Lecture 1 - CS486 Introduction

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Readings:Poole & Mackworth 1.1

Projects

CS486 (undergrad students)

Assignments, etc.

- 4 Assignments (40%: 10% each) (approx deadlines: May 29th, Jun 15, Jun 29, Jul 20)
- ▶ 1 midterm exam (15%) (June 8th. 7:00pm-8:50pm in M3-1006)
- 1 final exam (45%) (must pass to pass course)
- optional project (5% bonus, proposal due at midterm)
- CS686 (grad students)
 - ▶ 4 Assignments (25%: 6.25% each) (approx deadlines: May 29th, Jun 15, Jun 29, Jul 20)
 - ▶ 1 midterm exam (10%) (June 8th, 7pm-8:50pm 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.
- . the Final is cumulative (covers all course material) with a focus on the post-midterm material.x

People, books, web

- People:
 - Jesse Hoey (Instructor) ► TAs:
 - Kai Ma
 - Zheng Ma
 - Kelechi Ogueii
 - Kvle Tilbury Mojtaba Valipour
 - Blake Vanberlo
 - ▶ li Xin
 - Dake Zhang
- · Lectures:
 - Section 002: T/Th 1:00pm-2:20pm in RCH-302
 - Section 001: T/Th 2:30pm-3:50pm in RCH-302
- Office hours: TBA (online)
- Office hours (TA): near assignment due dates

- 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)
- https://cs.uwaterloo.ca/~jhoey/teaching/cs486/ projects.html

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.berkelev.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/spring2022/cs486686/home

assignments handed in and returned, grades, on LEARN

Volunteer Note Taker Required

AccessAhility Services Volunteer Notetaker Required

Interested? Complete an online application using your WATIAM: https://vork.accessiblelearning.com/UWaterloo/

More information:

Website: https://uwaterloo.cs/accessability-services/current-students/notstaking-services Email: notetakine@uwaterloo.ca Phone: 519-888-4567, ext. 35082



To accommodate a classmate who is registered with AccessAbility Services, the AccessAbility Services staff and I are looking for a volunteer notetaker for CS486. We appreciate your contribution to the university on behalf of fellow students who are unable to take notes due to a disability. If you are interested in being a volunteer notetaker, please complete the application form on the AccessAbility Services website by signing-in with your WATIAM credentials (https://york.accessiblelearning.com/UWaterloo/)."

Overview of the Course

Lectures

- Introduction
- Agents and Al
- · 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) Unsupservised learning (Expectation-Maximization)
- Planning
 - deterministic (under certainty) with uncertainty (Markov decision processes)
- reinforcement learning Topics (time permitting)

Integrity, Intellectual Property

- See official course outline at https://cs.uwaterloo.ca/ ~ihoev/teaching/cs486/S22CS486Outline.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).
- Sharing intellectual property without the intellectual property owner's permission is a violation of intellectual property rights.

Current Research In A.I.

What is Artificial Intelligence (AI)?

- Organizations:
 - Waterloo Al 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) https://aaac.world/

Journals

- ► Artificial Intelligence
 - journals.elsevier.com/artificial-intelligence/
 - ▶ Journal of Al Research jair.org
 - ▶ Journal of Machine Learning Research jmlr.org
 - arXiv Al https://arxiv.org/list/cs.AI/recent
- arXiv Learning https://arxiv.org/list/cs.LG/recent
- Conferences
 - ► International Joint Conferences on A.I. ijcai-22.org ► AAAI 2018 aaai.org/Conferences/AAAI-22
 - Neural Information Processing Systems neurips.cc
 - Neural Information Processing Systems neurips.c
 International Conf. on Machine Learning icml.cc

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)