

Cognitive Robotics: Candidate Lectures – Spring 05

The following is a candidate list of lectures. The detailed schedule will be shaped based on the interests and participation of the class. Note that roughly four to five lectures will be trimmed from this list:

Intro to Cognitive Robotics:

- Model-based Programming in Deep Space

Navigating In The World

- Probabilistic Path Planning (BW)

- Simultaneous Localization and Mapping (SLAM) (PR)

- Vision-based SLAM (PR)

- Path Planning in Unknown Environments (BW)

Diagnosis From Conflicts

- Diagnosing Multiple Faults (BW)

- Optimal CSPs and Conflict-Learning (BW)

Reasoning About Soft Constraints

- Valued Constraint Satisfaction Problems and Dynamic Programming (MS)

- Solving CSPs Through Tree Structured Decomposition (MS)

Monitoring using Hybrid Models: HMMs, Logic and ODEs

- Constraint-based Monitoring and Estimation of Discrete Systems (BCW)

- Monitoring and Estimation of Hybrid Discrete-Continuous Systems (LB)

Fast Planning of Activities and Control Actions

- Planning using Informed Search (BW)

- Reactive Planning (BW)

Planning Missions with Time and Resources

- Generating Flexible Plans (BW)

- Robust Plan Execution Through Dynamic Scheduling (BW)

Achieving Real-Time, Through Incremental Methods

- Incremental Deduction and Scheduling (BW)

- Incremental Path Planning (BW)

Cognitive Vision

- Visual Interpretation using Probabilistic Grammars (PR)

- Context-based Vision (WF)

Human - Robot Interaction

- Discourse Management and Nursebot (NR)

- Social Robotics (CB)

Space Exploration

Human-Robotic Exploration (JH)

Mars Exploration (MZ)

5-6 advanced student lectures (5-6 lectures)

(roughly last week of March, Beginning of April)

Project Demonstrations (1-2 lectures)