

The Role of Artificial Intelligence and Robotics in Healthcare, Industries, and Everyday Life

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Abstract

This paper examines the role of Artificial Intelligence and Robotics in modern society, with a focus on healthcare, industry, and everyday life. It explores how AI supports decision-making, data analysis, and intelligent responses, while Robotics enables machines to perform physical tasks with accuracy and consistency. Based on secondary sources, the study follows a descriptive and analytical approach. The paper highlights the growing usefulness of AI and Robotics, along with concerns related to privacy, bias, employment, safety, and access. It argues that these technologies should be developed responsibly, with human supervision, ethical design, and inclusive use.

Keywords: Artificial Intelligence, Robotics, Healthcare Technology, Industrial Automation, Everyday Technology, Human-Robot Interaction.

1. Introduction

Artificial Intelligence and Robotics are two important technological fields that are shaping the way human beings live, work, learn, and solve problems. Artificial Intelligence refers to the ability of machines or computer systems to perform tasks that require human-like intelligence, such as learning, reasoning, decision-making, image recognition, and problem-solving. Robotics, on the other hand, deals with the design and use of machines that can perform physical tasks either automatically or with human control. When these two fields are combined, they create intelligent systems that can observe their surroundings, process information, and perform useful actions.

In recent years, AI and Robotics have become increasingly relevant in different areas of society. Their applications can be seen in healthcare, industries, education, travel, security, entertainment, and everyday digital services. In healthcare, they can support medical diagnosis, robotic-assisted surgery, patient monitoring, rehabilitation, and hospital management. In industries, they are used for automation, quality checking, predictive maintenance, warehouse management, and workplace safety. In everyday life, AI and Robotics are visible through smartphones, smart home devices, voice assistants, learning platforms, navigation systems, cleaning robots, and assistive technologies.

The growing use of AI and Robotics shows that modern machines are no longer limited to simple mechanical functions. Many systems are becoming more responsive, data-driven, and capable of supporting human decision-making. This has created new possibilities for improving efficiency, accuracy, safety, convenience, and accessibility. At the same time, these technologies also raise important concerns related to privacy, job displacement, bias, unequal access, safety, accountability, and ethical use. This research paper studies the role of Artificial Intelligence and Robotics in healthcare, industry, and everyday life. It aims to understand how these technologies work together, where they are being applied, and what

benefits and challenges are associated with their use. The paper is based on secondary sources and follows a descriptive and analytical approach.

The study is important because AI and Robotics are expected to play a major role in future careers, education, and technological development. For students and budding scholars, understanding these fields can help build awareness about emerging areas such as Computer Science, Mechanical Engineering, Electrical Engineering, Mechatronics, Automation, and Human-Robot Interaction. Therefore, this paper attempts to present a clear introductory understanding of AI and Robotics while also highlighting the need for responsible, inclusive, and human-centred technological progress.

2. Research Questions

The present research paper is guided by the following research questions:

1. How are Artificial Intelligence and Robotics related, and how do they work together in modern technological systems?
2. How are Artificial Intelligence and Robotics being used in healthcare, industry, and everyday life?
3. What are the major benefits, challenges, and ethical concerns associated with the use of Artificial Intelligence and Robotics?

3. Review of Literature

Artificial Intelligence and Robotics have emerged as two of the most influential technologies of the twenty-first century. Existing research explains Artificial Intelligence as the capacity of computer systems to carry out activities that normally need human intellect, including learning, reasoning, decision-making, problem-solving, image recognition, and language processing. Robotics, in contrast, refers to the field that focuses on creating, controlling, and using machines capable of performing physical tasks. Scholars such as Stuart Russell and Peter Norvig explain AI as a broad field that allows machines to act intelligently, while robotics gives these intelligent systems a physical form through sensors, motors, cameras, and mechanical structures. Together, AI and robotics are increasingly being used to create smart machines that can sense their environment, process information, and perform tasks with limited human assistance.

A major theme in existing literature is that AI and robotics are not separate fields but interconnected technologies. AI provides the “intelligence” of the system, while robotics provides the “body” through which tasks are carried out. Researchers such as (Neupane, et al., 2024), argue that AI-robotics systems are now entering daily life through robotic vacuum cleaners, semi-autonomous vehicles, assistive robots, and smart machines. Their work also highlights that these systems usually depend on three important functions: perception, navigation or planning, and control. This shows that AI and robotics work together through sensing, decision-making, and action.

In the field of healthcare, studies show that AI and robotics are becoming important in diagnosis, treatment, surgery, patient care, and hospital management. Zhou et al. (2020) discuss how AI is changing surgery through medical imaging, surgical navigation, planning, and robotic intervention. Their work suggests that AI can support doctors before and during surgery by improving accuracy and decision-making. Similarly, D’Ettorre et al. (2021) discuss the growth of robotic-assisted surgery and the role of the da Vinci Research Kit in advancing surgical robotics research.

Healthcare robotics has also expanded beyond surgery. A scoping review on robots in healthcare identifies several roles of robots, including surgical robots, rehabilitation robots, mobility-support robots, telepresence robots, pharmacy robots, disinfection robots, delivery robots, and socially assistive robots

(Morgan et al., 2022). These studies show that robots can support healthcare workers by performing repetitive, precise, or physically demanding tasks. AI can also help in analysing medical images, monitoring patients, detecting diseases, and supporting clinical decisions. However, the literature also suggests that AI and robotics should support doctors and caregivers rather than replace human judgement, especially in sensitive areas involving patients' health and dignity (Loh, 2018).

In industry, existing research highlights the role of AI and robotics in automation, manufacturing, quality control, warehouse management, and workplace safety. Industrial robots are widely used for repetitive and high-precision tasks such as assembling, welding, painting, packaging, and material handling. AI further improves these systems by enabling predictive maintenance, defect detection, data-based decision-making, and production optimisation. Researchers such as Erik Brynjolfsson and Andrew McAfee have discussed how digital technologies and automation are changing productivity and the nature of work. Similarly, Daron Acemoglu and Pascual Restrepo have studied the effect of industrial robots on labour markets, especially in relation to employment and wages. Their work is important because it shows that robotics can increase efficiency, but it can also create concerns about job displacement and economic inequality.

Studies related to industrial automation also show that AI and robotics can improve safety by performing dangerous tasks in environments where human workers may face risks. In factories, mines, warehouses, construction sites, and chemical plants, robots can help reduce human exposure to harmful conditions. Research by (Liang et al., 2024) on AI and robotics in the architecture, engineering, and construction sector identifies possible benefits such as improved safety, productivity, and quality. At the same time, the study also highlights ethical issues such as job loss, privacy, data security, lack of transparency, reliability, and liability.

AI and robotics are also becoming part of everyday life. Scholars in human-robot interaction have studied how people interact with robots in homes, schools, workplaces, and public spaces. Everyday examples include robotic vacuum cleaners, smart home devices, voice assistants, delivery robots, educational robots, recommendation systems, and semi-autonomous vehicles. Darling, K. (2015) work on human-robot interaction is useful for understanding how humans emotionally respond to robots and often treat them as social beings. Turkle, S. (2007) has also raised important concerns about human relationships with technology, especially the possibility that people may begin to expect emotional support from machines while reducing meaningful human interaction.

The literature on everyday robotics shows both possibilities and concerns. On the positive side, AI and robotics can make life easier by saving time, assisting elderly people, supporting persons with disabilities, improving learning, and helping with domestic or repetitive tasks. Robots and AI-based systems can also support independent living, especially for people who need assistance in mobility, communication, or daily routines. However, scholars also warn that these technologies raise questions about privacy, surveillance, emotional dependence, and unequal access. Since many smart devices and robots collect data through sensors, cameras, microphones, and user behaviour, privacy becomes an important concern.

Ethical issues form a major part of existing research on AI and robotics. In healthcare, scholars raise concerns about patient privacy, algorithmic bias, data security, accountability, and fairness (Ueda D et al., 2024). A systematic scoping review on ethical issues in AI healthcare identifies key principles such as human autonomy, prevention of harm, fairness, explainability, and privacy (Maccaro et al., 2024). These principles are important because AI systems may influence decisions that affect people's health, safety,

employment, and daily life. If such systems are trained on biased data or used without proper human supervision, they may produce unfair or harmful outcomes.

Employment is another major concern. While AI and robotics can create new careers in engineering, programming, robotics maintenance, data analysis, and automation design, they can also reduce demand for some repetitive or routine jobs. Acemoglu and Restrepo's research is especially relevant here because it shows that industrial robots can negatively affect employment and wages in some labour markets. This does not mean that robotics should be rejected, but it does mean that societies need strong education systems, reskilling programmes, and fair labour policies so that technological progress does not only benefit privileged groups.

Access is also an important social concern. Advanced AI and robotic systems are often expensive, which means they may be more available in wealthy hospitals, large companies, urban schools, and developed regions. This can create a technology gap between rich and poor communities, urban and rural areas, and developed and developing economies (Ford, M. 2015). In healthcare, unequal access to AI-based diagnosis or robotic treatment may widen existing inequalities (Haider et al., 2026). Therefore, scholars argue that technological innovation must be inclusive, affordable, and designed with public welfare in mind.

Overall, the reviewed literature shows that AI and robotics have significant possibilities in healthcare, industry, and everyday life. They can improve accuracy, efficiency, safety, comfort, and productivity. They can also support doctors, workers, students, elderly people, and persons with disabilities. At the same time, the literature also highlights serious concerns related to job displacement, privacy, bias, cost, access, human dependence, and accountability. Therefore, AI and robotics should not be seen only as technical innovations, but also as social technologies that must be developed responsibly. The existing studies suggest that the future of AI and robotics depends not only on engineering progress, but also on ethical design, human supervision, inclusive access, and responsible use.

4. Research Methodology

The present research is based on a descriptive and analytical approach. It examines the role of Artificial Intelligence and Robotics in healthcare, industry, and everyday life by using secondary sources such as research articles, books, reports, credible websites, and relevant case studies. This study is review-based in nature and it analyses existing literature to understand the applications, benefits, challenges, ethical concerns, and future possibilities of these technologies.

The descriptive approach is used to explain the basic concepts and uses of Artificial Intelligence and Robotics, while the analytical approach helps examine their impact on healthcare systems, industrial work, and human life. The paper focuses on practical applications rather than the detailed technical design or programming of robotic systems.

5. Understanding Artificial Intelligence and Robotics

Artificial Intelligence means when a machine or computer can do tasks that usually need human thinking, such as learning, making decisions, solving problems, understanding images, and understanding language. (Jaboob et al., 2024). AI systems work through data and algorithms, which help them recognise patterns, process information, and improve their performance over time (Aldoseri et al., 2023). However, AI does not mean that machines think exactly like humans; rather, it means that they are trained to complete specific tasks intelligently.

Robotics is the branch of technology that deals with the design, construction, operation, and use of robots. A robot is a machine that can perform physical tasks either automatically or with human control (Khatib et al., 1999). Robots may include mechanical parts, sensors, motors, cameras, software, and control systems. They are generally built to carry out activities that are repetitive, difficult, dangerous, or require high precision.

AI and robotics are used across many areas of modern life. In healthcare, AI can support medical diagnosis by analysing patient data and medical images, (Panayides et al., 2020) while robots can assist in surgery, rehabilitation, patient care, and hospital delivery services. In industries, AI can help detect defects, improve quality control, and support automated decision-making, while robots are used for assembly, packaging, welding, painting, and material handling. In everyday life, AI and robotics are visible through search engines, mobile applications, smart devices, voice assistants, cleaning robots, educational tools, and service technologies (Lee, 2021).

Together, AI and robotics help machines become more useful, accurate, and responsive. AI provides the ability to analyse information and make decisions, while robotics provides the physical structure needed to perform tasks. Their combined use helps humans work more efficiently and safely, but it also requires careful attention to ethics, privacy, cost, accessibility, and human regulation.

5.1 Relationship Between AI and Robotics

Artificial Intelligence and Robotics are closely connected because both fields work together to create machines that can sense, understand, decide, and act. Robotics provides the physical structure of a machine, while Artificial Intelligence gives it the ability to process information and respond intelligently (Brady, 1985). In this sense, a robot can be understood as the body of a machine, and AI as the system that helps it make decisions. A robot without AI may only follow fixed instructions. For example, it may move in one direction, repeat the same action, or perform a task only when controlled by a human. Such robots are useful for simple and repetitive work, but they cannot easily adjust to new situations. When AI is added to robotics, the robot becomes more flexible. It can identify objects, understand its surroundings, avoid obstacles, recognise speech or images, and choose suitable actions based on the situation.

Understanding the relationship between AI and Robotics can be done in a simple technical flow: Sensors, perception, AI decision making, control system, actuators, physical action, feedback. In a robotic vacuum cleaner, for instance, sensors are used to locate obstacles, furniture, dust and walls around the room. This information is then fed into the AI system, which determines the cleaning path, avoidance of collisions, and an understanding of the space. The control system then communicates with the motors and wheels, which are considered actuators, and will aid the robot in moving in the desired direction. The robot keeps on moving and, as it does, it gets feedback from the sensors and makes adjustments to the path if a new obstacle is detected. This demonstrates the integration of AI and Robotics in sensing, decision making, acting, and continuous correction. Firstly, the robot gathers data using sensors, cameras, microphones or other input devices. Second, AI takes in this information and determines what action is necessary. Third, the robot operates with its mechanical components, motors, wheels, arms or tools to complete the specified task. (Vermesan et al., 2022). This process allows machines to move beyond simple automation and become more responsive to real-world conditions. For example, an educational robot may listen to a student's command, understand the instruction through AI, and then move or respond accordingly. A security robot may use cameras to observe a space, detect unusual movement, and alert human operators. A service robot in a hotel or airport may recognise a visitor's request, guide them to a location, or answer

basic questions. In these examples, AI helps the robot interpret information, while robotics enables it to physically interact with the environment (Brady, 1985).

AI also improves the learning ability of robots. Through machine learning, robots can become better at performing tasks by using data and previous experience (Tulli, 2024). For instance, a robot used for sorting objects can gradually improve its accuracy by learning from repeated examples. Similarly, a robot used in research laboratories can perform repeated tasks with precision and reduce human error. This shows that AI does not only control robots; it can also help them improve their performance over time. Another important aspect of this relationship is human-robot interaction. AI allows robots to communicate with humans through speech, gestures, facial recognition, or written commands (Saunderson & Nejat, 2019). This makes robots more useful in education, public services, entertainment, travel, security, and research and analysis. A robot that can understand basic human language or respond to human behaviour becomes easier to use, especially for people who may not have technical knowledge.

However, the connection between AI and Robotics also creates important responsibilities. As robots become more intelligent and autonomous, human supervision remains necessary. Machines may make mistakes if they receive incorrect data, misunderstand a situation, or operate in environments for which they were not properly designed. Therefore, AI-powered robots should be developed with safety checks, ethical guidelines, privacy protection, and clear human control (Biswas & Sarkar, 2026). Overall, Artificial Intelligence and Robotics work best when they support each other. Robotics allows machines to act in the physical world, while AI enables them to analyse situations and make informed decisions. Their relationship is important because it helps create intelligent systems that can assist humans in learning, work, safety, research, travel, entertainment, and many other areas of life.

5.2 Applications of AI and Robotics in Healthcare

Artificial Intelligence and Robotics are increasingly becoming important in the healthcare sector. Their use is not limited to advanced hospitals alone; they are gradually influencing diagnosis, surgery, patient care, rehabilitation, hospital management, and medical research (Deo & Anjankar, 2023). In healthcare, AI mainly helps in analysing information and supporting decision-making, while robotics helps in performing physical tasks with precision, control, and consistency. When used together, these technologies can support doctors, nurses, patients, and hospital systems (Bates, 2000).

One of the most visible applications of robotics in healthcare is robotic-assisted surgery. In this method, the robot does not operate independently. Instead, a trained surgeon controls robotic instruments from a console (Handa et al., 2024). The robotic system translates the surgeon's hand movements into smaller and more precise movements inside the patient's body. This is especially useful in minimally invasive surgery (Saqib et al., 2024), where small cuts are made instead of large openings. Such systems can provide better visualisation, controlled movement, and improved precision during complex procedures. A well-known example is the da Vinci Surgical System, developed by Intuitive Surgical (Deo & Anjankar, 2023). This system is used in different types of minimally invasive procedures, including urological, gynaecological, thoracic, and general laparoscopic surgeries. The system includes robotic arms, surgical instruments, a high-definition three-dimensional vision system, and a surgeon console (Handa et al., 2024). The surgeon remains in full control of the procedure, while the robotic arms assist in making accurate and steady movements. This example shows how robotics can support human expertise rather than to replace it.

Artificial Intelligence can further support healthcare by helping doctors analyse medical data. For example, AI-based systems can examine X-rays, CT scans, MRI scans, and other medical images to

identify possible signs of disease. These tools can help doctors detect conditions at an early stage, compare large amounts of data, and reduce the chances of missing important details. However, AI-based diagnosis should be understood as a support system, not a replacement for doctors. Final medical decisions still require human judgement, clinical experience, and patient-specific understanding. AI and robotics are also useful for patient monitoring. In hospitals, AI-supported systems can track patient health indicators such as heart rate, oxygen level, blood pressure, and temperature. If there is a sudden change in a patient's condition, such systems can alert healthcare workers. This can be particularly useful in intensive care units, emergency wards, and long-term care settings. Robotics can also support patient care by helping with medicine delivery, movement assistance, and routine hospital tasks.

Another important application is rehabilitation. Rehabilitation robots can support patients recovering from stroke, injury, surgery, or physical disability (Mohebbi, 2020). These robots can assist patients in repeating controlled movements, such as arm, leg, or walking exercises. Repetition is important in rehabilitation, and robotic systems can help maintain consistency and track the patient's progress over time. AI can support this process by analysing the patient's performance and helping therapists adjust the level of difficulty according to the patient's condition (Banyai & Brişan, 2024). AI and robotics also contribute to elderly care and assistive healthcare. In many countries, ageing populations have increased the need for support systems for elderly people. Assistive robots can help with reminders, mobility support, basic communication, and emergency alerts. AI-based systems can also help monitor daily routines and detect unusual patterns, such as a fall or missed medication. These technologies can support independent living, but they should be used carefully so that elderly care does not become impersonal or overly dependent on machines.

In hospital management, robots can perform tasks such as transporting medicines, laboratory samples, food, laundry, and medical supplies from one department to another. This reduces the workload of hospital staff and allows nurses and healthcare workers to spend more time on direct patient care (Ozkil et al., 2009). During infectious disease outbreaks, robots can also be used for disinfection and contactless delivery, reducing the risk of exposure for healthcare workers. AI is also becoming useful in medical research and drug development. It can help researchers analyse large datasets, identify disease patterns, study possible drug combinations, and speed up parts of the research process (Deo & Anjankar, 2023). In public health, AI can support the analysis of disease spread, hospital resource planning, and health-risk prediction. These applications show that AI is not only useful for individual patient care but also for broader healthcare planning and research.

Despite these possibilities, the use of AI and robotics in healthcare also raises important concerns. Since healthcare involves sensitive personal data, privacy and data protection are major issues (Biswas & Sarkar, 2026). AI systems must be trained on reliable and fair data so that they do not produce biased or inaccurate results. Robotic systems must also be tested carefully to ensure patient safety (Biswas & Sarkar, 2026). Another concern is cost, as advanced robotic surgery systems and AI-based tools may not be equally available in all hospitals, especially in rural or under-resourced areas.

Therefore, AI and robotics should be used as supportive technologies in healthcare. Their purpose should be to improve accuracy, safety, efficiency, and access to care, while keeping human doctors, nurses, and caregivers at the centre of the healthcare system. The future of healthcare will depend not only on advanced machines, but also on ethical use, affordability, human supervision, and patient dignity.

5.3 Applications of AI and Robotics in Industry

Artificial Intelligence and Robotics have become important parts of modern industrial development. In

industries, robotics is mainly used to perform physical tasks, while AI helps machines analyse data, make decisions, detect problems, and improve efficiency (Soori et al., 2024). Together, these technologies are changing the way goods are produced, stored, checked, transported, and delivered. Their use is especially visible in manufacturing, automobile production, electronics, logistics, warehouses, food processing, pharmaceuticals, and heavy industries. One of the most common uses of robotics in industry is automation. Industrial robots are used for tasks such as assembly, welding, painting, cutting, packaging, loading, unloading, and material handling (Javaid et al., 2022). These tasks often require speed, accuracy, and repetition. Robots can perform them consistently without tiredness, which helps industries improve productivity and reduce human error (Soori et al., 2024). For example, in automobile manufacturing, robots are commonly used to weld car bodies, paint vehicle parts, and assemble components with high precision. This allows companies to maintain quality and complete production at a larger scale.

AI adds another layer of intelligence to industrial robotics. Traditional robots usually follow fixed instructions, but AI-enabled robots can analyse information from cameras, sensors, and machines to respond more flexibly (Nwamekwe et al., 2025). For example, a robot on a production line can use computer vision to identify whether a product has a defect, whether a part is placed correctly, or whether an item needs to be removed from the line. This makes quality checking faster and more accurate. In industries where small defects can affect safety or product performance, AI-based inspection systems are especially useful.

A major application of AI in industry is predictive maintenance. Machines in factories often produce data through sensors related to temperature, vibration, pressure, speed, and sound. AI can analyse this data to identify early signs of machine failure (Javaid et al., 2022). Instead of waiting for a machine to break down, industries can repair or service it before a serious problem occurs. This helps reduce downtime, save costs, and maintain continuous production. Predictive maintenance is important in sectors such as manufacturing, energy, steel, transport, and chemical industries, where machine failure can lead to major delays and financial loss. AI and robotics are also widely used in warehouses and logistics. In large warehouses, mobile robots can move shelves, sort packages, carry goods, and support order fulfilment. AI helps these robots plan routes, avoid obstacles, organise inventory, and decide the most efficient way to move items (Mohan Banur et al., 2024). A real-life example is Amazon Robotics, where robots are used in fulfilment centres to support workers in storing, picking, sorting, and moving products. These robots do not simply replace human workers; rather, they help manage large volumes of goods and reduce physically demanding movement inside warehouses.

In industries, AI and robotics also improve workplace safety. Some industrial environments involve high temperatures, toxic chemicals, heavy loads, sharp tools, or dangerous machinery. Robots can be used in such areas to reduce direct human exposure to risk (Khurram et al., 2025). For example, robots can inspect pipelines, work in mining environments, handle hazardous materials, or enter unsafe spaces after industrial accidents. By taking over dangerous tasks, robots can protect workers and allow humans to focus on supervision, decision-making, and skilled technical work. Another important use is in supply chain and inventory management. AI systems can analyse demand patterns, stock levels, delivery timelines, and production needs (Mohan Banur et al., 2024). This helps companies decide how much to produce, when to order raw materials, and how to reduce wastage. When combined with robotic systems in warehouses, AI can make the movement of goods more organised and efficient (Javaid et al., 2022). This is especially useful for e-commerce, retail, pharmaceuticals, and food supply chains, where timing and accuracy are very important.

AI and robotics are also contributing to the idea of smart factories. A smart factory uses connected machines, sensors, robots, and software systems to improve production. In such factories, machines can communicate with each other, collect data, and adjust processes with limited human intervention (George et al., 2023). For example, if one machine slows down or shows signs of failure, the system can alert technicians or adjust production planning. This type of industrial development is often linked with Industry 4.0, which refers to the use of digital technologies, automation, data, and intelligent machines in manufacturing. The use of AI and robotics in industry has many benefits. These technologies can increase productivity, improve product quality, reduce waste, lower risk for workers, and support faster decision-making (Javaid et al., 2022). They can also help industries remain competitive in a global market. However, there are also concerns. Automation may reduce the need for some repetitive jobs, especially where workers are not given opportunities for reskilling. Small companies may struggle to afford advanced robotic systems. There are also concerns related to data security, technical failure, worker surveillance, and overdependence on machines.

Therefore, the use of AI and robotics in industry should be planned responsibly. Industries should not only focus on speed and profit, but also on worker safety, fair employment, training, and ethical use of technology. Human workers remain important because they provide judgement, creativity, maintenance, supervision, and problem-solving skills. The future of industry will depend on how effectively humans and intelligent machines can work together.

5.4 Applications of AI and Robotics in Everyday Life

Artificial Intelligence and Robotics are no longer limited to laboratories, hospitals, or factories. They are gradually becoming part of everyday life through digital devices, smart machines, online platforms, public services, and automated systems. Many people use AI-based technologies daily without always recognising them as Artificial Intelligence. Similarly, robotic systems are becoming more visible in homes, schools, public spaces, entertainment, and service-related activities (Bhome et al., 2026).

One of the most common examples of AI in everyday life is the use of smartphones and digital applications. AI helps mobile phones recognise faces, organise photos, correct spelling, suggest words while typing, translate languages, and provide navigation support. Search engines, video platforms, music applications, and shopping websites also use AI to understand user preferences and recommend suitable content, products, songs, or videos (Mishra, 2024). These examples show how AI supports convenience, personalisation, and faster access to information. Smart home technologies are another important area where AI and robotics are used. Devices such as voice assistants, smart speakers, smart lights, security cameras, thermostats, and robotic vacuum cleaners help people manage household tasks more easily. A voice assistant can answer questions, set reminders, control appliances, and support hands-free communication. A robotic vacuum cleaner can move across a room, detect obstacles, and clean floors with limited human effort. These technologies are useful because they save time and make daily routines more organised.

AI and robotics are also becoming relevant in education and learning. AI-based learning platforms can provide personalised lessons, practice questions, feedback, and language support according to a student's learning level (Fitria, 2021). Educational robots can help students understand coding, mathematics, problem-solving, and basic engineering through interactive activities. These tools can make learning more engaging, especially for students interested in science, technology, engineering, and mathematics. However, they should support teachers rather than replace the human role of guidance, care, and mentorship (Kumar et al., 2023).

In travel and transportation, AI is used in navigation apps, ride-booking platforms, traffic prediction systems, digital ticketing, and travel recommendation services. Navigation apps use AI-based analysis to suggest faster routes, estimate travel time, and identify traffic congestion (Robinsha & Amutha, 2025). Travel platforms recommend hotels, flights, tourist places, and routes based on user needs and previous choices. In some airports, hotels, and public spaces, service robots and digital kiosks help visitors with directions, check-in, information, or basic assistance. These applications make travel more convenient and accessible.

AI and robotics are also used in public safety, security, and entertainment. AI-supported cameras, traffic systems, emergency alerts, and automated access controls can help identify risks and improve response (Jain, 2025). Robots may be used in unsafe situations such as fire emergencies, disaster zones, or suspicious-object examination (Osumi, 2014). However, these uses must be handled carefully because they raise concerns about privacy, surveillance, data misuse, and unfair monitoring. In entertainment, AI is used in streaming platforms, gaming, animation, editing, and digital content creation. Robotics is also used in theme parks, exhibitions, stage performances, and interactive shows. These examples show how AI and robotics are not only changing services and safety systems, but also shaping creativity, leisure, and audience experiences.

AI and robotics can support accessibility and independent living through tools such as speech-to-text, screen readers, smart mobility devices, reminders, and emergency alerts. They can save time, improve convenience, support learning, and assist communication. However, concerns remain around privacy, consent, cost, unequal access, and overdependence on smart devices. Therefore, the use of AI and robotics in everyday life should be guided by responsible and human-centred design. These technologies should make life easier without reducing privacy, equality, creativity, or human connection. Their value depends not only on how advanced they are, but also on how safely, ethically, and inclusively they are used by society.

There is a similarity and a difference in the application of AI and Robotics in healthcare, industry and daily life. AI is primarily being used to assist in analysis, prediction, and decision-making in all three areas, and Robotics is assisting in physical tasks with accuracy and consistency. The primary similarity is that both technologies are focused on enhancing efficiency, safety and human support. They are used for different purposes in different industries: for example, in healthcare they are used for care and precision; in industry they are used for productivity and quality; and in everyday life they are used for convenience, learning, accessibility and assistance. Overall, the trend is towards more intelligent, responsive, and human-supportive automation systems.

6. Challenges and Concerns

Although Artificial Intelligence and Robotics offer many possibilities, they also raise technical, social, ethical, economic, and legal concerns. One major challenge is job displacement, as machines can perform repetitive and routine tasks with speed and accuracy. This makes reskilling and skill development important so that workers can adapt to changing job markets. Another concern is unequal access. Advanced AI and robotic systems require high investment, technical support, and maintenance, making them difficult for smaller institutions and under-resourced communities to use. This may widen the digital and social divide if the benefits of technology remain limited to privileged groups (Lee & Ahn, 2026). Privacy and data security are also serious issues. AI-based systems often collect information through cameras, sensors, microphones, and digital platforms. If this data is misused or poorly protected, it can

lead to surveillance, identity risks, and loss of personal control over information (Biswas & Sarkar, 2026). Bias and unfair decision-making are further concerns. Since AI systems learn from existing data, they may produce unfair results if the data contains social, gender, racial, or economic bias. Such systems must be regularly tested and monitored to ensure fairness and accountability (Mehrabi et al., 2021).

Safety is especially important when AI is connected with robots that act in the physical world. Software errors, sensor failures, hacking, or incorrect commands can cause harm. Therefore, robotic systems need safety standards, emergency controls, cybersecurity protection, and human supervision. Another challenge is transparency. Many AI systems are difficult to understand because their decision-making process is complex. This “black box” problem makes it harder for users to question or trust automated decisions. Explainable and responsible AI is therefore necessary (Hassija et al., 2024). Overall, AI and Robotics should be developed with care, fairness, privacy, safety, accountability, and inclusion. Technological progress should support human welfare rather than increase inequality, dependence, or risk.

7. Future Scope of AI and Robotics

The future scope of Artificial Intelligence and Robotics is closely linked with the development of smarter, safer, and more human-centred technologies. As these fields continue to grow, machines are expected to become more capable of understanding complex situations, working with humans, and supporting decision-making in different areas of life and work (Wang & Siau, 2019).

One important future direction is human-robot collaboration. Instead of replacing humans completely, future robotic systems may work alongside people as assistants, co-workers, learning tools, and support systems (Javaid et al., 2022). This will require better communication between humans and machines, improved safety design, and more user-friendly technology.

Another major area of growth is the development of affordable and accessible AI-based robotic systems. If these technologies become less expensive and easier to use, they can benefit smaller institutions, developing regions, and wider sections of society (Lee & Ahn, 2026). This will be important for reducing the technology gap and making innovation more inclusive. The future will also require stronger ethical and legal frameworks. As AI and robots become more advanced, questions related to privacy, responsibility, safety, bias, and human control will become more important (Biswas & Sarkar, 2026). Clear regulations, responsible design, and public awareness will be necessary to ensure that these technologies are used for human welfare.

AI and Robotics will also create new educational and career opportunities. Students interested in this field may explore areas such as Computer Science, Mechanical Engineering, Electrical Engineering, Mechatronics, Data Science, Automation, and Human-Robot Interaction (Fitria, 2021). Therefore, the future of AI and Robotics will depend not only on technological advancement, but also on skilled people who can design, manage, and use these systems responsibly. Overall, the future of AI and Robotics is promising, but it must be guided by responsibility, accessibility, and ethical thinking. These technologies can contribute meaningfully to society when they are developed to support human needs, reduce risks, and create inclusive opportunities.

8. Findings and Discussion

The study finds that Artificial Intelligence and Robotics are closely connected technologies that are gradually changing how humans interact with machines. AI gives machines the ability to analyse information and respond intelligently, while robotics allows them to perform physical actions. Together,

they create systems that can support human work with greater accuracy, speed, and consistency. The research also shows that these technologies are becoming useful across different areas of society, not only because they improve efficiency, but because they can reduce human effort, support decision-making, and make certain tasks safer. Their growing use reflects a shift from simple automation to more intelligent and responsive machines.

At the same time, the discussion shows that AI and Robotics cannot be understood only as technical achievements. Their impact depends on how they are designed, who can access them, how safely they are used, and whether they remain under responsible human supervision. Issues such as privacy, bias, cost, job displacement, and accountability remain important concerns. Overall, the findings suggest that AI and Robotics have strong potential for future development, but their value depends on balanced and ethical use. These technologies should be developed in ways that support human welfare, improve accessibility, and create opportunities without increasing inequality or social risk.

9. Conclusion

Artificial Intelligence and Robotics represent an important shift in the way technology is being designed and used. Their growing role shows that machines are no longer only tools for completing tasks, but are gradually becoming systems that can assist, respond, and support human decision-making.

The study suggests that the real value of AI and Robotics lies in how responsibly they are used. These technologies can become meaningful only when they improve human life without reducing privacy, fairness, dignity, or access. Their development should therefore be guided by ethical thinking, human supervision, and social responsibility. In the coming years, AI and Robotics will continue to influence education, work, services, and everyday experiences. For this reason, students, researchers, industries, and policymakers must understand both their possibilities and limitations. A balanced approach can ensure that technological progress remains inclusive, safe, and beneficial for society.

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