Robotic Devices and Systems- An Overview

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Abstract: **Information regarding the robot's method and system are provided in this paper. Everyone is aware of how artificial intelligence is advancing in business and how the industry is becoming entirely dependent on AI to handle the complex operations. The most well-known field in manufacturing and sciences is robotics, where every engineer is focused on creating a robot that can do a specific activity and provide the necessary results. As technology advances, engineers are all attempting to label robots with 0% error, which is virtually impossible. There is growing concern that robotics and artificial intelligence will replace many occupations. The employee of the future is predicated to be advanced, able to detect opportunities that transform firms and create novel solutions to deal with global challenges in order to be relevant in this shifting occupational scene. Work integrated learning (WIL) has emerged as an important strategy for developing these competencies. Examining the important factors that motivate creation among WIL scholars is the study's goal. This measureable, longitudinal study compares student abilities before and after participation in a WIL assignment at a business, in contrast to earlier schooling that was primarily qualitative or based on a single snapshot. The association of pre- and post-placement competencies is then based on confirmatory issue analysis.**

***Index Terms*- Innovation, Industry 4.0, Robots, Artificial intelligence, Employability, Work integrated learning.**

I. INTRODUCTION

Robots are human-like objects that are capable of performing all human tasks in a fraction of the time. While they cannot fully replace people, they can assist them in carrying out many of their daily tasks. Applications of artificial intelligence and sensors used in robots are similar to those used in humans. In the fields of research and computer applications, robots are used in a wide variety of ways. Engineers and scientists are developing robots to the point where they are virtually universally applicable. There are many robots that are similar to humans in that they can talk and walk without the assistance of a human thanks to programmable language input into them at the time of manufacturing. However, there are also some robots that are semi-automated, such as the needle remote for the controllability of its functioning. Every young person enjoys and wants to learn about robotics because it is one of the most popular and fascinating fields in science and education. In the future, humans will depend on fully automated drama full complicated stars for a variety of tasks, which will reduce the need for human labor.

1.1. Key Components of Robotic Devices And Systems:

Robotic devices and systems represent a fascinating field that integrates engineering, computer science, and various other disciplines to design, develop, and implement machines capable of performing tasks autonomously or semi-autonomously. These systems encompass a broad spectrum of applications, from industrial manufacturing and healthcare to household chores and space exploration.

Hardware: This includes the physical components of robots such as sensors, actuators, manipulators, power sources, and the body structure. These components are designed and integrated to enable movement, perception, and interaction with the environment.

Software: Robotic systems heavily rely on software algorithms for decision-making, control, navigation, and task execution. This software can range from simple scripts to complex artificial intelligence (AI) and machine learning algorithms enabling robots to learn and adapt.

Sensors: Sensors provide robots with the ability to perceive their surroundings. They can include cameras, LIDAR, radar, ultrasonic sensors, and various other types that enable robots to gather data about the environment, objects, and even human interactions.

Actuators: These are components that enable movement or manipulation in robots. Examples include motors, hydraulics, pneumatics, and other mechanisms that allow robots to perform tasks such as picking up objects, moving, or manipulating tools.

Control Systems: These systems manage and regulate the operation of robots. They ensure that the robot operates safely and accurately by processing sensor data and generating commands for the actuators.

II. TYPES OF ROBOTS

There are currently 5 known types of robots being developed. Robots can range in size from 2 mm and Depending on the necessity, they can be as large as 200 m and are divided into many varieties. As technology advances, it will undoubtedly get to the point when robots will take the place of people. Therefore, there are five different sorts.

Scripted Robots

Robots that have been preprogrammed or that are solely designed to perform one task. It is a robot created by a programme that only fixes one type of car because other cars are not programmed into it. For instance, we can state that a mechanical arm can only perform one operation connected to a card, such as joining a door or inserting a part into an engine. This robot arm's performance is far longer, faster, and more productive than human labor.

Robotic humans

The robots that resemble people in both conduct and vocalization are known as humanoid robots. These robots are capable of carrying out numerous tasks, including running, jumping, and carrying goods. These resemble a human face, which is the face with an expression, in appearance. The most well-known examples of these humanoid robots are the Boston Dynamics Atlas and Hanson Robot Sophia, both of which are human-like structured robots that can readily perform human tasks.

Autonomous machines

Robots that can be controlled autonomously are those that do so. These robots are designed to do the task in an unstructured environment without the assistance of humans. For instance, a hoover cleaner like Roomba may move about the house as needed.

Robots using teleoperation

Teleoperated robots are mechanical machines that can only be operated by people. These robots operate in locations with challenging environmental factors including weather. An illustration of a teleoperated robot is a submersible that is used to fix leaks during oil spills or a drone that searches for landmines on a battlefield.

Augmenting robots

Exoskeletons used to lift heavy objects are an excellent example of an augmenting robot. Augmenting robots either enhance current human capabilities or replace the capabilities a human may have lost.

III. USES

In practically every sector today, robotics is used in a variety of ways. Here are a few examples of robotics' use in some of the key fields where demand for it is increasing daily.

Manufacturing

The primary industry where robotics is having trouble is manufacturing. These robots are employed in engineering departments because they are more productive than a human employee. There are many businesses, such as the auto industry, where robots have successfully replaced humans as workers.

Home

Robots are also common in homes, where they assist with chores around the house, keep the kids entertained, and other little tasks. Examples of how the Roomba vacuum cleaner moves around the house cleaning and assisting others.

Travel

Many self-driving automobiles, which were sought many years ago, are now available on the market thanks to progress. It is encouraging since robotics and data science have combined to create self-driving cars for Tesla, Ford, Waymo, Volkswagen, and BMW. To eliminate the need for humans to properly operate them, these companies are all aiming to produce more vehicles that are similar in the future.

Healthcare

Since many departments in the healthcare industry are run by robots, they have also performed admirably in this sector. Engineers are attempting to make healthcare more convenient for the treatment of every ailment in a simple approach. Robots are capable of performing both physical therapy and surgery.

Toyota's healthcare robots are the best illustration of this type of machine because they assist individuals in getting back on their feet following any accident or other incident.

3.1 The future scope of robotic devices and systems

The future scope of robotic devices and systems is incredibly vast and promising, with continuous advancements poised to revolutionize various industries and aspects of everyday life. Several key areas highlight the immense potential and future prospects of robotics:

Industry and Manufacturing: Robotics will continue to play a pivotal role in industrial automation. The future will witness more sophisticated and collaborative robots (cobots) working alongside humans, enabling safer and more efficient production processes. These robots will be highly adaptable, capable of handling diverse tasks with increased autonomy and flexibility.

Healthcare: Robotic devices are anticipated to make significant strides in healthcare. Surgical robots will become more precise and versatile, allowing for minimally invasive procedures with enhanced accuracy. Additionally, robotic assistants and exoskeletons will aid in rehabilitation and physical therapy, improving patient outcomes and quality of life.

Service and Companion Robots: The demand for robots assisting in daily chores, elderly care, and companionship is expected to rise. Innovations in AI and natural language processing will enable more interactive and intelligent robots capable of understanding and responding to human emotions and needs.

Autonomous Vehicles and Drones: The development of self-driving cars, trucks, and drones will transform transportation and logistics. These vehicles will be equipped with advanced sensors, AI algorithms, and robust safety mechanisms, potentially leading to safer and more efficient transportation systems.

Space Exploration and Extreme Environments: Robots will continue to explore environments unsuitable for humans, such as deep sea exploration, space missions, and disaster areas. Advancements in robotics will enable these machines to perform complex tasks autonomously in harsh and remote environments.

Education and Research: Robotics will increasingly be integrated into educational curricula to teach programming, engineering, and problem-solving skills. Additionally, robots themselves will be used as tools for scientific research and experimentation in various fields.

Environmental Applications: Robotics will be employed for environmental monitoring, conservation efforts, and disaster response. Autonomous robots could assist in tasks like monitoring pollution, wildlife conservation, and assisting in search and rescue missions.

Personal Assistance and Entertainment: The development of socially intelligent robots capable of understanding and responding to human emotions will pave the way for robots serving as personal assistants, entertainers, and companions, enriching the lives of individuals in various ways.

IV. ADVANTAGES

Cost effective

Since they don't stop in between because the human body needs a rest while functioning, they are incredibly cost-effective. Therefore, once a cycle is established in it, this thing makes it cost-effective and allows it to perform the same task repeatedly.

With the rise in output, it also lowers the cost of manufacturing. The expense of purchasing a robot will be quickly recovered after an initial investment.

Enhancing Quality Assurance

There are very few individuals who enjoy performing their activities for a period of time and with complete focus, but after that they lose interest or focus and begin performing them solely for financial gain, but this is not the case with robots.

Because it is designed for working and produces higher-standard goods that are difficult to get by the human race when people compare their employment with their salaries rather than with their interests or fields, there is little possibility of getting bored or losing focus.

Higher Productivity

Robots boost an industry's efficiency since they can work continuously whereas humans can only do so for a set amount of time. Robots, however, can operate continuously without breaks or vacations. One robot can readily be deployed in a production facility for various productivity goals and can perform the work of ten employees.

When a robot is employed in your manufacturing company, you need to concentrate on your team so they can do their jobs, but your headache is also not their job.

Working in Dangerous Conditions

Robots can work wherever they are without regard to the surroundings, whereas humans are unable to do so. It produces at a very rapid rate. It might work. I am aware of extremely low temperatures and high temps when individuals find it difficult to work. The work is completed and there is no risk involved with the robot, unlike with humans. It's another important benefit of robots.

V. DISADVANTAGES

Problems Potential Job Losses

The major drawback of robots is that they force decent potential workers to lose their jobs because they can perform the duties of ten humans at once. Since everyone wants to save money, they purchase the robot rather than paying ten potential workers for their labour.

Show this caused a significant disadvantage for humankind, as unemployment is now more widespread than ever before and more people are losing their jobs every day as a result of the development of robots.

Costs of Initial Investment

When you purchase a robot for your job, the upfront cost is rather significant. Even when the investment's cost is recovered in a few months, one must still make a significant payment.

Engaging Skilled Personnel

It becomes very difficult to be paid guests take high salaries and arranging their salary in your work becomes quite difficult when you have a robot that is not entirely automatic. Therefore, it is better to have a fully automatic robot or pay humans for manpower. Although the fundamental and most significant olive advantages and downsides are all present, there are also numerous additional disadvantages and benefits

VI. CONCLUSION

This much information regarding robot systems and equipment is sufficient. As the world becomes more technologically oriented, robots are the top item in demand. To produce robots as quickly as possible, engineers from various companies work day and night. An economy develops quickly as a result of high demand and high expense. Therefore, we should continue looking into robotics and related technology that can assist us in creating a world full of technology when there is a shortage of human resources. We have seen that robots can perform every task that people can, and they are displacing human labour in every industry and area. As a result, we must develop the necessary skills to ensure that robots cannot take your job. A robot is a creation of mankind and cannot in any way replace humans. Simply keep developing your talents so that no machine can take your job at work. Since the production of robots is unlikely to become widespread, the best thing someone can do is develop their existing skills and learn new ones quickly. This will allow them to keep their jobs without being replaced by robots or other devices. There are many resources on robots and robotics that everyone should study and learn about so that they won't have to worry when it comes time to make any decisions in their future or for their generation, as the latter will be a generation that is entirely automatic and Technology will reach its peak.

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