

CS480 – ARTIFICIAL INTELLIGENCE FALL 2014

TOPIC: SYLLABUS
DATE: 8/25/2014



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AGENDA

1. Syllabus
2. What is intelligence?

COURSE INFORMATION

- Date and location:
 - I presume you already know
 - Unless you are here by accident
- Instructor:
 - Dr. Mustafa Bilgic
 - Research interests: machine learning and data mining
- Office location and hours:
 - SB 228 – Wednesdays 11am-12pm (or by appointment)
- TA:
 - None yet

COURSE DESCRIPTION

Introduction to computational methods for intelligent control of autonomous agents, and the use of programming paradigms that support development of flexible and reactive systems. These include heuristic search, knowledge representation, constraint satisfaction, probabilistic reasoning, decision-theoretic control, and sensor interpretation. Particular focus will be placed on real-world application of the material.

COURSE DESCRIPTION

- We will look at how to design and program computers/robots that can do things that require ***intelligence***.

SO, WHAT IS ARTIFICIAL INTELLIGENCE?

- First, what is “intelligence”?
 - Google “what is intelligence?”
 - <https://www.google.com/search?q=what+is+intelligence>
 - Wikipedia: “intelligence” article
 - <http://en.wikipedia.org/wiki/Intelligence>

IMITATE HUMANS?

- Would you call a robot that can perfectly imitate a human *intelligent*?

INTELLIGENT?

- Humans?



INTELLIGENT?

- Animals?



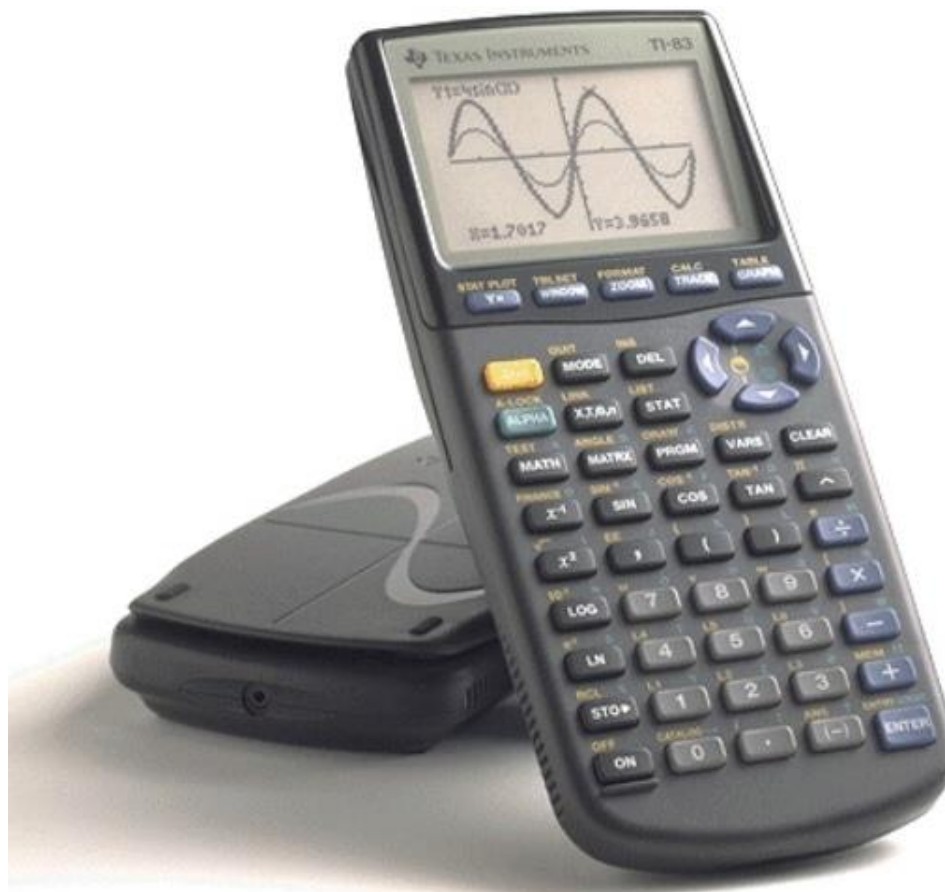
INTELLIGENT?

- Plants?




INTELLIGENT?

- Calculators?



INTELLIGENT?

- Wolfram alpha?

 **WolframAlpha**™ computational knowledge engine

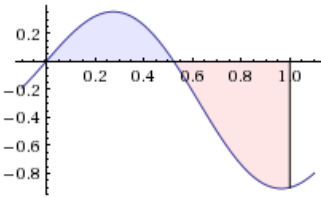
Enter what you want to calculate or know about:

[Examples](#) [Random](#)

Definite integral: [More digits](#)

$$\int_0^1 \sin(2x) \cos(3x) dx = \frac{1}{10} (-4 + 5 \cos(1) - \cos(5)) \approx -0.158215$$

Visual representation of the integral:



Riemann sums: [More cases](#)

left sum	$\frac{\cot\left(\frac{5}{2n}\right) + (\cos(1) - 1) \cot\left(\frac{1}{2n}\right) - \cos\left(5 - \frac{5}{2n}\right) \csc\left(\frac{5}{2n}\right) + \sin(1)}{4n} =$ $\frac{1}{10} (-4 + 5 \cos(1) - \cos(5)) + \frac{\sin(1) - \sin(5)}{4n} + O\left(\left(\frac{1}{n}\right)^2\right)$
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(assuming n subintervals of equal length)

$\cot(x)$ is the cotangent function »
 $\csc(x)$ is the cosecant function »

INTELLIGENT?

- Search engines?

The Google logo, featuring the word "Google" in its characteristic multi-colored font (blue, red, yellow, blue, green, red) with a trademark symbol (TM) to the upper right.The Bing logo, featuring the word "bing" in a blue sans-serif font with a small yellow dot above the 'i' and a trademark symbol (TM) to the upper right.

INTELLIGENT?

- Virtual Assistants?
 - Siri
 - Google Now
 - Cortana
- I suggest you to watch a few YouTube videos
 - Try searching: Cortana funny

INTELLIGENCE AND

- Consciousness
- Emotions
- Kindness
- Sense of humor
- Tell right from wrong
- Love
- Creativity
- Learning

WHAT DO YOU THINK INTELLIGENT ROBOTS SHOULD BE ABLE TO DO?

COURSE TOPICS

- Overview of artificial intelligence
- Problem solving
 - Search, games, constraint satisfaction
- Knowledge representation
 - Propositional logic, first-order logic, Bayesian networks
- Reasoning
 - Inference using logic and probabilities, decision making, utility functions
- Learning
 - Supervised learning, naïve Bayes, logistic regression, support vector machines, decision trees

TEXTBOOK

- Artificial Intelligence: A Modern Approach
 - 3rd edition
 - by Stuart Russell and Peter Norvig

ONLINE TOOLS

○ Syllabus

- The Course Website
- <http://www.cs.iit.edu/~mbilgic/classes/fall14/cs480/>

○ Questions and Answers

- Piazza
- <https://piazza.com/iit/fall2014/cs480/home>

○ Course documents, homeworks, etc.

- Blackboard
- <http://blackboard.iit.edu/>

LECTURING STYLE

- I use the board quite often
 - Be prepared to take notes
- I ask quite a few questions in class
 - Be prepared to answer questions
- The most important question in my class is why
 - Be prepared to ask *and* to be asked why

GRADING

Assignments (~8)	20%
Programming Exercises	0%
Project	25%
Midterm	25%
Final	30%

ASSIGNMENTS – 20%

- There will be approximately 8 assignments
- Will often consist of a few questions
- Should be very useful for preparing for the exams

PROGRAMMING EXERCISES – 0%

- In the past, many students complained that I did not assign small programming exercises
- I will assign programming exercises this year, but I will not collect them
- If you do them, they'll help you better understand AI algorithms
- Programming language: Python

PROJECT – 25%

- Task: to make a profit out of potentially faulty products
- A product has a value and a price
- A product can be faulty or in good condition
- You are presented a product and you decide whether you would like to buy it or not
- If you buy the product
 - If in good condition, you cash in the profit (value – price)
 - If faulty, you lose your payment (price)
- We will discuss and determine some of the details together
- Programming language: Python
 - If you do not know how to code in Python, it is fairly easy to learn, but start now

LATE SUBMISSION POLICY

- Assignments will be submitted through blackboard
- Blackboard timestamps your submission
- Every late minute will cost you a point

COLLABORATION POLICY

- You may work with your friends on the assignments
- However
 - You must write your own answers
 - You must include the names of your collaborators in your submissions

ACADEMIC HONESTY

- If you violate the academic honesty (such as unauthorized/undocumented collaboration, cheating, etc.), then depending on the severity of the violation, it can result in
 - zero points on the respective assignment,
 - E in the course,
 - suspension of your enrollment at the university,
 - expulsion from the university.

ATTENDANCE

- Historically, the students who attended the lectures almost always scored better than those who simply watched the videos

NEXT CLASS

- Read:
 - Chapter 1
 - Turing, A. (1950). Computing machinery and intelligence. *Mind*, 59, 433-460.
 - Tversky, A. and Kahneman, D. (1974). Judgment under uncertainty: heuristics and biases. *Science*, 185:4157, 1124-1131
- Get on Piazza: <https://piazza.com/iit/fall2014/cs480>