

CS 3600: Introduction to Intelligent Systems a.k.a Intro to AI

MWF 11:05-11:55am

Klaus 1447

<http://www.cc.gatech.edu/classes/>

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1 General Information

Introduction to Intelligent Systems is a three-credit undergraduate course on Artificial Intelligence. The class is called Introduction to Intelligent Systems instead of Introduction to Artificial Intelligence to emphasize that we intend to approach AI from the point of view of building intelligent agents, environments and systems. In particular, you will learn about the methods and tools that will allow you to build complete systems that can interact intelligently with their environment by learning and reasoning about the world.

2 Objectives

There are three primary objectives for the course: To provide a broad survey of AI and Intelligent Systems; To develop a deeper understanding of several major topics in AI; To develop the design and programming skills that will help you to build intelligent artifacts.

In practice, you should develop enough basic skills and background that you can pursue any desire you have to learn more about specific areas in IS, whether those areas are planning, knowledge representation, machine learning, vision, robotics or whatever. In particular, this class provides a useful foundation for a number of courses involving intelligence systems, including Machine Learning (CS4641), Knowledge-Based AI (CS4634), Computer Vision (CS4495), Robotics and Perception (CS4632), Natural Language Understanding (CS4650) and Game AI (CS4731).

3 Prerequisites

Someone once said that the trick to doing AI is coming up with a good representation. That's not quite all there is to it, but it's close enough, so to succeed at this class, you should know a bit about data structures and algorithms. At the very least, you will have to be able to read pseudocode and understand basic algorithms as they are presented to you.

Someone else one defined AI as finding fast algorithms for NP-hard problems. Again, that's not quite all there is to it, but it's not too far from the truth, so it also turns out that a familiarity with (or at least a lack of abject fear over) some basic theory helps to situate many of the algorithms.

As the semester continues, it turns out that a familiarity with basic probability theory will also be very useful; however, we will spend some time on that in class in order to refresh your memory. Finally, you should feel pretty comfortable programming on your own. Many of the projects will be in LISP, and perhaps one or two will be in C. We will not spend any time explaining these languages in class on the theory that at this point in your career you're capable of doing that sort of thing on your own (and if you're not, this is good time to learn).

Having said all that, the most important prerequisite for enjoying and doing well in this class is your interest in the material. That sounds vaguely corny I'm sure, but in the end it will be your own motivation to understand the material that gets you through it more than anything else.

If you are not sure whether this class is for you, please talk to me.

4 Resources

Required Text: Artificial Intelligence: A Modern Approach
Second Edition (the green book) by Russell & Norvig, 2002
ISBN 0 13 080302 2.

Readings. The textbook for the course is the second edition of Artificial Intelligence: A Modern Approach by Russell and Norvig. There are significant differences between it and the first edition, so be sure to have the right edition. We will follow the textbook quite closely (although time will not permit us to cover all of the chapters), so it is imperative that you have a copy of the book. We may occasionally use supplemental readings as well, but those will be provided for you.

Computing. You will have access to CoC clusters for your programming assignments. You can use whatever machines you want to do the work; however, the final result will have to run on the standard CoC boxes. Exactly what this means will be spelled out on each assignment. This shouldn't be much of a restriction for you.

Web. We will use the class web page to post last minute announcements, so check it early and often. Aside from that, if you want to learn more about intelligent systems or artificial intelligence, you can find an enormous amount just by typing in keywords in google (or whatever your favorite search engine is). One good place to start is with AI on the Web. It's also worth pointing out that Georgia Tech enjoys one of the largest IS groups around and our interests are quite broad, so surfing faculty web pages can also be enlightening.

5 Grading

Homework – Assignments will be made regularly, these will be worth 0% of your final grade. These are for your own good. If you keep up with, and do well on the homework assignments, it is very likely you will do well on the exams.

Projects – There will be 10 projects throughout the semester, these will be worth 35% of your final grade.

Exams – There will be a mid-term and a final exam, worth 30% and 35% of your final grade, respectively.

Class Participation – This is not part of your final grade, but may be used to determine boundary cases.

6 Schedule

You are responsible for the assigned reading material. Check the web page frequently for any modifications to this schedule.

CS 3600 Course Syllabus, Fall 2008				
Date	Topic	Reading	Out	Due
Aug-18	Intro to AI	Chapter 1,2		
Aug-20	Agents	Chapter 1,2		
Aug-22	Agents	Chapter 1,2	Project 1, Project 2	
Aug-25	Search	Chapter 3		
Aug-27	Search	Chapter 3		
Aug-29	Search	Chapter 3		Project 1
Sept-1	Holiday			
Sept-3	Search	Chapter 4		
Sept-5	Search	Chapter 4		Project 2
Sept-8	Search	Chapter 4		
Sept-10	Constraint Satisfaction	Chapter 5		
Sept-12	Constraint Satisfaction	Chapter 5	Project 3	

Table 1 – continued from previous page

Date	Topic	Reading	Out	Due
Sept-15	Game Playing	Chapter 6		
Sept-17	Game Playing	Chapter 6		
Sept-19	Game Playing	Chapter 6	Project 4	Project 3
Sept-22	Logical Agents, FOL	Chapter 7		
Sept-24	Logical Agents, FOL	Chapter 7		
Sept-26	First Order Logic	Chapter 8	Project 5	Project 4
Sept-29	FOL Inference	Chapter 9		
Oct-1	FOL Inference	Chapter 9		
Oct-3	Mid-term Exam			
Oct-6	Mid-term discussion			
Oct-8	Uncertainty	Chapter 13, 14.7	Project 6	Project 5
Oct-10	Uncertainty (drop day)	Chapter 13, 14.7		
Oct-13	Holiday			
Oct-15	Uncertainty	Chapter 13, 14.7		
Oct-17	Uncertainty	Chapter 13, 14.7		
Oct-20	HMM	Chapter 15.1-15.3	Project 7	Project 6
Oct-22	HMM	Chapter 15.1-15.3		
Oct-24	HMM	Chapter 15.1-15.3		
Oct-27	Perception	Chapter 24		
Oct-29	Perception	Chapter 24		Project 7
Oct-31	Planning	Chapter 11	Project 8	
Nov-3	Planning	Chapter 11		
Nov-5	Partial Order Planning	Chapters 11-12		
Nov-7	Partial Order Planning	Chapters 11-12		
Nov-10	Planning in Robotics	Chapter 17		
Nov-12	Decision Making	Chapter 17		Project 8
Nov-14	Learning	Chapter 18.1-5	Project 9	
Nov-17	Learning	Chapter 18.1-5		
Nov-19	Learning	Chapter 18.1-5		
Nov-21	Stat. Learning	Chapter 20.1-6		
Nov-24	Stat. Learning	Chapter 20.1-6		
Nov-26	Stat. Learning	Chapter 20.1-6		
Nov-28	Holiday			
Dec-1	Nat. Lang. Understanding	Chapter 22, 23		Project 9
Dec-3	Nat. Lang. Understanding	Chapter 22, 23		
Dec-5	Nat. Lang. Understanding	Chapter 22, 23		

Table 1: Fall 2008 Syllabus.

7 Disclaimer

I reserve the right to modify any of these plans as need be during the course of the class; however, I won't do anything capriciously, anything I do change won't be too drastic, and you'll be informed as far in advance as possible.