Engendering AI

A Gender and Ethics Perspective on Artificial Intelligence in Africa

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Contents

Executive Summary

As human existence revolves more and more around technology, and the distinction between offline and online spheres of life continue to blur, it is only appropriate to consider the ramifications of creating various forms of life from that technology. One particularly disruptive technology that is changing the way the world operates is Artificial Intelligence (AI). As the science and advancement of AI develops, smart technologies are increasingly being deployed which will have profound ethical, psychological, social, economic, and legal consequences for human society and our planet.

Although AI solutions have the potential to drive growth and development across major sectors such as finance, agriculture, and healthcare, the AI industry is currently still based in North America, Europe, and Asia, with Africa, unfortunately, still underrepresented (Jungblut, 2020).

This is a three-part series that will explore the landscape of Artificial Intelligence (AI) across the African continent through a feminist lens. This first part outlines existing AI applications on the continent, factors that drive or hinder AI innovation, and ethical concerns surrounding the impact of AI on women in the African context.

Subsequent papers will take an indepth look at the lived experiences of African women working in AI in order to adequately highlight the structural and individual barriers to the representation of women in the field. We will also be considering as part of this research, the effect of AI on gender equality on the continent given the heightened vulnerabilities of women and the dearth of gender inclusivity and representation in both the development and implementation of AI systems.

Introduction

AI does not have a universally accepted definition although it is firmly rooted in the field of computing and was consubstantial with its emergence in the 1940s (Miailhe, 2018). Today, it refers to a broad range of disciplines, technologies, and methods. Russell and Norvig (1995) in Artificial Intelligence: A Modern Approach, define AI as ***"the study of methods for making computers behave intelligently."*** Artificial Intelligence is today used as an umbrella term that includes tasks such as learning, reasoning, planning, perception, language understanding, and robotics, and through which one can solve problems by selecting the best possible action in a given scenario.

The American Heritage Science Dictionary (2020) defines AI as the ability of a computer or other machine to perform actions thought to require intelligence. The actions include logical deduction and inference, creativity, the ability to make deductions based on past experience or insufficient or conflicting information, and the ability to understand language drawing on human parallels.

A recent definition from Stanford University's 100 Year Study on AI describes AI as "a science and a set of computational technologies that are inspired by, but typically operate quite differently from, the ways people use their nervous systems and bodies to sense, learn, reason, and take action (Peter Stone et al., 2016).

The Nigeria Communication Commission (2021) defines AI as the development of computer systems that are able to perform tasks that would require human intelligence. Examples of such tasks are visual perception, speech recognition, decision-making, and translation of languages.
The emerging field of AI is a multidisciplinary concept combining Philosophy, Logic/Mathematics, Computation, Psychology, Neuroscience, and Evolution.

In her book, Mitchell (2019) discusses the problems involved in defining (artificial) intelligence. While there are various approaches to defining intelligence in humans - binary, on a continuum and multidimensional - in the field of AI, intelligence is defined largely as either scientific i.e. biological or practical (task solving).
This oversimplification is extremely revealing of the ethical challenges posed by the integration and deployment of AI today. The unwillingness, or perhaps inability of AI researchers to accurately "synthesize" machine intelligence reflective of the multi-faceted nature of human intelligence, in addition to their homogeneity, can not but be discriminatory towards underrepresented groups. Defining AI to mean the embedding of natural intelligence in machines is problematic as historically, certain groups of people such as women and individuals of African descent have been classified as less intelligent than their male or white counterparts. In much the same way, defining AI based on a machine's ability to solve tasks depends on the identification of suitably "complex" tasks, which are determined by a myriad of factors, not the least of which is privilege. In both scenarios, the questions are: Who or what is intelligent and who or what group classifies them as intelligent?

Influenced by Western philosophy, rationality, intelligence and cognition have been defined increasingly in terms of the individual and the individual's self-containment and self-sufficiency - cogito ergo sum - thus downplaying communality and the importance of interrelationships in the development of the person (Mhlambi, 2019). This notion, the very antithesis of the communalism witnessed in African philosophies such as Ubuntu which define the individual as "partly forged in the crucible of community" (Birhane, 2017).

AI is thus a more generic term than it seems. In fact, it is a collective imaginary onto which we project our hopes and our fears. The technologies of AI include, among others, machine learning, computer vision, intelligent robotics, biometrics, swarm intelligence, virtual agents, natural language processing, and semantic technology (Miailhe, 2018). The rapid progression of AI also makes it a powerful tool from economic, political, and military standpoints. Embedded in the digital revolution, AI will help determine the international order for decades to come, accentuating and accelerating the dynamics of an old cycle in which technology and power reinforce one another. It will transform certain axioms of geopolitics through new relations between territories, space-time dimensions, and immateriality (Miailhe, 2018).

The African Context

The integration of Artificial Intelligence in sectors such as energy, healthcare, agriculture, public services, and financial services, is having an increasingly positive impact all over Africa (Novitske, 2018). This impact has the potential to drive economic growth, development, and democratization, reducing poverty, improving education, supporting healthcare delivery, increasing food production, improving the capacity of existing road infrastructure by increasing traffic flow, improving public services, and improving the quality of life of people with disabilities (Pillay and Access Partnership, 2018).

Schwab (2016) mentions that AI forms the foundation of the so-called Fourth Industrial Revolution - Industry 4.0. The technological advancements that mark this new era include Biotechnology, Blockchain technology, the Internet of Things, and at the forefront, Artificial Intelligence. With 7 out of 10 Africans owning mobile devices (World Bank, 2016) and three-quarters expected to be internet users by 2030, access to knowledge is unlimited. Entrepreneurs across the continent have capitalized on this, resulting in the fast creation of tech hubs across the continent, spurring AI innovations (ITU, 2020).

Brandusescu et al. (2017) provide examples of innovative AI use in Kenya, Nigeria, and South Africa to address needs in health, agriculture, fintech, public transportation, and language translation. In Kenya, Sophie Bot (a free chatbot that works on several popular messaging apps) relies on AI to process and reply to questions on sexual and reproductive health. In South Africa, aerobotics is assisting the agricultural industry by using drone aerial imagery to identify problems in crop yields, which is important considering the challenges faced by the industry including sustained periods of drought. In Nigeria, Road Preppers have developed a solution that allows users to navigate traffic congestion with driving directions and public transport options.

Smith and Neupane (2018) provide examples from Uganda, of beneficial AI use in point-of-care diagnostics, government service delivery, wildlife conservation, crop monitoring, water management, enterprise development, and financial services. In Uganda, the Makerere AI Lab is building National Language processing Text and Speech Datasets for Low Resourced East African Languages from Uganda, Tanzania, and Kenya. The speech data is geared towards training a speech-to-text engine for an SDG relevant use-case and general-purpose automated speech recognition (ASR) models that could be used in tasks such as driving aids for people with disabilities and the development of AI tutors to support early education. The lab is also using artificial intelligence to mine data from local village radio stations to generate timely data on crop pests and disease in sub-Saharan Africa since local radio shows are a powerful source of information flow in rural African villages (Makerere AI lab, 2021)

Although significantly more effort can be put into investigating and deploying Artificial Intelligence in Africa, it is already being applied in many different fields and contexts.

More Current Applications of AI in Africa

Innovation	AI Application	Role	Country
Abby	Chatbot	Digital Person banker.	Mauritius
Botter	Chatbot	A bot creation platform that allows users to create courses, track students' progress, message students and train their chatbots.	Ethiopia
CHIL AI	Chatbot, Machine Learning, Automated referrals, drug ordering etc.	Cervical cancer testing and treatment services.	Uganda
COAST	Machine Learning and data collection	End-to-end AI and data systems for targeted surveillance and management of COVID-19 and future pandemics.	Uganda
Crowd Analyzer	Natural Language Processing and Machine Learning	Arabic-language focussed social monitoring platform to analyze posts on social media sites.	Egypt
Data Systems	Adaptive Learning	Education, e-commerce software development services.	Rwanda
Digi Smart Solutions	Machine Learning, Automated Decision Making	Provides smart water management solutions using IoT and AI, offering an intelligent system for managing and controlling water consumption in real-time.	Tunisia
FarmDrive	Machine Learning	Credit scoring platform for smallholder farmers.	Kenya

Innovation	AI Application	Role	Country
HearX Group	Image Classification	Cell phone-connected otoscope that uses image analysis and AI to generate automated diagnoses for common ear diseases.	South Africa
M-Shule	Adaptive Learning	An adaptive mobile learning management platform that is designed to improve academic performance.	Kenya
MomConnect	Helpdesk automation, Machine Learning	An app that connects pregnant mothers to vital services and information.	South Africa
rAInbow	Chatbot	Social enterprise that has built an intelligent, ethical, and scalable solution to tackle the lack of support and the loneliness faced by domestic violence survivors through a chatbot powered by AI.	South Africa
Tabiri Analytics	Automation, Decision Making	Automated cybersecurity services.	Rwanda
Twiga Foods	Machine Learning	A B2B technology-enabled food distribution platform.	Kenya
Ubenwa	Machine Learning, Speech Analytics	Analyses a baby's cry to detect early signs of anomalies.	Nigeria
Wekebere	Data Analytics	Wearable devices for maternal and foetal health care.	Uganda
Zipline	Unmanned Aerial Vehicles	A start-up that uses drones to deliver blood to citizens.	Rwanda & Ghana

Despite the many promises of AI, history tells a different story about the impact of western science and technology in Africa, one laden with extractivism, racism, colonisation and capitalist exploitation and which innovators must be careful to avoid replicating.

Foundations that drive AI innovation in Africa

Strategic Planning and Regulation

Effoduh (2020) mentions that African countries like Kenya, Mauritius, and Egypt have recognized the potential for AI to improve GDP and provide a competitive advantage, they are driving economic expansion by developing national AI strategies and regulations, aimed at advancing investment, talent development, and financial aid. In Mauritius, the strategy focuses on how AI can support the ocean economy, which comprises over 10% of its GDP. It also suggests investment into a maritime Internet of Things (IoT) (Gilbert, 2020). In Egypt, the AI strategy has two pillars: building human capacity and supporting scientific research and innovation. Egypt has also created a National AI Council which is responsible for supervising the implementation of the strategy. Kenya established a Blockchain & Artificial Intelligence Taskforce to contextualize the application of AI in areas of the country's financial inclusion, cyber-security, land titling, election, and single digital identity processes.

Artificial Intelligence Institutions

Sub Saharan Africa is often ranked low by several AI readiness aggregators and publications, a position which could be due to the prioritisation of other necessities and infrastructural needs over Artificial Intelligence. For instance, only 21 of the 32 countries in Africa that responded to a UNESCO 2020 survey, regarded the development and use of AI as a priority in their national development plans (AI4D, 2021) and Mauritius is the only African country with a National AI strategy in Sub Saharan Africa. However, the situation is changing as several African governments have approved and/or initiated AI centers and programmes on the continent to promote knowledge, acquisition, and mobilization of AI.

Ethiopia established the AI & Robotics Center of Excellence, and it is one of the Centers of Excellence which is identified by the Ministry of Science and Technology to be established in Addis Ababa Science and Technology University. The Artificial Intelligence & Robotics Center of Excellence (AI&R CoEs) was established with the aim to create a close collaboration between academia and industries in the fields of Artificial Intelligence and Robotics (The Artificial Intelligence & Robotics Center of Excellence, 2021). Cameroon opened its first AI Centre whose aim is to improve the employability of job-seekers "through transformative education and training systems to meet the knowledge, competencies, skills, research, innovation, and creativity needs required to nurture the future of the AI sector" (ITWeb, 2019). In partnership with Facebook and Google, the African Institute for Mathematical Sciences Center provides a funded one-year intensive graduate program with state-of-the-art training in machine learning and its applications.

Research and Academia

Butcher (2021) mentions that universities and research institutions create the conditions for AI ecosystems to flourish, as they are locations where scientists and engineers who are at the forefront of innovation should be able to experiment with new ideas. Several Centres of Higher Education and Training in Africa have undertaken Research and Development (R&D) activities to grow communities of practice. Some notable examples include South Africa's University of Pretoria's Intelligent Systems Group (ISG), and it's Centre for AI Research (CAIR) as well as the Dedan Kimathi University of Technology (DeKUT) in Kenya.

The University of Lagos launched the country's first AI center, concentrating on deep learning and fostering new talent discovery in the innovation and data analytics field. The iLabAfrica Research Centre has been established at Kenya's Strathmore University to foster cutting-edge research on new technologies such as Big Data, Artificial Intelligence (AI), Blockchain Technology, Cyber Security, Internet of Things (IoT), and Cloud Services (Artificial Intelligence for Africa Report, 2018 p.17-18). In Ethiopia, at least two universities have prioritized activities in the field of AI. The Addis Ababa

Science and Technology University established the Artificial Intelligence and Robotics Centre of Excellence, which has been promoted by the Ministry of Science and Technology. The Centre seeks to create a close collaboration between academia and industry in the fields of AI and robotics (APC, ARTICLE 19 and SIDA, 2019).

Makerere University in Uganda formed the AI & Data Science Research Group, which examines various areas related to AI and data science such as ML methods, computer vision, and predictive analytics. The group has conducted research on the automated diagnosis of crop and human diseases, auction design for mobile commodity markets, analysis of traffic patterns in African cities, and the use of telecoms and remote sensing data for anticipating the spread of infectious disease (AI Research and Data Science Group).

Strategic Partnerships

Effoduh (2020) also states that initiating strategic partnerships has been a major vehicle for AI adoption on the continent. With several African states partnering with international organizations, businesses and governments alike, African countries are legitimizing the use of AI within several sectors domestically.

The government of Zimbabwe signed a strategic cooperation agreement with CloudWalk Technology Co. to undertake a mass facial recognition project (Burt, 2018). Ghana also houses Google's first AI lab in Africa which brings together top machine learning researchers and engineers dedicated to AI research and its applications (Google, 2018). The Government of Rwanda and Babylon Health (operating as Babyl in Rwanda) entered into a 10-year partnership to create Africa's first universal primary healthcare service, which introduced an AI-powered triage and symptom-checker platform (RDB, 2020).

In 2019, the African Union also partnered with GIZ for the Citizen Engagement and Innovative Data Use for Africa's Development (Data-Cipation) project with the goal of developing the continental data policy framework and the digital ID framework (GIZ, 2021)

Foreign Funding and Donor Prioritization

Another driver for AI development in Africa is funding received from foreign governments such as the Artificial Intelligence for Development in Africa (AI4D Africa) program launched by Canada's International Development Research Centre (IDRC) and Sweden's government agency for development cooperation (SIDA) in 2020 (Research ICT Africa, 2021). In a similar vein, research outputs such as My Data Rights (My Data Rights, n.d.) are supported by funding provided through fellowships targeted at policymakers and developers which also contribute to the development of the AI ecosystem in Africa.

There is also a pan-African slant to the adoption of AI by African governments. A clear example is UNESCO's very first important International Forum on Artificial Intelligence in Morocco, which was held in 2018. The forum unanimously adopted the Benguerir Declaration, agreeing on the need to promote AI as a lever for development that focuses on the human dimension and is rooted in human rights principles and standards. The declaration encourages the African Union, regional economic communities, governments, academic institutions, and professional associations, the private sector, civil society, and international organizations to promote an equitable, rights-based, open and accessible to all and multi-stakeholder AI as an instrument for the empowerment of African peoples (UNESCO, 2018).

Hindrances to AI innovation in Africa

Low Trust in AI

Depending on whom you ask in Africa, AI is either a panacea for all of the world's problems or the unavoidable cause of the apocalypse. A huge portion of the fear is fanned by the looming threats of job loss under automation, and evidence of the harms of AI in other countries. Trust in AI is also eroded by the inability to understand how AI works.

These fears are not entirely unfounded. First, Phillips et al (2011) found that AI developed in Western or Asian countries perform better on their respective populations. When such AI is deployed in African nations, they are likely to cause harm on African populations because of the racial and phenotypic differences that were not accounted for in the datasets used in training such AI. Buolamwini & Gebru (2018) give one example of this in automated skin cancer detection systems. Many AI systems rely on algorithms trained with labelled data. When the training datasets do not have labels for skin characteristics such as color, thickness, and the amount of hair, one cannot

measure the accuracy of such AI systems for individuals with different skin types. Such an oversight on the importance of context can have catastrophic effects on people's lives, hence eroding people's trust in AI systems.

The threats around job loss under AI driven automation is another cause for concern around AI deployment in Africa. Currently, Africa has the world's youngest population and by 2030, is expected to make up a third of the global youth workforce (ILO, 2019). This population is most likely to be affected by automation as their occupations of choice (factories, call centres, and distance manufacturing employment) are expected to decrease because of automation (World Economic Forum, 2016). And while the WEF (2020) recently announced that automation would create more jobs, the distribution of these jobs across global markets is not assured. Additionally, these new jobs will require 'upskilling' and 'reskilling', opportunities that may not be available and accessible to many young Africans.

Lastly, trust in AI is diminished by the lack of understanding on how algorithms driving AI work. While public and private institutions increasingly deploy AI-driven technologies, there has been little room for the public to challenge or change algorithmic outcomes that affect them . In Kenya, for instance, Digital ID system known as Huduma Namba, was deployed even with resistance from various sections of the public. In February 2019, the government gave the public 45 days to register on the new ID, and threatened denial of government services to those who resisted (Nyabola,2021). In such a case, citizens are coerced, and this in turn erodes trust in the capabilities of such technologies to be used for good. AI, therefore ,requires a framing that is conscious of power structures and provides meaningful forms of dissent across affected communities(Raji & Dobbe, 2020).

Lack of Educational Opportunities

Lack of quality education in AI and related fields is another prominent hindrance to AI development in Africa. Despite the attempts of African governments to include Science, Technology, Engineering, and Mathematics (STEM) into the curriculum, there is still a significant deficit in the ranks of academic researchers working on AI, such that many researchers currently working in Africa are foreign-trained or subsequently leave to join more developed research communities in foreign universities and institutes as well as large tech corporations abroad. As such, there are just a handful of local AI research centers and hubs in African universities. Worse, many of the efforts to bridge the gap in AI research focuses majorly on technical skills, namely Machine Learning and Deep Learning, or Data Science without including AI or tech-adjacent fields such as Social Sciences or the Arts, necessary to develop ethical, beneficial, and responsible AI development.

Data Deficits

AI is data-driven. The more data there is, the better and more efficient AI algorithms will be at carrying out the analytic and predictive functions they are designed for. In addition, labelled data used to train algorithms need to be representative of the demographics that will use the systems. For AI to effectively be trained for use in African countries, then an open data sharing environment would need to exist.

However, private institutions gatekeep the troves of data that they collect from their users. For instance, Mobile Network Operators – MTN, Airtel, Orange, and Vodacom – maintain databases of hundreds of millions of subscribers, which include identifying information like names and photographs, and in some countries biometrics as well. These companies store very large databases but some do not process the information or sell it to other companies. M-Shwari is also the first large-scale product that taps into digital information (in this case, telecommunication data) of poor and unbanked customers in an emerging market to make credit-scoring decisions. The M-Shwari product allows customers to save for the short term while also increasing access to credit options in the future, which makes customers feel that their funds are "working" for them (Cook & McKay, 2015). Common social media platforms like Facebook, Whatsapp, and other platforms are also producing volumes of data that Artificial Intelligence algorithms require. There were more than 233 million Facebook subscribers in Africa by December 2020 (Boakye, 2021). This data would lend itself to very powerful algorithmic classifications.

On the other hand, while African governments collect large amounts of data through their administrative systems, on their citizens, public data collection through administrative systems such as birth records, pensions, tax records, health, and census are performed infrequently. The data they collect often lacks the granularity necessary to make meaningful inferences about small, sub-populations of interest. For instance, gender and sex-disaggregated data remain undercollected in African countries, making it hard to identify how African women and gender-non conforming people are affected by different issues.

Most importantly, availability of data in both public and private domains does not automatically translate into better AI. Data is neither neutral nor objective. Bias can be encoded into data from how it was collected to how it is interpreted. AI trained on such data can amplify the already existing bias in such datasets, and even entrench them further.

Lack of Appropriate Regulation

In many African countries, the absence of adequate ICT regulation makes the equitable implementation of AI difficult. This state of events has culminated in a piecemeal approach towards regulation on the continent. Under the existing system, AI is ostensibly regulated by a variety of laws

with varying degrees of enforceability under the legal systems of different countries. While some countries such as Senegal and Tunisia have passed Startup Laws that have relevant applications to AI deployment, the majority of the countries are yet to do so, thus impacting startup investments and growth in the respective countries.

A similar situation exists with data governance regulation, where only 28 out of the 54 countries in Africa are in possession of data protection legislation (UNCTAD, n.d.). While the African Union has since 2014, passed a Convention on Cyber Security and Personal Data Protection also known as the Malabo Convention, only about 8 African countries have ratified it, as opposed to the 15 required for the Convention to come to full effect (African Data Protection Conclave, 2020). The absence of data protection renders a country's information ecosystem vulnerable to exploitation by foreign and local actors. In addition, total or partial internet shutdowns which have become increasingly common in Africa, reflect an anti-democratic environment that is inconsiderate of equitable integrations of AI technology, which could repel some investors while simultaneously attracting interest from entities with anti-democratic values into the system.

Ethical Concerns Surrounding AI

As Africa adopts AI, these technologies will be used in imperfect and unequal environments where they may be used by governments for non-democratic ends under political corruption and authoritarian rule. Misused, AI may threaten basic human rights and civil liberties, such as the right to privacy and freedom of expression. Further, the corporate use of algorithms in modern data-processing techniques raises important human rights and ethical issues, including privacy and the protection of personal data. The unwanted social and economic impacts of AI may be felt most immediately by historically marginalized groups. AI's impact on labour disruption and digital divides will likely be more pronounced in Africa (Research ICT Africa, 2020).

It is important to note that the ethical concerns surrounding Artificial Intelligence deployments and integrations will vary depending on the peculiar nature of the environment it is integrated or deployed into. Technology itself, and by extension, its creators and developers, has been rightfully criticized for being complicit in the preservation of social hierarchies with nary a thought spared towards social welfare or change. In fact, the very nature and reality of the persons or groups well-positioned to influence the direction of tech development is typically homogenous and delineated by class, sex, and race thus unsurprisingly, reflecting their biases.

In societies with a history of racial violence and injustice such as the United States, there are a plethora of ways through which technology and AI have been used to foment and perpetuate racial injustice, such as the COMPAS recidivism algorithm which unfairly judged black defendants to be more likely to offend, thereby influencing sentences issued by judges (Larson et al., 2016). Biases in

facial recognition technology stemming from dismal approaches to inclusion and diversity have also influenced the development of AI algorithms that are incapable of recognizing black people in the US (Simonite, 2019) and worse, when used by law enforcement, incorrectly leading to the arrest of black men due to the inability of facial recognition to distinguish between the facial features of black people (Hill, 2020).

In Africa, these challenges, if not holistically evaluated in the pre-integration process could further complicate existing social justice issues especially in the criminal justice system. Worse, these complications could exist along new axes including age, class and ethnicity furthering discrimination.

Colonial Continuities of AI

There is no doubt that AI innovation in both the private and public sectors on the continent is being spearheaded by foreign multinational corporations and technology monopolies. As a result, this innovation promotes profit making and mimics classic colonization. In this case, Africa is seen as a treasure trove of raw data that can be harnessed to improve AI. Not only is Africans' data collected and monetized without their consent, but African populations are used for beta-testing of AI driven technologies whose effects are still unknown (Mohamed et al., 2020). For many of these companies protecting individual privacy rights and promoting fairness is not a priority if such practice gets in the way of mining data, building predictive models, and pushing products to customers (Birhane, 2020).

Exploitation of Africans in AI goes beyond data collection, but also into the erasure and exploitation of African workers embedded in the global AI value chain. A five-year study by Graham & Anwar (2020) found that while African workers in the outsourcing sector played a key role in building, maintaining and improving AI in technology like self-driving cars, their contributions are invisibilized under the hyperbolic claims that AI is developed enough and does not need human training, oversight and intervention. In addition, they only earn a tiny fraction of the profit that these technologies go on to churn for the companies that deploy them (Graham & Anwar, 2020). African AI researchers have also been routinely left out of international AI conferences where key networking and learning opportunities exist. For two years in a row, more than 100 African AI researchers were denied visas to attend the Neural Information Processing Systems (NeurIPS) conferences in Canada (Hudson, 2018; Serebrin, 2019).

A Gendered Look into AI in Africa

One of the biggest concerns for the deployment of AI in African countries is the potential it has to improve African women's lives. AI development means that women can access new forms of work. AI can also be used in more effective content moderation against gendered cyberviolence, precise detection of cancers that predominantly affect people with female bodies, and improved automated responses in femtech chatbots.

Yet, at its current state, African women seem to be left behind in the AI race because of multiple factors. Firstly, African women are underrepresented in AI and Data Science fields. Globally, only 22% of AI professionals are women (World Economic Forum, 2018). Even when women are employed in these roles, very few of them are in top decision-making roles. This gap in representation means that the lived experiences of African women are omitted from the product development cycle, and that AI technologies are not designed with their needs and desires in mind.

African women stand to be disproportionately affected by AI bias. One cause of this bias lies in the issue of datasets. Historically, traditional data sets left out women and other marginalised groups (Ahmed, 2020). Additionally, African countries lag in collecting gender and sex disaggregated data, with indicators like digital access and participation being completely ignored.
Without adequate data on African women, algorithmic systems could potentially amplify this erasure, and even create new biases against African women. One example of this is in the fintech ecosystem in Africa, where digital lending apps use data on credit histories and even internet browser activity to determine credit worthiness. The dearth of gender disaggregated data on digital participation coupled with the fact that women access the internet less frequently because of the gendered digital divide means that they are more likely to receive lower credit scores than men. This directly affects their ability to secure loans and investment opportunities.

African women with intersecting identities stand to experience multiple levels of AI bias. Research has found that race, gender identity, sexual orientation, class, disability status and other identity markers directly influence one's experiences with AI driven technologies. Already, automated decision making systems are being used to surveil marginalised groups and criminalize poor people (Eubanks, 2019). Buolamwini & Gebru (2018) found that darker-skinned Black women are more likely to be misidentified by computer vision systems, especially when compared to their white male counterparts. AI also excludes trans people and reinforces gender normativity as data that the systems are trained on is collected in binary form. Data deficits can also contribute to this intersectional exclusion of African women. For instance, data on sexual orientation, gender identity and even HIV status are deemed sensitive and private, hence are not made publicly available. These data gaps make it hard to identify how AI systems perform across such omitted dimensions and make it even more difficult to assess the harms that people with such identities face under automated decision-making systems (Tomasev et al., 2021). While evidence on how the intersections of race, gender and class shape women's experience with AI in the US context, there needs to be more of this kind of research in African contexts.

Lastly, AI's biggest threat to African women lies in its potential as a tool for malign purposes. As most AI tools are designed by white men from the Global North, they are rarely assessed for their effects on women's privacy and safety. AI driven technologies like smart home devices and facial recognition technologies have been proven to pose safety risks to women as they can be used by abusive spouses and employers to track and monitor their movements. Deep fakes, which are AI generated images, pose threats to the careers of women in public life as bad actors use them to generate doctored nude images of them, known as deep nudes, tarnish their public image. Women who are not in public life, too, are put at risk of social, reputational and career damage when deep nudes are used against them. For equitable AI innovation, it is important that AI developers start thinking of the safety and privacy of women users, with a keen focus on marginalized women.

Conclusion

AI is one of the most discussed, and anticipated emerging technologies today, with inspiring and advantageous use cases growing on a regular basis. Globally, the use of AI is growing more widespread with diverse applications and benefits. Organizations around the world realize the immense benefits that could be reaped by adopting this technology. Big Tech companies, such as Google, Amazon, Facebook, and Tesla have also been showcasing the successful application of AI systems (Wakefield, 2016).

However, as we've noted above, AI is also a double-edged sword, and concerns have risen over its harmful effects and ethical implications including but not limited to security concerns, lack of standardizations and accountability, and bias.

In order to reap the benefits of AI technology and minimise its harms, it's important to view through various lenses the state through which AI impact is established and viewed. Our report hopes to contribute to the wider conversation surrounding AI deployment through a unique(ly) feminist African perspective in hopes of broadening the existing knowledge base.

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