Evolution of Robotics

Presented By
Asikuzzaman Rimon [20CSE026]

How do you define a Robot?

**Robotics can be a hobby, a science fiction genre, a scientific discipline or an industrial technology.

**No Single definition is going to satisfy such a variety of perspectives and interests.

Definition :

- A robot is a software controlled mechanical device that uses sensors to guide one or more of end effectors through programmed motions in a workspace in order to manipulate physical objects.
- **Robotics is the intelligent connection of perception to action.**

Robotics Timeline :

- **1495:** Leonardo DaVinci designs a Mechanical device that looks like an armored knight.The mechanism inside "Leonardo 's Robot " are designed to make the Knight move as if there was a real person inside.
- **1920:**Czechoslovakian playwright Karel Capek introduces the word robot in the play R.U.R - Rossum's Universal Robots. The word comes from the Czech robota which means tedious labor.
- **1942:** Isaac asimov publishes Runaround in Which he defines the Three laws of Robotics...
- **1951:** In France, Raymond Goertz designs the first teleoperated articulated arm for the Atomic Energy Commission.
- **1954:** George Devol design the first programmable robot and coins the term Universal automation, planting the seed for the name of the future Company Unimation....

Robotics Timeline :

- **1962:** General Motor's purchase the first industrial robot from the Unimation.
- **1978:** Brooks Automation founded 1979 Sankyo and IBM market the SCARA.
- **1994:** CMU Robotics Institute's Dante-II, created a six legged walking robot...
- **1995:** Intuitive Surgical formed by Fred Moll,Rob Younge and John Freud to desing and market surgical robot system.
- **2000:** Honda Showcase Asimo the next generation of its series of humanoid robots..
- **2001:** Built by MD Robotics of Canada, the Space Station Remote Manipulator System(SSRMS) is successfully launched.

The Laws of Robotics :

- 1.A robot may not injure a human Being.
- 2. A robot must obey the orders given to it by human Being.
- 3. A robot must protect its own existence as long as such protection does not conflict with the First and Second law.

Five Myths and Fact about Robotics Technology in Today :

- 1. Robotics are intended to eliminate Job(MYTH)
- 2.Manufacturing and Logistics must adopt robots to survive (FACT)
- 3.Autonomous Robots are still too slow(FACT)
- 4. Robots are too expensive (MYTH)
- 5.Robots are difficult to use(FACT)

Classification :

1.Industrial Robots
2.Fields and Survice Robots
3.Entertainment /Educational Robots
4. Wheeled Mobile robots/Intelligent vehicles

- Walking robots
- Humanoid
- Climbing robots
- Medical robots
- Agricultural robots.

Industrial Robots :

- Pick and Place
- Assembly
- Welding
- Painting
- Machining

Underwater Robots :

- A mobile robotic device designed and developed to work in underwater environment to accomplish specific tasks which are normally performed by human operators.

Remotely Operated Vehicle(ROV):

- **Tethered Supervised Vehicles :**

The vehicle is connected to a mother ship by a cable Through which communication, data transmissions and power supply are carried out.

ROV Deployment and Application :

- Diver observation
- Platform Inspection
- Pipeline Inspection
- Survey’s Drilling Support.
- Construction Support
- Platform Cleaning
- Telecommunication Support
- Objects location and recovery

Autonomous Underwater Vehicles (AUV)

- It is a robotic device that is driven throug the water by a Propulsion system, controlled and piloted by an onboard computer.
- It’s need to be pre-programmed
- AUV will be require fool-proof-navigation,control and guidance system on board.

Robotics for Health Care :

- Surgeon
- Robot Master
- Robot Slave
- Tool
- Tissue

Rehabilitation Robotics :

It is a field of research dedicated to understanding and augmenting rehabilitation through the application of robotic device.

Types of Rehab.Robots :

- 1.**Upper Extremely Robots**
- Haptic interface
- Upper limb.
- 2.**Lower extremely robot.**
- Leg,ankle,foot
- Pedaling, walking

Ekso(The Exoskeleton) :

Product of Berkeley Bionics,California

Is used to enable the user to walk with the presence of limb...

Also has crutches with buttons to activate the Motors.

Aerodynamic Configuration :

- **1.Lighter Than Air.**
- Airships Blimps
- Hot Air balons..
- **2.Heavier than Air.**
- Fixed wing
- Flapping wings

Hardware and software of robots :

Hardware :

- Mechanical Subsystem (arm,body,Gripper)
- Electrical subsystem (motors,computers)
- Sensor subsystem (camera,force sensors)

Software :

- Modeling
- Planning
- Perception
- Control
- Simulation

Topics in Robotics :

- **Kinematics**: Deals with the spatial locations and velocity of a robot.
- **Statistics :** analyzes the force and moment
- **Dynamics :** study the dynamic behaviour of a robot.
- **Sensing and perception :** obtain and reason about sensory information.
- **World modeling :** represent the knowledge About the robot.
- **Robot programing :** programme the robot task.
- **Simulation :** simulate physical movement.

Thank you