Welcome!

CS5811 - Advanced Artificial Intelligence

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Outline

Information about me and you

Course logistics

Lecture topics

What is AI? (Chapter 1 - Introduction)

Agents and environments (Chapter 2 - Intelligent Agents)

Information about me

- Dr. Nilufer Onder
- Research interests:
  - Artificial intelligence planning
    Planning under uncertainty
    Temporal, concurrent planning
  - Project management
    Decision making under uncertainty
    Simulation based intelligent assistance
  - Increasing and broadening participation in STEM fields
    Student persistence
    Underrepresentation
    Career choices

Information about you

I shared a document for you to type information about yourself.
You may use this to select paper and project partners.
Update the document with your information and upload your
current resume. There is a reminder assignment on Canvas.

- Name
- Degree program
- How long have you been at Michigan Tech?
- Have you taken CS4811? Have you taken other AI related courses?
- Background
- General interests
- Project topics you are interested in
- Do you have a project partner?

Course logistics

- 2 exams (20% each, **40%** total)
  Exam 1 is on Week 6, Exam 2 is on Week 12
  No final exam

- Written assignments and paper presentations (**40%**)

  - Written assignments based on course material
    Individual work
    Pdf submission on Canvas (typed or scanned)
  - Presentation of two recent papers
    Groups of 3, take turns to present
    20 minutes for presentation + 5 minutes for questions
    Need one 1.5 hour class for each set

- Group project (**20%**)

First paper presentation

- Form a group of three, at least two different countries
- Look at the IAAI (Innovative Applications of AI) proceedings. Go to aaai.org, click on "View list of conference proceedings", click on a year under IAAI.
- Use years 2013-today.
- Select only from deployed papers, don't select from the other categories.
  Many papers are available to choose from.
- Write your choice and presentation date on the shared document. There is a Canvas reminder.
- Presentations will be during Week 5 (Career Fair Week).

Semester project

- Form a group of three
  at least two different countries,
  different from the paper groups
- Decide on a project based on your interests
- The project should involve programming and generating or processing data
- You may use others' software or data but you have to make a contribution
- Submit a proposal by the end of the second week

Overview of the lecture topics

- Textbook: Russell and Norvig's
  "AI A Modern Approach (AIMA)".
  3rd edition, 2010.
- Prerequisite: CS4811
- Ch. 01: Introduction
- Ch. 02: Intelligent agents
- Ch. 03: Solving problems by searching
- Ch. 06: Constraint satisfaction problems
- Temporal Constraint Networks

Lecture topics (cont'd)

- Ch. 10: Classical planning
- Ch. 11: Planning and acting in the real world
- Ch. 13: Quantifying uncertainty
- Ch. 14: Probabilistic reasoning
- Ch. 15: Probabilistic reasoning over time
- Ch. 16: Making Simple Decisions
- Ch. 17: Making Complex Decisions
- Additional topics, time permitting

Topics not covered

- Ch. 04: Beyond classical search
- Ch. 05: Adversarial search
- Ch. 07: Logical agents
- Ch. 08: First-order logic
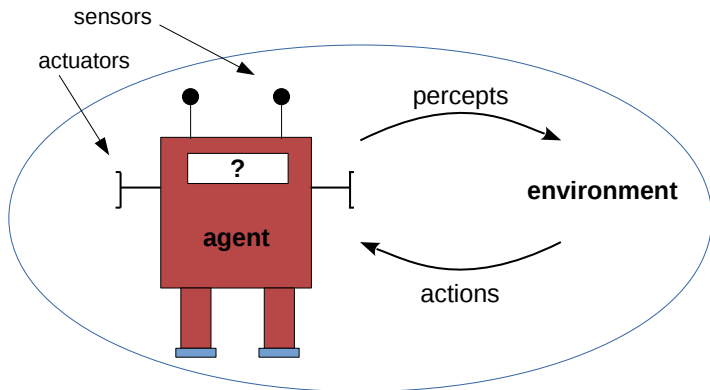- Ch. 09: Inference in first-order logic
- Ch. 12: Knowledge representation

What is AI?

Systems that:

think like humans	think rationally
act like humans	act rationally

- ▶ Cognitive science
- ▶ The Turing test
- ▶ Logic
- ▶ Doing the right thing
  - ▶ Knowledge representation
  - ▶ Reasoning (algorithms)

Agents and environments

- Agents include humans, robots, softbots, thermostats, etc.
- The agent function maps percept histories to actions:
  $f : P^* \rightarrow A$

Basic agent types

In order of increasing generality (and complexity):

- simple reflex agents
- reflex agents with state
- goal-based agents
- utility-based agents

All of the basic types can be turned into learning agents

Sources for the slides

- AIMA textbook (3rd edition)
- AIMA slides (http://aima.cs.berkeley.edu/)