EECS 391: Introduction to Artificial Intelligence
Fall 2017

Instructor

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Teaching Assistants

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Class meeting times

Tue/Thu 10:00 - 11:15 AM in White 411

Web page

The course has a canvas site (https://canvas.case.edu). You should be automatically added if you are registered for the course, but if you are not, please contact me. Check the site periodically for the latest announcements, homework assignments, lecture slides, handouts, etc.

Course Description

EECS 391 is a broad introduction to the many subjects that are collectively called artificial intelligence or AI. We will study the concepts that underlie intelligent systems. Topics covered include problem solving with search, optimal game playing, knowledge representation and reasoning, introduction to machine learning, neural networks, planning and reinforcement learning.

Course Goals

The goals of this course are for you to learn the general concepts in AI and become proficient in solving problems and writing programs in this domain. This course is also foundational, so an additional goal is to prepare you for more advanced and in-depth AI courses in the curriculum. Recently, AI has exploded in popularity and has received a great deal of attention in the media. In this course, we will also discuss the broader impacts of AI so that you can think and debate intelligently on the subject and its societal implications.

Prerequisites

EECS 132 or ENGR 131. Although not explicitly, required it is very helpful to have a working familiarly with basic algorithms and data structures as taught in EECS 233. It is also useful if you have already completed your statistics requirement. We recommend MATH 380.

Textbook

Artificial Intelligence: A Modern Approach (3rd ed) by Stuart Russell and Peter Norvig.

You are expected to read and study the chapters in the textbook prior to when they are covered in the lecture.

Grading

Students are required to attend lectures and are expected to master all the material covered in class. Classes missed due to reasons other than medical conditions cannot be made up. Prior experience shows that students regularly attending lectures usually perform much better in the exams than those who do not.

The course grade is determined as follows:

- six written assignments (5% each, 30% total)
- three project assignments (10% each, 30% total)
- two exams: midterm (15%) and final (25%)

I encourage questions and discussion. I will consider class participation as one of the factors in determining borderline grade cases.

Late Assignments

Late submission of assignments is permissible, but with a grade reduction but of 10% per day up to at most three days.

Course Learning Guidelines

This is a large class with only two TAs. To help things run smoothly and please adhere to the following guidelines:

- **Do the readings in advance of the lectures**. The lectures are designed to supplement the readings, solidify your understanding, and provide a common venue to ask questions and have discussions.
- **Start the assignments early**
- **Take advantage of office hours**
- **Ask questions during class**. Especially if there are aspects of the assignments that are unclear. It's much better for everyone and more efficient use of time. Also, feel free to come up and ask questions before or after class.
- **Please refrain from asking questions over email**. This is a large class, so please be mindful of the numerical asymmetry. Email might seem convenient, but it is often the least efficient use of time compared to a short conversation during office hours or in class. The TAs can only devote a fixed amount of time to all their 391 responsibilities and are not required to answer questions over email.

Academic Conduct, Collaboration, and Cheating

Collaborative discussion is encouraged, but any work submitted as a homework assignment must be entirely your own and may not be derived from the work of others, whether a published

source, assignments from previous years, another student, or any other person. Doing otherwise without acknowledging that you have done so is cheating. It is your responsibility to take standard measures to protect your programs, homework assignments, and examinations from illicit inspection or copying. Violations will be handled in accordance with the University Policy on Cheating and Plagiarism. We can detect cheaters quite reliably. Cheaters are parasites and academic thieves. They try to falsely benefit from the hard efforts of others and weaken the value of a good grade.

Copying from old exams and assignments is cheating. Looking up answers on the internet is also cheating. You can search for explanation of the concepts, but not specific answers to problems. Making new problems takes a lot of time and effort. We don't make new problems for every assignment or test. More importantly, we want to keep good problems, so that everyone can benefit and learn from them. If we have to throw them out due to the potential of cheating, it is everyone's loss.

More importantly, if you see previous solutions to problems, it seriously impairs your originality and your ability to come up with novel solutions. I like nothing better than to see good, novel approaches, and I always look to see who it is. That tells me you're thinking. There is a big difference between being able to follow the solution to a particular problem, versus understanding the general concepts the problem is based on, so that you can solve the problem *on your own*. If you understand the principles, you can often solve similar problems. If could only follow the solution, but didn't solve it on your own, it is likely you'll just be stuck again when you encounter a new problem. This is the last thing we want for Case students. For this reason, we try to place novel problems in exams.

You will have plenty of example problems to work from, and there are a wealth of problems in the book. Do not study from old exams, and once you have finished the course, take responsibility for the stewardship of the problems by preserving their learning value for others. Providing answers or even too many hints is neither charitable nor helpful. It can undermine the learning value of the problem and often sets up the person you are trying to help for failure. When you help, try to correct misunderstandings or help them realize the errors in their approach. What you want is for them to have the insight to reach the solution.

Our goal is for the grades the accurately reflect your understanding of the material and ability, solve these types of problems, and program their solutions. To help preserve the integrity of the solutions, when we hand them out, we only give the *minimal* answer. Students who understand the material are able to provide a full and detailed answer. If the solutions are not enough, ask myself or your TAs for help. For this same reason, we sometimes only go over a solution in class.

Schedule (subject to revision)

L	Date	Topic	Chap.	Assignments and Notes
0	Tue, Aug 29	Course Overview		
1	Thu, Aug 31	Introduction	1	
2	Tue, Sep 5	Intelligence, Agents, and Representation	2	W1 out (Written Assign. 1)
3	Thu, Sep 7	Problem Solving by Search	3	P1 out (Prog. Assign. 1)
4	Tue, Sep 12	Search Methods	3	
5	Thu, Sep 14	More Search Methods	4	
6	Tue, Sep 19	Algorithms for Optimal Game Play	5	W1 due; W 2 out
7	Thu, Sep 21	Algorithms for Optimal Game Play	5	
8	Tue, Sep 26	Constraint Satisfaction Problems	6	P1 due
9	Thu, Sep 28	Constraint Satisfaction Problems	6	
10	Tue, Oct 3	Probability and Uncertainty	13	W2 due; W3 out
11	Thu, Oct 5	Reasoning with Bayes' Rule	13	P2 out (*P2 is tentative*)
12	Tue, Oct 10	Probabilistic Reasoning	14	
	Thu, Oct 12	midterm review		W3 due
	Tue, Oct 17	**Midterm Exam**		
13	Thu, Oct 19	Bayesian Belief Networks	14	W4 out
	Tue, Oct 24	*Fall Break - no class*		
14	Thu, Oct 26	Inference in Bayes Nets	14	
15	Tue, Oct 31	Deep Belief Networks		W4 due
16	Thu, Nov 2	Models for Sequential Data	15	W5 out
17	Tue, Nov 7	Probabilistic Reasoning Over Time	15	P2 due
18	Thu, Nov 9	Sequential Decision Problems	17	
19	Tue, Nov 14	Sequential Decision Problems	17	P3 out
20	Thu, Nov 16	Learning from Examples	18	W5 due; W6 out
21	Tue, Nov 21	Reasoning with Continuous Variables	20	
	Thu, Nov 23	*Thanksgiving Holidays*		
22	Tue, Nov 28	Unsupervised Learning and Clustering	20	
23	Thu, Nov 30	Neural Networks	20	
24	Tue, Dec 5	Application: Object Recognition		W6 due
	Thu, Dec 7	final review		P3 due
	TBD	**Final Exam**		