Lecture 1 - CS486 Introduction

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Readings: Poole & Mackworth 1.1
People, books, web

- **People:**
  - Jesse Hoey (Instructor)
  - Aravind Balakrishnan (TA)
  - Ashish Gaurav (TA)
  - Milad Khaki (TA)
  - Sajin Sasy (TA)
  - Pan Pan Chen (TA)
  - Timmy Rong Tian Tse (TA)

- **Lectures:**
  - Section 001: M/W 1:00pm-2:20pm in OPT401
  - Section 002: M/W 10:00am-11:20am in OPT401

- **Office hours:** TBA
- **Office hours (TA):** near assignment due dates
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 Feb 14th)

- **CS686 (grad students)**
  - 5 Assignments (35%: 7% each)
  - 1 final exam (35%) (must pass to pass course)
  - 1 project report (30%, proposal due Feb 14th)
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* aimacs.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) 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 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)?
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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)