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ARTIFICIAL INTELLIGENCE AND ENVIRONMENTAL RACISM: INITIAL REFLECTIONS

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This chapter aims to provide initial reflections on the impacts of artificial intelligence (AI) on environmental racism. It starts by setting the ground with basic concepts of AI and environmental racism. Next, it analyzes three areas in which AI relates to environmental racism: carbon footprint, discriminatory content on large language models, and data-driven AI climate initiatives. Through human rights lenses, the risks and opportunities are discussed. It concludes by suggesting initial guidelines to prevent the risks and enhance the positive impacts of AI in the realm of environmental racism.

INTRODUCTION

Artificial intelligence (AI) has increasingly shaped the way humans communicate, act, work, and spend their free time, and has even been defined as a fourth industrial revolution (Abbot, 2020, p.

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2). It can be broadly defined as systems capable of analyzing a massive volume of information and providing answers to incomplete scenarios (Bathaee, 2018, p. 898) in a way that mimics human behavior. However, technology is not neutral and encompasses not only developers' bias but also society's bias contained in the vast amount of data used to train it. This means, and studies have shown (Buolamwini & Gebru, 2018) that the uses of those technologies have a differential impact on historically marginalized populations. Furthermore, the development and use of AI itself impact the environment, but this impact is not equally distributed among humans.

Environmental racism relates "to the unequal access to a clean environment and basic environmental resources based on race" (Patnaik et al., 2020). Environmental negative impacts such as hazardous waste sites and flood-prone residential areas disproportionately burden low-income neighborhoods with increased percentages of racial and ethnic minorities. Furthermore, the cascading effects of climate change, including fatalities and injuries resulting from floods, heatwaves, and compromised food quality due to pests, disproportionately impact traditionally marginalized populations.

This chapter focuses through human rights lenses on the question of how AI relates to environmental racism through three aspects: carbon footprint, discriminatory content on large language models, and data-driven AI climate initiatives. Those aspects were chosen through the bibliographic review, but other areas need to be explored by further research.

The hypothesis is that AI's relation to environmental racism is ambiguous: it can both enhance environmental racism and also be a tool to prevent it. Therefore, human rights play an essential role in developing safeguards in its development and use to prevent AI from enhancing environmental racism.

The chapter aims to raise awareness of some of the impacts of AI on environmental racism and on some possible human rights-based safeguards to foster positive impact.

Regarding the methodology, the chapter is based on a human rights-based approach[3]. To address the research question, qualita-

3 (United Nations Sustainable Development Group, n.d.) "The human rights-based approach (HRBA) is a conceptual framework for the process of human development that is normatively based on international human rights standards and operationally directed to promoting and protecting human rights. It

tive research was conducted mainly through bibliographic review Its results were analyzed using the hypothetical-deductive method. The three concrete cases presented were also the basis for reflection using the inductive method.

This chapter will start by providing three of the areas in which AI relates to environmental racism: carbon footprint, discriminatory content, and disaster relief and prevention. It then discusses the IA environment and racism and its ambiguous relation. Next, it reflects on sustainable future IA and measures to counter environmental racism.

1. IA ENVIRONMENT AND RACISM: AN AMBIGUOUS RELATION? THREE AREAS OF INTERSECTION

a. Data-driven environmental initiatives and AI

At the United Nations Environmental Assembly, it has been argued that "A global digital ecosystem for the environment has the potential to put us on a path toward a sustainable future". It has been acknowledged the ongoing AI environmental monitoring and the need for adequate safeguards to address the risks posed by technology (United Nations Environment Assembly, 2019).

AI technologies have enabled the development of programs that aid disaster relief and prevention, which might aid communities in having earlier warnings on forthcoming extreme weather events and the need to evacuate, and on a post-event strategy to rescue lives. An example of those programs is Google GraphCast, which is an AI-based weather simulator that aims at faster and more accurate weather forecasts. It is capable of predicting 10 days in advance extreme weather events, and tracks of cyclones, flooding, and thus saving lives (Lam, 2023). Another example of AI program, xView2 uses machine learning techniques to analyze satellite images of constructions before and after disasters (such as dam collapses, wild-

seeks to analyses inequalities which lie at the heart of development problems and redress discriminatory practices and unjust distributions of power that impede development progress and often result in groups of people being left behind."

fires, landslides, earthquakes, hurricanes, tsunamis, storms, and floods). This program identifies constructions and their level of damage, which might aid in speeding rescue and recuperation initiatives (Software Engineering Institute, 2020). Extreme weather events statistically have more negative impacts on historically marginalized communities, such as black, Latino, and indigenous peoples. Therefore, early warnings and efficient post-event relief is a measure that helps to address at least the consequences of environmental racism by reducing the chances of casualties.

In this context, AI emerges as a promising tool for improving predictions for a variety of high-impact events. Nevertheless, if it is not developed and applied ethically and responsibly, it might encompass geographical or population biases and non-representative data, which is likely to lead to environmental racism

Among the risks is that data-driven AI climate initiatives can enhance inequality in climate response, by prioritizing resources, such as knowledge and funding to some areas, while others remain excluded (Nost, 2022). For example, studies have shown that many areas with a majority of African American descent in the southeast of the United States are relatively far from radar sites, meaning that it is harder to gather information about storms impacting these areas (McGovern et al., 2022, p. 4). India's 100 smart cities challenge, for example, had postcolonial and exclusionary impacts. Accessibility was a requirement to participate in the program and those without accessibility were often the share of the population deprived of property and housing. Therefore, such a program expanded existing inequalities (Datta, 2018). Studies have shown the racial violence related to algorithms deployed to aid in decisions regarding the advancement of urban development (including investments or not in public services) in various United States municipalities which enhanced the historical spatialization of race (Safransky, 2019).

An additional challenge of the big data landscape is "function creep" (Brayne, 2019; Innes, 2001), which is the risk of data deviation, meaning that data originally collected for one purpose might be used for another objective. In this scenario, data collected for environmental forecast and relief aims might also be used for other settings, such as law enforcement and social scoring, with racially discriminatory effects. When digital data can be easily stored and

shared, "the value of information no longer resides solely in its primary purpose" (Cukier, K. & Mayer-Schoenberger, 2013).

b. Carbon footprint

AI development and use requires vast amounts of energy, for instance, it depends on myriad specialized computer chips, other computational resources, and materials (Luccioni et al., 2023) which is likely to elevate the world's carbon emissions, especially if data centers get their energy from fossil fuels. If they use renewable resources, the impact decreases but still exists (Erdenesanaa, 2023) "In a middle-ground scenario, by 2027 AI servers could use between 85 to 134 terawatt hours (Twh) annually. That's similar to what Argentina, the Netherlands and Sweden each use in a year, and is about 0.5 percent of the world's current electricity use." (Erdenesanaa, 2023). Research has shown that the Global North was responsible for 92% of excess global CO2 emissions (Hickel, 2020) whereas the impacts of climate change are most severely felt at the Global South

By perpetuating high-carbon-emitting behaviors, AI systems play a significant role in exacerbating the climate crisis. Furthermore, the chatbots and image generators popularity is expanding, which strengthens tech titans' competition and investment in the field. This scenario is likely to expand the market and further deepen environmental concerns (Keller, 2024). The environmental impact of AI, combined with its financial costs means a double punishment for traditionally marginalized communities. Not only are they less likely to enjoy the progress of technology but also, they are more likely to suffer the environmental impacts of its resource demands (Bender at al., 2021, p. 610).

Considering AI´s negative environmental impacts, experts are attempting to make AI greener, which requires, among other things, transparency so that stakeholders can know how much electricity computers are using and how that translates into carbon emissions and other environmental indicators. The metrics and measurement tools of AI carbon footprints need to go through a standardization process to enable stakeholders to compare the impacts of various systems. Incentives are also crucial to encour-

age cloud providers to develop data centers where renewable energy is the mainstream and to incentivize the expansion of clean power supply (Cho, 2023).

c. Discriminatory content and language learning models

AI develops its task based on a vast amount of data. Therefore, AI can base its outputs both on implicitly biased and explicitly discriminatory data which might result in racist and sexist outputs for example (Bender at al., 2021, p. 611). In 2019, researchers from University of New York found a gender and race diversity crisis in the AI sector, (West, 2019), especially in the highest level of decision-making. According to the study, large scale AI systems are mostly developed by technology companies and elite university laboratories, dominated by "white, affluent, technically oriented, and male. These are also spaces that have a history of problems of discrimination, exclusion, and sexual harassment (United Nations, 2020)." Among the discriminatory results, IA might generate environmental racist content.

Among the types of AI is language learning models, meaning "a complex mathematical representation of language that is based on very large amounts of data and allows computers to produce language that seems similar to what a human might say." (Cambridge, n d). The use of LLMs has been increasingly used (Bender at al., 2021, p. 610). At the end of 2022, the world experienced the rise of a new paradigm with the release of ChatGPT (OpenAI, 2022), a chatbot that uses a type of LLM named generative pre-trained transformer. It is generative as it is capable of creating content, based on a dataset it was trained. The content generated might, even if without intentionality, maintain or even multiply environmental racism (Rillig et al., 2023, p. 3464).

Another relevant aspect is access to LLM technology The lack of access to LLM apps can widen the digital gap, as traditionally marginalized communities remain at the margins, without or with less information, while those who have access to LLM apps are likely to receive more information on environmental issues (Rillig, 2023).

On the other hand, LLMs could be a tool to aid humans in generating informative content on environmental education, and also to

adapt it for different audiences, depending on the age, educational level, and other variables (Rillig, 2023). A relevant aspect is that "To implement AI-based technology successfully, tech companies must be willing to share knowledge with users, including instructions on how to take measurements that will yield data" (Nixon-Saintil, 2023). Furthermore, LLMs based apps could enhance the amount of people taking part in environmental discussions, as those systems might be available in multiple languages (Rillig, 2023).

2. REFLECTIONS ON AI AND ENVIRONMENTAL RACISM: A HUMAN RIGHTS-BASED APPROACH

2.1 Human Rights Framework

This section provides a brief reflection on AI, human rights, and environmental racism. First, it discusses the current legally binding framework, next it presents some reflections based on international organization human rights monitoring bodies, and then it discusses soft law on the topic.

The current scenario is that AI technologies affect a broad spectrum of human rights, and there is no legally binding international human rights framework that specifically addresses AI technologies. However, long-established human rights principles, including racial equality and non-discrimination principles, provide relevant duties to protect, respect, and remedy human rights in the context of AI-related actions. Those principles are codified in all core human rights treaties and have achieved the status of a peremptory norm with obligation *erga omnes* (United Nations, 2020).

For instance, article 26 of the International Covenant on Civil and Political Rights (ICCPR)

> "All persons are equal before the law and are entitled without any discrimination to the equal protection of the law In this respect, the law shall prohibit any discrimination and guarantee to all persons equal and effective protection against discrimination on any ground such as race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth or other status." (ICCPR, 1976).

In the same way, application of the Convention on the Elimination of All Forms of Racial Discrimination's prohibition on racial discrimination should be pursued alongside the Convention on the Elimination of All Forms of Discrimination against Women (art 1), the Convention on the Rights of Persons with Disabilities (art 2) and the United Nations Declaration on the Rights of Indigenous Peoples (art 2), which similarly prohibit or condemn direct and indirect forms of discrimination.

It is important to recall that all human rights are indivisible and interdependent, which means that violation of a civil and political right (such as privacy or non-discrimination) might also result in a violation of the right to access to an economic, social, cultural, and environmental right (such as access to a health environment). Likewise, the international human rights framework and the specific rights guaranteed under it are applicable in the context of AI systems

Overall, human rights system offers legally enforceable principles and specific courts, commissions, and institutions where individuals can raise human rights and associated environmental issues with the legitimate expectation of securing some relief. In this sense, International Human Rights play an important role in identifying and addressing the social impacts of artificial intelligence and ensuring accountability for these harms

Potential contributions do not merely result from the enforcement of international treaties and domestic law and manifest themselves in court decisions; rather, the framework should be understood comprehensively as a combination of legal remedies, moral justification, and political analysis that inform one another (Bakner, 2023).

Different human rights mechanisms have closely monitored the impact of AI on human rights Various United Nations Human Rights Council reports address how these technologies affect a broad spectrum of human rights, including racial equality and non-discrimination principles under international human rights law (United Nations, 2020). Those principles are codified in all core's human rights treaties and have achieved the status of a peremptory norm with obligation *erga omnes*.

The Special Rapporteur on contemporary forms of racism, racial discrimination, and xenophobia, and related intolerance, re-

port "Racial Discrimination and Emerging Digital Technologies: A Human Rights Analysis" shared the concern that "emerging digital technologies exacerbate and compound existing inequities, many of which exist along racial, ethnic and national origin grounds" (United Nations, 2020).

Under this subheading, the Special Rapporteur outlined States obligations and corporate responsibilities for mitigating discrimination in the use of emerging technologies. Specifically, the report suggested that State must address direct and indirect forms of racial discrimination resulted from the design and use of technologies. In addition, the report calls the States to reject a "colour-blind" approach to governance and regulation of emerging digital technologies and emphasizes the disproportionate effects on these groups (United Nations, 2020). Likewise, the report recalled the important role played by private actors in providing reparations for racial discrimination, including by taking responsibility for their role in such discrimination. As articulated in the Guiding Principles on Business and Human Rights, private companies bear a responsibility to respect human rights, including through human rights due diligence.

Subsequently, the forty-eight section of the Human Rights Council addressed concerns regarding environmental racism and guidance on how to effectively address environmental injustice on people of African descent. According to the EPA (Environmental Protection Agency, 2022), "environmental justice (EJ) is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation and enforcement of environmental laws, regulations and policies."

The report indicated that environmental racism is perpetrated by States, international corporations, and other non-State actors, often in breach of international human rights duties and local law, and with deliberate indifference to the impact on communities of African descent. It is for this reason that the Durban Declaration and Programme of Action requested States to consider positively concentrating additional investments in environmental control in communities of primarily African descent.

At the regional level, the Inter-American Commission on Human Rights (OAS, 2019) has consistently emphasized that the princi-

ple of non-discrimination is one of the linchpins of any democratic system and that it is one of the cornerstones of the human rights protection system established by the Organization of American States (OAS).

Alongside the binding international treaties, some relevant soft law instruments were approved to provide guidance to the emerging intersections between AI and human rights. First we will present PECD´s instrument, which has more general provisions, and then UNESCO´s Recommendation on the Ethics of AI, in which environmental racism effects were highlighted, and the touch upon United Nations Guiding Principles on Business and Human Rights (UNGPs).

In May 2019, OECD (The Organization for Economic Co-operation and Development) member countries approved the "OECD Principles on Artificial Intelligence," the first international soft law instrument agreed upon by States. The instrument embraces concrete recommendations for public policy and strategic approaches. Its degree of generality maximizes its effectiveness by guaranteeing that the recommendations can be applied to AI developments in diverse context and regions of the globe (OECD, 2019).

In this regard, principle 1.1., which concerns inclusive growth, sustainable development and well-being, underlines that:

> "Stakeholders should proactively engage in responsible stewardship of trustworthy AI in pursuit of beneficial outcomes for people and the planet, such as augmenting human capabilities and enhancing creativity, advancing inclusion of underrepresented populations, reducing economic, social, gender and other inequalities, and protecting natural environments, thus invigorating inclusive growth, sustainable development and well-being." (OECD, 2019).

Furthermore, principle 1.2 relates to human-centered values and fairness:

> "a) AI actors should respect the rule of law, human rights and democratic values, throughout the AI system lifecycle. These include freedom, dignity and autonomy, privacy and data protection, non-discrimination and equality, diversity, fairness, social justice, and internationally recognised labour rights.

> b) To this end, AI actors should implement mechanisms and safeguards, such as capacity for human determination, that are appropriate to the context and consistent with the state of art" (OECD, 2019)."

Discussing OECD human centered principle, the OECD.AI Policy observatory highlights that principles also acknowledge the importance of instruments such as "human rights impact assessments (HRIAs) and human rights due diligence, human determination (i.e., a "human in the loop"), codes of ethical conduct, or quality labels and certifications intended to promote human-centered values and fairness" (OECD.AI Policy Observatory).

According to UNESCO's Recommendation on the Ethics of AI, States must ensure that the use of AI related to the environment aligns with the values and principles of the recommendation (United Nations, 2021, par. 79). On the politics of data, it highlights States duty to ensure data policies that offer a total safety of sensitive personal data which is published or inadequately shared might cause damage or exceptional burdens, and exemplifies with personal data related to race (United Nations, 2021, par. 74). It also foresees that both States and corporations have a duty to evaluate throughout the AI lifecycle, the direct and indirect environmental impact of AI, including the carbon footprint, energy consumption, and reduce the environmental impact (Unesco, 2021, par. 84). It acknowledges some positive impacts of AI in systems such as those which "support the protection, monitoring and management of natural resources," "support the prediction, prevention, control and mitigation of climate-related problems," support a more efficient and sustainable food ecosystem" and acknowledges the duty to ensure that indigenous communities are part of processes throughout AI´s lifecycle (United Nations, 2021, par. 85).

Furthermore, the UN Guiding Principles on Business and Human Rights (UNGPs) set forth clear expectations for States and businesses and provide a tool for initiatives and processes by States and businesses, which have the potential to catalyze transformative change. If effectively implemented, the UNGPs would lead to meaningful action in preventing and addressing environmental racism.

In short, considering that human-centered values might be deliberately or accidentally infringed by AI systems and that there

is no specifically international human rights legally binding instrument on AI, soft law instruments play a relevant role in a) specifying the content of long-established principles such as non-discrimination, b) supporting the development of trustworthy and ethical AI, and c) guaranteeing the safety and fundamental rights of peoples

3. FINAL CONSIDERATIONS

It is undeniable that AI has emerged as one of the disruptive technologies of this century, with the potential to trigger significant transformations. The reflections are no longer about whether we should welcome this type of technology but under what conditions and safeguards. Recognizing that this emerging technology should not be embraced uncritically, systematic theoretical and empirical investigations are required to examine the potential negative consequences of IA and avoid discrimination. This chapter sparks the discussion and provides initial thoughts through case studies.

With regards to AI and environmental racism, preliminary research reveals the likelihood of discrimination against social groups in situations of vulnerability, particularly in low-income neighborhoods with higher proportions of racial and ethnic minorities. The three case studies presented in this paper showed an ambiguous relationship between AI and environmental sustainability.

Regarding data-driven environmental initiatives and AI, a bibliography review indicates AI as a promising alternative for improving predictions for a variety of high-impact events. For example, it allows the development of programs that aid disaster relief by providing faster and more accurate weather forecasts. Positive outcomes in terms of environmental racism were also found by reducing the chances of casualties from early warnings and efficient post-event relief.

While climate AI is meant to address social and environmental inequities, in many ways it might reproduce them. As negative outcomes, the research finds geographical or population biases, non-representative data, and inequalities by prioritizing resources. For example, coverage gaps in weather radars can inadvertently under-represent some populations, such as indigenous people and

black populations living far from radar sites and with low access to technology.

AI systems also present sustainability issues regarding the consumption of natural resources, including electricity and water, and the carbon emissions involved in their development and use. The second case study identifies that AI systems contribute significantly to worsening the climate crisis by increasing high-carbon-emitting behaviors. Traditionally marginalized communities are also more likely to suffer the environmental impacts of their resource demands. To manage AI's growing carbon footprint, data center operators must embrace sustainable data center investments and practices, which will require transparency, footprint standards, and public policies such as tax incentives to incentivize the expansion of clean energy grids.

Among LLM models, AI can base its outputs both on implicitly biased and explicitly discriminatory data which might result in environmental racism. The lack of access to LLM apps can widen the digital gap, as traditionally marginalized communities remain in an invisible zone while those who have access to LLM apps might receive more information on environmental issues.

The widespread development of AI needs to be grounded on human rights and supported by the necessary regulatory insight to enable sustainable development and avoid unintended effects, such as increasing environmental racism The Human Rights legal framework plays an important role in identifying and addressing the social impacts of artificial intelligence and ensuring accountability for these harms In this regard, it is essential to not only ensure that AI systems are rights-respecting by design, but also to guarantee that those who are impacted by these technologies are not only meaningfully involved in decision-making on how AI technology should be regulated, but also that their experiences are continually surfaced and are centered within these discussions (Nolan, Maryam, & Kleinman, 2024).

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