CMPE 480 - Introduction to Artificial Intelligence

SYLLABUS

Instructor: Emre Ugur (e-mail: emre.ugur@boun.edu.tr)

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

- Russell & Norvig, Artificial Intelligence: A Modern Approach, 3rd ed.

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
- Approachs 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