch:

> Microsoft still maintains its Office of Responsible AI (ORA), which sets rules for responsible AI through governance and public policy work. But employees told Platformer that the ethics and society team was responsible for ensuring that Microsoft's responsible AI principles were actually reflected in the design of the products shipped. The team recently worked to identify the risks posed by Microsoft's integration of OpenAI technology into its suite of products.

A hotline can be created from this, because if companies deal with the users of their solutions in such a way, we can imagine how they manage an international workforce, which does not have the legal framework and power to face them.

In his research, Saux (2019) shows that employers in the United States are more likely to seek foreign workers when domestic hiring takes longer, that is, there is already a definition that hiring workers internationally is simpler, especially in a market with a shortage of labor such as the AI market.

METHODOLOGY

Large language models (LLMs) are already part of many AI strategies but have gained prominence in recent months due to the popular advent of the pre-trained ChatGPT LLM. ChatGPT is a specific implementation of a large language model (LLM) called GPT (*Generative Pre-trained Transformer*), developed by OpenAI.

According to OpenAI (2023), OpenAI's GPT models have been trained to understand natural language and code, as well as provide text outputs in response to their inputs, in which the inputs to the GPTs are also referred to as "*prompts*" or requests. In addition, the company adds that to design a *prompt* is essentially how you "program" a GPT model, usually providing instructions or some examples of how to successfully complete a task.

In order to identify the colonial movements of hiring AI workers in Brazil by American companies, AI tools are used, including ChatGPT, to extract and analyze job descriptions posted on LinkedIn Vagas. There are three stages in the development of this work, the first is data collection, pre-processing of the data, and ending the analysis of the text.

Data collection

In the Data Collection stage, we used the filter on LinkedIn Vacancies, of job offers for positions containing the following words Data Analytics, Data Science and Machine Learning. The filter also selected only remote vacancies, in the English language, from companies in the United States. To extract the information and create a database, the *web scraping* technique was used. *Web scraping,* also known as web scraping or harvesting, is a technique for extracting data from the *World Wide Web (WWW)* and saving it to a file system or database for later retrieval or analysis (Zhao, 2107).

The tool chosen for *scraping* was a Chrome browser extension called Web Scraper. The tool works from the creation of *sitemaps*, that is, a sequence of actions is programmed that the robot will later execute and extract the information in predefined spaces. All of these actions are saved in just one *sitemap* presented in Table 1 below.

Table 1: Sitemap built for scraping jobs on LinkedIn

Name	Sitemap
VagaUSA	{"_id":"vagausa","startUrl":["https://www.linkedin.com/jobs/search/?currentJobId=3650245916&f_E=3%2C5%2C6&f_WT=2&geoId=103644278&keywords=%22Data%20Analytics%22&location=Estados%20Unidos&refresh=true&sortBy=R"],"selectors":[{"id":"element","parentSelectors":["_root"],"type":"SelectorElement","selector":"div.scaffold-layout","multiple":false},{"id":"click","parentSelectors":["element"],"type":"SelectorElementClick","clickElementSelector":"a.disabled","clickElementUniquenessType":"uniqueText","clickType":"clickOnce","delay":1000,"discardInitialElements":"do-not-discard","multiple":true,"selector":"_parent_"},{"id":"vacancy","parentSelectors":["click"],"type":"SelectorText","selector":"h2.t-24","multiple":false,"regex":""},{"id":"description","parentSelectors":["click"],"type":"SelectorText","selector":"div.jobs-box__html-content","multiple":false,"regex":""}]}

Source: Prepared by the author (2023).

It can be seen that the set of actions is present in the *Sitemap*, such as selecting elements, clicking on the vacancies, and copying the job title and job description, thus forming a spreadsheet as a database.

Data pre-processing

As a result of the data extraction, a database was generated, in spreadsheet format in Google Sheets, with about 122 job vacancies, of these, a cleaning was carried out removing the irrelevant information for the analysis, resulting in 109 vacancies for analysis.

Considering that we are only looking for vacancies where AI workers can perform their activities remotely in Brazil, it was based on three aspects of segmentation, the job descriptions must not have any indication of the need for a visa or U.S. work permit, the requirements in English language proficiency and remote work. Therefore, a list of keywords is created that are used in the construction of the vacancy filters, as shown in Table 2.

Table 2: List of keywords for each aspect

Categories	Key Words
Visa Requirement	work permit, employment authorization, work visa, work clearance, visa, visa status, immigration status.
Communication in English	English, language proficiency, speaking ability, linguistic skills, conversational skills, language aptitude, oral and written skills.
Fully remote or hybrid work	remote, fully remote, completely remote, fully virtual, exclusively remote, totally work-from-home.

Source: Prepared by the author (2023).

The words adopted were due to their presence in the job descriptions. After defining the words, a descriptive analysis was performed, as shown in Table 3 below. As a result, the vacancies that had words referring to the need for a visa were eliminated and the vacancies that had the requirement of communication in English. On the other hand, the vacancies that have in the descriptive remote work and its variables, were maintained, resulting in 32 vacancies to be analyzed.

Table 3: Vacancies analyzed in this article

	Vacancy	Remote	Visa	English
1	Data Science	yes	No	No
2	Director of Data Science	yes	No	No
3	Lead Data Science with ML/Ops (DevOps)at Minneapolis, MN (Remote)	yes	No	No
4	Product Manager Hospitality Data Science	yes	No	No
5	Financial Crimes Data Science Sr. Manager	yes	No	No
6	Senior Technical Product Manager, Data Science	yes	No	No
7	Program Manager – The Academic Cancer Data Science Collaborative Ecosystem	yes	No	No
8	Data Science Team Lead	yes	No	No
9	Senior Data Science Engineer	yes	No	No
10	Remote opportunity for Predictive Modeling/ Data Science Actuary – PR12514A	yes	No	No
11	Data Science Manager II	yes	No	No
12	Data and Analytics Marketing Analyst – Remote | WFH	yes	No	No
13	Intern – Data and Analytics – REMOTE	yes	No	No
14	Data Analytics Engineer	yes	No	No
15	K-12 Data Analytics Specialist	yes	No	No
16	100% Remote Data Analytics Coordinator // pay rate: $36.74/hr.	yes	No	No
17	Data and Analytics Engineer	yes	No	No
18	Data Analytics & Development	yes	No	No
19	Manager, Data and Analytics	yes	No	No
20	Data Analytics Lead	yes	No	No
21	Pharmacovigilance Data Analytics and Reporting, Senior Manager-US Remote	yes	No	No
22	Director of Data & Analytics	yes	No	No
23	Director, Data and Analytics	yes	No	No
24	Senior Director, Sales Operations and Data Analytics	yes	No	No
25	Director, Customer Data Analytics	yes	No	No

26	Senior Data Analytics Developer	yes	No	No
27	Data Analytics Manager	yes	No	No
28	Internal Auditor (Senior Level) – IT & Data Analytics	yes	No	No
29	Senior Software Engineer-Data and Analytics	yes	No	No
30	Senior Machine Learning Engineer – Computer Vision (Healthcare), USA	yes	No	No
31	Instructor, AI/Machine Learning, Simplilearn (Part time)	yes	No	No
32	Senior Staff Software Engineer, Machine Learning Infrastructure	yes	No	No

Source: Prepared by the author (2023).

Text Analysis

To perform the analysis of the text, in order to identify the elements and classify them, ChatGPT integrated with Google Sheet through an API was used *Application Programming Interface* or Application Programming Interface (API), the analyses were performed according to the following categories in Table 4.

Table 4: Categories of analysis and objectives

Analysis Category	Goals
Technical Skills Requirements	Identify the specific technical skills required for the positions, such as knowledge in machine learning algorithms, natural language processing, computer vision, etc.
Experience Required	Analyze prior experience requirements, such as years of experience in machine learning, working on AI projects, etc.
Level of seniority	Classify vacancies according to seniority level, such as junior, full, senior, technical leader, etc.
Scope	Identify the industries or areas of application of AI mentioned in the descriptions, such as healthcare, finance, retail, etc.
Main responsibilities	Analyze the key responsibilities mentioned in the descriptions, such as developing AI models, implementing algorithms, optimizing processes, etc.
Programming Skills	Assess required programming skills, such as knowledge of Python, R, C++, etc.
Knowledge of tools and libraries	Identify the specific tools and libraries mentioned in the descriptions, such as TensorFlow, PyTorch, scikit-learn, etc.
Interpersonal skills	Identify desired interpersonal competencies such as communication skills, teamwork, leadership, etc.
Academic Requirements	Analyze the aforementioned academic requirements, such as a bachelor's degree in computer science, a master's or doctoral degree in a related field, etc.

Source: Prepared by the author (2023).

On the other hand, the execution of such complex analyses is used by ChatGPT, through *Prompts* which uses the LLM to do the analyses. To do this, you create a list of *Prompts* to execute the requests according to each analysis category, as shown in Table 5.

Table 5: ChatGPT Prompts

Analysis Category	Prompt ChatGPT
Technical Skills Requirements	=GPT("read cell A2 and identify specific technical skills requirements needed for the position, such as knowledge of machine learning algorithms, natural language processing, computer vision, etc."; A2)
Experience Required	=GPT("read cell A2 and identify the required experience in years"; A2)
Level of seniority	=GPT("read cell A2 and identify Seniority Level, classifying the job description according to seniority level, such as junior, full, senior, technical lead, etc."; A9)
Scope	=GPT("read cell A2 and identify the AI industries or application areas mentioned in the descriptions, such as healthcare, finance, retail, etc."; A2)
Main responsibilities	=GPT("read cell A2 and list the key responsibilities mentioned in the descriptions, such as developing AI models, implementing algorithms, optimizing processes, etc."; A2)
Programming Skills	=GPT("read cell A2 and list the required programming skills present in the description, such as knowledge of Python, R, etc."; A2)
Knowledge of tools and libraries	=GPT("read cell A2 and list the specific tools and libraries mentioned in the descriptions, such as TensorFlow, PyTorch, scikit-learn, etc."; A2)
Interpersonal skills	=GPT("read cell A2 and identify the desired interpersonal competencies, such as communication skills, teamwork, leadership, etc."; A2)
Academic Requirements	=GPT("read cell A2 and list if there are requirements such as undergraduate, master's, or doctoral degrees"; A2)

Source: Prepared by the author (2023).

After the construction of all ChatGPT requests and the generation of results, there was a need to manually standardize the answers, in order to carry out an analysis of the results generated by the tool presented in the following section.

FINDINGS

In this section, we will explore the results obtained through the analysis, in order to achieve the objective proposed by this article. They are organized according to the categories of analysis.

It can be seen that in the total of 122 vacancies initially extracted, 32 of them have a potential remote work for professionals from Brazil, potential is affirmed, because a clear characteristic of imperialism is not to clearly expose what is sought, that is, in technology job vacancies, there will not be a vacancy with the title "Brazilians are sought to work with technology". The strategy is based on the search for as many resources as possible, whether they are in Brazil or not. Therefore, it can be said that approximately 26% of the vacancies analyzed, Brazilians could apply.

Another point perceived was the advancement of AI for positions that before, such knowledge was not required, now it is possible to see that vacancies of commercial managers are already requesting knowledge in *Data Science* as well as customer service positions, that is, the AI areas are merging with other corporate areas creating a decentralization of AI management within companies.

In the analytics category, technical skills requirements showed great demand for people who have knowledge in machine learning (ML) algorithms, natural language processing (NLP), as well as knowledge in statistics, mathematics, computer science, or data sciences. The vacancies have a well-defined type of skills of the professionals and are mostly related to ML and NLP.

For the required experience and seniority level categories, it showed that the most sought-after professional must have 5+ years of experience for senior and manager positions. This demonstrates that the type of professional sought are people with great experience and with already established careers, causing an impact of the loss of this level of labor for Brazilian technology companies. Developing technology in the global south already presents a number of challenges, and when you add to it the factor of competition for labor with U.S. companies, it becomes even more challenging. It is common to see in Brazil an excellent technical workforce able to work with AI and few Brazilian companies developing AI. This disparity is a demonstration of the loss of surplus value presented by Ruy Mauro Marini (2017), in which there is a need to prepare and protect AI development companies in Brazil so that they compete with American companies, because from the worker's point of view, the best scenario will always be the company that has a higher payout.

Regarding the sector where these companies operate, defined as the category of application domain, we have the Health sector mentioned seven times, followed by the Education sector mentioned five times and Retail mentioned five times, Technology mentioned four times, Financial mentioned three times, among other non-expressive results. This result demonstrates which markets are seeking the adoption of AI technologies in their operation on a larger scale.

With regard to the responsibilities assigned to the positions, there are 1) Development and management of production data pipelines; 2) Building products and features from start to finish; 3) Leadership in modeling, introduction of new methodologies and innovation in existing problems; 4) Application of expertise in machine learning, quantitative analysis, experimentation, and data presentation to build ML, AI, and optimization capabilities in products; 5) Research and imple-

mentation of statistical methods to improve data accuracy and reliability. These responsibilities demonstrate a direct correlation with the seniority of the professionals sought.

The programming skills and knowledge of tools and libraries summarize with expressiveness the Python and SQL tools, with the following libraries according to the frequency of appearances: scikit-learn, BigQuery, Snowflake, Jupyter, Pandas, Seaborn, Fivetran, dbt, Metabase and Mode Analytics.

And the ten interpersonal skills that appeared the most in the vacancies were: 1) written and verbal communication skills; 2) leadership skills; 3) teamwork and collaboration; 4) problem-solving skills; 5) autonomy and responsibility; 6) ability to influence and maintain effective relationships; 7) focus on reliability and accuracy; 8) strategic and creative thinking; 9) passion for the area of expertise; 10) self-motivation and ability to work in situations of uncertainty.

Regarding the academic requirements for vacancies, it presents the following composition, there are no requirements 18 vacancies, followed by only undergraduate with 11 vacancies and with postgraduate degrees such as master's and doctorate only 3. That is, the academic requirements for such vacancies did not present a high degree of relevance.

FINAL CONSIDERATIONS

The aim of this work is to discuss the issue of labor leakage in artificial intelligence, hired by companies in the United States through the remote modality, super exploiting this labor and impacting the generation of technological wealth in AI of Brazilian companies, thus using their tool to expose such practices, performing a decolonial turn. A more sought-after profile was then created, defining the flight of great talents.

Drawing a profile of the most sought-after professional, it is the one with experience in ML and NLP, senior with 5 years of experience, to assume responsibilities related to people management and development of strategies and solutions, with knowledge in Python and SQL, with no graduation requirements as long as they have experience.

We can then define that the decolonial AI movement must be initiated, not only in the lines of code, but in the structure of production installed in which imperialist states seek to expand their productive capacity, with labor in the global south, thus expanding their profit margins. This work fills the gap that, unlike super-exploitation in the production of physical goods, usually occurs through people with low education and few opportunities, for AI over-exploitation happens through educated labor, with extensive technological experience, slowing down the construction of technology in national AI.

From the information presented here, one can build critical thinking on how to protect the national market, providing competitive capabilities to AI develop-

ment companies in Brazil, consequently, these great minds will produce wealth for the country.

This study was made from a cut of 122 vacancies posted on LinkedIn, reducing it to 32 for analysis, that is, to solve this limitation it is necessary to expand the amount of analysis from more data sources.

The process of decolonization begins with the expansion and recognition of the population about the colonial forces to which we are subjected on a daily basis, forces that are also present in technology. Discussions like these need to be initiated so that it is possible to prepare the country with international competition, positioning itself as global technology suppliers and not just labor suppliers.

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