

Robotics: Science and Systems

CS 4610/5335

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Times: T/F, 3:25—5:05

Course web page:

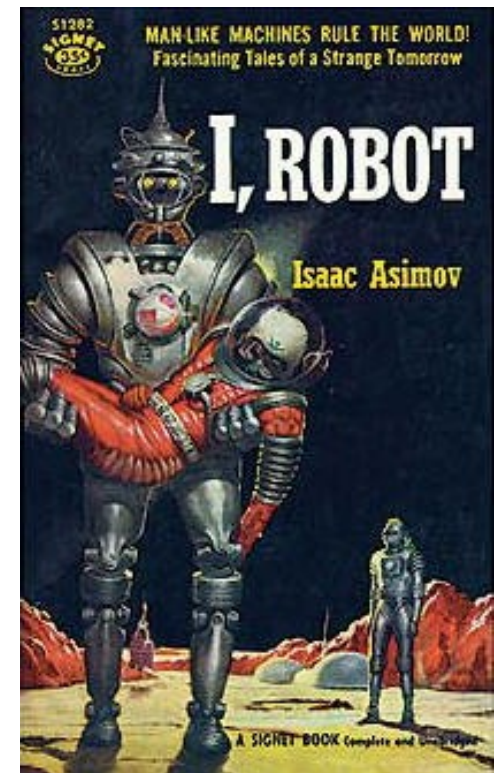
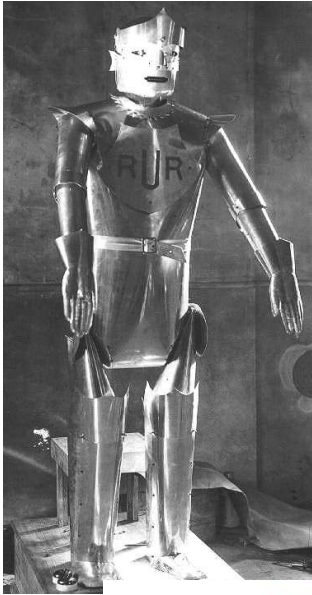
http://www.ccs.neu.edu/home/rplatt/cs5335_2016/index.html

Office Hours: Fridays, 11-12, 208B West Village H, or by Appt

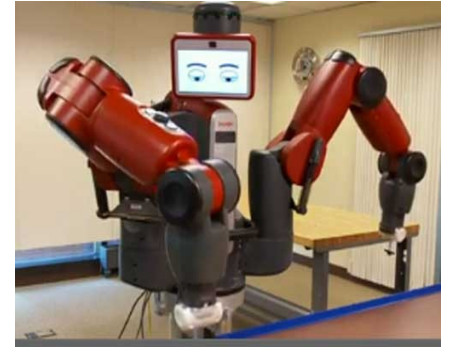
TA: None!

What is robotics?

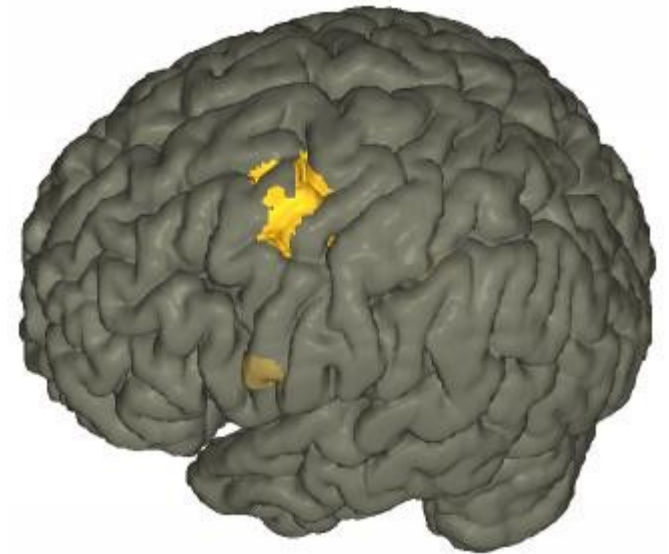
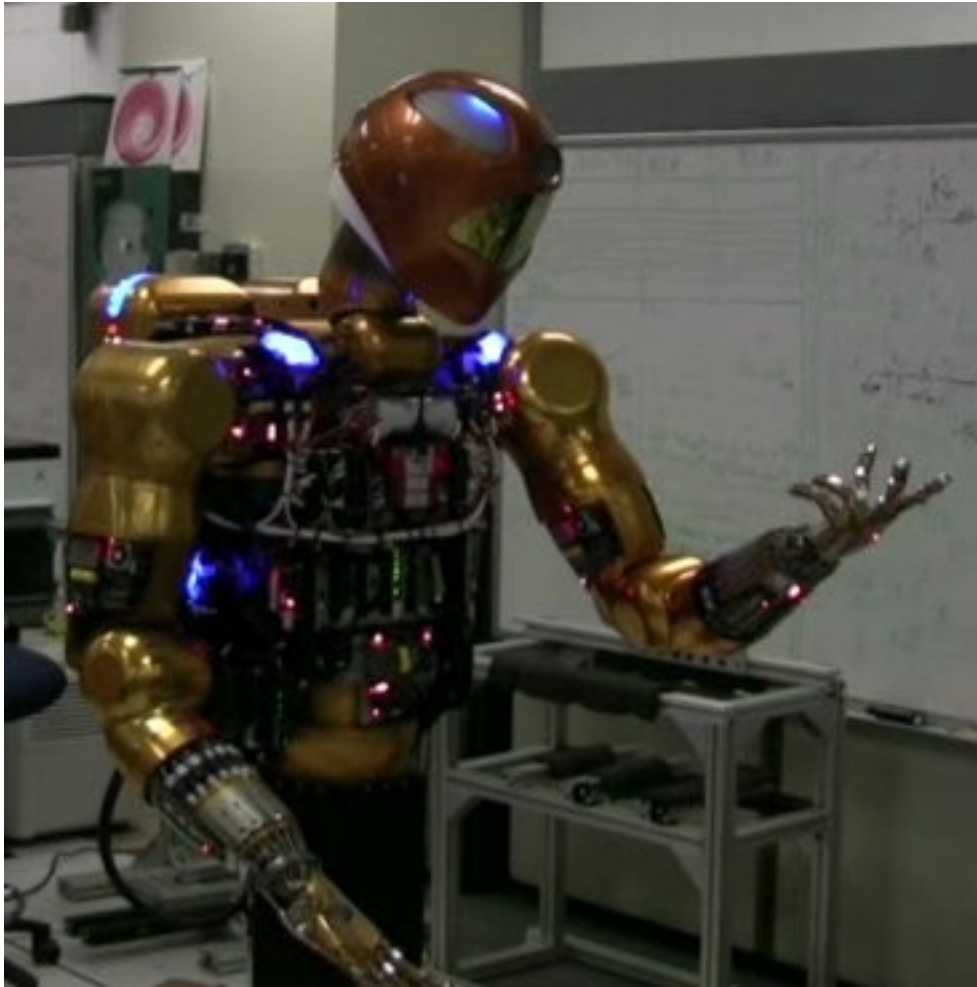
What is robotics?



What is robotics?



Focus of this course

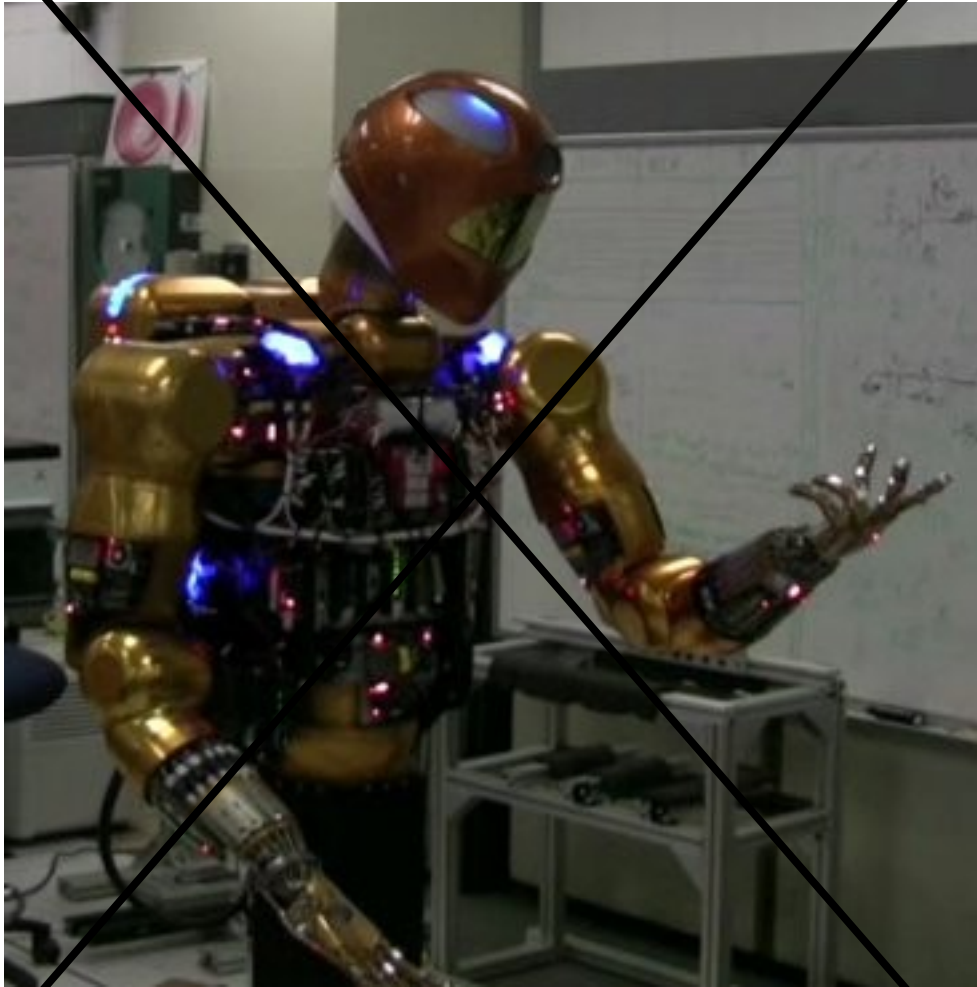


Hardware?

or

Smarts?

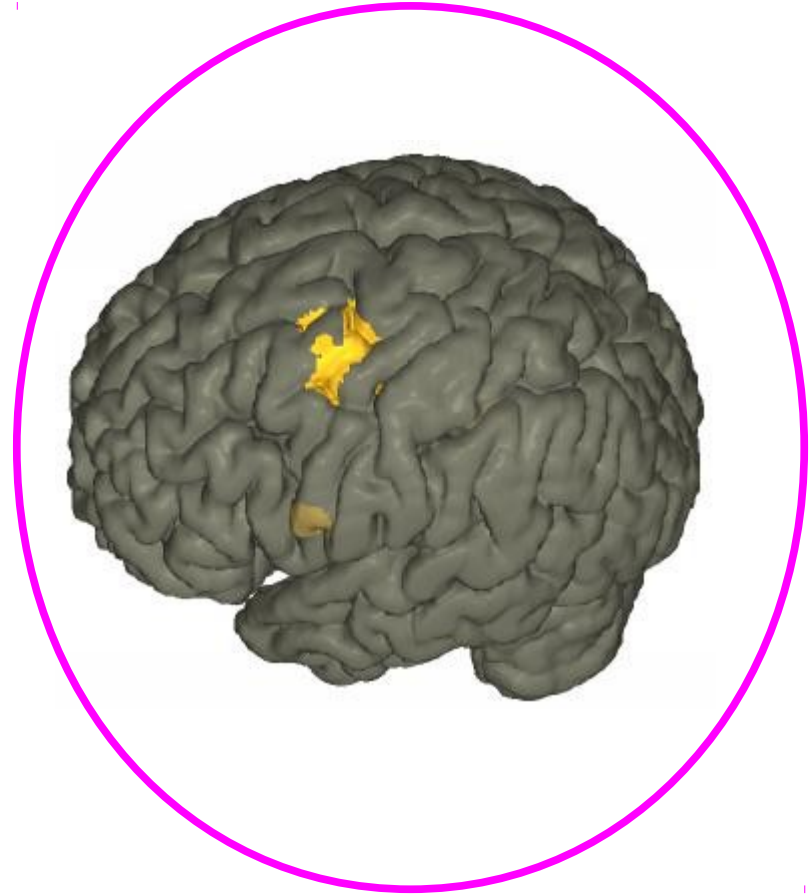
Focus of this course



Hardware?

or

Smarts!



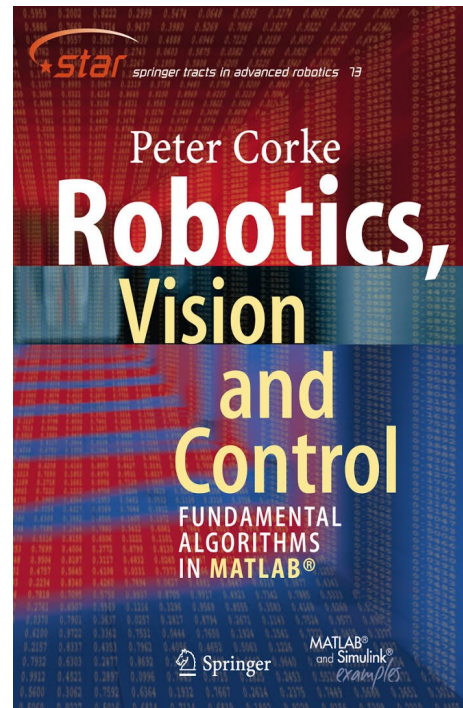
This course: objectives

1. Understand “the” basic problems in robotics
2. Understand a few key algorithms in detail
3. Learn mathematical/algorithmic tools that you can use elsewhere

Course Prerequisites

1. Ability to program in Matlab (or the ability to learn to do this)
2. Comfortable with linear algebra and math in general.

Reading material



Primary text: Robotics, vision, and control by Peter Corke

Additional text materials will be posted on schedule tab of course webpage.

Topics

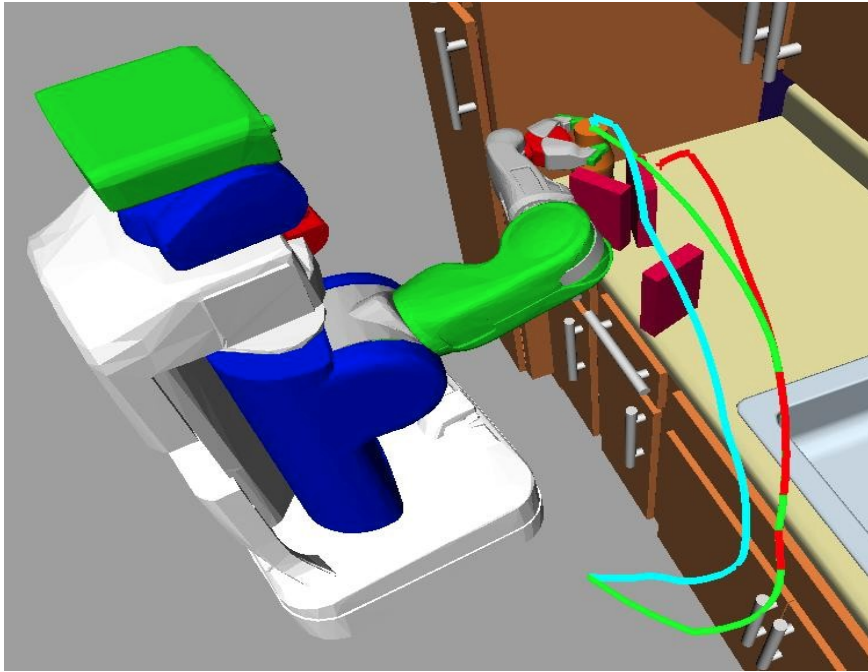
1. Kinematics & Cartesian Control
2. Planning/Control
3. Localization and mapping
4. Computer Vision and Point Clouds

Kinematics and Cartesian Control



- How do we represent position/orientation targets for the hand?
- How should the robot joints move in order to place the hand in a specific location?
- How do we achieve specific desired hand trajectories?

Planning and Control



– How should the robot arm move in order to avoid collisions?



– How does this guy remain standing upright?



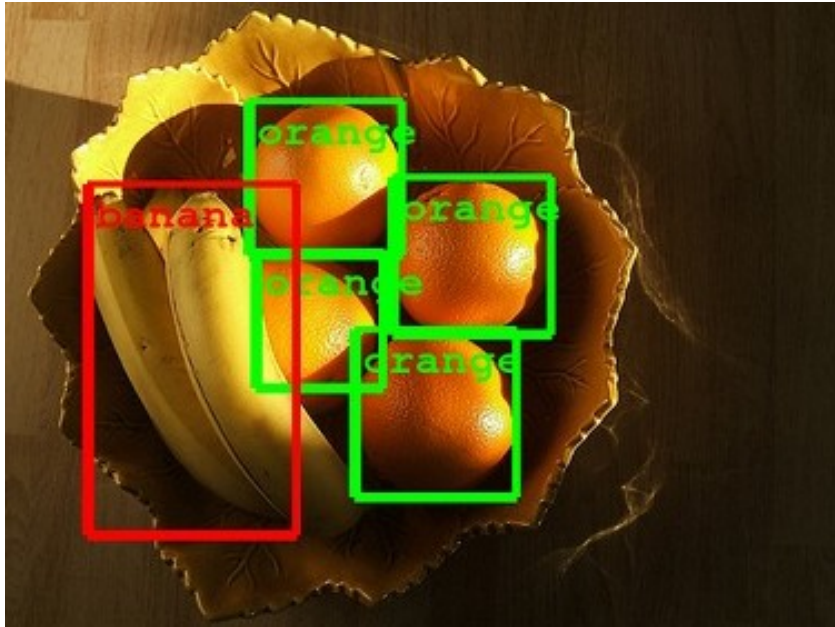
– How does this plane fly?

Localization and SLAM

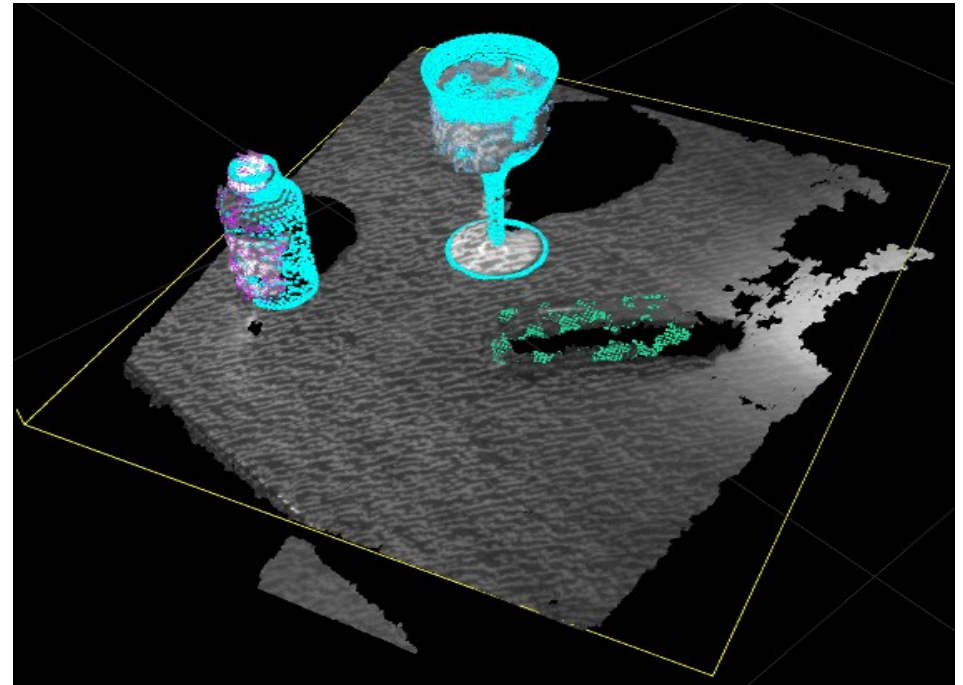


- How can a robot localize itself, given a map?
- How can a robot create a (metric) model of the environment as it moves?

Computer vision and point clouds



– Object category detection (RGB)



– Object pose estimation (pt cloud)