Name : M. Aafreen
Reg.NO : 205001301
Dept : CSE - III year 'A'
Date : 26/11/2022

UCS1504 - Artificial Intelligence

Application of robot control :

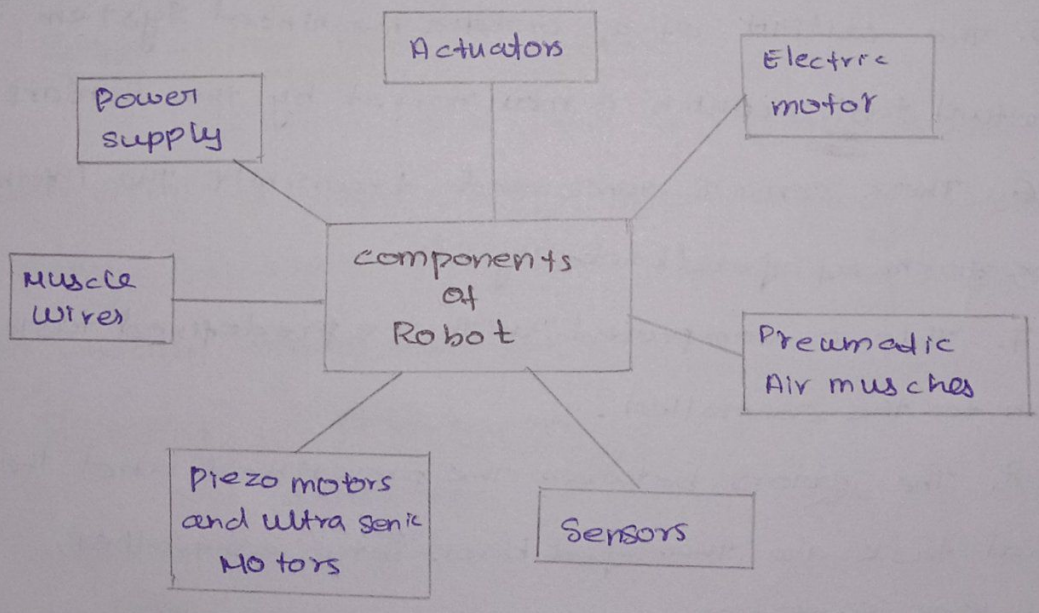
Robot :

A robot is a machine that looks like a human, and is capable of performing out of box actions and replicating certain human movement automatically by means of commands given to its using programming.

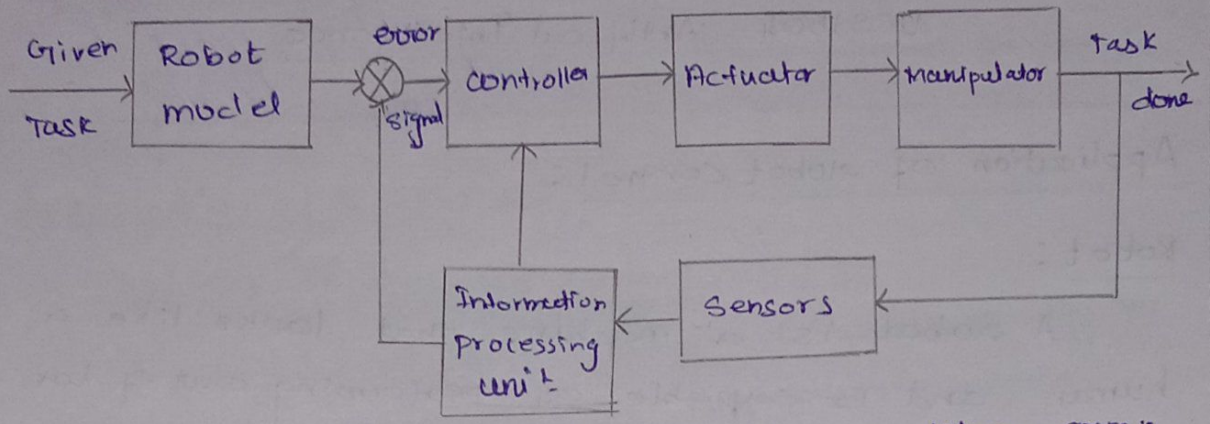
Example :

1. Order picking Robots
2. Drug compounding Robot.
3. Automotive Industry Robots.
4. Industrial floor scrubbers and Sage Automation Gantry Robots.

components of Robot :



Block Diagram of Robot working :



1. An Industrial robot has basic parts like arm, Sensors actuator, Controller etc.

2. These subsystems communicate among themselves via interfaces, whose function consists basically of decoding the transmitted information from one medium to another.

3. Figure shows that block diagram representation of a typical robotic mechanical system.

4. The input is a prescribed task, which is define earlier.

5. The output of a robotic mechinal system is the actual task, which is monitored by the sensors.

6. These sensors sence and transmit the information in the form of feedback signals.

7. This is compared with the predefined task given to the controller.

8. The errors between the prescribed and the actual task are then fed back into controller, which then synthesize the necessary corrective signals.

9. These are in turn feedback to the actuators, which then drive mechanical system through the required task.

10. Thus, the given task is performed by the robot.

Application of Robotics:

1. Robotics in defence sectors:

The defence sector is undoubtedly the one of the main parts of any country. Each country wants their defence system to be strong. Robots help to approach inaccessible and dangerous zone during war.

2. Robotics in Industrial sectors:

Robots are used in various industrial manufacturing industries such as cutting, welding, assembly, dissembly, pick and place for painted circuit boards, packaging & labelling, palletizing, product inspection and testing, colour coating, drilling, polishing and handing the materials.

3. Robotics in medical sectors:

Robots also help in various medical field such as laparoscopy, neurosurgery, orthopaedic surgery, disinfecting rooms, dispensing medication and various other medical domains.

4. Robotics in Entertainment:

Over the last decade, use of robots is continuously getting increased in entainment area. Robots are being employed in entertainment

Sector, such as movies, animation, games and cartoons. Robots are very helpful where repetitive actions are required.

Advantages:

1. Accuracy
2. Flexibility
3. Reduced labour charge
4. Low noise operation.
5. Fewer production damages
6. Increase products

5. Farming and Agriculture:

AMR's are helping farmers harvest their crops more quickly and efficiently and they're using impressive intelligence capabilities to do it. Agricultural robots can assess ripeness, move any branches or leves out of the way, and pick the crop precisely and delicately to avoid causing any harm to the product.

6. Smart cities:

Robotics help create smarter and safer cities. Humanoid robots offer way-finding and information services. AMR's are used to deliver goods and conduct routine security patrols. Robotics also help expective building construction. conduct site surveys and collect building modeling information.

Reinforcement Learning in Robotics :

1. Reinforcement Learning (RL) enables a robots to autonomously discover an optimum behaviour through trival-and-error interaction with its environments.

2. Instead of explicitly detailing the solution to a problem in reinforcement learning the designer of a control task provides feedback in term of a scalar objective function that measure the one-step performance of the robot.

Principles of Robot Reinforcement Learning:

1. Effective representation.
2. Approximate models.
3. Prior knowledge or information.