

Robotics

The background is a solid teal color. Faintly visible in the background is a stylized illustration of two hands shaking, rendered in a lighter shade of teal. The hands are positioned horizontally across the middle of the frame, with the fingers slightly curled as if in a firm grip.

Introduction to Robotics

What is Robotics/A.I

- Robotics is the study of the design, construction and use of robots.
- Artificial intelligence is the branch of computer science that deals with writing computer programs that can solve problems creatively; "workers in AI hope to imitate or duplicate intelligence in computers and robots"

Definition of a Robot

- "A reprogrammable, multifunctional manipulator designed to move material, parts, tools, or specialized devices through various programmed motions for the performance of a variety of tasks" .
- Or a simpler version
- *An automatic device that performs functions normally ascribed to humans or a machine in the form of a human.*

What is a Robot

- The term robot derives from the Czech word robota, meaning forced work or compulsory service, or robotnik, meaning serf.
- First used to describe fabricated workers in a fictional 1920s play called *Rossum's Universal Robots* by Czech author Karel Capek.

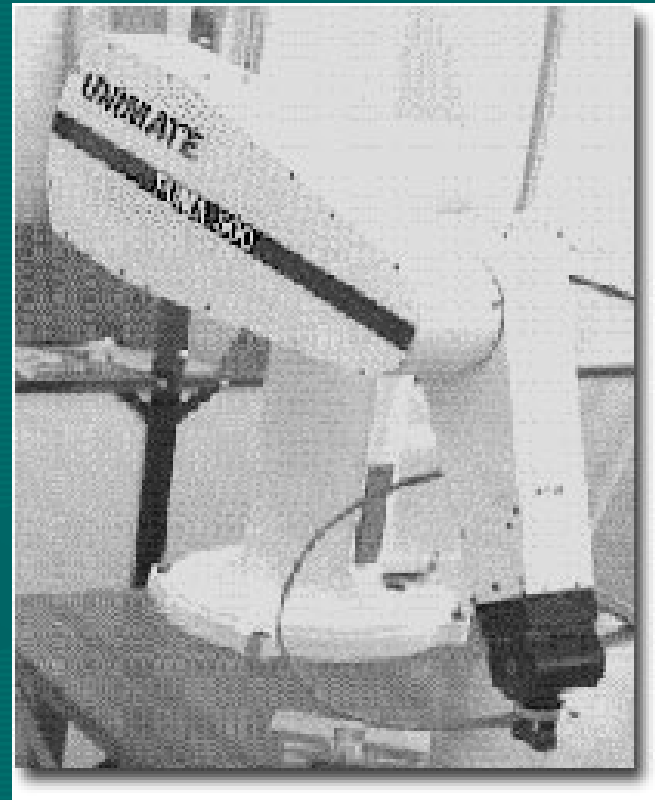


Robots in Early History

- Ancient Greek poet Homer described maidens of gold, mechanical helpers built by Hephaistos, the Greek god of metalsmiths.
- The golems of medieval Jewish legend were robot-like servants made of clay, brought to life by a spoken charm.
- In 1495, Leonardo da Vinci drew plans for a mechanical man.
- Real robots were only possible in the 1950s and 1960s with the introduction of transistors and integrated circuits.

First Commercial Robot

- After the 1950's the first commercial robot nicknamed the 'Unimate', was created.
- The first Unimate was installed at a General Motors plant to work with heated die-casting machines .



- Following the early instances of robots in plays and science fiction stories , robots then started to appear on television shows, like Lost in Space and then in Hollywood movies.
- In Lost in Space the robot demonstrated human characteristics such as feelings and emotions.
- Scientists today are still a long way off from programming robots which can think and act like humans.

Robots in Fiction/Hollywood

- Robby the Robot (1956)– the first robot seen at the movies
- A scene from Forbidden Planet
- Lost In Space (1965)
- Star Wars



More Recent Movies

- Bicentennial Man – Robin Williams
- I Robot
- Any Others?



Asimov's Laws of Robotics(1942)

- A robot may not injure a human being, or, through inaction, allow a human being to come to harm
- A robot must obey orders given it by human beings, except where such orders would conflict with the First Law.
- A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.

Types of Robots

- Industrial Robots –
 - materials handling
 - welding
 - inspection
 - improving productivity
 - Laboratory applications



Types of Robots (Cont)

- Mobile Robots

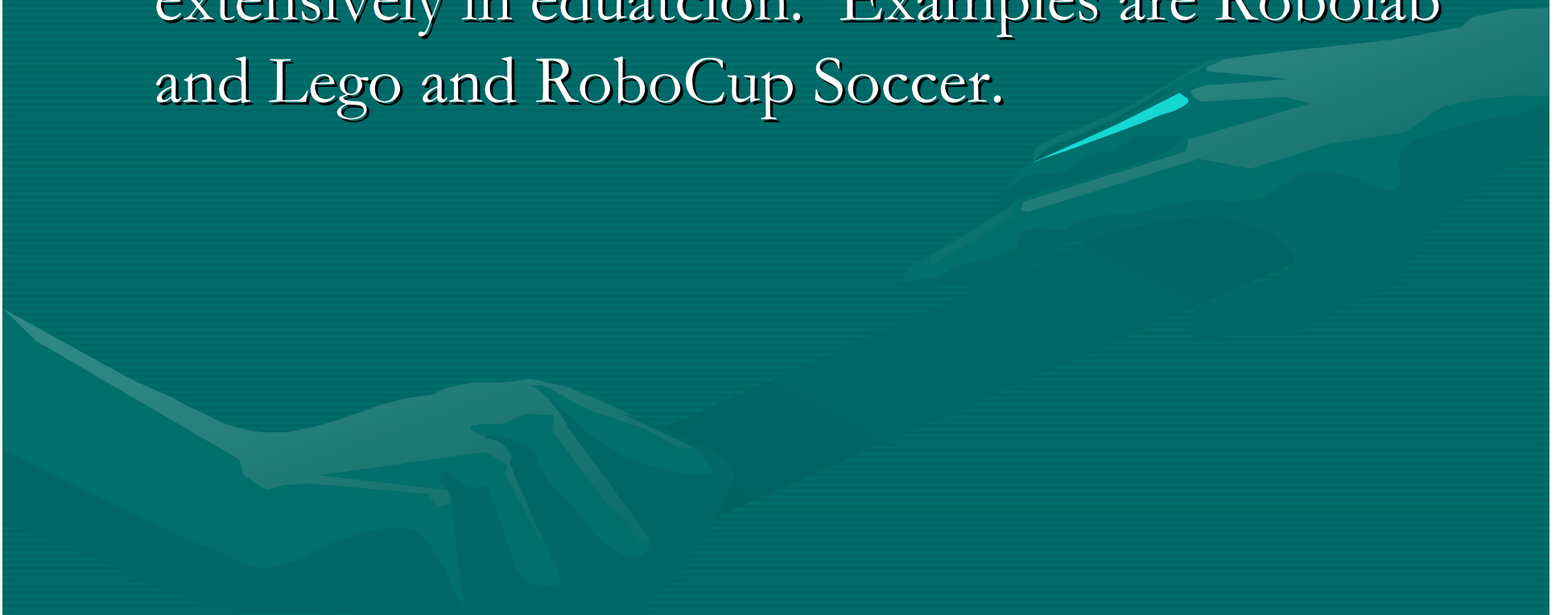
- Robots that move around on legs, tracks or wheels.

- In 1979 a nuclear accident in the USA caused a leak of radioactive material.

Led to production of special robot

- teleoperator to handle the radioactive material

- Educational Robots – robotic kits are used extensively in education. Examples are Robolab and Lego and RoboCup Soccer.



Types of Robots (Cont)

- Domestic Robots – 2 types – those designed to perform household tasks and modern toys which are programmed to do things like talking, walking and dancing.



Hardware- Robots

- Robots are programmable computers designed to perform a variety of tasks by moving parts, tools or specialised devices.
- Non- adaptive robots - no way of sensing the environment, so do the job regardless of any environmental factors
- Adaptive Robots - get feedback from a sensor to alter the operation of the device.
- Robots can also be classified according to whether they are stationary or mobile. Mobile robots are free to move around, but stationary robots remain in 1 place but have arms that move.

The Purpose of Robots

Robots are also used for the following reasons:

- Repetitive tasks that robots can do 24/7.
- Robots never get sick or need time off.
- Robots can do tasks considered too dangerous for humans.
- Robots can operate equipment to much higher precision than humans.
- May be cheaper over the long term
- May be able to perform tasks that are impossible for humans

The Purpose of Robots (Cont)

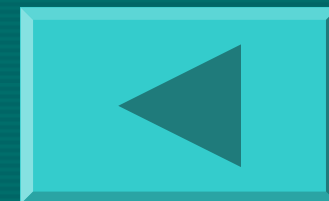
- Robots are also used for the following tasks:
- Dirty Tasks
- Repetitive tasks
- Dangerous tasks
- Impossible tasks
- Robots assisting the handicapped.

Use of Robots

- EXPLORATION-
 - Space Missions
 - Robots in the Antarctic
 - Exploring Volcanoes
 - Underwater Exploration
- MEDICAL SCIENCE
 - Surgical assistant
- ASSEMBLY- factories

Robots in Exploration

- Robots are also used extensively for exploration.
- The hardest thing any robot has to do is to be able to be taught how to walk.



- The *Mini-Andros* is used by bomb squads across the country to locate and dispose of bombs. About three feet long, the *Mini-Andros* looks something like a small armoured tank with eight wheels on four "legs" that extend for climbing stairs.



The Future?

- Although most robots in use today are designed for specific tasks, the goal is to make universal robots, robots flexible enough to do just about anything a human can do.
- [Here](#) is an example of some new development on creating robots that walk.



