



## **A Comparative Study of Robotics and Artificial Intelligent**

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### **ABSTRACT**

Robotics and artificial intelligence (AI) are two rapidly evolving fields that are transforming the way we live and work. Robotics involves the design, development, and application of robots to perform tasks, while AI involves the development of intelligent systems that can learn and reason. The integration of robotics and AI has led to significant advancements in a variety of industries, such as manufacturing, healthcare, and transportation. The use of robots in manufacturing has led to increased productivity and efficiency, while the use of AI has enabled robots to perform more complex tasks with greater precision and accuracy. Robotics technology has advanced significantly in recent years, but there are still limitations to its capabilities and applications. Here are some of the key limitations and challenges of robotics technology and artificial intelligent are Limited Dexterity and Sensory Capabilities, Safety Concerns, Ethical Concerns, Lack of Standardization, Cost, Data Bias. Hope this paper provides a motivating overview of important research directions to overcome the current limitations, and helps to fulfill the promising potentials of deep learning in robotics and artificial intelligent.

Keywords: Wide range, artificial intelligence, deep learning, machine learning, Interactive.

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### **I. INTRODUCTION**

Robotics and artificial intelligence (AI) are two rapidly evolving fields that are transforming the way we live and work. Robotics involves the design, development, and application of robots to perform tasks, while AI involves the development of intelligent systems that can learn and reason. The integration of robotics and AI has led to significant advancements in a variety of industries, such as manufacturing, healthcare, and transportation. The use of robots in manufacturing has led to increased productivity and efficiency, while the use of AI has enabled robots to perform more complex tasks with greater precision and accuracy. In healthcare, robotics and AI are being used for surgical procedures, drug discovery, and patient monitoring. The use of robots and AI in transportation is also gaining momentum, with the development of autonomous vehicles and drones. However, the integration of robotics and AI also raises ethical concerns, particularly in regards to the impact on the workforce and the potential for autonomous robots to cause harm. There is a need for increased regulation and oversight to ensure that the benefits of robotics and AI are balanced with the potential risks. Overall, the integration of robotics and AI has the potential to revolutionize the way we live and work. With continued research and development, it is likely that we will see new and innovative applications of these technologies that will benefit society in countless ways. In space exploration, robots are used to explore new planets and conduct research. The versatility and potential of robotics technology have led to continued research and development, with many new applications and innovations expected to emerge in the coming years. Overall, robotics technology is transforming the way we live and work, and its impact is likely to continue to grow in the coming years.

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### **II. HISTORY OF ROBOTICS AND ARTIFICIAL INTELLIGENT**

The history of robotics and artificial intelligence (AI) can be traced back to ancient times. The ancient Greeks and Egyptians had myths and legends of machines and artificial beings that could perform tasks that were beyond human capabilities. Still, the development of ultramodern robotics and AI began in the mid-twentieth century. In 1956, the term "artificial intelligence" was coined at a conference at Dartmouth College. The conference brought together leading scientists and experimenters to explore the possibilities of creating machines that could suppose and reason like humans. In the 1960s, the first artificial robots were developed for use in manufacturing. These early robots were large, precious, and only able of performing simple tasks. still, they paved the way for farther advancements in robotics technology. In the 1970s, the first microprocessors were developed, making it possible to develop lower and more important robots. In the following times, robotics technology continued to advance, with the development of detectors, computer vision, and machine literacy algorithms that enabled robots to perform more complex tasks. In the field of artificial intelligence, the development of expert systems and rule- grounded systems in the 1980s and 1990s enabled machines to perform tasks that preliminarily needed mortal intelligence. The arrival of machine literacy algorithms in the 2000s enabled machines to learn and ameliorate their performance grounded on experience. The conception of automata, or tone- operating machines, was first introduced by Greek mathematician Archytas of Tarentum in the 4th century BCE. In the following centuries, automata came a popular subject in literature, with numerous authors, including Leonardo da Vinci and Gottfried Leibniz, proposing designs for tone- operating machines. The first artificial robot, the Unimate, was developed by George Devol and Joseph Engelberger in the 1950s. The Unimate

was used in the automotive industry for tasks similar as welding and oil, and it paved the way for the development of other artificial robots. The term "artificial intelligence" was first coined in 1956 by John McCarthy, Marvin Minsky, Nathaniel Rochester, and Claude Shannon at a conference at Dartmouth College. The thing of the conference was to explore how computers could be used to pretend mortal intelligence. In the following decades, experimenters continued to make advancements in robotics and AI. In the 1960s and 1970s, robots were developed for a variety of artificial operations, and AI systems were developed for tasks similar as natural language processing and expert systems. The 1980s and 1990s saw the development of neural networks, which allowed for more complex and sophisticated AI systems. In the 2000s and 2010s, machine literacy and deep literacy ways came popular, leading to improvements in image and speech recognition, natural language processing, and game playing. moment, robotics and AI are being used in a variety of diligence, including healthcare, manufacturing, and transportation. With continued exploration and development, it's likely that we will see further advancements in robotics and AI that will transfigure the way we live and work.



Fig 1. HISTORY TIMELINE

### III. CURRENT STATE OF THE ART OF ROBOTICS AND AI

Building on the advances made in mechatronics, electrical engineering and computing, robotics is developing increasingly sophisticated sensorimotor functions that give machines the ability to adapt to their ever-changing environment. Until now, the system of industrial production was organized around the machine; it is calibrated according to its environment and tolerated minimal variations. Today, it can be integrated more easily into an existing environment. The autonomy of a robot in an environment can be subdivided into perceiving, planning and execution (manipulating, navigating, collaborating). The main idea of converging AI and Robotics is to try to optimize its level of autonomy through learning. This level of intelligence can be measured as the capacity of predicting the future, either in planning a task, or in interacting (either by manipulating or navigating) with the world. Robots with intelligence have been attempted many times. The current state of the art of robotics and artificial intelligence (AI) is marked by several exciting advancements and innovations that have the potential to revolutionize a variety of industries. Some of the current state-of-the-art developments include:

- ✓ Autonomous Vehicles: Autonomous vehicles, also known as self-driving cars, are one of the most exciting developments in robotics and AI. Companies such as Tesla, Waymo, and Uber are developing autonomous vehicles that use a variety of sensors and algorithms to navigate roads and avoid obstacles.
- ✓ Humanoid Robots: Humanoid robots, which are robots that resemble humans in appearance and movement, are being developed for a variety of applications, including healthcare, education, and entertainment. Examples of humanoid robots include the Honda Asimo and Boston Dynamics' Atlas.

- ✓ Machine Learning and Deep Learning: Machine learning and deep learning techniques are being used to develop intelligent systems that can learn and reason. These techniques are being applied in a variety of fields, such as natural language processing, image and speech recognition, and predictive analytics.
- ✓ Collaborative Robots: Collaborative robots, also known as cobots, are designed to work alongside humans in manufacturing and other industrial applications. These robots are equipped with sensors and algorithms that allow them to work safely alongside humans, increasing productivity and efficiency.
- ✓ AI-Assisted Healthcare: AI is being used to develop intelligent healthcare systems that can help diagnose and treat patients. Examples of AI-assisted healthcare systems include IBM Watson Health and Google's DeepMind Health.
- ✓ Drones: Drones are being developed for a variety of applications, including delivery, agriculture, and surveillance. These drones use sensors and algorithms to navigate and perform tasks autonomously.

As these and other advancements continue to be developed, the potential for robotics and AI to transform industries and improve the quality of life for people around the world continues to grow. However, with these advancements come concerns about the ethical implications of these technologies, particularly in regards to the impact on the workforce and the potential for autonomous robots to cause harm. Continued research and development, along with increased regulation and oversight, will be needed to ensure that these technologies are developed and used responsibly

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#### IV. LITERATURE SURVEY ON ROBOTICS AND AI

Here is a literature survey on robotics and artificial intelligence:

- ✓ "Robotics and AI in Healthcare: A Review" by Hui Wang and colleagues (2020). This review article explores the current state of robotics and AI in healthcare, including applications such as surgery, rehabilitation, and medical imaging. The authors also discuss the challenges and opportunities associated with these technologies in healthcare.
- ✓ "Robotics and Artificial Intelligence: A Review on Recent Advances" by Ayesha Nazir and colleagues (2020). This article provides an overview of recent advancements in robotics and AI, including topics such as deep learning, reinforcement learning, and autonomous vehicles. The authors also discuss the current state of the art in each area and provide examples of real-world applications.
- ✓ "Robotics and Artificial Intelligence in Industry 4.0: A Review" by S. E. Chang and colleagues (2019). This review article focuses on the application of robotics and AI in the context of Industry 4.0, which refers to the integration of digital technologies into manufacturing and industrial processes. The authors discuss the benefits and challenges of using these technologies in industry, including topics such as collaborative robots, predictive maintenance, and digital twins.
- ✓ "Artificial Intelligence and Robotics: Future of Employment and Society" by D. D. Tripathi and colleagues (2019). This article examines the potential impact of robotics and AI on employment and society. The authors discuss the current state of these technologies, as well as the challenges and opportunities they present for the workforce and society as a whole.
- ✓ "A Review of the Integration of Robotics and Artificial Intelligence in Manufacturing" by J. Wang and colleagues (2018). This review article provides an overview of the use of robotics and AI in manufacturing, including topics such as smart factories, collaborative robots, and digital twins. The authors also discuss the challenges and opportunities associated with these technologies in the context of manufacturing.

Overall, these literature surveys highlight the many applications and potential benefits of robotics and artificial intelligence, as well as the challenges and limitations that need to be addressed in order to fully realize their potential. They provide a valuable resource for researchers and practitioners interested in exploring these rapidly evolving fields..

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#### V. METHODOLOGY ON ROBOTICS AND AI

The methodology for research in robotics and artificial intelligence (AI) typically involves a combination of theoretical analysis, algorithm design, and experimental validation. Here are some key steps that researchers may follow in this process:

- ✓ Define the research problem: The first step in any research project is to define the problem or question that you want to address. This may involve identifying a gap in current knowledge or technology, or developing a new application for robotics and AI.
- ✓ Conduct a literature review: Before starting any research project, it is important to review the existing literature to understand what has already been done in the field. This will help you identify gaps in knowledge and opportunities for new research.
- ✓ Develop a theoretical framework: Based on the literature review and research problem, researchers may develop a theoretical framework to guide their work. This may involve developing mathematical models or algorithms that can be used to address the research question.

- ✓ Design algorithms: Once the theoretical framework has been established, researchers can begin to design algorithms and other computational methods that can be used to implement the theoretical framework. This may involve developing new algorithms or modifying existing ones to meet the specific needs of the research project.
- ✓ Conduct experiments: With the algorithms in place, researchers can conduct experiments to test their theoretical framework and evaluate the performance of their algorithms. This may involve simulations, laboratory experiments, or field trials, depending on the specific research question and application.

## VI. LIMITATION OF ROBOTICS AND AI

While robotics and artificial intelligence (AI) have shown great promise in many areas, there are still several limitations that need to be addressed in order to fully realize their potential. Here are some key limitations:

- ✓ Limited flexibility: Many robots are designed to perform a specific task or set of tasks, and are not easily adaptable to new situations. This limits their ability to work in environments that are constantly changing or to respond to unexpected events.
- ✓ Limited perception and reasoning: While AI has made significant progress in recent years, it still falls short of human perception and reasoning in many ways. For example, robots may struggle to recognize objects or understand natural language, which limits their ability to interact with humans and perform complex tasks.
- ✓ Safety concerns: As robots become more autonomous and interact more closely with humans, safety concerns become more important. There is a risk of accidents or harm to humans, particularly in industrial or healthcare settings where robots may be used to perform tasks that are dangerous or involve contact with people.
- ✓ Ethical concerns: As robots become more sophisticated and capable of making decisions, ethical concerns arise around the use of AI and robotics. For example, there is a risk of bias or discrimination in decision-making algorithms, or of robots being used for unethical or harmful purposes.
- ✓ Cost and complexity: Developing and deploying robots and AI systems can be expensive and complex, particularly for small or medium-sized businesses. This limits the adoption of these technologies, particularly in industries or settings where the potential benefits may not be immediately clear.
- ✓ Limited data availability: Many AI algorithms rely on large amounts of high-quality data to be trained and to make accurate predictions. However, in some areas such as healthcare, data may be limited or difficult to obtain, which limits the ability of AI to make useful predictions.

## VII. MAJOR COMPANIES IN AI FIELD

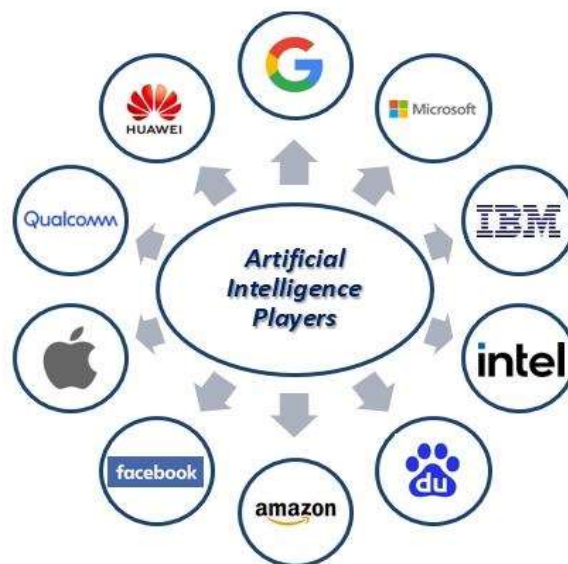


Fig 2. COMPANIES

## VIII. LISTS OF AI AND ROBOTICS PROGRAMING LANGUAGE



Fig 3. PROGRAMMING LANGUAGE

## IX. CONCLUSION

While robotics and AI offer many benefits, there are also concerns about their potential impact on society. Some worry that automation will lead to job loss and exacerbate economic inequality. Others are concerned about the potential for AI to be used in ways that violate human rights, such as facial recognition technology and predictive policing. To address these concerns, it is important that we develop regulations and policies that ensure that robotics and AI are used in ways that are beneficial to society. This may include investing in education and training programs to help workers adapt to the changing job market, as well as developing ethical guidelines for the use of AI in areas such as healthcare and law enforcement. In conclusion, robotics and AI are powerful technologies that have the potential to transform many aspects of our lives. However, it is important that we approach their development and deployment with caution and careful consideration to ensure that they are used in ways that are beneficial to society as a whole.

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