Lecture 1 - CS486 Introduction

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Readings: Poole & Mackworth 1.1

Assignments, etc

- CS486 (undergrad students)
  - 5 Assignments (60%: 12% each)
  - 1 final exam (40%) (must pass to pass course)
  - optional project (5% bonus, proposal due Oct 15th)
- CS686 (grad students)
  - 5 Assignments (35%: 7% each)
  - 1 final exam (35%) (must pass to pass course)
  - 1 project report (25%, proposal due Oct 15th)

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/winter2018/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) aaaa.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 aaaa.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

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    emotion-research.net
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  - *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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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)