

Humanoid robotics



INTRODUCTION



Robotics Outline

1. Definition
2. Types
3. Uses
4. History
5. Key Components
6. Applications
7. Future
8. Robotics

Robot Define

- Word robot was coined by a Czech novelist Karel Capek in a 1920 play titled Rassum's Universal Robots (RUR)
- Robot in Czech is a word for worker or servant
- Definition of robot:
 - –Any machine made by by one our members: Robot Institute of America
 - –A robot is a reprogrammable, multifunctional manipulator designed to move material, parts, tools or specialized devices through variable programmed motions for the performance of a variety of tasks: Robot Institute of America, 1979



Karel Capek

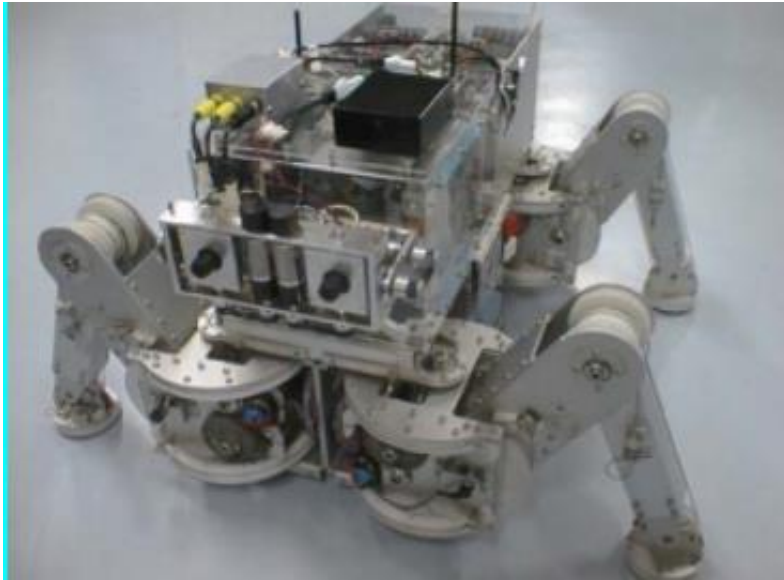
Types of robot

Manipulator



Types of robot

Legged Robot and Wheeled Robot



Types of robot

Autonomous Underwater Vehicle and Unmanned Aerial Vehicle



Robot Uses

Jobs that are Dangerous for Humans



Decontaminating Robot

Cleaning the main circulating pump housing in the nuclear power plant

Robot Uses

Welding Robot



Repetitive jobs that are boring, stressful, or labor-intensive for humans

Laws of Robotics

- Asimov proposed three “Laws of Robotics ” and later added the “zeroth law ”
- Law 0: A robot may not injure humanity or through inaction, allow humanity to come to harm
- Law 1: A robot may not injure a human being or through inaction, allow a human being to come to harm, unless this would violate a higher order law
- Law 2: A robot must obey orders given to it by human beings, except where such orders would conflict with a higher order law
- Law 3: A robot must protect its own existence as long as such protection does not conflict with a higher order law

History of Robotics

- The first industrial robot: UNIMATE
- 1954: The first programmable robot is designed by George Devol, who coins the term Universal Automation. He later shortens this to Unimation, which becomes the name of the first robot company (1962)



History of Robotics

- 1978: The Puma (Programmable Universal Machine for Assembly) robot is developed by Unimation with a General Motors design support



History of Robotics

- 1980s: The robot industry enters a phase of rapid growth. Many institutions introduce programs and courses in robotics. Robotics courses are spread across mechanical engineering, electrical engineering, and computer science departments.



Adept's SCARA



Cognex In-Sight Robot



Barrett Tech Manipulator

History of Robotics

- 1995-present: Emerging applications in small robotics and mobile robots drive a second growth of start-up companies and research
- 2003: NASA's Mars Exploration Rovers will launch toward Mars in search of answers about the history of water on Mars

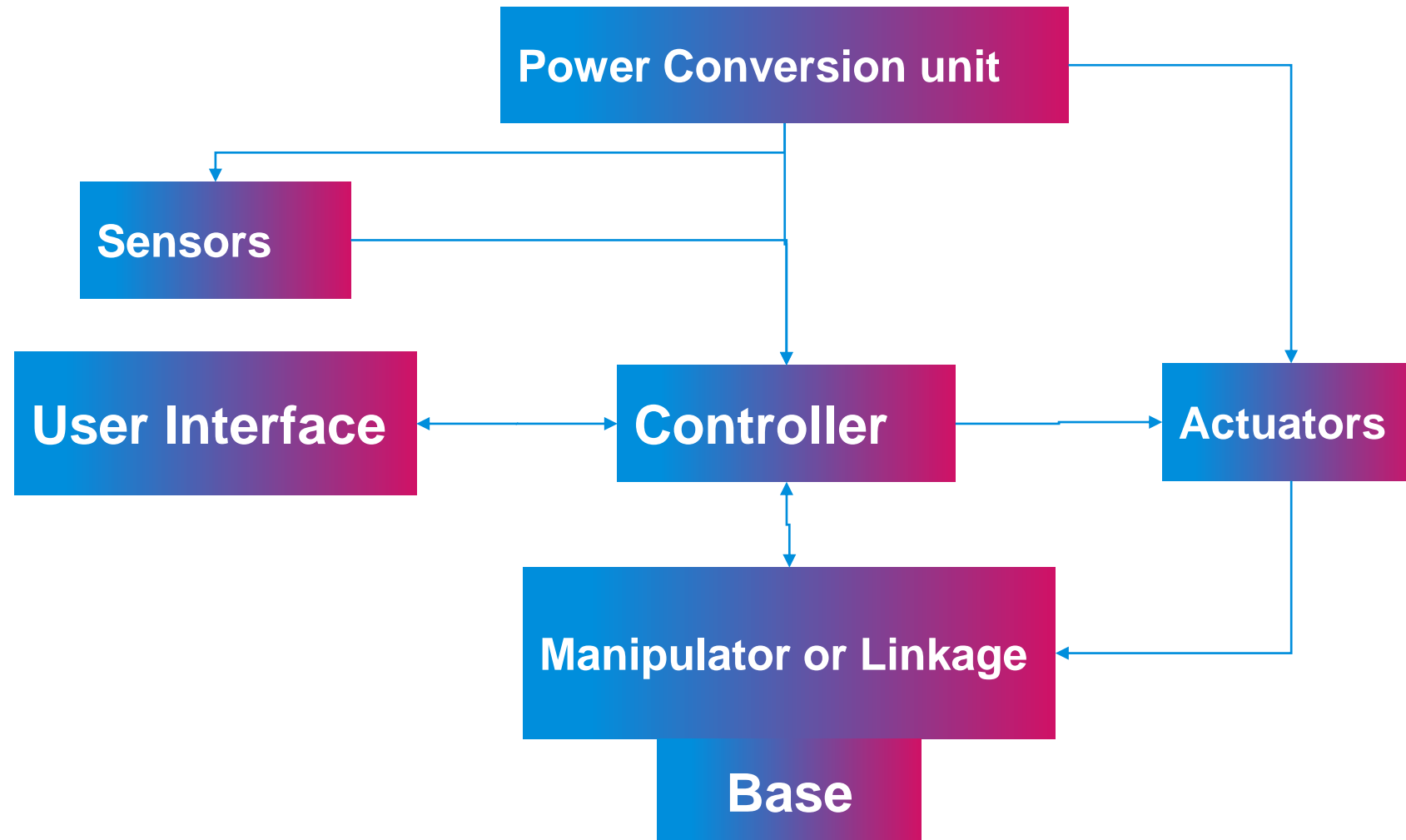


Knowledgebase for Robotics



- Typical knowledgebase for the design and operation of robotics systems
 - –Dynamic system modeling and analysis
 - –Feedback control
 - –Sensors and signal conditioning
 - –Actuators (muscles) and power electronics
 - –Hardware/computer interfacing
 - –Computer programming

Key Components



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