



Mobile Robotics Course Study Guide: Computer Science Section Fall 2009

Note: Anything on the list is fair game, anything not on the list will not be on the quiz

Robot Control Architectures

- Closed World vs. Open World Assumption
- What is the frame problem? What is the symbol grounding problem?
- Deliberative/Hierarchical Control Architecture: What is it? Good points. Bad points.
- Reactive/Behavior Based Architecture: What is it? Good points. Bad points.
- What is a schema? Show an example of a schema.
- Hybrid Architecture: What is it?
- Design a FSM (Finite State Machine) for a robot to accomplish a specific task.
- Different methods for coordinating behaviors in a reactive/behavior based control architecture: competitive (action selection, voting method, subsumption), cooperative (behavior fusion).
- Create a subsumption (suppression) network from a FSM.

Localization and Navigation

- What are some difficulties with localization?
 - Define: sensor aliasing, sensor noise, dynamic environments, unanticipated events
- DoF
- Create a C-space and a map using one of the different kinds of map representations: regular grid, meadow map, quadtree.
- Describe how the heading and distance traveled is calculated in dead reckoning.
- What is a topological map representation; kinds of landmarks (natural, artificial, passive, active); what makes a good landmark? (perceivable, persistence, distinct, unique).
- Describe how triangulation works for localization.
- Know how to do wave front planning.
- Know how to do an A* search (create a search tree for a specific problem).
- Describe D*; what advantages/disadvantages does it have over A* ?
- What does it mean for a heuristic to be admissible?

Image Processing & Vision

- What is an image? What is a pixel?
- What is visual erosion?
- What is binary image?
- RGB representation (interleaved vs separate)
- Describe the algorithm for image segmentation using RGB representation