CPSC 625-600 Artificial Intelligence

- Instructor: Yoonsuck Choe (choe@tamu.edu)
- http://faculty.cs.tamu.edu/choe/
courses/02fall/625
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Send email to dhw7942@cs.tamu.edu with the subject CS625. All communications out of the class will be through email, and the announcements on the web page.

Topics

- Introduction
- LISP
- Search
- Game Playing (1st Project)
- Logic (2nd Project)
- Learning
- Special Topics: Neuroscience, Vision, GA, etc.

Textbook

- Russell and Norvig
- Prentice Hall, 1995

Other material: available on the course web page, including class notes.

Grading

Grades will be awarded on the absolute scale:
A: 90% Total score, B: 80%, C: 70%, D: 60%, F: below 50%.

- Exam: midterm (20)
- Homeworks: 6
- Programming Assignments: 24
- Project: 30
### Projects

Two mini-projects and one major project will be assigned. Details will be available ASAP so that you can start working on it whenever you feel comfortable.

Basic building blocks for the mini-projects will be provided to avoid unnecessary time spent on extra programming details. All mini-projects and programming assignments should be done in Common Lisp.

The final project will be flexible in topic, and you can choose your favorite language (although it must run on SunOS hosts in the CS department).

### Things You May Need

- **Students with disability:**
  Please contact the department office (HRBB 3rd floor) for assistance.

- **Computer (UNIX) accounts:**
  If you don’t have one, get one:
  http://www.cs.tamu.edu/department/policies/accounts

  **Getting Your Money’s Worth**

  - Utilize your instructor and TA as much as possible.

### Academic Policy

- All assignments and projects are to be done **strictly individually**: no discussion is allowed out of the class. Violating this policy will result in a grade of $F$.

- If you find solutions on the web or in a book, you can use it verbatim, but you **HAVE TO CITE** the source properly, otherwise you will get 0 points. When in doubt, please see the instructor.

- All incidents of academic dishonesty (plagiarism, cheating, etc.) will be dealt with according to the university policy.

### What is Intelligence

**Textbook Definitions**

- Thinking like humans
- Acting like humans
- Thinking rationally
- Acting rationally $\leftarrow$

However, it depends on definition: **whatever the (intelligence) test tests.**
What is AI

Diverse areas: http://www.aaai.org

- Problem solving
- Reasoning
- Theorem proving
- Learning
- Planning
- Knowledge representation
- Perception and Robotics
- Agents
- and more

Approaches

Two basic stances (comparison to flight)

- Strong AI:
  1. Let's make a conscious being.
  2. Let's make a flying machine that mimics a bird so that it feels what a real bird feels when flying.

- Weak AI:
  1. Let's make something useful mimicking humans.
  2. Let's make something that can float and navigate in the air.

Problems

- Strong AI:
  Hard to determine if something is really consciously intelligent or not (the other minds problem in philosophy).

- Weak AI:
  Utility of the result is limited by the stated goal. Hard to achieve a general usefulness as in true intelligence.

How to do AI

Why doing AI like plane-building will fail:

1. Flight
   goal is simple:
   - float in the air.

2. Intelligence
   goal is complex and fuzzy:
   - intelligence is a collection of many abilities.

There are many ways to meet a single clear goal (flight), but there can be only a small number of ways to simultaneously meet a huge number of fuzzy goals (intelligence).
**Why not the Plane-Model?**

Some things may seem impossible: e.g. the fine control of flight in flies.

- Flapping their wings cannot generate enough lift (for their body weight), but they do fly!
- Jumbo jets cannot explain how the beetles achieve such an impossible feat.
- Recent observations:
  Beetles gyrate their wings to generate a vortex to create greater lift.

Moral: if you fail to build the impossible, study an existing working example.

**AI vs. Other Unsolved Problems**

There are other unsolved scientific problems:

- Faster than light travel
- Teleportation
- Antigravity devices

Difference between these and AI: *We know the existence of intelligence, i.e. ourselves, the humans.*

**How Flies Fly**

**Then, How to do AI?**

Instructor’s perspective:

- Where does intelligence come from? → from the brain. → so, study the brain function.
- What shapes the brain? → complex but orderly nature of the world → so, study the order and structure in nature.

We must think about the more fundamental issues from time to time when research seems to be at a dead-end.
Back to Reality

True AI (weak or strong) is far from our reach, and we have a limited time (one semester). :-)

- Study strategies employed by humans in dealing with real-world problems.
- These include all the topics listed earlier.
- The background you learn in this course will enable you to appreciate the problems, and to pursue further interest in AI, and in human and machine intelligence in general.

Unix Help

- You should at least know how to use an editor in unix: vi, emacs, pico, etc.
- Depending on demand, I will do a short intro to the unix environment.

Little Bit of LISP

http://www.cs.tamu.edu/faculty/choe/courses/02spring/lisp-quickref.html

- GCL: GNU Common LISP
- /usr/local/bin/gcl
- At the > prompt, just type the expressions.

unix$ gcl
GCL (GNU Common Lisp) Version(2.3) Wed Feb 14 16:09:29 CST 2001
Licensed under GNU Library General Public License
Contains Enhancements by W. Schelter
>(+ 10 20)
30
> [CTRL]-[D]

Next Time

- Academic disciplines studying intelligence
- History of AI
- Successes and failures
- Rebuttals
- State of the art

Class notes will be available on the web 24 hours prior to the class. It is your responsibility to print it out and bring it to the class.

http://faculty.cs.tamu.edu/choe/courses/02fall/625/lectures/