

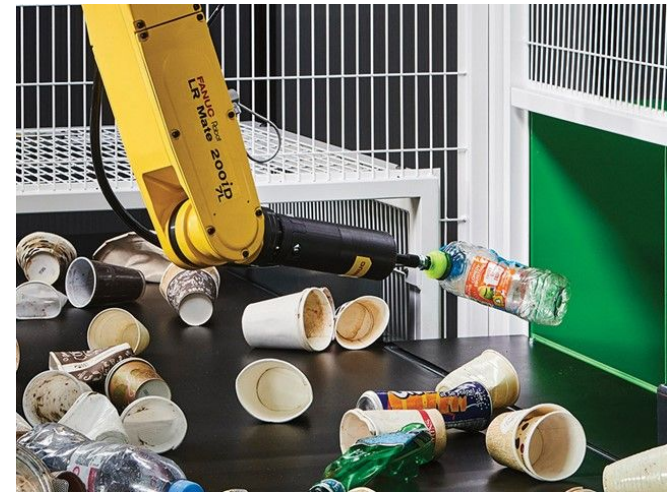
Introduction to robots and robotics

Applications of Robots

In Manufacturing Units

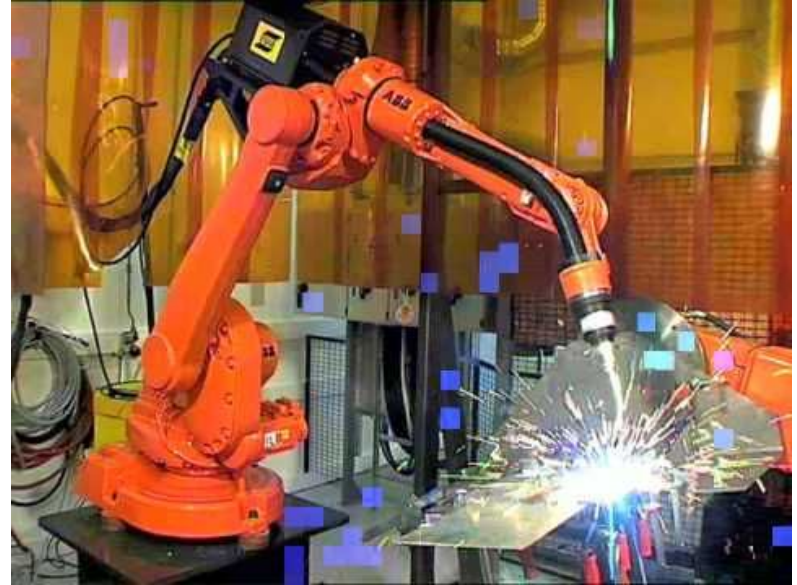
Advantages of Robots

- ★ Robots can work in hazardous and dirty environments
- ★ Can increase productivity after maintaining improved quality
- ★ Direct labour cost will be reduced
- ★ Material cost will be significantly reduced
- ★ Repetitive tasks can be handled more efficiently



Applications Areas

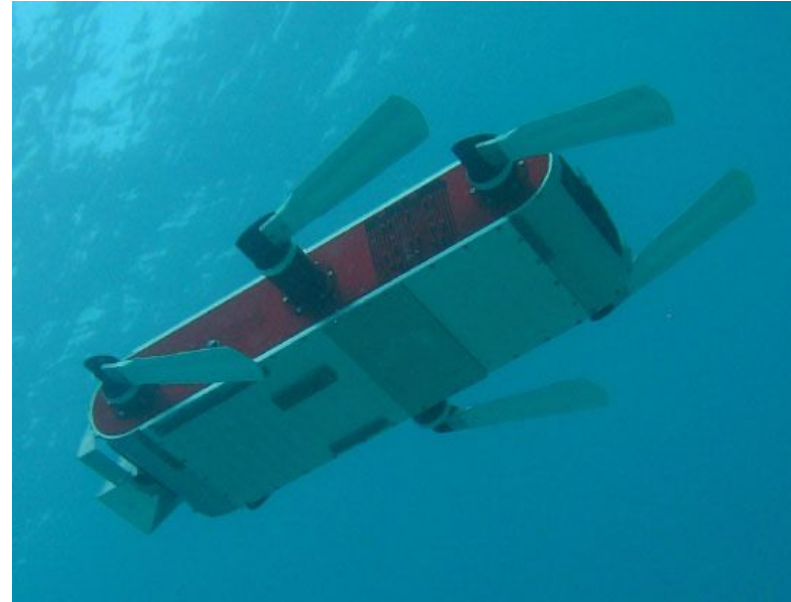
- ❖ Arc Welding
- ❖ Spot Welding
- ❖ Spray Painting
- ❖ Pick and Place Operation
- ❖ Grilling
- ❖ Drilling
- ❖ Milling



Under-water Applications

Purpose

- ❖ To explore various resources
- ❖ To study underwater environment
- ❖ To carry out drilling, pipeline survey, inspection and repair of ships

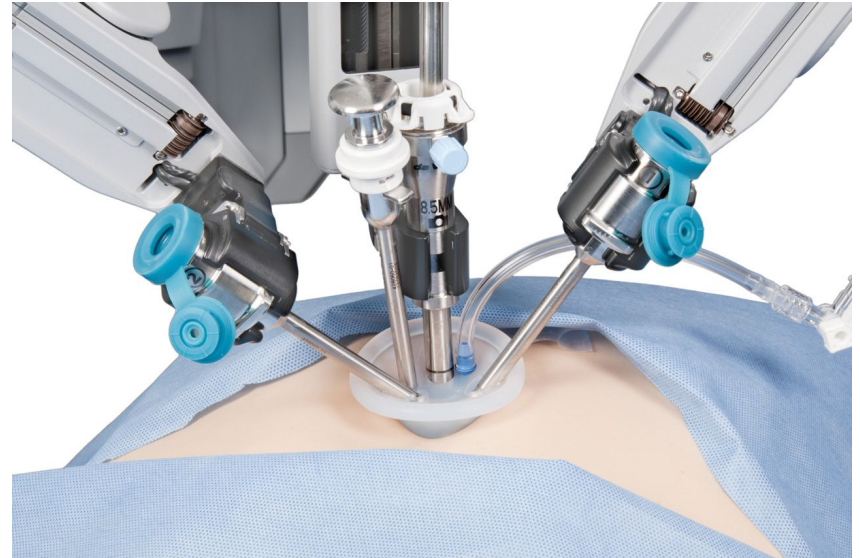


Notes

- ★ Robots are developed in the form of ROV (**Remotely Operated Vehicle**) and AUV(**Autonomous Underwater Vehicle**)
- ★ Robots are equipped with navigational sensors, propellers/thrusters, on-board softwares, and others

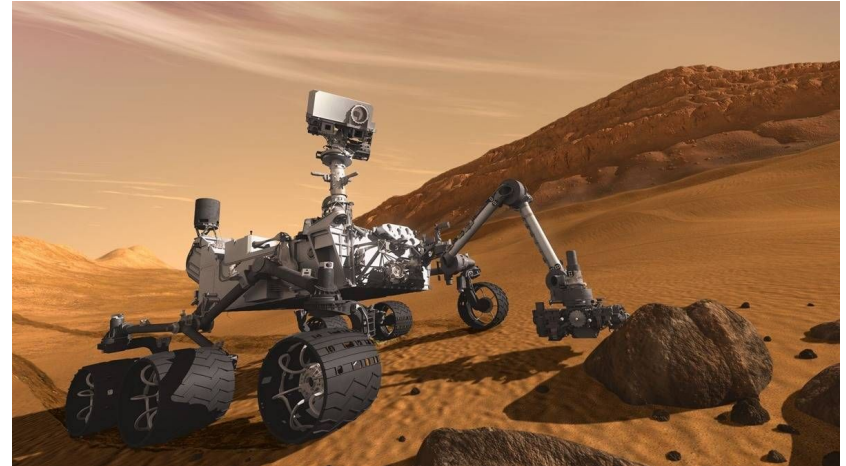
Medical Applications

- ★ Telesurgery
- ★ Micro-capsule Multi-legged robots
- ★ Prosthetic devices (ie. rehabilitation)



Space Applications

- ★ For carrying out on-orbit services, assembly job and interplanetary missions
- ★ Spacecraft deployment and retrieval, survey of outside space shuttle; assembly, testing, maintenance of space stations; transport of astronauts to various locations
- ★ Robonauts
- ★ Free-flying robots
- ★ Planetary exploration rovers



In Agriculture

- ★ For spraying pesticides
- ★ For spraying fertilizers in liquid form
- ★ Clearing weeds
- ★ Sowing seeds
- ★ Inspection of plants
- ★ Harvesting fruits



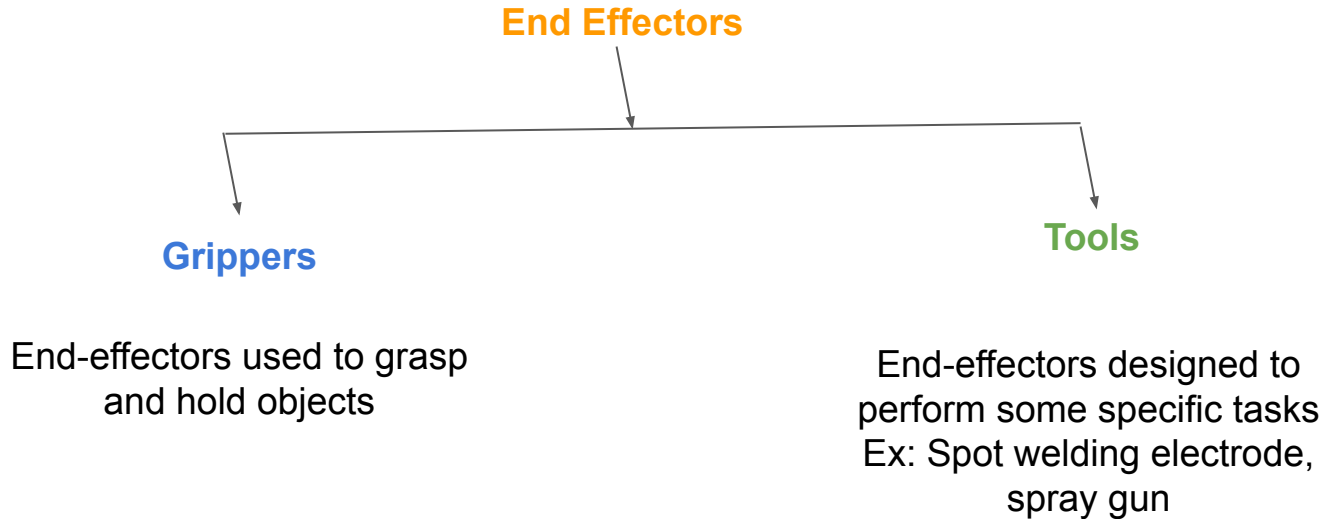
Some Other Applications

- ★ Replacement Of maid -servant
- ★ Garbage collection
- ★ Underground coal mining
- ★ Sewage-line cleaning
- ★ Fire-fighting etc.



Robot End-Effectors

An end-effector is a device attached to the wrist of a manipulator for the purpose of holding materials, parts, tools to perform a specific task



Classification of Grippers

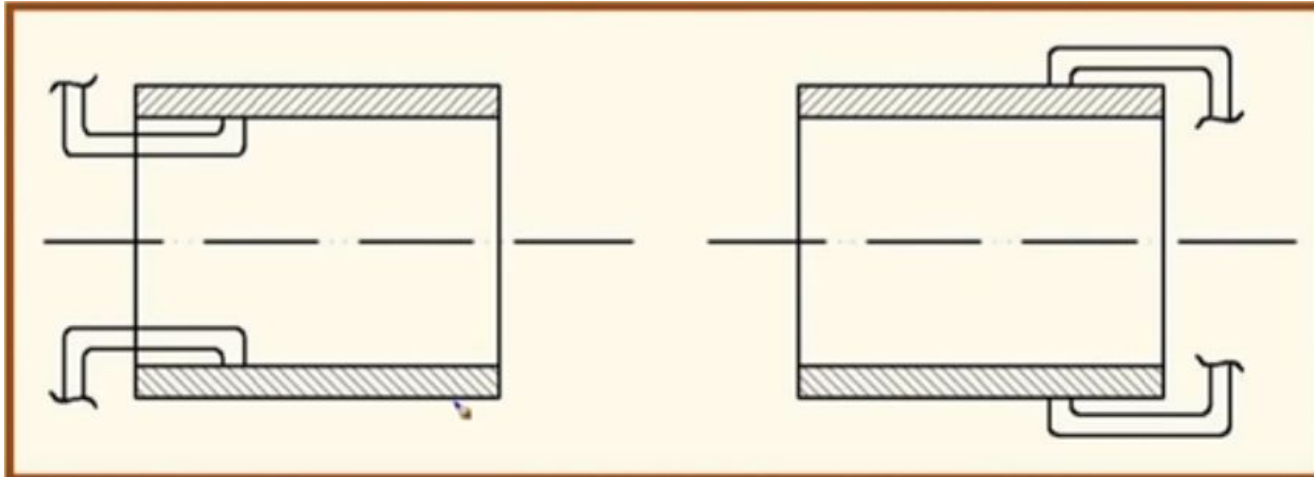
1. Single gripper and double gripper

- Single gripper: only one gripping device is mounted on the wrist
- Double gripper: Two independent gripping devices are attached to the wrist

Example : Two separate grippers mounted on the wrist for loading and unloading applications

Classification of Grippers

2. Internal gripper vs. External gripper



Internal Gripper

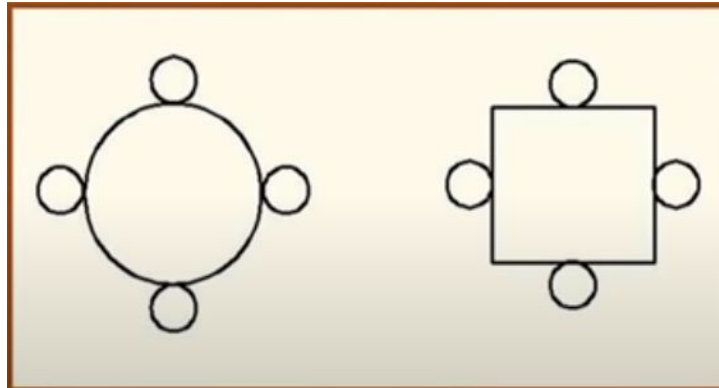
External Gripper

Classification of Grippers

3. Soft gripper vs. Hard gripper

Hard Gripper: Point contact between the finger and object

Soft Gripper: Area (Surface) contact between the finger and object



Classification of Grippers

4. Active Gripper and Passive Gripper

Active gripper: Gripper equipped with sensor

Passive Gripper: Gripper without sensor