

ROBOTICS

Lesson : 1

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Definition:

Robotics is a branch of technology that deals with the design, construction, operation, and Application of robots.

Robotics is such a technology that we are using robotics in the medical field, in the building construction field as well as in many fields. After understanding the meaning of robotics, it has come to know that all these things are done with the help of robots, so now we understand what is robot.

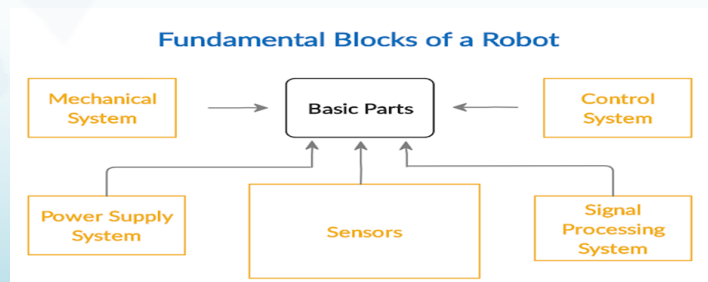
Robot

Robots are automated machines. Robots can go where humans cannot go, such as mining and space and deep water, etc. They can do Repetitive tasks without getting bored. They need minimal rest. The best part of the Robots is they never complain. Now we will read further

Why do we need robotics?

Robotics technology affects every aspect of work and home. Robotics has the potential to positively transform life and work, increase efficiency and safety levels, and provide advanced levels of service.

Next, we see Fundamental blocks of robotics



First, we read about the mechanical system

The mechanical system is the heart of the Robot. In a mechanical system, we will first look at the chassis then the wheels, and then the actuators.

Chassis: The chassis is the base frame of the Robot.

Wheels: It helps in balancing the Robot.

Actuators: We need devices that convert electrical energy into mechanical energy to move the Robot and such devices are called Actuators. The most Popular Actuator is the DC Motor. Next, we see the mechanical system

Power supply: For the Robot to work we need to provide a power supply In most applications, a DC power supply is used to power the robot. Most of the Integrated chips and actuators are DC powered.

Sensors

A sensor is a device that is capable of sensing physical parameters such as temperature, humidity, pressure, magnetic fields, radio waves, light, etc.

Sensors are of two types Active and Passive sensors

Active sensors

Active sensor requires external power sources

for example:

Digital camera, Radar and Ultrasonic sensors, etc.

Passive sensors

Passive sensors do not require external power sources

Example:

Thermocouples etc.

Sensors help the Robot to be independent and have no human interference.

Signal Processing system

Signals inside a signal processing system are in the form of digital and analog. All applications have digital processing units. We also use digital processing units inside robots. The digital signal is in form 0,1. Meaning that the processing unit will get the input signal converted to the form 0,1.

Control system:

Under every robot, there is a control system that takes data from the input and gives the output according to the processing of the input.

Example

Arduino board etc.

Types of robots(Based on control)

First of all, we see Wired and Wireless in

Manual type

Humans are controlled by manual-type robots and completely humans are involved in its control.

Semi-autonomous

This robot can take its own decision but works without direction.

Autonomous

This robot can take its own decision but works with direction.

Pre-Programmed

Self Learning

Both are working as autonomous.

Applications of robotics

There are many applications of robotics like

Applications

- Military - For surveillance, attack, etc.
- Manufacturing industry - For automating things
- Mining industry - For exploration and excavation
- Laboratories - For Science and Engineering research
- Space exploration - For research and testing

- Automobile industry - For assembly and testing
- Agriculture - For crop harvesting, monitoring, and animal grooming

Advantages of Robots

- Robots are much faster than human beings.
- They work without the interference of human beings.
- We can use them where humans cannot go.
- They can get more information than human beings.

Disadvantages of Robots

- Huge investment would be required.
- They need a continuous power supply.
- People lose their jobs because of the automation of Robots.
- They should be maintained regularly.