Today: 8/29

- What is AI?
- Administrative stuff
- Overview of course topics

A Mental Exercise:
Why Artificial Intelligence

First let's consider some alternative names for this field:
- Fake intelligence
- Imitation intelligence
- Synthetic intelligence
- Simulated intelligence
A Framework

"The automation of activities that we associate with human thinking." Bellman 1978

"The study of mental faculties through the use of computational models." Charniak & McDermott

"The study of how to make computers do things at which at the moment people are better." Rich & Knight

"The branch of CS that is concerned with the automation of intelligent behavior." Luger & Stubblefield

Our Framework

Getting computers to do the right thing based on their circumstances and what they know.

- No presuppositions about how they should be designed to do the right thing
  - I.e. not limited to how people do it
- Evaluation is based on performance, not on how the task is performed

Applied Areas of AI

- Game playing
- Speech and language processing
- Expert reasoning
- Planning and scheduling
- Vision
- Robotics
Some Examples

- Playing chess
- Driving on the highway
- Translating languages
- Recognizing speech
- Diagnosing diseases
- Mowing the lawn

Playing Chess

- Environment?
  - Board
- Actions?
  - Legal moves
- Doing the right thing?
  - Moves that lead to wins

Recognizing Speech

- Environment
  - Audio signal
  - Knowledge of user
- Actions
  - Choosing word sequences
- Doing the right thing
  - Recovering the users words
Diagnosing Diseases

- Environment
  - Patient information
  - Results of tests
- Actions
  - Choosing diseases
  - Choosing treatments
- Doing the right thing
  - Eliminating disease

Translation

- Environment
  - Source text to be translated
- Actions
  - Word sequences in target language
- Doing the right thing?
  - Words that achieve the same effect
  - Words that are faithful to the source

Google/Arabic
Driving

- Environment
  - Restricted access highway
- Actions
  - Accelerate, brake, turn, navigate, other controls
- Doing the right thing
  - Stay safe, get where you want to go, get there quickly, don't get a ticket
2007 Challenge

The DARPA Urban Challenge will feature autonomous ground vehicles executing simulated military supply missions safely and effectively in a mock urban area. Safe operation in traffic is essential to U.S. military plans to use autonomous ground vehicles to conduct important missions.

DARPA will award prizes for the top three autonomous ground vehicles that compete in a final event where they must safely complete a 60-mile urban area course in fewer than six hours. First prize is $2 million, second prize is $500,000 and third prize is $250,000. To succeed, vehicles must autonomously obey traffic laws while merging into moving traffic, navigating traffic circles, negotiating busy intersections and avoiding obstacles.

The Architectural Components of AI Systems

- State-space search
- Knowledge representation
- Logical reasoning
- Reasoning under uncertainty
- Learning
- Sensing/Motion components
- Communication

Administrative Stuff

- CAETE
- Web page
- Reasonable preparation
- Requirements
- Programming
CAETE

A couple of things about this format
• Classes are recorded
• They are available for viewing on the Web
  - Not a substitute for coming to class
• Don’t make a mess

Web Page

The course web page can be found at.
www.cs.colorado.edu/~martin/csci5582.html

It has (will have) the syllabus, lecture notes, assignments, announcements, etc.
You should check it daily for new stuff.

Preparation

• Basic algorithm and data structure analysis
• Ability to program
• Some exposure to logic
• Exposure to basic concepts in probability
• Familiarity with linguistics, psychology, and philosophy
• Ability to write well in English
Requirements

• READ the book!
  - Artificial Intelligence: A Modern Approach
    Russell and Norvig, Prentice-Hall 2002
• 4 or 5 assignments
• 3 quizzes and a final

Grading

• Assignments - 30%
• Quizzes - 30%
• Final - 30%
• Participation - 10%

Looks like the final is scheduled for 12/18 at 1:30. Don’t schedule your holiday travel prior to that.

HW Late Policy

• Assignments are due in class, at the beginning of class, on the assigned due date.
• That is unless you’ve made some arrangement with me ahead of time.
Programming

The programming for this class will be done in Python.
• Python is a
  - High-level, interpreted, scripting language suitable for the homeworks in this class.
  - Free versions are available for UNIX, Windows and Macs

Main Course Topics

• Agents
• State space search
• Knowledge representation
• Uncertain reasoning
• Machine learning
• Speech and language processing

Assignment 1

• Two parts
  - Install and learn Python
  - A simple programming problem
  - A short writing assignment
• See the web page for more details (soon)
• Both are due in class at the start of class on 9/7
Next Time

• Read Chapters 1 and 2
• Get started on the first assignment