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# Social, Economic, and Ethical Consequences of AI

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**Abstract**

Advancement of AI technology has enabled more expansion of its application area. From medical treatment, gaming, manufacturing to daily business processes. Huge amount of money has been poured in AI research due to its exciting discoveries. Technology giants like Google, Amazon are one of the driving forces in the field today. But the rapid growth and excitement that the technology offers obscure us from looking at the impact it brings in our society. This report gives a brief introduction to AI and summarizes various impacts of AI in our lives and society today. The report focuses on social, Economic and ethical issues that are currently facing the AI field. It has been compiled based on the analysis of available articles and other sources which are addressing the issue together with a personal view.

Keywords: Artificial intelligence; Robots; Economy; Ethics; Drones

## 1 Introduction

Although Artificial intelligence came into existence in ancient times, it way only in 1956 where the official name was formally born [1]. Since that time AI research has undergone a period of optimism and disappointment due to the slow progress which was observed. There was a fluctuation in progress made until after 1993. Research began to pick up again after that, and in 1997, IBM's Deep Blue became the first computer to beat a chess champion when it defeated Russian grandmaster Garry Kasparov [2]. This was the beginning of the new era in the AI field.

In the last two decades, much has been done in academic research, but AI has been only recently recognized as a paradigm shift. A lot of progress are now being made as the investment has been going into the field. AI researches highly depend on funding since it's a long-term research field and requires an enormous amount of effort and resources.

There are all kind of application of AI that we can think of today. Managing our environment, economy, security, infrastructure, food production, healthcare, and to a large degree even our personal activities are now an application area for artificial intelligence. Using AI techniques in predicting deforestation before it happens, NASDAQ stock now monitors trades to see if insider trading is going on, NASA use of AI methods to schedule payload operation, diagnosis of acute leukemia, breast and pancreatic cancer and also predict patient survival with breast cancer, to car automation and many other areas [3]. These application area highlights the importance and the benefits that the AI technology brings us today.

## 2 What is Artificial intelligence?

Artificial intelligence or machine intelligence can be devoted as an activity of making machine intelligent. That intelligence can be seen as the quality that enables an entity to function appropriately and with foresight in its environment [4]. But artificial intelligence research defines AI as the study of intelligent agents, an agent that can perceive its

environment and takes an action that maximizes the outcome or goal [5]. Advancements in computing power, theoretical understanding and large amount of data has enable AI techniques to be an essential part of technological revolution and in helping to solve many complex problems of our daily life.

AI is a disruptive innovation on its own. It has open new possibilities of solving complex problems which was never being imagined before. Take an example of recognizing object from images which was just seems as a sci-fi of AI few years ago but now a simple conventional neural network sits at the back and do the work [6]. All this may just be the begging of the new era of technological advancement. Huge amount of money has been poured into AI research due to its exciting discoveries and as the days goes on its getting better and better. But perhaps the capabilities that the AI brings obscure us from looking at the consequences that come with it. In this paper we try to review the current social, economic and ethical consequences that AI technologies will bring.

Artificial intelligence, referring to the creation of intelligent hardware or software, able to replicate "human" behaviors such as learning and problem solving, is a field of computer science that has been the subject of people's imaginations and science fiction movies for decades.

## 3.Social Economical and ethical consequences of AI

Social consequences involve those effect which the technology will directly or indirectly impact our life from individual perspective, community and the society at large. Integration of AI is now transforming our daily life inevitably [7]. We are using different product powered by AI without even noticing. Google assistant, Amazon's Alexa, Roomba vacuum cleaner, chatbots and many other products in our world today are mostly powered by AI technology. With all these technological advancements the society will face further challenges in directing and investing in technologies that benefit humanity instead of destroying it or intruding on basic human rights of privacy and freedom of access to information. The popularity of the technology has been assisted by the increase in computational power and large amount of data been produced [8]. The excitement about AI and its future impact on health care, our economy, climatic changes and education system is promising. Below are some of the application area that the AI has a huge impact on social aspect of our daily life.

The technology giants like DeepMind (Alphabet), Microsoft, Amazon, IBM and Facebook are now taking consideration of the ethical and social implication that AI will have on the society. One good example among them is the DeepMind company which has opened a research unit which is focusing on the social and ethical implication of the AI it is creating. Although the technologies are developed to help solve human problems they may also be disruptive, with uneven and hard-to-predict implications for different affected groups. In his interview the co-founder of DeepMind Mustafa Suleyman said "A tech company that applies its technology without due consideration for ethical and social implications is destined to be a bad tech company" [9]. Despite of AI progress few ethical issues have been presented. With the technological approach to be human like, the threats and unpredictable complication cannot be overseen.

Although current AI offers us few ethical issues that are not already present in the design of cars or power plants, the approach of AI algorithms toward more humanlike thought portends predictable complications. The following are some of the social and ethical issues that needs to be addressed at present time in the AI field.

### 3.1 Unemployment

With the automation of processes dominating the AI field. Job displacement is one of the huge consequences that AI will have. In the past decade human have relied on physical work and investing their time to earn. With the

technology been in practical to a wide variety of industries, machines are performing far better and more efficient than human, hence replacing human is not an option if the business wants to survive. This brings a bigger question of what these all people will do after losing their jobs to machines. With the technology still rising and smart intelligent robots been to developed Elon Musk predict the future where being paid just for being citizen will be important in helping to combat the job stealing automation[1]. Despite of the threat, a look of some automation like autonomous vehicle seems as a good ethic choice as it will help in significant reduction of accident if successfully implemented. One study conducted by Morgan Stanley team led by Elga Bartsch found that 47% of total US employment is at risk of being replaced by machines over the next two decades [2]. AI related jobs are now dramatically increase in demand. According to the [3] the AI skills requirements in job-listing has continue to growth multiples times from year to year.

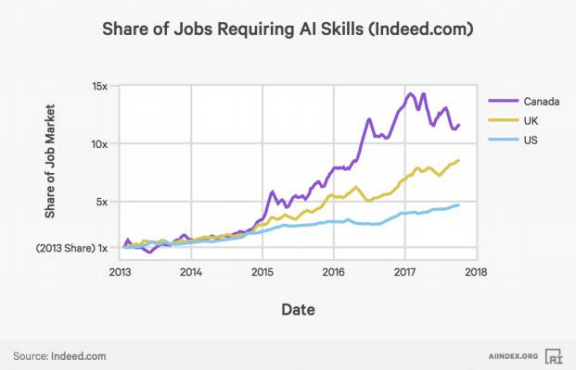


**Figure 1: Job requirement for AI skills (Source)**

These statistics indicates the increase need of AI skills to survive on the job market. But on the bright side the replacement of machine could finally see human doing what they like and other non-labor activities like family caring, community activities and found other new ways to help the society.

### 3.2 Inequality

Another dramatic effect of the AI technology is the widening of wealth gap. As the technology cut off human workforce in different companies, this means the revenue will go to fewer people. Hence AI driven companies will make all the money while fewer people will benefit. Although some people argued that the automation won't be the source of increase unemployment still it can destroy middle range jobs while increasing those on the low and high-end jobs. This will augment the social inequality and amplify the gap between low and higher end job earnings [4]. The AI startups are now benefiting from the investments as the potential of the technology indicating its potential towards businesses.

This bring the initiative for the society and their governments to crease policies that will supervisor and ensure equal distribution of wealth among individual to combat the increasing gap. This can range from increasing taxes to those companies and exposing more people to the technology. Future generation needs to be prepared for the future technology and current worker skills needs to be enhanced either by inventing and being creative of controlling the automation itself.

### 3.3 Humanity

With the rise of artificial intelligence bot, modern human interaction is also changing. A remarkable artificial intelligent bot named Eugene Goostman won the Turing challenge for the first time [5]. IN this challenge the bot interacted with human in a text input format and the user were required to guess whether they were chatting with machine or human. The bot fooled more than half of the human raters into thinking they have been talking to their fellow human being.

This marked as the milestone and the beginning of the new age in which the humans expose and

interact more frequently with machines as they do with other human. Unlike human nature of being tired and changing mood, these machines are more efficient and have a wide environment and resources of making relationships with humans. The chatbot of today not only can answer a variety of human question but also have the ability to establish emotional connection with human themselves[6].Sooner we are going to see more of these intelligent bots in customer services and support which means a job loss to some extent for humans who used to perform those kinds of jobs.

We have already started to see the beneficial use of the bots. One good example is the visabot which help a user better understand American immigration laws and apply for the right visa based on persons need. The chatbot helps in smoothing visa processes, save time, and ensure already filled in visa forms [7]. On the other we have seen some of the chatbot which has been created and deployed to social media to learn from humans as they interact. A good example is the Microsoft chatbot which was created to interact with people on social media but end up adapting the bad side of conversation as they interact[8]. This serves as an example of the need for guidance on the purpose of the chatbot we are creating. There has been many positive story and use of chatbots, but the question remains will they create a society of its own on the already disconnected world of social media or will they help to shape up the behavior of the humans which in some extent has already degraded.

**3.4 Artificial stupidity**

With unpredictable behavior of humans, learning from them can sometimes be difficult. The data that the AI technology is using to train and learn mostly does not cover all the aspect of human behavior.

Intelligence comes from learning, whether you're human or machine. Systems usually have a training phase in which they "learn" to detect the right patterns and act according to their input. Once a system is fully trained, it can then go into test phase, where it is hit with more examples and we see how it performs.

Obviously, the training phase cannot cover all possible examples that a system may deal with in the real world. These systems can be fooled in ways that humans wouldn't be. For example, random dot patterns can lead a machine to "see" things that aren't there. If we rely on AI to bring us into a new world of labor, security and efficiency, we need to ensure that the machine performs as planned, and that people can't overpower it to use it for their own ends.

**3.5 AI bias**

For human to be intelligent they need to learn so as do the AI systems. But the imperfect nature and of humans creates a bias environment when it comes to the dataset the models are learning from. Although the capacity and speed of processing of AI is beyond humans for now, we cannot fully trust it to be fair and neutral [5]. One good example could be a criminology prediction system which was observed to be bias against black people [9]. Although the model proved to be accurate still the assessment of the prediction together with the errors produced was not assessed enough. Here comes the question of the purpose and the impact of the technology on people's lives. The analysis and handling of the technology needs in depth exploration of the results its produced and not only rely on the accuracy. Handling these system to non-expert to rely on can be more detrimental than it looks. Although the systems are building to serve our social progress the bias nature of human can still be propagated if not handled carefully.

In another research conducted by Massachusetts institute of Technology together with Stanford University were the team examined the three facial recognition system and broke down the accuracy and broke down

the accuracy of the result based on gender and race [9]. The researchers noted biases in the results produced and noted that that classification bias came from the dataset used to train the model. So, of the researchers in AI argues that the biases in the kind of the system we produced can be reduced by diversifying the workforce that are involved in building the systems or even making the researchers aware of the biases that exist in their work.

### 3.6 Security

With the amount of effort and investment that some of the government put in to AI research is finally paying off. Autonomous weapons are now being developed at a rapid pace. Powerful nations are battling each other to become the leading power in autonomous weapons. From military drones, automated warfare jets, to robotic soldiers all are already in the ground field. The increase power of destruction that the technology is adding is far beyond measures. Talking about nuclear, aerospace, cybersecurity and biotechnology these are priority areas for countries national security.

Although everyone utilizes the technology for protection, it is more important to focus on the impact and the purpose the technology will serve. Cybersecurity is becoming even more important now as the fight won't only be on the battle ground but on the systems, we are building ourselves. Big countries like US, China and Russia are racing each other towards global dominance of the AI technology. A quote from the Russia president Vladimir Putin said, “Artificial intelligence is the future, not only for Russia, but for all humankind,” and he also added to that by saying “It comes with colossal opportunities, but also threats that are difficult to predict. Whoever becomes the leader in this sphere will become the ruler of the world.” [10].Other giant country which is China have even announced its ambition of becoming the leader in AI technology by year 2030[19]. This shows the race is on and only time can tell the outcome of the system that are faster and more capable than human by order of magnitude.

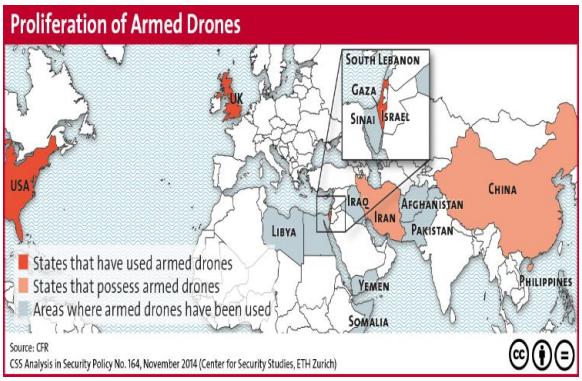


**Figure 2: Proliferation of Armed Drones (Source)**

### 3.7 Evil genies

With many unanswered question within the AI field today, new questions and unknowns continues to erupt as the technology progresses. The evil within the AI is not what we see in Hollywood movies of machines turning against humans, but rather is the mechanisms that the AI uses to solve the problems which we did not intended do that way. One article provided [5] a clear understanding of this concept by an example on place. Image we are asking an AI system to provide a solution to eradicate cancer in the world. After lots of computation the system gives the formula to eradicate the cancer by killing all the humans. In this example we can clearly see the machine achieves its goal efficiently but, in a way, that we did not intend. So as useful as it is the technology still needs to understand the full context of the environment in which we want to find a solution for that.

### 3.8 Singularity

With the exponential growth of the technology, some of the AI researcher argues that the stage in which the machines surpass human intelligence is getting near. At that point is when the progress of the technology is

controlled by the machines themselves [11]. That is the so called "Singularity" or other call its artificial super intelligence (ASI). Although this seems far distant away, but some of the technology guru like Ray Kurzweil now a chief engineer at Google predict this to happens in the next 20 to 25 years [12]. Currently machines are trained to be intelligent in a specific area or task unlike humans which can accomplish a certain task although it's not an area of expertise. As the AI technology grows exponentially its rather sooner than later we start to see machine that can accomplish different task as human do and not only accomplishing the task with precision but also anticipating the coming future. The question remains whether the machines will take advantage over us or will we still have the control over those intelligent machines we build?

### 3.9 Robot rights

The art of the robots we are building is no longer focusing on electrical and mechanical functionality rather the focus is for now is how intelligent it is and how well the robot improves its behavior as its learns from the environment it is in. The initial idea of the robots was more of assisting manual works in industries and have evolved ever since. In today's world not only, the robots are in our industries the expanded idea brought us to human like robots who can socialize and assist humans in various form. "Sophia" one of the recent humanoid robot developed by the Hanson robotics are now working to supplying Sophia with personality content and cognitive, linguistic, perceptual and behavioral content aimed at enabling loving interactions supportive of human self-transcendence in their joint project with the Institute for Noetic Sciences (IONS) in a project called "Loving AI" [13]. As the technology progresses these robots are becoming more complex and life like. Another good example is the "Spencer robot" which assist passengers to navigate to their departure gates at the Schiphol airport [14]. Apart from humanoid robots we also have autonomous cars. All these needs a set of rules like the humans which are being trained to be like them.

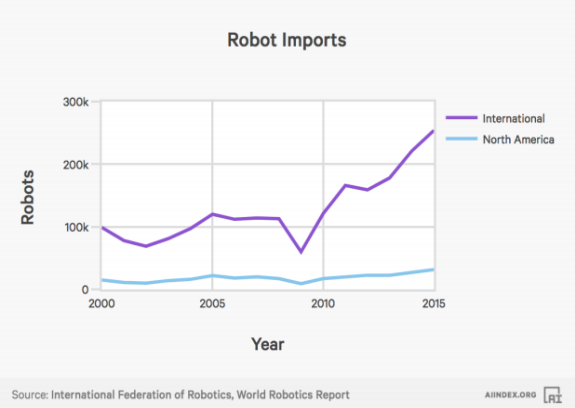


**Figure 3: imports of industrial robot units into North America and globally**

Some of the ethical questions would be to ask ourselves how we should treat and deal with them. Should will treat them differently from animals? this makes more sense as they intelligence of the machine improves as its learning from its surrounding. Again, who is in control of them, who should be held accountable if they do any damage. All these and many other questions are still in its early stages to be answered. Governments should take initiative to ensure they put proper laws and policy at earliest for the manufacturer to develop their robots surrounding those safety policies. But with all the risks involved, the positive impact the AI technology is changing our live to the better with the aim of serving humans not overpowering them.

## 4 Economic impact of AI

Like in early days when electricity was discovered and brings about industrial revolution, the same is predicted for the AI technology to bring another industrial revolution. In an article posted by [15] four sectors that will see the tremendous effect of AI technology are the Manufacturing industries, Professional services, Financial services, and wholesale and retail. Some countries are

already starting to take an advantage of the opportunities presented by the technology today. One of the country is China which has even sets its goal of become the global leader in AI research by 2030[10].With a massive population of around 1.4 billion in which 730 active internet users, the country sees its potential in collecting data and the technology becoming more hungry for data. It's clearly seems that the AI is going to become the new power house for the countries and investment in research will be crucial for the country break through and beneficial utilization of technology.

According to research conducted by Accenture one of the leading global technology company on top twelve global economic leaders revealed that the AI technology could double annual economic growth rates in 2035 by changing the nature of the work and creating new relationships between man and machine[23]. This indicate an increase in absorption of AI in our economies. The technology will continue to offer amplification and transcend of the current capital and labor capacity to propel our economic growth. Although the initial phase will be more on industrial and manufacturing side, consumers will be the next frontier as variety of AI product will finally be on the market.

## 5 Conclusion

With the exponential increase in AI technology, it is time for the people and their government to embrace the technology instead of fear for change. It is also clear that the complication of the challenges that the technology presents is also a concern. We need to ensure we prepare for the better future and benefits where people will use the technology to simplify their tasks rather than thinking of being eliminated. Governments and other policy makers should collaborate with the researchers to try and steer the technology towards serving humanity as the impact of the technology spans globally.

As we are in data driven era, the use of people data should be make transparent and making people understand on the clear use and protection of their privacy.

As the computation power advances and more data being generated, researchers together with the community should focus on making both technology and people working more together rather than an increasing the gap. Different organizations, associations and individuals are becoming global examples in collaborating to take actions and measure against the challenges that the technology presents. Organizations such as Algorithmic Justice League which highlights the algorithmic bias and let the people raise their concerns and experience to develop best practice and accountability. The petition to UN urging rapid action on weaponized AI will help global engagement. The AI4All which aims to train new and more diverse generation of the future AI technologist, thinkers and leaders [3]. The is a need for global engagement for AI to stimulate and enforce policymakers to take appropriate actions.

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