Introduction to Robotics
CSE 461

Lecture 1: Chapter 1(Introduction to robotics: basics)

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Marks Distribution

- Quizzes/Class Tests: **15%**
- Attendance : **5%**
- Mid Term Examination: **20%**
- Final Examination: **35%**
- Lab: **15%**
- Project: **10%**
- Total: **100%**

Syllabus

Chapter	Description	Class
1 . Robotics Basics	Definition of Robot, Robotics, Roboticity, Autonomy, Laws of Robotics, Types of robots, Paradigms, Subsystem	**1 - 4**
2 . Introduction to Industrial Arm	Manipulator Types, Forward Kinematics, Inverse Kinematics	**5 - 8**
3. Trajectory Planning and Wrists mechanism	Joints space, Linear Path Planning, Non Linear Path Planning	**9 - 10**
4 . Control System	Types of Control, Block diagram solving, PID control, Fuzzy Logic Control	**11 - 13**
5. Robot Navigation	Path Planning, Localization, Mapping, Exploration	**14 - 15**
6 . Robot Learning	Machine Learning Reinforcement Learning Computer Vision	**16 - 18**

What is a robot?

What is a robot?

An embodied agent that can be programmed to perform physical tasks.

What is 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 task."

[Robot Institute of America, 1979]

"An automatic device that performs functions normally ascribed to humans or a machine in the form of a human."

[Webster's Dictionary]

"a reprogrammable manipulator device"

[British Department of Industry]

"Robotics is that field concerned with the intelligent connection of perception to action."
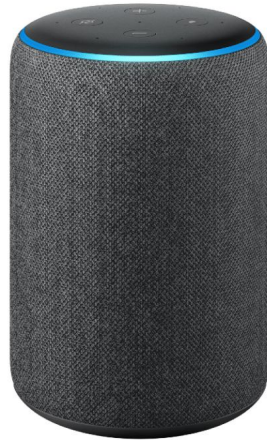
[Mike Brady]

What is a robot?

- Ultimately, all proposed definitions have some issues

- Is this a robot?

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Degrees of *roboticity?*

An embodied agent that can be programmed to perform physical tasks

- Lack of universally acceptable definition hints at some deep philosophical questions

- Could also be an indicator of the youth of the field

- Probably need to measure degree of "*roboticity*"

  - In terms of degree of embodiment, autonomy, complexity, programmability, …

  - But we don't have formal definitions for these concepts

Robotics

Robotics is a branch of engineering and computer science that deals with the design, construction, operation, and use of robots.

Robotics vs. Artificial Intelligence

- This is something most roboticists agree on

  - A robot needs to be embodied

  - Artificial Intelligence (AI) need not be embodied
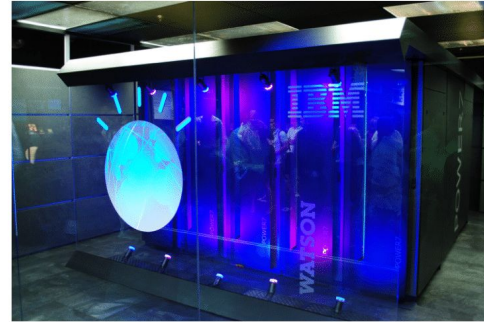
How Robots Are Used Across Industries

- Industrial
- Farming and Agriculture
- Healthcare
- Logistics
- Family Robots

Think of some features for your own family robot !

Next Class

- Laws of Robotics
- Primitives
- Paradigms

Thank You