Lecture 1 - CS486 Introduction

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January 6, 2019

Readings: Poole & Mackworth 1.1

Assignments, etc

- CS486 (undergrad students)
  - 4 Assignments (40%: 10% each)
  - 1 midterm exam (15%) (Feb 8th, 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 8th, 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.

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: www.student.cs.uwaterloo.ca/~cs486
- Discussion forum and email: Piazza
  piazza.com/uwaterloo.ca/winter2019/cs486686/home

- assignments handed in and returned, grades, on LEARN

Conferences

- International Joint Conferences on AI.ijcai-18.org
- AAAI 2018 aaai.org/Conferences/AAAI-18
- Neural Information Processing Systems nips.cc
- International Conf. on Machine Learning icml.cc

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

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- Email: notetaking@uwaterloo.ca
- Phone: 519-888-4567, ext. 35082

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 AI.ijcai-18.org
  - AAAI 2018 aaai.org/Conferences/AAAI-18
  - Neural Information Processing Systems nips.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
- Learning and Planning
  - Supervised learning
  - Unsupervised learning
  - Reinforcement learning
  - Machine Learning
  - Neural Networks and Deep Learning
  - Planning (with certainty and uncertainty)
- Topics (time permitting)
  - Affective (emotional) computing
  - Robotics
  - Natural Language Processing

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

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