The future of Artificial Intelligence (AI) and the challenges for its regulation

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Abstract. Artificial intelligence (AI) has rapidly advanced in the past few years and has become an essential part of our daily lives, transforming the way we communicate, work, and interact with technology. Today, AI is a rapidly growing field with many applications in various industries. AI-based technologies are used to improve efficiency, make better decisions based on large amounts of data, and automate routine tasks. As AI technology continues to evolve and expand into new areas, there is an increasing need for regulatory frameworks to ensure its responsible development and use. Regulating AI presents multifaceted and complex challenges, requiring an understanding of both the technology itself and its potential impact on society. Control of privacy and data security and control of autonomous systems are examples of areas that need regulation so that the evolution of these systems does not negatively affect people's lives. This article explores the development and current state of artificial intelligence in our society, the challenges that face its regulation, and predictions for its future. The article discusses the evolution of AI from the mid-20th century, when computer scientists started exploring the possibility of creating machines capable of simulating human intelligence, to the present day, where AI is already a part of our lives. It also explores its current landscape, including its applications in healthcare, finance, transportation, and other fields.

Keywords. Artificial Intelligence, AI, Machine Learning, Regulation, Computing, Technology.

1. Introduction

In recent years, Artificial intelligence (AI) has rapidly advanced, becoming a factor of extreme relevance in several different sectors. It has also become an essential part of our daily lives, transforming the way we communicate, work, and interact with technology. As AI technology continues to evolve and expand into new areas, there is an increasing need for regulatory frameworks to ensure its development and responsible use.

The challenges of regulating AI are multifaceted and complex, requiring an understanding of both the technology itself and its potential impacts on society. This article will explore the development and current state of artificial intelligence in our society, the predictions for the future of this area and the challenges facing its regulation.

2. The evolution of Artificial Intelligence (AI)

2.1 The beginning of AI development

As we go back in history, the concept of artificial intelligence (AI) can be traced back to the mid-20th century, when computer scientists started to explore the possibility of creating machines capable of simulating human intelligence.

In 1950, the famous British mathematician Alan Turing proposed the 'Turing Test' [1], which involved a machine attempting to pass as a human in a conversation with a human evaluator. This test became a benchmark for measuring the progress of AI research.

Early AI systems were based on rule-based algorithms, where the machine was programmed with a set of rules to follow in order to solve a specific problem. In these systems, the AI was working as a recipe that the computer should strictly follow each step. Clearly, these systems were quite limited and they could not handle complex tasks without a lot of human intervention.

In the 1950s and 1960s, the development of machine

learning algorithms enabled machines to learn from data and improve their performance over time. It was also during this time that neural network research started to develop with the discovery and use of multilayers [2].

In the 1980s and 1990s, AI research shifted towards developing expert systems, which used knowledge bases and inference engines to solve problems in specific domains. However, these systems were also limited in their ability to handle real-world complexity.

With the advent of big data and the availability of large amounts of computing power, the development of deep learning algorithms in the 2010s led to a new era of AI research. These algorithms, based on neural networks, enabled machines to learn and recognize patterns in data, leading to breakthroughs in areas such as speech recognition, natural language processing, and computer vision.

2.2 The current AI landscape

Today, AI is a very rapidly growing field with many applications in a wide range of industries, including healthcare, finance, transportation, and more. AI-based technologies are being used to improve efficiency, make better decisions based on data and automate routine tasks.

AI is being used in fields such as healthcare, where it can be used to diagnose diseases, predict patient outcomes, and develop personalized treatment plans. In transportation, it is being used to optimize routes, reduce traffic congestion and improve safety. There are also many projects being developed to improve autonomous vehicles and drones, which have the potential to totally transform the way we travel in the future. In finance, AI is being used for fraud detection, risk management, and investment analysis. Basically, it's possible to find ways to fit artificial intelligence into almost any field.

However, As the use of AI becomes more common, there are also concerns about the impacts it may have on jobs, privacy, and security. Nevertheless, the continued development and deployment of AI technologies are expected to have significant impacts on the way we live and work in the coming years.

3. The impact of AI in our society

Artificial intelligence has changed the way we live, work, and interact with each other. It has the potential to transform almost every aspect of our lives. However, with all the fast progress that this area has had in recent years, it is necessary to pay close attention to the real impacts on our society.

One of the most significant impacts of AI is its ability to automate many tasks that were previously performed by humans. Modern systems can process vast amounts of data and make decisions in real-time, allowing businesses to operate more efficiently and effectively. This has the potential to increase efficiency and productivity significantly in industries around the world.

Another great example of AI implementations are virtual assistants and chatbots. Voice-activated assistants like Siri and Alexa are becoming increasingly popular, allowing all users to control their homes and complete tasks with simple voice commands. Smart homes and IoT devices are also becoming more common, enabling home automations.

As AI continues to evolve, it is easy to see the potential substitution of human tasks for the use of automated systems. A major concern is the potential impact on jobs. As AI systems become more advanced, they have the potential to replace many jobs currently performed by humans. While this could lead to increased efficiency and productivity, it could also lead to significant job losses.

Another big concern is the potential for bias and discrimination. AI algorithms are a direct product of the data they are trained on, and if that data is biased or incomplete, the resulting system will also be biased. Solving these problems is a very challenging task since, most of the time, data directly reflects the problems of our society. This could have significant implications for areas such as hiring, lending, and criminal justice, where biased AI systems could lead to discrimination and unfair treatment.

In 2015, Google Photos became embroiled in a very controversial issue when it was reported that the app's image recognition algorithm was labeling pictures of black people as “gorillas” [3]. This has led to the company being heavily criticized for perpetuating racial stereotypes and insensitivity. Google quickly apologized and promised to fix the issue, which it attributed to a lack of diversity in the training data used to develop the algorithm. However, even after 8 years of the occurrence, the problem was not completely solved because the solution adopted was to banish the word "gorilla" from its auto-tag tool. This just shows how complex it is to address this problem, as even one of the biggest reference companies in AI had difficulties to deal with it.

As we produce more and more data everyday, privacy and data security is another major concern. AI systems rely on vast amounts of data to operate and if that data falls into the wrong hands, it could be used for malefic purposes. There are also many concerns around the potential for AI systems to monitor and control our behavior. Technology is all around us all the time and it has had a huge influence on our choices and behavior in general, leading to a loss of personal freedom and autonomy.

As we continue to develop more sophisticated AI systems, it is important to carefully consider these impacts and develop policies and regulations to ensure AI is used responsibly and ethically.

4. The challenges of regulation

AI technologies continue to develop at a rapid pace, and concerns have also arisen about their ethical and societal implications. The regulation of AI systems is a very complex issue as it involves many different factors. They can include technical capabilities, ethical considerations, legal frameworks, and many others.

To reduce the chance of negative impacts on our society, there is much debate about these factors being addressed through clear legal frameworks that can guarantee the development and responsible use of AI. Despite this, it is important to balance regulation with innovation. AI has the potential to drive significant innovation and economic growth, but overregulation could stifle innovation and prevent businesses from exploring new opportunities. Therefore, it will be important to strike the right balance between encouraging innovation and protecting consumers and society.

There are a few key areas where regulation of AI is likely to be necessary. One of the most important areas is data privacy. AI systems rely heavily on data to function, and the collection and use of data raise a range of ethical and legal concerns. Regulation of data privacy is extremely necessary to ensure that individuals' rights are protected, and that AI is used in a responsible and ethical manner.

Another important area for regulation is the development and use of autonomous systems, such as drones and self-driving vehicles. These types of automations are already present in our world and, therefore, many countries already have established regulations for their uses. However, its use will grow more and more in the next coming years and a more complex and detailed regulation will be necessary.

Finally, regulation of AI will also be necessary to ensure that the technology is used ethically and in accordance with societal values.

The previously reported incident involving Google Photos highlighted the inherent biases and limitations of artificial intelligence and machine learning, and raised important questions about the responsibility of tech companies to ensure their products are inclusive and ethical.

This could include regulations around the use of AI in decision-making processes, such as hiring and lending decisions. It may also be necessary to establish ethical guidelines for the development and use of AI systems to ensure that they are aligned with societal values and do not pose a threat to human rights or dignity.

Probably the biggest regulatory challenge for the future will be how to control the use of materials produced by automated systems. Nowadays, systems like ChatGpt, even if they still don't work perfectly, an already be used to produce texts and complete works and it is not always easy to detect that the result wasn't done by a human being.

In early 2023, a photo (Figure 1) of Pope Francis wearing a white coat went viral on the internet.

Fig. 1 - Pope Francis Wearing A White Puffer Coat.

An artificial intelligence tool called Midjourney was used to create an image that looked incredibly realistic. The image was posted on Reddit and later shared on Twitter, where the majority of people believed it was authentic. [4].

It was not the first time that an important figure like Pope Francis was used as a model for images of this type [5]. Although it seems harmless, this shows a big potential of AI that, if not controlled, can be heavily used for sharing fake news and biased manipulation of opinions.

In conclusion, the regulation of AI is a complex and multifaceted issue that will require careful consideration and collaboration between governments, industry, and other stakeholders.

5. Future Scenario

Artificial intelligence has come a long way since its inception in the 1950s. With all the advances in computer processing power, data storage, and algorithms, AI has become increasingly sophisticated and capable of solving complex problems that were previously thought impossible.

As we look to the future, the potential for AI is immense, with many predicting that it will revolutionize every aspect of our lives. It is expected to have a significant impact in healthcare by helping doctors to analyze vast amounts of medical data develop new treatments. It is expected to have a major impact in transportation as self-driving cars are already a reality, and as AI algorithms continue to improve, they will become even more capable of navigating and avoiding accidents. This could lead to safer, more efficient transportation systems, reducing congestion and improving accessibility for everyone. AI is also expected to transform the way we work. As machines become more intelligent, they will be able to perform increasingly complex tasks,

from data analysis to customer service leading to significant productivity gains and cost savings for businesses.

For all this to happen in a healthy and safe way for our society, It will be important to ensure that AI is developed in a way that is transparent and accountable, so that we can understand how decisions are being made and identify and correct errors or biases. The development of flexible and adaptive regulatory frameworks will be essential to ensure that AI is developed and used responsibly and ethically. It will be important to remain vigilant and adapt regulatory frameworks to address new challenges as they arise.

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