SOCIETAL IMPACTS OF WESTERN-DEVELOPED AI ALGORITHMS ON AFRICA

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Abstract

The 21st century has seen a tremendous growth in technology. This has given birth to large tech monopolies who over the years have not only built superior technologies and infrastructures but have also gained unprecedented influence over various aspects of human life. **In this discussion, I analyze the influence of these tech monopolies on Africa by examining the work of Abeba Birhane on her seminal paper "Algorithmic Colonization of Africa"** [1]. I investigate and analyze the main arguments made by Birhane, such as modern tech companies share some characteristics with traditional colonizers of Africa, western AI is unfit for Africa, techno-optimism without ethics is dangerous to the society, etc. The values and intentions behind Birhane's paper, such as supporting homegrown technologies and infrastructures, using AI as a tool to aid African people, etc. are justifiable but certain claims made by her to achieve this goal is debatable and needs to be discussed with factual evidences. I conclude this discussion by formulating a solution that I see fit from a technological, sociological, political and cultural perspective that goes abreast with Birhane's solution to Africa's problems.

Keywords

Algorithmic Colonization; Tech Monopolies; Techno-Optimism; Western AI; Traditional Colonizers

1. Introduction

Modern AI algorithms have become more sophisticated and have been instrumental in solving complex real-world problems, such as identifying worst polluted areas under ocean for cleanup to reduce marine pollution [2], preventing global food crisis and famines by predicting areas where they are likely to happen in the future [2], etc. Despite being pivotal in solving some of these complex real-world problems, AI algorithms and their capabilities are not positively embraced by everyone in the world. Many people are still conservative about using AI algorithms on technologies that directly affects human lives [3]. People are cautious and worried about the social, political and cultural impacts of AI algorithms when implemented in their society. For example, let us take the case of Africa.

The growth in AI in Africa carries with it a fear of falling behind more developed economies rather than being excited by new technology [4]. This is largely due to the

fear of job losses which might occur as the result of automation and robotics [4]. Abeba Birhane, the cognitive science PhD researcher from the University College Dublin, Ireland, argues in her paper "*Algorithmic Colonization of Africa*", that there are more deep seated problems that the people of Africa will experience on adopting these AI algorithms without fully understanding them. She urges people to question western-developed AI algorithms before importing them to Africa. **The arguments made by Birhane in her original paper motivated me to explore if there are any ethical violations that are being committed while importing western-developed AI algorithms to Africa**.

Some of these violations mentioned in the original paper by Birhane includes collecting personal data through mobile recharges and conversations and using them to make profits for western corporations, creating a population density map of entire Africa thereby creating population knowledge of the whole continent, etc. The accusations made by Birhane seem to include violations, such as breach of data ethics, data privacy, AI ethics, etc. **The possibility of such violations in a continent like Africa having huge population, presented me with an opportunity to perform a qualitative research on her claims**.

In this paper, **I discuss all the claims and arguments made by Birhane to validate them and analyze the impact of western-developed AI on Africa and its people.** I proceed to perform this qualitative research in three stages: First, I identify all the claims, arguments, statements and opinions made by Birhane in her paper. Next, I validate these claims based on factual evidences collected through various literatures, articles, journals, etc. Finally, I conclude by providing my solution to Africa's problems that were highlighted in the original paper.

I draw three conclusions from Birhane's paper: First, the statements made by Birhane offer a clear sociopolitical view into the problems that Africa faces or will face upon importing western-developed AI without questioning its underlying purpose. Second conclusion that I draw from her paper is that some of the examples that were discussed by Birhane seem to be the problems of capitalistic business models rather than an algorithmic colonization of Africa. These problems exist even in situations where technology is not as influential as it is in AI. The final conclusion that I make is that her entire argument is focused on tech giants and their responsibilities in building and exporting AI to Africa, whereas very little focus is directed towards questioning the local authorities – the governments and the judiciaries. I believe it is not just the responsibility of the tech corporations but also the responsibility of the governments and the judiciary of independent countries in Africa to strengthen the laws around how a company uses its algorithms on people and how the data should be collected, processed and utilized. Examples of such strong government policies and laws created around data and AI algorithms can be seen in Europe in the form of **General Data Protection Regulation (GDPR).**

A strong example of how GDPR controls a modern tech giant and protects the rights of

people is an incident from 2021 when **Luxembourg National Commission for Data Protection (CNDP) issued a huge fine of €746 million ($888 million) to Amazon Inc**. [5]. This is the biggest fine in for violation of the GDPR in its history. CNDP investigated into how Amazon processed personal data of its customers and found infringements regarding Amazons' advertisement targeting system that was carried out without proper consent. Therefore, the CNDP imposed a fine of €746 million to Amazon for violating European Union (EU) privacy rules.

2. Birhane's Main Arguments

The implications of importing AI algorithms developed using western perspectives and knowledge without understanding whom the algorithms might benefit or affect is one of the main arguments that Birhane makes in her paper. Apart from this, she also focuses on three other arguments: '***Dependency on western AI***', '***Techno-Optimism without ethics***', and '***Nudging users***'. These claims come from both scientific and ethical backgrounds. In this section, I discuss these three arguments with some real world examples to validate Birhane's original claims.

2.1 Dependency on Western AI

Birhane claims that when Africa starts importing more and more state-of-the-art algorithms to solve their problems, the continent will become dependent on western software and infrastructures that it may hamper the growth of local technologies and products. To validate this claim, I take the example of United Arab Emirates (UAE). According to Business Insider, UAE is the third richest country in the world with 3rd highest Gross Domestic Product (GDP) per capita rate [6]. According to a publication by PricewaterhouseCoopers (PwC), **UAE is projected to have 13.6% of its total GDP contributed by Artificial Intelligence by 2030** [7]. PwC estimates that this amount is close to $96 billion [7]. Below is a bar graph (*Fig 1*) provided by PwC, which depicts the percentage of AI contribution to GDP for different regions by the year 2030.

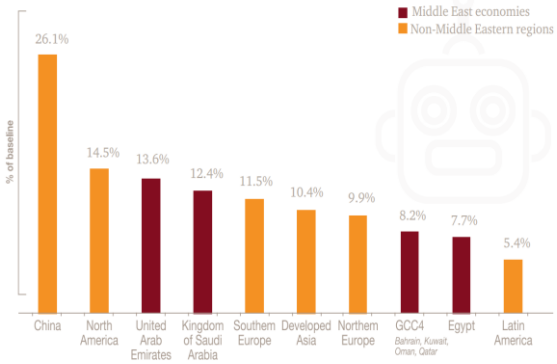

Fig 1 - Contribution of AI to GDP by regions, 2030 [8]

The bar graph clearly shows that UAE is one among the top 3 countries to embrace AI technologies. Despite being one of the leading countries to have a significant percentage of its GDP (approx.14%) contributed by AI [7], **there are no major homegrown technologies or companies dominating the AI space in UAE. The leading AI companies are all western tech giants like Google, Facebook, NVIDIA, Microsoft, IBM, etc.** [9]. This is a good example of how western tech monopolies and their AI algorithms can dominate a country's GDP if the country does not nurture locally built software and technologies. When a country as rich and developed as UAE can be dominated by western tech monopolies, it is not difficult to imagine, as Birhane fears, that Africa and

its people might become completely dependent on western-developed AI and technologies if local products and infrastructures are not supported and developed.

2.2 Techno-Optimism without Ethics

Another important discussion that Birhane brings to the table is how techno-optimism without considering its harmful impacts is dangerous to the society. This is true in most cases both with engineers in large tech corporations as well as with researchers in the scientific community. Complex cultural, moral, and political problems of the society are reduced to problems that can be measured and quantified without any context to the culture. **These complex problems are viewed and approached as something that can be 'fixed' with the latest algorithms**. In the last 10 years, various algorithms have been created that could potentially be used to segregate, target, surveil and harm particular communities in our society. Below are some examples of such harmful algorithms.

2.2.1 Google Search Advertisements

A study published in 2013 by *Latanya Sweeney* tested for advertisements in Google searches [10]. The test showed different results for black-sounding names and white-sounding names. A pattern quickly emerged showing criminal report ads when black-sounding names were searched in Google whereas there were no ads showing criminal records or any mentions of arrest when white-sounding names were searched [10]. This research shows that there is a clear discrimination caused by AI algorithms to one particular community in our society. These discriminations are embedded into the Google search engine in the form of AI algorithms. These AI algorithms are not only unique to the United States, the same Google search engine is being used in Africa, Asia and other continents of the world. When criminal report ads are associated to only one particular race, this further augments the existing unconscious bias on the black community, thereby causing discrimination to African people in the real world as well [11].

2.2.2 Adult Content in Google Search

Another independent research performed in 2020 by *Leon Yin* and *Aaron Sakin* [12], 7 years after the 2013 study by *Latanya Sweeny* [10], showed that Google was still making the same egregious mistake on their advertising platform.

The researchers found that **searching Google's ad buying portal for "Black girls" returned hundreds of terms leading to adult content** [12]. Google's *Keywords Planner*, which helps advertisers choose which search terms to associate their ads with, offered hundreds of keyword suggestions related to "Black girls", "Latina girls", and "Asian Girls". **The majority of those keyword suggestions were related to pornography**. Searches in the Google Keyword Planner for "boys" of those same ethnicities also returned suggestions related to pornography. **Searches for "White girls" and "White boys" however returned no suggested terms at all**. Below is a pictographic representation (*Fig 2*) of '***the number of recommended keywords***' and '***its types***' suggested by Google Keyword Planner for different input search term [12].

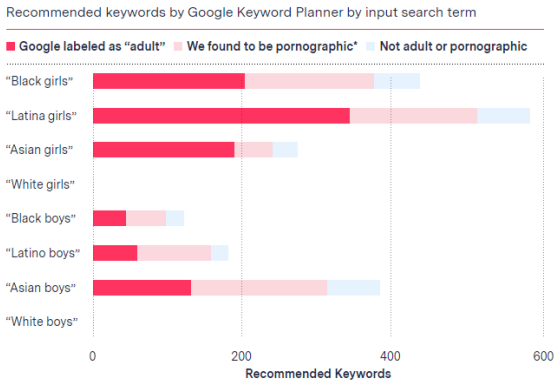

Fig 2 – Recommended Keywords by Google Keyword Planner by input search terms [12]

These search results could result in creating negative emotions, such as inferiority complex, fear of missing out, stigmatizing, etc. on young black girls and boys who search for their cultural identity on the internet. Most African kids who are exposed to the internet for the first time, experiments with it by searching many things on Google. One such topic is their own culture and ethnicity. When exploring their ethnicity and culture through the internet, these AI algorithms embedded into the Google search engine could show them these discriminated results. This could potentially create a negative impact on young African kids causing mental issues, such as Post Traumatic Stress Disorder (PTSD), Anxiety or Depression. These kind of discriminations also negatively impact the image of black women across the world whose identities are already maligned in the media making it even more difficult for them to get social, political, and economic justice and recognition [13].

2.3 Nudging Users

Tech giants in today's world influence everyday lives of people, from what one should watch, follow, like, dislike, support, and to the extent of even influencing whom one should vote for [14]. This is exactly what Birhane calls in her paper as '***nudging***' the users to perform an action that benefits the corporation. Nudging users can have serious implications in a society. Although it was initially used to push the customers into buying more products**, after the Cambridge Analytica scandal in 2017 [15], it became clear that nudging users can not only be used to buy more products, but also to coax and manipulate the users into voting for particular political parties by flooding their social media with targeted advertising and highly personalized content**. In Cambridge Analytica's case, Facebook was used as a tool to manipulate and nudge users into voting for a particular political party in the 2016 US elections [16]. When nudging users is considered as a weapon by tech monopolies in Africa, similar to what happened in the United States in 2016, these tech giants could use the power of AI and technology to alter any political situation in any country in Africa by targeted advertisements and personalized contents to spread their political propaganda. By bringing to power a governance that strongly favors these tech corporations in the long run, this could create political instabilities and unrest in many countries of Africa.

By discussing Birhane's main arguments, such as '***Dependency on Western AI***', '***Techno-Optimism without Ethics***' and '***Nudging Users***' in this section, **we can understand that her fears are real** and there are possibilities that Africa may become completely dependent on western AI like UAE (section 2.1), when western-developed AI is imported to Africa, some

algorithms may have been built without considering ethics (section 2.2) which could potentially harm the people of Africa. There are also possibilities that these AI algorithms could be used by tech corporations like Cambridge Analytica to nudge users (section 2.3) in Africa similar to that of the 2016 US elections to alter the political dynamics of any country in Africa to benefit the corporation and its shareholders.

People create, control, and are responsible for any system that they develop. These algorithms stem from the same biases that humans have shown in the past. Therefore, it is very important to understand the ethical impacts of algorithms before building them. Behavior modification, exploitation of human resources, influencing peoples' decisions, etc. are some of the other red flags that Birhane brings to the notice of the readers in her original paper.

3. Analysis

Tech monopolies from Silicon Valley or other parts of the global west have infiltrated almost every country through the means of AI algorithms. There are very few countries in the world like China and North Korea where Google and Facebook doesn't dominate the tech space [17] [18]. The average number of users globally using Google every day is approximately 2 Billion [19]. Facebook had 2.9 Billion monthly active users in April 2022 [20]. To make the readers understand the impact of western tech giants dominating Africa, Birhane makes certain claims in her original paper, such as Modern tech colonialism has characteristics similar to traditional colonialism, western corporations use Africa's resources to make money for the western shareholders, etc. Birhane also refers to Shoshana Zuboff's book – "*The Age of Surveillance Capitalism*" [21] to explain how tech corporations enter and conquer a country using technology. These claims are analyzed in this section to verify if they are really true or an exaggeration of the reality.

3.1 Traditional – Modern Colonialism

Birhane often makes references to traditional colonizers in her paper comparing them to today's tech monopolies whom she refers to as "*modern colonizers*". She attributes some characteristics of modern tech giants to that of the traditional colonizers of Africa. Although some characteristics are similar, **traditional colonization is not the same as modern algorithmic colonization**. This is because in traditional colonialism, an entire country asserted unilateral power and dominance over another country. They did not offer a choice to the colonized communities. In algorithmic colonization in today's world, people can stop using certain technologies and the power that these modern colonizers have over the population can be controlled. **People are only algorithmically colonized as long as they want free sophisticated technologies at their fingertips**. Algorithmic colonialism is indeed driven by profit maximization by using human activities as a "raw material" free for the taking. This is because tech giants consider human beings as a natural resource that produces data. This argument is entirely true but when you see it from a neutral perspective, all these large tech corporations offer a service – e.g. search

engine, social media, entertainment service, etc. in return for making use of the data produced by human activities. These services, by themselves, have proven to be extremely helpful to people in some of the most important situations [22] [23] [24].

Even without considering the benefits offered by these services, modern colonialism is better than traditional colonialism in comparison. This is because **traditional colonialism did not offer any commodities or service to the colonized communities but rather imposed military actions to extract valuable resources from them in a more brutal and forceful way**. Therefore, comparing tech monopolies to traditional colonizers seems unfair as the people still have a choice to control and reject these modern algorithms consciously. This might make the lives of people difficult but it is very much under the control of individuals, unlike in Traditional colonialism, where one might get killed or imprisoned if they oppose the colonizers. Let us take China for example, Chinese people and their government decided to discard western-developed AI and invest more in homegrown companies and technologies. This has given monumental rise to local companies like Baidu, Alibaba, Tencent, Ant, etc. **Since these companies are homegrown, they develop AI algorithms for the benefit of local communities by understanding the contextual relevance to the local communities' problems**.

This can be done in any country in today's world whereas in the days of traditional colonization, it took decades or even centuries for the colonized countries to eliminate the colonizers because all the resources from the colonized communities were looted and taken away by the colonizers. Thereby, making the colonized communities impoverished and dependent on the colonizers. I agree that Chinese tech corporations also exploit human resources in other countries in terms of labor but the example of China here is only to refute Birhane's argument that 'Modern Colonialism is similar to Traditional Colonialism' and to support my argument that '**Modern Colonialism can be defeated by the colonized communities with stronger laws and judiciaries**'. China, as we know, is an authoritarian regime and the tech corporations from China creates its own problems in various parts of the world, sometimes even worse than that of western tech corporations [25].

3.2 Age of Surveillance Capitalism

Shoshana Zuboff in her book "*The Age of Surveillance Capitalism*" [21] remarks how the conquest pattern of tech corporations unfolds in three phases:

1. **Inventing legal measures to provide justification of invasion**
2. **Declaration of territorial claims**
3. **Finding a town to legitimate the declaration**

This is an accurate and precise explanation of how tech giants enter and control a market. She explains how companies use declarations by taking a problem out of the market sphere and creating a solution to solve this problem. These declarations are used to impose new facts on the social world and the declarers use it as means to get others to agree with those facts [21]. There are numerous examples in today's world that exactly matches her description.

One example is provided by Birhane herself in the original paper – Facebook declaring that it is creating a population density map of Africa in 2016 without asking anyone's permission [1]. Another example of this conquest pattern is how Google unilaterally declared that the world wide web was its to take for its search engine. When a user enters a keyword in Google, Google search engine crawls through billions of webpages on the internet to find the matching keywords entered by the user [26]. For this Google creates a list of 'known pages' by constantly looking for new and updated web pages on the internet [26].

As a developer, if I create a website and host it on the internet, Google has the tools to access my website and download all webpage urls present in my website to add to its list of 'known pages'. The only way I can prevent Google from crawling through my webpages is if I explicitly disallow Google crawling and by making sure no other website on the internet refers to any of my webpages [26]. **This way Google assigned itself the authority and provided justification that it allows more users to find the website on the internet.** Thereby generating more revenue for the website, but the question here is: who gave Google the authority to crawl any webpage available on the Internet?

Google, in this example, has followed the same conquest pattern that Zuboff had mentioned in her book. First Google found legal measures to provide justification of crawling through almost all webpages available on the internet. Then, Google declared that the internet is its for the taking. Finally, Google legitimated its declaration in over 219 countries in which Google search is being used every day [27].

3.3 Capitalistic Business Model

Birhane vehemently argues in her paper that tech monopolies should not exploit human resources to make more money. This is true as there are many examples in today's world where humans are being exploited as physical workers and also as data points being fed into algorithms but most of the examples that she shares in her paper about western companies making profits, seem to be an attack on capitalism rather than an ethical discussion on the harms inflicted on the African community due to importing of western-developed AI. For example, one of the major concerns that Birhane shares in her paper is that the FinTech microfinancing industry in Africa are owned by western multinational shareholders. Her view is that these FinTech microfinancing industries gives out loans to African people who are in poverty and who don't have access to banking infrastructure. Thereby, leaving Africa's poor communities in perpetual debt and increasing the profits for the western multinational shareholders.

I agree with Birhane's view that exploiting the economic situation of an individual to make more money is wrong from a general perspective **but this argument leans more towards Birhane's personal opinion on the economic system of capitalism rather than an algorithmic colonization of Africa and its people**. Microfinancing industries existed even before the western-developed AI were imported to Africa to select people for financing. This has been a problem for decades and to include this as a

reason to reject western-developed AI seems less convincing to me. **There are also other examples from her paper where she mixes her personal opinions about capitalism and blames it as "Algorithmic colonization of Africa"**. Another such example from her paper is that of Safaricom – a modern fintech company in Kenya which made a profit of $620 billion in 2019 using 'revolutionary' and 'state-of-the-art' technology [1]. Birhane claims that this profit was paid out as dividends to its shareholders – Vodafone and other wealthy foreign investors from the global north, rather than using the profits to develop Kenya. Her arguments were that the western shareholders use these 'revolutionary' and 'state-of-the-art' algorithms as tools to exploit and colonize the people of Africa. **I disagree with her argument in this case as these are generic capitalism problems that also existed before the internet**. These problems exist in almost all developing countries. Since this is not unique to AI or to Africa this does not completely come under the topic of "Algorithmic colonization of Africa".

I conclude this analysis by acknowledging the underlying intentions behind Birhane's paper, such as people should question all AI algorithms before adopting them, making Africa self-sustainable instead of being dependent on western technologies and infrastructures, changing the portrayal of Africa as a continent that is impoverished and plagued to focus more on the vibrant culture and traditions, etc. I believe these intentions are genuine and will improve the living conditions of the people of Africa. **Where I do not agree with Birhane is with some of her examples, as mentioned in this section, where general 'capitalism' problems are misquoted as problems of 'algorithmic colonization of Africa'** in the original paper.

4. Conclusion

Abeba Birhane has offered a clear view in her original paper about the consequences of blindly importing western-developed AI into Africa from both technological and sociological viewpoints.

Her fears on problems, such as **dependency on western AI, techno-optimism without considering ethics, importing western AI algorithms without questioning its underlying purpose and contextual relevance seem valid based on my analysis of her arguments in section 2 (Main Arguments) & in section 3 (Analysis)**. Although her intentions are reasonable, some examples provided to support her argument that western-developed AI is unfit for Africa, such as FinTech microfinancing industries being owned by western shareholders, Safaricom not utilizing its profits to develop Kenya, etc. **seem to be the problems of capitalism rather than the problems of algorithmic colonization of Africa**. These problems will continue to exist even if western-developed AI algorithms are not imported to Africa. Birhane also focuses her criticism entirely on the tech giants and the people who import western-developed AI to Africa **but very little focus is directed towards discussing the role of governments and the judiciary which provides the legal platform for these western tech monopolies to operate in Africa**.

My solution to Africa's problems goes abreast with Birhane's solution:

1. African youth in AI should create their own technologies and infrastructures that serve various local communities to solve their problems rather than blindly importing western-developed AI systems.
2. Some AI algorithms that cannot be built at home, which needs to be imported to Africa from western tech corporations, need to be regulated and audited in order to make sure that it benefits the people of Africa and not some distant western tech corporation.
3. These imported algorithms may also need to be modified as they might have been created with western perspectives. Therefore, it may not fit well in solving the problems of the people of Africa.
4. AI should be used as a tool to aid Africa in portraying how the people of Africa want to be understood and perceived and not from the western perspectives mirroring the bias and stereotypes existing in the real world.
5. Any corporation that utilizes people to make money should be held responsible to answer the questions of the people. Rather than questioning the capitalistic tech corporations whose sole purpose is to make money, it is the government and the judiciary, as the representatives of the people of a country, who needs to be held responsible and questioned for permitting such tech monopolies to deploy unsafe and harmful algorithms in their country. Even in western countries like USA, there have been many instances where individual researchers were fired, demoralized or threatened to be sued when they flagged potentially harmful AI algorithms in large tech corporations [28]. I believe it will be no different in the case of Africa when independent researchers go against large tech corporations individually. Their focus should be on educating the people to force the governments to pass laws that protects the rights of the people. Similar to how GDPR is used in Europe.

These are my solutions to the problems of Africa that Birhane has highlighted in her original paper. These solutions not only solve the problems but also paves the way for a brighter future for Africa where technology is built locally and is utilized to serve and help local people in a safe and inclusive environment.

On a positive note, I see that there is an increase in awareness of the issues that unregulated AI might cause in a society. In recent years, people are also more aware of the problems that arise from trying to solve complex social, political, cultural and economic problems using AI algorithms without fully understanding them. This might be the result of ongoing attempts to integrate ethics into computer science programs within the academia. Thereby creating future engineers and researcher who focuses not only on technology but also on ethics. Creating ‘ethics boards’ within the industry and various AI policy guidelines that have been proposed have also impacted positively on creating awareness about using AI to solve complex problems. These are healthy approaches that help develop, implement, and teach responsible and ethical AI. These approaches need to be appreciated and supported in creating safe, ethical, mutually benefitting and technologically advanced societies in the future.

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