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A Short Review of the Robotics

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Abstract

Robotics can be both a success story and a frustration story. The twenty-first century is the century of robotics [1]. Robots have been carrying new possibilities for a long time. The role of robots in every aspect of life is increasingly important in society, with medicines and healthcare, building services, manufacturing, including food, manufacturing, supply, and transportation collaborating. Robotics is a key technology in the modern world; robots now play an important role in every field of science, from medical science to robots working in every branch of science. The robot is doing perfect and complex work very easily without any kind of damage. In today's world, robots have become the main mantra of human cooperation.

Keywords:*-Robotics, Human Cooperation, Manufacturing, Transportation Collaborating*

INTRODUCTION

Robotics is a field of science that deals with machines; robotics is a branch of engineering and science that includes electronics engineering, mechanical engineering, computer science, etc. [2]. These robots are designed to be used for any purpose but they are used in sensitive environments like bomb detection, various bomb disposal, etc. The robots that have taken the form of human faces are probably capable of human-like walking, speech, comprehension, and most importantly what humans can do. These robots communicate directly with the physical world - and they are often used to perform monotonous and repetitive tasks instead of humans. Isaac Asimov, a writer,

said he was the first person to name robotics in a short story written in the 1940s [3]. And he talked about three principles in his story that can guide a robot.

What is the robotics?

Robotics is an interdisciplinary branch of computer science and engineering [4]. Robotics is the ultimate consequence of science, engineering, and technology that we know as robots. These machines are used for various purposes such as manufacturing, construction, healthcare, and many more. They can even perform tasks that are highly repetitive and not easily performed by humans, such as exploring space or overcoming dangerous environments. Robots can take the place of humans in production processes in hazardous environments. But the effectiveness and potential use of robots did not increase significantly until the 20th century. Throughout history, robotics has often been seen to mimic human behavior and perform tasks in the same manner. Today, robotics is a fast-growing device that can serve as a human alternative, such as bombdisposal, shipwreck, and mine exploration. Robotics is also used as a teaching aid in STEM (science, technology, engineering, and mathematics) [5].

Why robotics is important?

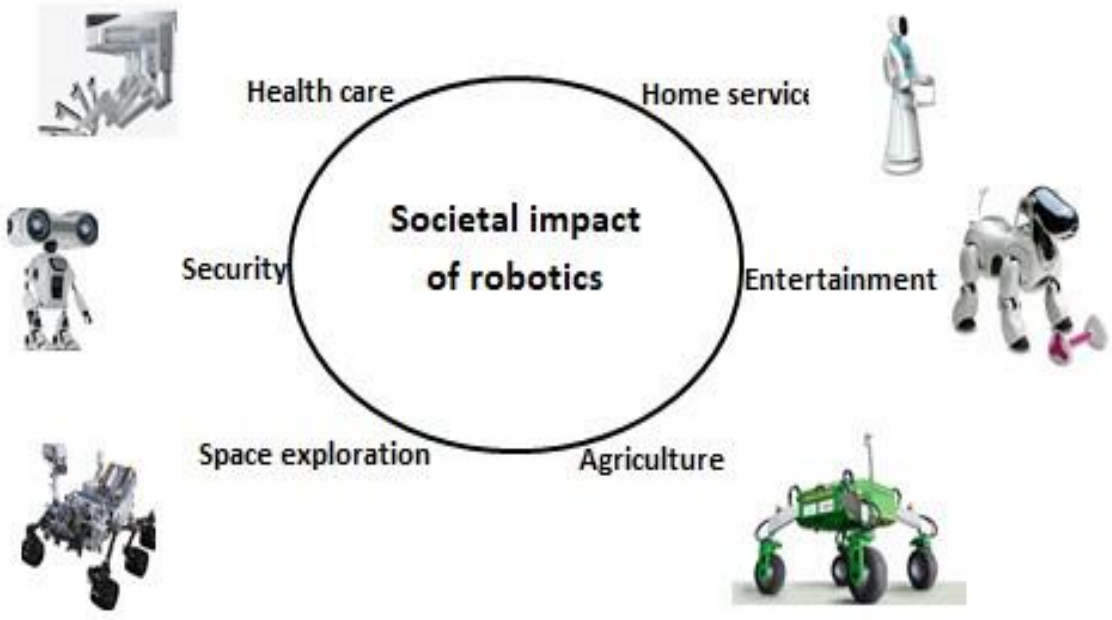


Figure 1: Importance Robots

Robotics is part of science, technology, and engineering. In ancient times and in the middle Ages, robots were mainly used for entertainment. But, the current robot has changed the structure of society and allowed safe conditions for labor. Also, the implementation of advanced robotics in the military and NASA has changed the landscape of national defense and space exploration. The industry has greatly benefited from the expansion of robotic workers. Because robots never get tired and do a lot more work in a short time than humans. Robots are very convenient for humans because robots can work in dangerous environments. The robot can easily handle heavy and toxic substances and repetitive tasks. Robots help factories avoid many accidents, as well as save time and money.

Robotics covers Mechanical Engineering, Electrical Engineering, Computer Engineering, Software Engineering, and Information Engineering. Robotics builds machines that can act like humans and act as human alternatives. First, robots were created to perform dangerous tasks so that workers in the industry would not face problems. Robots are also employed in jobs that are too dirty, dangerous, or dull to be suitable for humans. Robots are widely used in manufacturing, assembly, packing and packaging, mining, transportation, earth and space exploration, and surgery. [6]

It can also help put out fires, play a big role on the battlefield, work in the military, work with people in factories, make things like automobiles, work in dangerous situations and save lives, and help with emergency searches. The role of robots in rescue work is immense. In addition, the role of robots in weapons, laboratory research, security, and mass production of consumer and industrial products is invaluable [7]. Robots are a wonderful invention in our lives. We notice the use of robots in our daily work. So we can say that robots are no less important in our lives.

There are also tasks such as space and underwater exploration that are very dangerous and unsafe for humans. Robots can be used for dangerous tasks such as bomb disposal. The use of robots in such cases greatly reduces the number of accidents at work. While a robot can work perfectly 24 hours a day, 7 days a week and a robot can work with many people alone in a very short time, the robot works endlessly throughout the year.

Robotics has already become the first to compete in the large-scale manufacturing industry. Without robotics, many successful manufacturing industries in Europe would not be able to compete with their current European base operations. These industries have already survived in the employment of robotics. Growing robotics is becoming more relevant for the small manufacturing industry at the center of Europe's manufacturing and employment potential.

Farmers are doing everything from harvesting crops with robots and they have taken advantage of new technology. Now those robots are being used in the waste disposal industry and cleaning up their mess, the medical industry has benefited from advances in auxiliary surgical robotics.

A brief History of the robotics

The term robotics is derived from the word robot, which Czech author Carroll Čapek introduced to the public in his play R.U.R. (Rossum's Universal Robots), published in 1920 [8]

The first industrial robot was created by George Devell, an American inventor and founder of the first robotics company in history: Unimation.

In 1954, what is considered the first industrial robot was developed in the United States: a hydraulic arm, called the Unimet, used to lift heavy loads, which was sold to General Motors. The development of modern robotics was accelerated by the advent of steam power and electricity during the Industrial Revolution. Using robots can speed up production, do things that humans cannot do, and replace humans in dangerous situations. In 1898, inventor Nikola Tesla (1856-1943) demonstrated a model of a remotely operated submersible boat in Madison Square Garden [9].

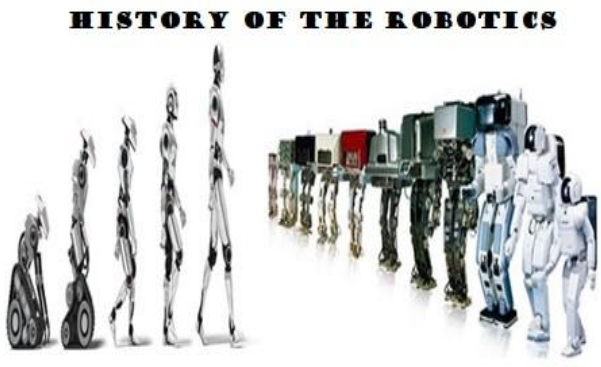


Figure 2:History of the Robotics

TTesla further writes that he believes that one day it is possible to create an intelligent, autonomous humanoid robot. Tesla's ideas were not taken seriously until the twentieth century. The robotics industry emerged in the mid-twentieth century. Robots are integrated into production and are gradually being applied in the military, aeronautical and aerospace, medical and entertainment industries.

Types of robots

In general, there are five types of robots:

1) Pre-programmed robots,

Pre-programmed robots work in a controlled environment where they work simply, monotonously. And to perform the task longer, faster, and more efficiently than humans.

2) Humanoid robot

Humanoid robots are robots that behave like humans. These robots typically perform human-like activities (such as running, jumping, and carrying objects).

3) Autonomous robot

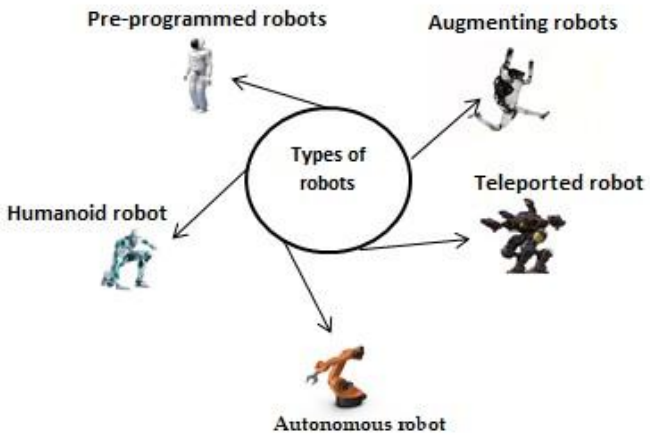
Autonomous robots operate independently of human operators. These robots are usually designed to perform tasks in an open environment that does not require human supervision.

4) Teleported robot

A teleported robot is a semi-autonomous bot that uses a wireless network to enable human control from a safe distance. These robots usually work in extreme geographical conditions, weather, conditions, etc.

5) Augmenting robots

Augmentation robots enhance existing human abilities or replace lost human abilities. Augmenting robots can redefine humanity by making humans faster and stronger.



Robots began as the entertainment of the royalty. Early humanoid automata and programmable automaton bands were created and [10] inventors such as Al-Jazari and Leonardo da Vinci worked to create automatons for their benefit. Al-Jazari formed a floating band that was human-like and performed a variety of songs and drum beats. It can stand up and move its arms and neck, as well as open its mouth. It wasn't until 1961 - when an inventor named George Devil installed his robot, Unmet, at a general motor factory in Trent, New Jersey - that the robot's first modern industrial use was attempted.

Application of the robotics

Robots are helping us in different ways in our daily life; robots have become a reliable tool in our daily work. Although robots are not becoming chefs and doctors, they are widely used in industries such as food making, healthcare, and more. Robots are in almost all industries today because of their precision and benefit to people. There are many jobs in industries like manufacturing, agriculture, entertainment, etc. which also require tedious monotonous work and precision. In such situations, robots are more suitable than humans because they are precise, intelligent, and do not bother like humans.

Here are some of the robotics applications that help us in our daily lives:

Security

Currently, robotics companies are working to link robot guards with human safety consultants. One of the most famous companies in the field is Nightscape in the United States, which has autonomous security robots capable of assisting human security guards with real-time, actionable intelligence. These robots can assist in crimes such as armed robbery, theft, domestic violence, fraud, injury and running.

Figure 3: Security Robot

Robots have many roles in the army. These robots can be used as drones to monitor enemy camps or even entire cities. Search and rescue robots are extremely convenient during war. They can search, track and rescue in nuclear, biological, radiological and chemically harmful environments.

Healthcare

Robots have brought many changes to healthcare, robots are now used in the operating room and in clinical settings to assist health workers and improve patient care. When robotic systems are used for surgery, they offer advantages like high accuracy, low risk of infection, enhanced visuals, good control, and much more. The robot can help doctors perform operations more precisely and the robot can be used as an artificial limb, providing therapy to patients, and so on. An example of this is the Da Vinci robots which can help surgeons perform complex surgeries on the heart, head, neck, and other sensitive areas. See Figure :-4

Space Exploration:

With the advancement of robotic technology, robots are being sent into space exploration instead of living creatures. When humans set foot on the moon, scientific knowledge of the state of the planets, including Mars, Venus, Titan, and Jupiter, comes almost exclusively from robotic explorations. There are many things in space that are very dangerous for astronauts. Humans cannot travel to Mars all day to collect soil samples or repair spaceships from the outside while in deep space! In thissituation, the robot can work instead of humans, but there is no possibility of human death. Organizations like NASA often use robots and autonomous vehicles to do things that humans cannot. The Mars Rover, for example, is an autonomous robot that travels to Mars and takes pictures of interesting or important Mars rock formations and then sends them back to Earth for NASA scientists to study.

See Figure 5

Figure 4: Healthcare Robot

Figure 5: Space Exploration Robot

Underwater exploration

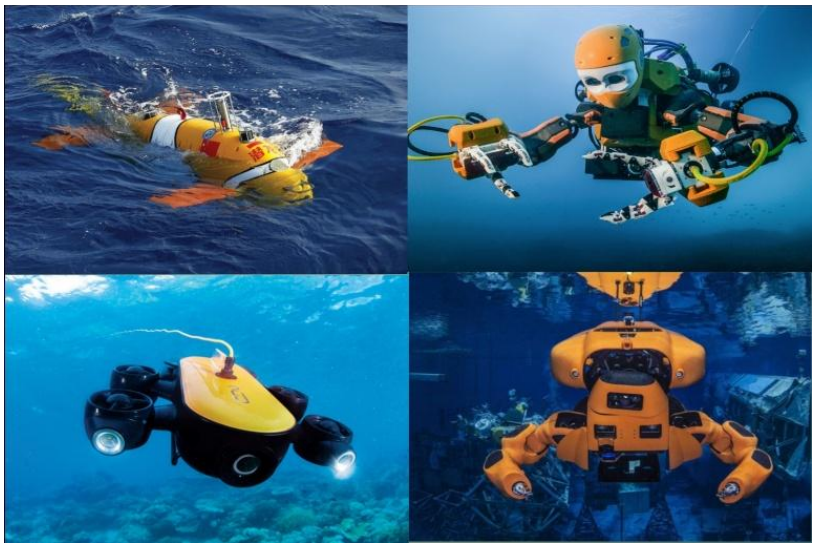


Figure 6: Underwater Exploration Robot

In everyday life, we use robots to explore the depths of the ocean and as an alternative to humans; we can send robots where humans cannot reach. There is a lot of water pressure in the depths of the ocean for which people cannot go much deeper. But even machines like submarines can only go to a certain depth. There are mysterious places under the deep water of the sea, where people cannot go but mysterious places can be explored using robots. These robots are remote-controlled and can help collect information and images about aquatic plants and marine life.

Manufacturing

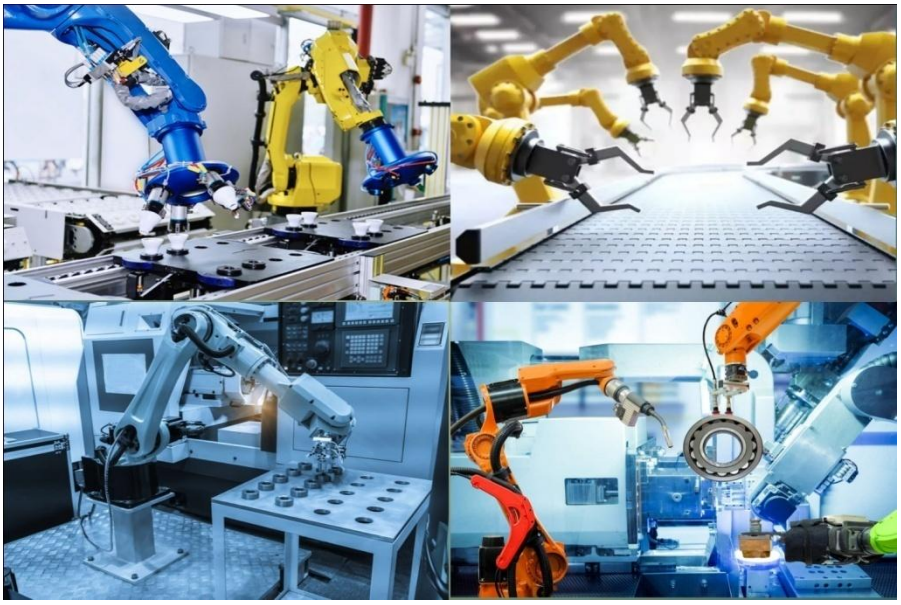


Figure 7: Manufacturing Robot

There are many repetitive and hard works in our manufacturing industry which requires a lot of work like welding, assembly, packing, etc. But people are no longer needed to do these things. Tasks can be done easily by robots Robots can easily do other things instead of just human tasks. Robots can be trained to perform repetitive and monotonous tasks with precision under the guidance and supervision of a human. As an alternative to humans, robots can perform dangerous tasks accurately and save humans from various harms and increase productivity.

Military

Robots are also being used in the army. The army of a country is very important to maintain the law and order of that country and to protect the country from the hands of the enemy. Nowadays the robot is being used by the military as a drone to monitor the enemy, even as an armed measure to attack the opposition forces or as a Medicare agent to help the friendly forces. Some popular robots used in the military sector include the MAARS (Modular Advanced Armed Robotic System) which looks like a tank and contains tear gas and lasers to confuse enemies and even grenade launchers for desperate situations. The DOGO is a tactical combat robot that has a camera to spy on enemy activity and a 9-millimeter pistol in case of an emergency! So we can say that the use of robots in the military is immense.

Figure 8: Military Robot

Entertainment

Figure 9: Entertainment Robot

Robots are also playing a big role in our entertainment industry. Although they may not be exactly actors and actresses, robots can be used to operate cameras, to do special work, behind the sets of movies and serials. Robots can be used for tedious and repetitive tasks that are not suitable for humans. Robots can also be used to perform stunts which are very dangerous for humans but it is more beautiful to watch these video images in an action movie. A variety of robotic movies are being made with robots which are very much discussed in the present world and people are enjoying watching movies very much.

Agriculture

Figure 9: Agriculture Robot

Agriculture is the foundation of human civilization; we have been providing food through agricultural work since the beginning of agricultural civilization. Weather is very important for agricultural work. Agricultural work depends on favorable weather, soil, etc. Moreover, agricultural work is the work of physical labor that makes a person tired. Agriculture is a work that involves a lot of repetitive work which is a waste of a lot of time for the farmer but we can perform tasks properly using robots as an alternative to humans such as sowing seeds, weeding control, harvesting, etc. Robots are commonly used for harvesting which reduces farmers' time wastage and makes the farmer financially self-sufficient. An example of a robot used to remove weeds on a farm is ecorobotics. It is powered by solar energy and can be used to target and spray weeds using a complex camera system. So we can improve agriculture by using robots.

CONCLUSION

With all the advances in technology over the past decade, the advancement of robotics is the most important. Saw different applications of robots in different industries. Robots are used today for everything from security guards, chefs, doctor assistants, customer service agents, and even the war army! Robots can do all the physically necessary things that are difficult or impossible for humans. Robots are becoming more intelligent and smart with the advancement of artificial intelligence. Robots perform a variety of dangerous, annoying, or repetitive tasks through programming. Lastly, robots can

be the perfect helper for humans to solve many problems in different industries.

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