# *The Evolution of Artificial Intelligence (AI) and its impact on Women: how it nurtures discriminations towards women and strengthens gender inequality*

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## Abstract

*Artificial Intelligence is growing fast, impacting our lives in ways we do not even realize. However, the evolution of Artificial Intelligence (AI) is deepening the gender gap. Regulations regarding AI are lagging in so many fields, even more so when it comes to human rights and, more specifically, women's rights. Understanding how Artificial Intelligence could benefit women and working toward that objective is of the utmost importance in order to achieve gender equality. The article looks into the evolution of AI, women's contribution to this field, and most importantly, the impact AI can have on women's rights.*

*Keywords— Artificial Intelligence, algorithms, women's rights, gender gap, STEM, regulation.*

## I.    INTRODUCTION

Even though women account for fifty percent of the world's population, they remain a minority. The evolution of Artificial Intelligence proved to deepen the gender gap and is more a curse than a blessing for women. Artificial Intelligence (AI) is growing fast, much faster than we think, and it is impacting our lives in ways we do not yet grasp. It seems that nowadays, we are playing catch up with the Artificial Intelligence evolution. Unfortunately, we are lagging in so many fields, mainly in terms of regulation and women's rights. It will be nearly impossible to fix the issues if we do not move fast and find ways to move at the same pace as Artificial Intelligence to protect women's rights and human rights.

Moreover, the current pandemic context is not helping women's situation. Indeed, the COVID-19 pandemic did affect women more, so the efforts need to be doubled, not only to gain more rights but also to keep the already earned ones that can no longer be taken for granted.

Artificial Intelligence is moving much faster than gender equality. It is starting to have disastrous impacts on women's lives and humanity in general: it is growing exponentially and becoming a superpower that is not always working for the benefit of humankind. As much as it is essential to keep striving for more gender equality and more diversity, we must think about how Artificial Intelligence could benefit all of humanity, not just fifty percent of humanity, leaving the other half behind: women.

## II.    WOMEN PIONNERING AI

The world's first coder was a woman, but very few people know it. Ada Lovelace (Augusta Ada King, Countess of Lovelace) was an English mathematician and writer of the 19<sup>th</sup> century, daughter of Lord Byron, renowned poet and politician. Ada Lovelace has published the first algorithm to be executed by a machine. Hence she was the first to discover that machines actually had applications that could go beyond pure calculations. That is how programming was invented [1].

Though women pioneered this field, currently, Artificial Intelligence is primarily led by men, hence suffering from gender inequality. Today, women account for just 22% of people working in Artificial Intelligence worldwide [2].

According to the UNESCO Institute of Statistics, one-third of the world's researchers are women [3]. Over the last decade, the number of female graduates in STEM (Science - Technology - Engineering - Math) has been growing, but they remain a minority. The Gender Gap is significantly large in the fastest growing and highest paying jobs of the future of STEM. The underlying reasons for this setback are social beliefs and gender bias. According to the American Association of University Women (AAUW), girls'

professional and educational interests are shaped by their environment, and stereotypes lower their aspirations to enter the STEM fields [4] The prevailing stereotypes and the bias of associating males to STEM fields and females to arts eventually lead to fewer women working in the STEM fields. The fewer women in those fields, the less visibility, fewer role models for young girls to project themselves in STEM, which eventually leads to fewer women in these fields' decision-making processes.

## III.    DISCRIMINATIONS TOWARDS WOMEN

"[Gender inequality] should shame us all in the 21st [century]. Because it is not only unacceptable, it is stupid"- UN Chief Antonio Guterres.[5]

Women not only contribute to the development of their families but that of the whole community and the coming generations. However, the social problems impacting women are not affecting women only; but they affect society as a whole. When women do not have control over their lives and choices, their kids pay the price, meaning the next generations. Thus, gender equality is not just a women's issue; it is a society's issue because it impacts everybody.

The first generation of airbags killed more women and children than it saved as those airbags had not been designed with them in mind. The main reason being that the engineers' team that developed those airbags was male-only, so they created them and tested them on an average male body. [6]

Most of the users of popular health tracking apps and devices are women. Yet, the original versions did not include a way for women to track their menstrual cycles, even though periods are a fundamental component of women's health [7].

Women are usually complaining of being cold in offices, especially during summer; this is due to the fact that the algorithm that regulates office temperature was defined in the '60s for the average male wearing a suit [8].

The algorithms of employment platforms, such as LinkedIn, have been gender-biased. For instance,

they would show the high-paid jobs more frequently to men than women as more men were initially looking for highly paid jobs, so the algorithms just started displaying those jobs post to men [9].

Artificial Intelligence's rapid and accelerated evolution feeds discrimination towards women. Considering that most of the people working on the algorithms are men, women's interests are rarely, if at all, taken into consideration. This element, coupled with the fact that data inputted into algorithms reflect the biased present-day reality, keeps on reinforcing the bias and stereotypes towards women, ergo depriving them of accessing the same opportunities as their male counterparts.

## IV.  THE EVOLUTION OF AI AND ITS HEGEMONY

Change is a given, and adapting to change is a necessity. Humans have lived through three main industrial revolutions. Still, this fourth one may not only change our habits, our behaviors, our interactions with others, the way we perceive the world around us but also change the face of humanity. We do not know how, when, or what the future will be like with artificial intelligence. Although, what we know for sure is that it is happening much faster than we think and impacting our lives in ways we do not yet even consider or realize.

In his book, AI Superpowers, Kai-Fu Lee, a prominent futurist and Artificial Intelligence expert, explains the four different phases of AI's evolution and how those different stages impact our lives [10].

- The First Wave: Internet AI. This first stage was essentially defined by algorithms growth. In this phase, the world was exposed to recommendation engines that learn from user data to provide personalized content to each individual.
- The Second Wave: Business AI. During this phase, algorithms are trained on a wide range of data sets that enable improved decision-making processes.
- The Third Wave: Perception AI. In this phase, the digital world is merging with the

physical world. As a result, sensors and smart devices proliferate around us: smart homes and face recognition are part of daily life.

• The Fourth Wave: Autonomous AI. This final stage integrates all the previous ones and enables machines to sense, respond, and interact more intuitively with the world around us. This gives Artificial Intelligence the ability to replace human labor, consequently having a significant economic impact. According to PWC, by 2030, AI will contribute nearly $16 trillion to worldwide GDP [11].

Looking at the market capitalization's growth over the past three decades shows the power shift that came with the development of Artificial Intelligence. For example, the combined market capitalization of the five companies united under the acronym GAFAM (Google, Apple, Facebook, Amazon, and Microsoft), the five biggest US tech companies, had reached by January 2021 approximately USD 7.2 trillion

[12]. By comparison, the United States, the world's leading economy, has a GDP figure in the first quarter of 2021 of USD 22.6 trillion [13]. Hence, the cumulative valuation of the five GAFAMs makes this group the third-largest economic power in the world after the United States and China, and ahead of Japan and Germany, therefore establishing its hegemony.

## V.   WHY ARE REGULATIONS LAGGING BEHIND AI?

Nowadays, governments, institutions, and NGOs seem to be constantly catching up with technology and regulations to control and amend its impacts and effects on human rights. Yet, they are still lagging several steps behind largely because the growth of technologies has been underestimated. According to Ray Kurzweil and his Law of Accelerating Returns, technology is moving exponentially, whilst the human brain is accustomed to a linear evolution. The implications are that we usually overestimate the rate of technological acceleration in the short run but underestimate it in the long run [14].

Peter Diamandis, Singularity University co-founder together with Ray Kurzweil, has used an excellent metaphor to explain the Law of Accelerating Returns. If we took 30 linear steps (1-2-3-4-…-30) of one meter each, we would have walked 30 meters. On the other hand, taking the same 30 steps exponentially, which would mean doubling the steps every time (1-2-4-8-16-32, etc.), would be equivalent to going 26 times around the earth [15].

This metaphor illustrates why regulations, governments, and UN Nations have been left lagging in this race. Although they have left the starting blocks simultaneously, they are running at a linear pace whilst competing with an enhanced athlete. The latter runs much faster, exponentially, and leaves the institutions and regulations behind, hence us humans, with no possibility of any kind to catch up or potentially win the race.

This race has never been fair and will never be, as the more the athletes run, the more one keeps learning how to run faster, while the other is constantly running into hurdles and

trying to overcome and fix them. This describes the current situation with Artificial Intelligence regulations.

## VI.   WHAT ARE THE THREADS OF THIS RAPIDLY-PACED EVOLUTION?

Evolution is not always synonymous with progress, especially when it comes to Artificial Intelligence and human rights. From a technical standpoint, it is clear that Artificial Intelligence has indeed tremendously improved our lives. From the Internet of Things and connected houses that ease our daily lives to machine learning and algorithms that make predictions or recommendations on the music we listen to or movies we watch. Still, from a social and more human standpoint, the reality is different. Artificial Intelligence is more of a revolution than an evolution. Artificial Intelligence has not helped women nor their role in society.

On the contrary, a leap backward has been made, and, in some cases, gender discriminations have worsened. Artificial Intelligence is a tool, but it is far from being flawless.

It does learn from its errors, as it is its way to grow. Nonetheless, it does not understand the impact of its errors. The more it evolves and grows, the broader the spectrum of new errors becomes. Society changes, mentalities evolve, but the technology mistakes are unacceptable to the least and are not reparable to the worst. Artificial Intelligence can adapt by analyzing how its actions impact the environment, but it cannot demonstrate common sense or self-awareness.

What to expect from a tool which recently confused Black people with apes? In 2018, Google's image-recognition algorithm confused black people with gorillas, and as a response, Google blocked the words gorilla, chimpanzee, and monkey [16]. Unfortunately, not fixing the issue and trying to solve it at its source and just curtailing enabled this scenario to reiterate. This year, Facebook's facial recognition tool has labeled black people as primates [17]. And again, their response to this unacceptable mistake: Facebook switches off the recommendation function. History repeats itself.

## VII.    HOW TO PROTECT WOMEN'S RIGHTS IN THE FUTURE?

Artificial Intelligence reinforces the existing bias against women because it is mainly about algorithms, data inputs, and outputs. Moreover, the data injected in the algorithms are based on the picture of today's world, which is biased, and those algorithms will thus contribute to more inequalities.

Women play a central role during the pandemic. They account for 70% of the world's health workers, and women in STEM have been leading research on viruses and vaccines [18]. Despite that, COVID-19 coupled with the economic crisis affects women more both socially and economically. In some countries, governments deprioritized gender equality from their agendas. According to the Global Gender Gap Report 2020, it will take 100 years to achieve gender equality in the workplace [19]. But with this crisis, it may be even more than a century before the goal is reached. Efforts must be doubled, and raising awareness is more crucial than ever.

The Human Rights Council report "The right to privacy in the digital age" warns about the disastrous and catastrophic effects technology can have on humans and human rights [20]. Furthermore, it states that the impact of Artificial Intelligence on humans has been poorly evaluated, which created severe discriminations that could stigmatize or even be harmful to human lives. Hence, according to the report, it is crucial to act fast and implement safeguards to prevent and minimalize any other detrimental impact that Artificial Intelligence could bring.

Artificial Intelligence needs to be an enabler and not an impediment to protecting women's rights in a future with omnipresent technology. So how can it help break stereotypes against women and support women and their rights? Leveraging technology for the good of women and human rights is a key priority. So instead of reinforcing the bias against women by injecting the current picture into algorithms, it is crucial to have more women at the table so that the algorithms that are created ad hoc reflect a fair and equal future.

It is imperative to start thinking about how Artificial Intelligence could and should benefit all of humanity by having women fully integrated into the Artificial Intelligence discussions and part of the decision-making process. These debates and conversations should be about challenges today, how to fix the current issues and tomorrow, and how to preempt any further issues causing discrimination or more inequalities. Thus, it is not only about women today but also about both women and humanity tomorrow.

## VIII.    CONCLUSION

Change is a given, and embracing change a necessity. However, with the fast-paced evolution of technology, it is derisory to think that it can be slowed down. Events have shown that Artificial Intelligence is starting to have disastrous impacts on women's lives and humanity in general: it is growing exponentially and becoming a superpower that is not always working to benefit humanity. On the other hand, regulations have been trying to catch up with the rapid development of Artificial Intelligence, trying to fix

and overcome the issues that it created. Nevertheless, that approach proved not to be optimal. Now is the time to adopt a different methodology and ride the wave rather than swim against the current.

It is crucial to include women in the discussions and decision-making process to avoid jeopardizing the gains made so far regarding women's rights.

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