Syllabus

COEN 166 Artificial Intelligence
Department of Computer Engineering
Santa Clara University

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Spring Quarter 2007
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Tuesday & Thursday 7:00-7:30pm

Course Description

Artificial Intelligence viewed as knowledge engineering. Historical perspective. Problems of representation: AI as a problem in language definition and implementation. Introduces representations, techniques, and architectures used to build applied systems and to account for intelligence from a computational point of view. Applications of rule chaining, heuristic search, constraint propagation, constraint search, inheritance, and other problem-solving paradigms. Applications of identification trees, neural nets, genetic algorithms, and other learning paradigms. Speculations on the contributions of human vision and language systems to human intelligence.

Prerequisite

Probability and Statistics, Data Structures and Computer Algorithms, Formal Languages and Compiler Construction, Truth, deduction, and Computation, Database Systems, Logic Programming.

Required Textbooks

1. "Artificial Intelligence: Structures and Strategies for Complex Problem-Solving, 5th Edition", by George Luger, Addison-Wesley, 2005
2. "Robot Modeling & Kinematics" by Rachid Manseur, ISBN: 15845-08515, Charles River Media, 2006

Recommended Textbooks

1. "Artificial Intelligence, A Modern Approach, 2nd Edition" by Stuart Russell, Peter Norvig, Prentice Hall, 2002
2. "Artificial Intelligence, 3rd Edition", by Patrick Henry Winston, Addison-Wesley Publishing Company, 1992

References

1. "Artificial Intelligence: A Guide to Intelligent Systems, 2nd Edition", by Michael Negenivtsky, Addison-Wesley, 2005
2. "Expert Systems, Principles and Programming, 4th Edition", by Joseph C. Giarratano, Gary D. Riley, ISBN: 05343-84471, Course Technology, 2005
3. "AI for Game Developers", by David M. Bourg, Glenn Seemann, ISBN: 05960-05555, O'Reilly, 2004
4. "Hands-on AI with Java : Smart Gaming, Robots, and More", by Edwin Wise, ISBN: 00714-24962, McGraw-Hill, 2004
5. "Computer Vision, A Modern Approach", by David A. Forsyth, Jean Ponce, Prentice Hall, 2003
6. "Proglog Programming for Artificial Intelligence, 3rd Edition" by Ivan Bratko, Addison-Wesley, 2001
7. "Spoken Language Processing: A Guide to Theory, Algorithm and System Development", by Xuedong Huang, Alex Acero, Hsiao-Wuen Hon, Raj Reddy, Prentice Hall, 2001
8. "Data Mining: Practical Machine Learning Tools and Techniques with Java Implementations", by Ian H. Witten, Eibe Frank, Morgan Kaufmann Publishers, 1999
9. "Mobility: Processes, Computers, and Agents", by Dejan S. Milojicic, Frederick Douglis, Richard G. Wheeler, Addison-Wesley Publishing Company, 1999
10. "Robotics, Designing the Mechanisms for Automated Machinery, 2nd Edition", by Ben-Zion Sandler, Academic Press, 1999.
11. "Genetic Programming: An Introduction: On the Automatic Evolution of Computer Programs and Its Applications", by Wolfgang Banzhaf, Peter Nordin, Robert E.Keller, Frank D. Francone, Morgan Kaufmann, 1998
12. "Neural Networks: A Comprehensive Foundation, 2nd Edition", by Simon S. Haykin, Prentice Hall, 1998
13. "Machine Learning", by Tomas M. Mitchell, McGraw-Hill, 1997
14. "Natural Language Understanding, 2nd Edition", James Allen, The Benjamin/Cummings Publishing Company, 1995.
15. "The Elements of Artificial Intelligence Using Common Lisp, 2nd Edition", by Steven L. Tanimoto, W.H. Freeman & Co, 1995
16. "Computational Brian" by Patricia S. Churchland and Terrence J. Sejnowsky, MIT Pres, 1992
17. "Common LISPcraft", by Robert Wilensky, W. W. Norton & Company, 1986

Grading Policy

Course grade is determined based on the total score (maximum 1000 points + 250 bonus points) from:

1. Mid-term and final exams of 250 points each (close book with one A4 note and a calculator.) Makeup exams (must have a very good reason for makeup) are much difficult than normal exams.
2. Two programming assignments of 100 points each (late penalty: 20 points/day.) Makeups are more difficult too.
3. A group (prefer 2-3 people in a team) programming term project of 250 points (late penalty: 60 points/day.) No makeup is allowed.
4. 18 Bonus assignments will be assigned at each lecture with 10 points each. Due before next lecture begin. The solution for bonus point will be posted on my protected web page. No late work accepted for bonus assignments. 75-80% of exam questions are similar to bonus.
5. 70 points for class attendance/attitude, total subjective.
6. Class average targeted at **B-/ C+** .

Table 1: Grade-score table

1000 - 1200	950 - 999	900 - 949	850 - 899	800 - 849	750 - 799	700 - 749	650 - 699	0 - 649
A	A-	B+	B	B-	C+	C	C-	F

Course Schedule (Tuesday/Thursday 5:15pm-7:00pm)

Table 2: Course Schedule

#	week	readings	remarks
1	4/3 4/5	introduction	submit due 4/5
2	4/10 4/12	problem solving	
3	4/17 4/19	knowledge and reasoning	program 1 due 4/15
4	4/24 4/26	action logically	
5	5/1 5/3	uncertain knowledge	program 2 due 4/29 midterm exam 5/3
6	5/8 5/10	learning	problem due 5/8 group & topic due 5/10
7	5/15 5/17	vision	Paper presentation 5/15 and 5/17
8	5/22 5/24	natural language processing	proposal due 5/22
9	5/29 5/31	robotics	
10	6/5 6/7	expert systems	Final 6/7
11	6/12		project defense 6/12

Reminder

- No cheating, and no register complaint without talking to me first.
- No incomplete. Due date for withdraw is May 20.
- No sit-in or audit the class except formally registered.
- Read files under /home/mwang2/tips for help.
- Prepare a self-addressed and stamped envelope if you want your last programs or final to be returned.
- Handouts, homework and programming assignments will be posted on the web. You should check the class web site at least once a week. You are responsible for printing and bring the handout to the class.

Honor Code

All students taking course in the school of engineering agree, individually and collectively, they will neither give nor receive unpermitted aid in examinations or other course work that is to be used by the instructor as a basis of grading.

Disability Accommodation Policy:

To request academic accommodations for a disability, students must contact Disability Resources located in The Drahmann Center in Benson, room 214, (408) 554-4111; TTY (408) 554-5445. Students must provide documentation of a disability to Disability Resources prior to receiving accommodations.