CMPE 480 - Introduction to Artificial Intelligence

SYLLABUS

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Course Description

- Representation of knowledge. Search and heuristic programming. Logic and logic programming. Application areas of artificial intelligence: problem solving, games and puzzles, expert systems, planning, learning, vision, and natural language understanding. Exercises in an artificial intelligence language

Text Book


Class Participation Policy

- Quizzes in almost all lectures

Evaluation (subject to change)

- Quizzes and in-class participation: 30%
- Homeworks: 30%
- Midterm: 20%
- Final: 20%

Course Contents

Introduction and Overview

- Course overview
- Topics of AI
- Brief history of AI

Intelligent Agents

- Agent terminology
- Taxonomies
- Agent programming

Solving Problems by Searching

- Formulating problems
- Toy problems - real problems
- Search and success criteria
- Heuristics
Beyond Classical Search

• Optimization
• Hill climbing, simulated annealing, genetic algorithm
• Relaxing some assumptions

Adversarial Search

• Min-max search,
• Optimal decisions in games,
• Satisficing in games,
• Stochasticity
• Constraint Satisfaction Problems

Logical Agents

• Knowledge based agents,
• Wumpus world,
• Propositional logic

First order Logic

• Using first order logic
• Knowledge engineering in first order logic

Inference with logic

• Unification
• Forward/backward chaining
• Resolution principle

Classical planning

• State spaces
• Planning graphs
• Approaches to planning

Making Complex Decisions

• Sequential Decision Problems
• Value Iteration
• Policy Iteration
• Partially Observable MDPs
• Decisions with Multiple Agents: Game Theory

Reinforcement Learning

• Passive and active RL
• Policy search