ARTIFICIAL INTELLIGENCE, ROBOTICS & IT'S IMPACT ON THE SOCIETY

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Abstract— **This research looks at the tremendous impact of robots and artificial intelligence (AI) on civilization. It gives a thorough account of their historical evolution, present applications, moral repercussions, and potential future effects. Aside from addressing some of the most pressing global issues, like climate change and food security, the research also highlights how AI and robotics are currently being used in a variety of industries, including manufacturing, healthcare, and food security. It also acknowledges potential concerns, like the displacement of human labour and ethical issues with privacy and security. Overall, this study makes the case that while AI and robotics have the ability to significantly advance civilization, we must also be aware of any potential negative effects.**

Keywords—**Artificial intelligence, Robotics, History, Ethical concerns**

I. INTRODUCTION

"ARTIFICIAL INTELLIGENCE (AI) IS THE TERM USED TO DESCRIBE THE USE OF COMPUTERS AND TECHNOLOGY TO SIMULATE INTELLIGENT BEHAVIOR AND CRITICAL THINKING COMPARABLE TO A HUMAN BEING". It has the potential to revolutionise a wide range of industries, including manufacturing, transportation, and healthcare. While these technologies have many advantages, they also bring up a number of significant issues and difficulties. What effect will AI and robotics have on the labour market, for instance, and what ethical issues need to be taken into account as these technologies develop? How will these innovations alter the way we communicate, live, and work? What impact should politicians and other stakeholders have on how these technologies are developed and used? From speech recognition and natural language processing to picture recognition and autonomous cars, AI and robotics have advanced significantly in recent years. These advances are causing a revolution in health care, Self-driving cars, intelligent virtual assistants, and robots that can carry out difficult jobs in the manufacturing and other industries are just a few of the new applications and use cases that have resulted from these technological advancements that were once considered to be the stuff of science fiction. These technologies have simultaneously sparked worries about their effects on the labour market and the economy as a whole. Many analysts believe that automation and robotics will result in considerable job losses in the upcoming years, particularly in sectors like transportation, manufacturing, and customer service that are particularly vulnerable to automation. This might have significant effects on the economy, businesses, and workers. The broad deployment of AI and robotics has a lot of ethical and societal ramifications in addition to these economic ones. For instance, there are worries about the possibility that these technologies will be utilised for evil things like cyberattacks or autonomous weaponry. Additionally, there are worries that these technologies could maintain or exacerbate current socioeconomic disparities. In this research, we describe the impact of AI and robotics to revolutionize many industries, from manufacturing to

healthcare and it's ethical concerns that need to be addressed. We thoroughly cite relevant literature for information on the underlying techniques and sources used..

II. LITERATURE REVIEW

In recent research, several articles have explored the impact of artificial intelligence (AI) and robotics in various domains. Valtteri Kaartemo and Anu Helkulla's "A Systematic Review of Artificial Intelligence and Robots in Value Co-creation" investigates how these technologies are likely to change the way value is co-created and experienced in markets and everyday life. Kerstin Denecke and Claude R. Baudoin's "Artificial Intelligence and Robotics in Transformed Health Ecosystems" examines the influence of AI and robotics on P5 medicine and the challenges faced in implementing this approach. Meanwhile, Carl Benedikt Frey and Michael Osborne's "The Future of Employment: How Susceptible Are Jobs to Computerization?" analyzes the potential for job automation, particularly emphasizing the vulnerability of low-skill positions. Ajay Agrawal, Joshua Gans, and Avi Goldfarb's "The Impact of Artificial Intelligence on Innovation" focuses on the revolutionary potential of AI in the invention process, while also raising concerns about bias and ethical issues. Additionally, Michael Osborne and Carl Benedikt Frey's article "The Impact of Artificial Intelligence - Widespread Job Losses" highlights a study suggesting significant job automation, up to 47% of US employment, in the near future. James Bessen's "Robotics and Automation in the Workplace" argues that although automation leads to job displacement initially, it can contribute to long-term productivity and economic growth. Finally, "The Ethics of Artificial Intelligence" by Eliezer Yudkowsky and Nick Bostrom examines the ethical ramifications of AI, including the potential for autonomous weaponry and the importance of transparency in AI decision-making. Collectively, these articles shed light on the various impacts, challenges, and ethical considerations associated with the proliferation of AI and robotics in different spheres of life.

III. THE HISTORY OF AI AND ROBOTICS

Artificial intelligence (AI) and Robotics have a long and fascinating history that dates back to ancient times. The Greek philosopher Aristotle made the first recorded mention of a machine capable of thought and reasoning in the fourth century BCE. However, AI and robotics did not start to develop as separate academic disciplines until the 20th century. Researchers started looking into the idea of building machines that might mimic human intelligence and reasoning in the 1940s and 1950s. The Dartmouth Conference, which is regarded as the genesis of AI, was organised by a group of researchers in 1956, marking the first important advancement in this field. The first time the term "Artificial Intelligence" was used was at the Dartmouth Conference, which American computer scientist John McCarthy organised in 1956. To investigate the potential of AI, research facilities have sprung

up all around the United States. The promotion of AI as a branch of computer science with the potential to revolutionise society was greatly assisted by researchers Allen Newell and Herbert Simon. Artificial intelligence (AI) and robots did not start to significantly affect society until the 1980s and 1990s. For AI research, the 1980s saw both great growth and hardship. A creative period occurred from the late 1950s through the early 1960s. AI soon entered the public consciousness thanks to anything from programming languages that are still in use today to books and films that explore the concept of robots. Artificial intelligence (AI) and robots have advanced to a point where they are now pervasive. While improvements in robotics have made it feasible to create robots that can carry out complex tasks in a variety of settings, advances in machine learning and deep learning have made it possible to create intelligent systems that can learn from new conditions and adapt to them. AI and robotics are used in a variety of products today, from drones and self-driving cars to virtual assistants and smart home appliances. Looking ahead, these technologies will only spread throughout society in the coming years. There are many ways that robotics and AI will influence our future, both in terms of the advantages they will provide as well as the difficulties they will present.

IV. COMPONENTS OF AI

The major components of AI are:

A) The User Interface

The user interface serves as a communication channel between a user and the problem-solving procedures of expert systems. If an expert system does not have a useful interface, it is not very useful. It must be able to validate the instructions entered by the user in a form. It should interpret the system's generated responses.

B) The Information Base

It keeps track of every detail and regulation pertaining to a strict problem domain. It provides these to the inference engine in a form that is useful to it. The Details might be included in the system's background order in some way. The rules encompass both the production guidelines specific to the field of expert systems and the heuristics and rules-of-thumb offered by the field authority to assist the system in solving problems.

C) The Shell or interface Engine

The shell or interface engine of an AI refers to the external component that interacts with users, allowing them to input queries or commands and receive responses from the AI system. It serves as a communication interface between the user and the underlying AI model.

The interface engine is a programme that searches the database for relevant data and infers new data by using consistent processing and analytical techniques.[11]

V. AI AND ROBOTICS EFFECTS ON THE LABOUR MARKET AND THE ECONOMY

The current state of AI and robotics in the job market demonstrates a combination of job displacement, job transformation, and the emergence of new roles. New occupations have always been produced by technology. AI doesn't assist us in performing what we already do more efficiently. Even if we discovered new, better jobs, the AI would already be superior to us at those tasks, making AI

fundamentally different from human beings. Even if they are better than human being, they need professionals to develop, maintain, and manage AI systems and robotic platforms. As the quest for improvement of current processes continues to grow, it makes sense for professionals to gain expertise in AI. In many industries that involve manual labour, data entry, etc., AI and robotics increase productivity and efficiency. Workers moving into new roles in both the blue-collar and white-collar sectors may be affected by this displacement. In order to adapt to this shifting environment, people and organisations must stimulate innovation, acquire the necessary skills, and confront the ethical ramifications of emerging technologies

A) Role of AI and Robotics in Healthcare

One of the most sensitive sectors of the economy, the healthcare sector, has experienced remarkable growth and progress over the past few decades. The promise of AI and robots is one of them. They are becoming more adept at performing tasks that we were accustomed to, but they are also lot more efficient, quick, and affordable. Robotics and AI, which will soon be a part of our lives, will have a big impact on medical services.. The fact is that since 1985, robots have been employed in healthcare. The DaVinci robot's masterful display and the grape operation film were the first, ushering in a new era of technology and robotics in the medical field. It is changing the healthcare sector in ways that were previously regarded as impossibilities. AI is revolutionising the way we approach healthcare, from early diagnosis to individualised treatment strategies. While there are issues with the moral use of patient data and the effects on employment. AI's versatility in application is a benefit in the healthcare industry. Numerous healthcarerelated disciplines, including medication research, image processing, data analysis, and more, are seeing advancements. Since there is so much digital information, processing it would take years without artificial intelligence (AI), which can deliver the most latest research data for use in healthcare. There are numerous instances of AI prejudice that may endanger patients or deny opportunities for treatment. The most egregious instance is an AI system that incorrectly determined that Black patients are healthier than equally ill White patients because less money was spent on them by using health expenses as a proxy for healthcare needs. Before AI is employed in healthcare, the risks must be addressed and considered. Contrary to it, predictions made by AI are frequently difficult for a human to understand, which can conceal bias or inaccuracies. Physicians are unable to

assess the validity of the recommendations when there is a lack of information regarding the factors that led to an AI-based decision, which puts patients at risk. We may anticipate even more intriguing advancements in the healthcare sector as AI develops. Several proof-of-concept and pilot programmes have produced encouraging outcomes for diagnosis, treatment, and maintaining health over the past few years. They have not yet been used extensively, in part because it takes so much time to thoroughly assess their effectiveness and safety. There are many challenging problems to overcome, the majority of them go beyond technical ones. The primary concern is demonstrating the systems' dependability and security in order to gain the trust of both practitioners and patients. [10]

B) Role of AI and Robotics on Privacy and Security

"Certainly, AI has the potential to revolutionize our lives, but it also raises serious concerns about privacy. As AI becomes more prevalent, it has the potential to collect and analyze vast amounts of personal data, which can be used for various purposes, both positive and negative," Vipin Vindal, CEO, Quarks Technosoft said. In order to function successfully, AI and robotics require enormous amounts of data. It concerns the handling of people's personal information which include Personal and sensitive information, including medical records, financial information, and personal preferences including how it is gathered, used, and shared.. Concerns concerning data protection and personal privacy are raised by the gathering and use of this information. The crux of the issue, though, is personal information and how it needs to be protected for there to be true privacy. For instance, law enforcement organisations have employed facial recognition technology to locate people in public places and identify suspects. The right to privacy and the risk for technology abuse are brought up by this. The use and management of that personal data are important to privacy. there is a risk that it could fall into the wrong hands, either through hacking or other security breaches. Contrarily, security may or may not be connected to personal data. In terms of security, this means ensuring that the data is kept private, that its integrity is safeguarded, and that it is accessible when required. It is crucial to make sure that the collection, use, and processing of personal data by AI is done in accordance with the GDPR. The acquisition and processing of personal data should be kept to a minimum, and AI algorithms should be created to guarantee that the data is kept secure and private. [6]

C) Potential for AI and robotics in Agri-Food Sector

The impact of AI/robotics on food security and agriculture is closely tied to poverty. Technologies may alter the economic environment. The smaller scale of efficient production would increase smallholders' profitability. Robots in the field also give chances for farmers and their families to diversify their sources of revenue because they eliminate the need for family labour for low-profit tasks and free up time for more lucrative pursuits. Robots can work around-the-clock,

providing for better harvest time. Precision agriculture techniques are made possible by AI and robotics by gathering and analysing data from sensors, drones, and satellites. This data-driven strategy helps to maximise the use of pesticides, fertilisers, and irrigation, which improves crop output, cuts down on resource waste, and boosts sustainability. However, some areas of agriculture have become overheated because of low automatization and any data breaches can have severe consequences for farmers and the overall food system thus raises ethical concerns, such as the responsible use of genetic data, potential bias in decision-making algorithms, and the impact on farm labor and rural communities. The reduced scale of efficient production would mean higher profitability for smallholders but implementing them may need a substantial initial expenditure, which could be difficult for small-scale farmers or people living in impoverished countries [3].

D) Artificial Intelligence-based Robots in Education

The use of AI robots for instruction has grown in popularity as a result of the quick development of artificial intelligence. Numerous research have demonstrated that AI robots may offer novel learning opportunities in educational settings. Every industry is using robotics and artificial intelligence more and more frequently. Like other industries, education has a lot of room to grow in terms of robots technology. Implementing it can provide Virtual and augmented reality often combined with robotics, offer immersive and interactive learning experiences, Virtual laborataries, block chain technology, potential to assist pupils with unique needs or impairments. Speech recognition, text-to-speech, and other adjustments are made possible by assistive technology, which encourage inclusivity and equal access to education, Personalized learning platforms which will provide tailored content, adaptive assessments, and targeted feedback, better engagement, motivation, and academic outcomes. When implementing AI and robotics in educational settings, it is vital to preserve student data and guarantee privacy rights. Since, computers can instruct students without the need for human intervention and because they are not interacting with actual humans during class, students are unable to practise and develop social skills. This is one of the disadvantages of artificial intelligence (AI) in education. Despite the possibility that artificial intelligence (AI) will revolutionise education, there is currently a substantial communication gap between people and computers. The study of robotics and AI applications in education, however, is still in its infancy. Future studies can continue to investigate and forecast how robots will affect students and delve deeper into the function of robots in education.[4]

E) Potential of AI and Robotics in Transportation and Mobility

Today, technological and social factors like shared mobility, driverless automobiles, and electric vehicles are combining to bring about a transformation that is at least as revolutionary. AI and Robotics have the potential to revolutionize transportation and mobility systems, offering numerous benefits and advancements. Robots are essential to the revolution taking place in the transportation industry, which is undergoing a tremendous change. One of the most significant applications of robotics technology in transportation is the creation of autonomous systems that can carry out jobs formerly completed by humans has resulted from the improvement of robotics technology, improving safety, efficiency, and cost effectiveness. They have the potential to decrease collisions, enhance traffic flow, and boost the effectiveness of the transportation system. Additionally, because they use less fuel and emit fewer pollutants, autonomous vehicles can help minimise the carbon impact of transportation. Improving safety, efficiency, cost-effectiveness, Weather forecasts, Alternate routes, Traffic jams and environmental sustainability are just a few of the benefits that the transportation industry, society, and economy can expect from the deployment of robots technology. However, The entire process of adjusting to a new technology takes some time, and some skills must be learned. For instance some nations' infrastructures, particularly those in the third world, do not support autonomous driving automobiles. Just to launch self-driving cars would necessitate extensive reconstruction and adjustments. Mobility and transportation automation could result in workforce disruption and job losses. A critical factor to take into account is preparing for the shifting labour market and enabling a smooth transition for impacted employees. Moreover, the advancement in tech has also led to concerns about privacy and security, so Proper data governance and security measures are necessary protected against any mishap or cybercrime. As the technology continues to advance,According to analysts, millions of self-driving cars will be on the road by the end of 2050, increasing accessibility and enhancing communities' and individuals' overall travel experiences.[12]

F) Potential of AI and Robotics in Disaster Management

Natural or man-made disasters have always been a part of human history. Natural disasters cannot be completely prevented, but damage and potential hazards can be lessened by planning for early warning systems, disaster preparedness, and disaster recovery with the aid of various technical tools. Robotics and AI are among the resources. They have significant potential in enhancing disaster response and management efforts. Aerial mapping, information source systems, and rescue robotics are just a few of the many improvements in disaster management that have been created utilising AI. Robotics, such as drones and robotic vehicles, can be deployed for search and rescue missions in hazardous environments First responders may become unable to access disaster-affected areas, which could prolong the rescue effort or put them in risk. Consequently, AI techniques can provide more sophisticated decision-making support, enabling more complex activities. AI has enormous potential to improve in

this sector in a variety of ways and is not simply a distant idea. However, as with the development of any new technology, significant moral and legal questions are posed. These can include the requirement for diverse and high-quality data, compatibility with current systems and technology, and ethical and societal ramifications, and Developing these robots is challenging, given the lack of on-site observation networks across the country. To ensure that AI is created and applied in ways that are successful in lessening the effects of disasters, it is imperative to address these issues. Consequently, by utilising AI and robotics to their full capacity, disaster response and management efforts could be improved, resulting in better preparedness, more efficient response operations, and eventually, the possibility of saving lives and reducing the effects of disasters. [9]

VI. ETHICAL ISSUES THAT ARE RAISED BY THE USE OF AI AND ROBOTICS

Rapid advancements in machine learning and artificial intelligence (AI) have enormous potential advantages. If we want to prevent unintended, negative outcomes and hazards resulting from the adoption of AI in society, we must examine the complete ethical, social, and legal dimensions of AI systems. The fundamental issue of what human creators, producers, and users should do to prevent ethical harms that AI can cause in society—damages that may be caused by unethical design, inappropriate use, or misuse. The scope of AI ethics includes immediate, here-and-now concerns like data privacy and bias in current AI systems, as well as near-, medium-, and long-term concerns like the effects of AI and robotics on employment and the workplace and the potential for AI systems to reach or surpass human-equivalent capabilities. Data privacy, liability, and safety concerns are a few of the legal issues that have been brought forward. Who would be accountable, for instance, if a robot were to harm someone? Concerns regarding how these technologies will be applied ethically are also present. It is crucial to make sure that the technology respects users' privacy rights and does not discriminate against particular categories of individuals(11). Robots could potentially replace human labour in a range of areas thanks to robotics, which could have a detrimental effect on employment rates.Sometimes, AI and robotic systems function as "black boxes," making it challenging to understand how they make judgements or forecast the future. Existing social and economic inequality may be made worse by the use of AI and robotics. There may not be equal access to AI technologies, data, and the benefits they bring, creating a digital divide and further marginalising underprivileged populations. An essential ethical aspect is ensuring fair access and reducing inequality. There are several legal and ethical factors that must be taken into account in situations like this. So It is obvious that we must utilise these tools with care, and part of that involves considering the moral and legal ramifications of our actions.[8]

CONCLUSION

In conclusion, AI and robotics have a profound impact on society, offering immense potential for advancement and transformation. These technologies have the capacity to revolutionize various sectors, including healthcare, transportation, agriculture, education, ecommerce, disaster response, and more. To guarantee that society as a whole will benefit from the development of AI and that its possible negative impacts are reduced from the start, a clear approach is needed to take into account the related ethical and legal concerns. So as the As the technology continues to advance, Artificial intelligence and robotics are expected to play an even more significant role in todays world.

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