Intro to Artificial Intelligence

2024 Syllabus | TuTuring

Instructors

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Course Schedule

Thursday, July 25th

- Class Overview
- Programming experience check
- Heuristics Introduction
- Homework: Code Golf

Sunday, July 28th

- Introduction of Class Game: *Ultimate Tic Tac Toe*
- Basic heuristics for the game
- Homework: Constructing the framework

Thursday, August 1st

- Overall strategies for competing in AI competitions
- Optimizing current heuristic
- Homework: Create or improve your heuristics

Sunday, August 4th

- Adversarial AI competition 1 - only heuristics
- Minimax/Negamax
- Homework: Minimax/Negamax

Thursday, August 8th

- Improvements upon Negamax:
  - Alpha Beta Pruning
  - Principle Variation Search
- Homework: Finalize program

Sunday, August 11th

- Adversarial AI competition 2 - final
- Neural Networks Part 1
  - The theory of stochastic gradient descent

Thursday, August 15th

- Neural Networks Part 2
    - Vanilla implementation

Sunday, August 17th

- Neural Networks Part 3
    - Using PyTorch

Additional topics, time permitting

- *Monte-Carlo Tree Search extension on adversarial AI*
- *A*/D* search on*
    - *Rush hour, 1-player chinese checkers, deterministic 2048*
- *Constraint problems*

This schedule is subject to change.

Pre-requisites

We require all students to be “competent at programming.”

Specifically:

- Experienced using loops, if statements, etc.
- Moderate understanding of algorithms, like BFS, DFS

For example, if you are able to code the workings of Chess, minus the GUI, then you are ready for this class.

Expectations

- All students should have WiFi access and a Python development environment
- All students should be engaged during class time, with minimal distraction. We can tell if you’re doing something else.
- All students should complete homework on time, as homework is cumulative.

Credits

This course is inspired by TJHSST AI and MIT Battlecode. All materials are original and developed by *TuTuring*, with the exception of open-source supplements which will be credited.