Lecture 1 - CS486 Introduction

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January 14, 2020

Readings: Poole & Mackworth 1.1

People, books, web

People:
▶ Jesse Hoey (Instructor)
▶ TAs:
  ▶ Shushant Agarwal
  ▶ Ehsan Ganjidoost
  ▶ Joshua Jung
  ▶ Charupriya Sharma
  ▶ Kyle Tilbury
  ▶ Ethan Ward
  ▶ Allen Wang

Lectures:
▶ Section 001: T/Th 4:00pm-5:20pm in MC-2038
▶ Section 002: T/Th 11:30am-12:50am in RCH-307

Office hours: Mondays 1pm-2pm in DC2584 (CHIL)
Office hours (TA): near assignment due dates

Assignments, etc

CS486 (undergrad students)
▶ 4 Assignments (40%: 10% each)
▶ 1 midterm exam (15%) (Feb 7th, 630pm in M3-1006)
▶ 1 final exam (45%) (must pass to pass course)
  ▶ optional project (5% bonus, proposal at midterm)

CS686 (grad students)
▶ 4 Assignments (25%: 6.25% each)
▶ 1 midterm exam (10%) (Feb 7th, 630pm in M3-1006)
▶ 1 final exam (35%)
▶ 1 project report (30%, proposal due at midterm)

Students wishing to write a project (and all CS686 students)
must submit a project proposal.

Projects

Optional for CS486 students (5% bonus)
Mandatory for CS686 students (30% of grade)
you must submit a correctly constructed and formatted
proposal by the midterm - will be pass/fail with no mark
Final project due before the final exam
Individual project (CS686)
Group project (up to 3 members, CS486):
  ▶ must be substantially more involved than individual projects,
  ▶ each team members contributions must be clearly and
    specifically described
  ▶ there must be more papers referenced and discussed for team
    projects (3 more per team member)

Textbooks, websites

Textbook: David Poole and Alan Mackworth
Artificial Intelligence: Foundations of Computational Agents.
available online at artint.info
Secondary textbooks:
▶ Russell and Norvig
  Artificial Intelligence aima.cs.berkeley.edu/
▶ Ian Goodfellow and Yoshua Bengio and Aaron Courville
  Deep Learning - deeplearningbook.org/
Website:
https://cs.uwaterloo.ca/~jhoey/teaching/cs486/index.html
Discussion forum and email: Piazza
piazza.com/uwaterloo.ca/winter2020/cs486686/home
assignments handed in and returned, grades, on LEARN

Current Research In A.I.

Organizations:
▶ Waterloo AI institute waterloo.ai
▶ Assoc. for the Advancement of A.I. (AAAI) aaai.org
▶ European Association for A.I. (EurAI) eurai.org
▶ Canadian A.I. Association caiac.ca
▶ Intl. Machine Learning Society machinelearning.org
▶ Association for Affective Computing (AAAC)
  emotion-research.net
Journals
▶ Artificial Intelligence
  journals.elsevier.com/artificial-intelligence/
▶ Journal of AI Research jair.org
▶ Journal of Machine Learning Research jmlr.org
▶ arXiv AI https://arxiv.org/list/cs.AI/recent
Conferences
▶ International Joint Conferences on A.I.ijcai-18.org
▶ AAAI 2018 aaai.org/Conferences/AAAI-18
▶ Neural Information Processing Systems neurips.cc
▶ International Conf. on Machine Learning icml.cc
Overview of the Course

Lectures:
- Introduction
- Agents and AI
- Representation and Reasoning
  ▶ States and Searching
  ▶ Features and Constraints (CSPs)
  ▶ Logical inference
  ▶ Uncertainty (Bayesian probability)
- Learning
  ▶ Supervised learning (Regression)
  ▶ Neural Networks and Deep Learning (Stochastic gradient descent)
  ▶ Bayesian learning (learning Bayes Nets)
  ▶ Unsupervised learning (Expectation-Maximization)
- Planning
  ▶ deterministic (under certainty)
  ▶ with uncertainty (Markov decision processes)
  ▶ reinforcement learning
- Topics (time permitting)

What is Artificial Intelligence (AI)?

The synthesis and analysis of computational agents that act intelligently.

An agent acts intelligently when
- what it does is appropriate for its circumstances and its goals, taking into account the short-term and long-term consequences of its actions
- it is flexible to changing environments and changing goals
- it learns from experience
- it makes appropriate choices given its perceptual and computational limitations

Next:

- What is AI? (Poole & Mackworth chapter 1.2-1.10,2.1-2.3)
- Search (Poole & Mackworth chapter 3)

Integrity, Intellectual Property

- See official course outline at https://cs.uwaterloo.ca/~jhoey/teaching/cs486/W20CS486Outline.html
- Property of UW:
  ▶ Lecture content, spoken and written (and any audio/video recording thereof);
  ▶ Lecture handouts, presentations, and other materials prepared for the course (e.g., PowerPoint slides);
  ▶ Questions or solution sets from various types of assessments (e.g., assignments, quizzes, tests, final exams); and
  ▶ Work protected by copyright (e.g., any work authored by the instructor or TA or used by the instructor or TA with permission of the copyright owner).

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