CPSC 625-600 Artificial Intelligence: Fall 2013

Syllabus

NEWS: *8/24/13, 10:18AM (Sat)*

- [LINKS] •News archive•Grades•Codes•Lecture notes

Read-Only Bulletin Board.: 8/31/10, 12:20PM (Tue)

Page last modified: 8/25/13, 05:23PM Sunday.

General Information Resources Weekly Schedule Credits Lecture Notes Example Code Read-Only Board

I. General Information

Instructor:

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Prerequisite/Restrictions:

CPSC 311 or equivalent

Lectures:

MWF 9:10am-10:00am, HRBB 113

Goals:

To understand the problems in AI and to learn how to solve them:

1. traditional methods in AI (search, pattern matching, logical inference, theorem proving, etc.).
2. modern approaches in AI (learning, probabilistic approaches, etc.).

Textbook:

Stuart Russell and Peter Norvig, *Artificial Intelligence: A Modern Approach* (AIMA, hereafter), **3rd Edition**, Prentice Hall, New Jersey, 2010.
Book Homepage
* The second edition may be okay if that's what you have.

Computer Accounts and Usage:

1. Computer accounts: if you do not have a unix account, ask for one on the CS web page. We will be using the CMU Common Lisp as our main language. You may use a different language but example code will only be made available in Lisp.
2. CMU Common Lisp:
   - Carnegie Mellon U. Common Lisp homepage
   - On all SunOS systems in the department (**sun.cs.tamu.edu** etc.), the program is installed in **/opt/apps/cmucl/bin/lisp**.
   - See the Read-only Board for a brief example.

Topics to be covered:

See the Weekly Schedule section for more details.

1. Introduction
2. LISP
3. Search
4. Game playing, alpha-beta pruning
5. Propositional Logic, first-order logic, theorem proving
6. Uncertainty, probabilistic approaches
7. Learning
8. Special topics

Grading:

1. Exams: 31% (midterm: 15%, final: 16%)
2. Homeworks: 21% (about 3, 7% each)
3. Programming Assignments: 42% (about 3, 14% each; 3rd one will be open-ended [mini project])
4. Class participation: 6%

Grading will be on the absolute scale (no curving). The cutoff for an `A' will be 90% of total score, 80% for a `B', 70% for a `C', 60% for a `D', and below 60% for an 'F'.

Attendance is mandatory. Sign-in sheets will be distributed. Faked signatures will be reported to the Aggie Honor System Office. Low attendance will lead to 0% score for class participation.

Academic Integrity Statement:

AGGIE HONOR CODE: An Aggie does not lie, cheat, or steal or tolerate those who do.

Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the TAMU community from the requirements or the processes of the Honor System.

For additional information please visit: http://aggiehonor.tamu.edu/

Local Course Policy:

- All work should be done **individually** and **on your own** unless otherwise allowed by the instructor.
- Discussion is only allowed immediately before, during, or immediately after the class, or during the instructor's office hours.
- If you find solutions to homeworks or programming assignments on the web (or in a book, etc.), you may (or may not) use it. Please check with the instructor.

Students with Disabilities:

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities, in Cain Hall or call 845-1637.

II. Resources

1. LISP quick reference
2. **CMU Common Lisp** (This one will be used in the class.)
3. GNU Common Lisp
4. My general resources page
5. An interesting popular view of AI
6. Chess playing program (with neat visualization)

III. Weekly Schedule and Class Notes

- **Lecture notes (in PDF format)**: all notes will be uploaded in this directory.
- It is **your responsibility** to download, print, and bring the notes to the class. Notes will be available 24 hours before each class.

- See the **TAMU Calendar** for breaks, etc.
- When reading the chapters, you do not have to memorize everything. A separate list of terms you need to know will be handed out prior to each exam.
- All reading material below refers to the AIMA book 2nd edition. The *(old XX)* tags next in the Reading field are the corresponding chapters in the old AIMA book (1st edition). To see how the 1st and the 2nd edition chapters correspond, see the "AIMA 1st and 2nd edition chapter map".
- More detail will be available as we go along.

Week	Date	Topic	Reading	Assignments	Notices and Dues	Notes
1	8/26	Introduction	Chapter 1 1.1 and 1.2		First day of class	slide01.pdf
1	8/28	Introduction	Chapter 26 26.1 and 26.2			slide01.pdf
1	8/30	Lisp	Lisp quick ref			slide02.pdf
2	9/2	Lisp, Symbolic Differentiation	Lisp quick ref			slide02.pdf
2	9/4	Uninformed Search (BFS,DFS,DLS,IDS)	Chapter 3.1-3.5 (3.6,3.7 optional)			slide03.pdf
2	9/6	Uninformed Search (BFS,DFS,DLS,IDS)	Chapter 3.1-3.5 (3.6,3.7 optional)			slide03.pdf
3	9/9	Informed Search (BestFS,Greedy,A*)	Chapter 4.1-4.3 (4.4 optional)(old 4.1-4.3)			slide03.pdf
3	9/11	IDA*,Heuristic Search, Simulated Annealing, etc.	Chapter 4			slide03.pdf
3	9/13	IDA*,Heuristic Search, Simulated Annealing, etc.	Chapter 4			slide03.pdf
4	9/16	Game playing Min-Max, Alpha-Beta	Chapter 5 (optional) and 6.1-6.8 (old 5)			slide03.pdf
4	9/18	Game playing	Chapter 5 (optional) and 6.1-6.8 (old 5)			slide03.pdf
4	9/20	Game playing	Chapter 5 (optional) and 6.1-6.8 (old 5)			slide03.pdf
5	9/23	Game playing wrap up; Propositional Logic	Chapter 7.1, 7.3, 7.5, 7.6 (old 6)			slide03.pdf slide04.pdf

5	9/25	Theorem proving	Chapter 9 (old 10)	Homework #1 TBA		slide04.pdf
5	9/27	FOL; Theorem proving for FOL	Chapter 8 (old 7); Chapter 9 (old 10)			slide04.pdf
6	9/30	FOL; Theorem proving for FOL	Chapter 8 (old 7); Chapter 9 (old 10)		Program 2 due	slide04.pdf
6	10/2	Inference for FOL	Chapter 9			slide04.pdf
6	10/4	Inference for FOL	Chapter 9			slide04.pdf
7	10/7	Uncertainty	Chapter 13 (old 14)		Homework 1 due	slide05.pdf
7	10/9	**Exam #1**	In class			
7	10/11	Uncertainty: Probability and decision theory	Chapter 13 (old 14), Chapter 14 (old 15)			slide05.pdf
8	10/14	Uncertainty: Bayes rule	Chapter 13 (old 14), Chapter 14 (old 15)			slide05.pdf
8	10/16	Uncertainty: Probabilistic inference	Chapter 13 (old 14), Chapter 14 (old 15)			slide05.pdf
8	10/18	Uncertainty: Belief network	Chapter 13 (old 14), Chapter 14 (old 15)			slide05.pdf
9	10/21	Uncertainty: Belief network	Chapter 13 (old 14), Chapter 14 (old 15)			slide05.pdf
9	10/23	Neuroevolution				slide06.pdf
9	10/25	Learning: Inductive learning, Decision trees	Chapter 14 (old 15)			slide07.pdf
10	10/28	Learning: Decision trees	Chapter 18			slide07.pdf
10	10/30	Learning: Perceptrons	Chapter 18			slide07.pdf
10	11/1	Learning: Perceptrons, Multilayer networks	Chapter 20 (old 19)	Homework #2 TBA		slide07.pdf
11	11/4	Learning: Backprop				slide07.pdf

11	11/6	Learning: Backprop			slide07.pdf
11	11/8	Learning: Unsupervised learning, Self-organizing maps			slide07.pdf
12	11/11	Learning: Recurrent networks, Genetic algorithms			slide07.pdf
12	11/13	Learning: Genetic algorithms			slide07.pdf
12	11/15	Autonomous semantics	see refs in slide08	Homework #2 due	slide08.pdf
13	11/18	Planning			slide09.pdf
13	11/20	Natural language processing			slide00.pdf
13	11/22	**No class (Thanksgiving)**			
14	11/25	Natural language processing			slide00.pdf
14	11/27	**Exam #2**			
14	11/29	Distributed representation and analogy			slide00.pdf
15	12/2	Last day of class. Topic TBA			

IV. Credits

Many ideas and example codes were borrowed from Gordon Novak's AI Course and Risto Miikkulainen's AI Course at the University of Texas at Austin (Course number CS381K).

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