

# Artificial Intelligence

CS 440

Fall'20

# Welcome to CS440!

- In this course we will:
  - Have fun!
  - Learn about artificial intelligence concepts, techniques, and algorithms.
  - Real world applications and state-of-the-art.
  - Outline:
    - Course Logistics
    - Today we will start with part of the recipe of every AI algorithm
    - **TODO:** *Please fill out the timing zone info poll I will post on Piazza*

# Course Staff

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Instructor

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Teaching Fellow

# Course Staff Cont'd

## Graders:



Fred Fung



Siddarth Mysore



Ximeng Sun



Mona Jalal

Class Moderator (for lab sessions): Michelle Lee

# Please let us know ASAP if:

- You are not yet added to the Piazza course.
  - Please use Piazza for all course related communication
  - Please remember that: with great power comes great responsibility
- You cannot make it to *\*any\** of the posted office hours.
- There is a lecture you cannot attend -> for Exam scheduling.

# Course Pre-requisites

- CASC112  
Introduction to Computer Science 2
- CASC132  
Geometric Algorithms
- Calculus exposure: partial derivatives

# Course Grading

- Grading Criteria
  - 5% Piazza, Lecture, and Lab Participation
  - 5% Pre-lecture materials
  - 30% Assignments
  - 10% Class challenge
  - 25% Exam 1
  - 25% Exam 2
- Late assignments will be levied a late penalty of 0.5% per hour (up to 72 hours). After 72 hours, no credit will be given.
- All course participants must adhere to the BU Academic Conduct Code:  
<http://www.bu.edu/academics/resources/academic-conduct-code/>  
All instances of academic misconduct must be reported to the College Academic Conduct Committee.

# Examinations

- **Administering the exam:**

- During lecture time
- Open: Video camera + Microphone
- Your hands must be in the camera's field of view
- Open exam pdf posted on Piazza
- Take photos of your solutions on paper
- Submit a pdf of the photos on a google form, just like you submit assignments
- Confirm we received your submission before you leave (through private chat)

- **What do you need?**

- Internet + Pen/pencil + Empty sheets of paper (~10)
- New question, new page
- Cell phone to take photos of your solutions at the end for submission

***If you have problems supplying a stable internet connection please ask the dean of students for help NOW***



# Rotations for In-Person Attendance

- Lecture Rotations:
  - Attend on **Tuesday ONLY** if your last name starts with **A-K**
  - Attend on **Thursday ONLY** if your last name starts with **L-Z**
- Rotations might change as the semester progresses. Piazza announcement will be made if such changes are necessary.
  - If unexpected number of students appear, we will have to make more rotations.
  - If COVID cases increase on campus, we will have to make more rotations
- **IMPORTANT:** If at any time you change your status from Remote -> In-Person you need to email me *\*before\** attending class.

# Safety

- **COVID Compliance** – please remember to do your daily symptom surveys, schedule your COVID screening tests as required, always wear your mask, maintain 6+ feet of social distancing, and follow all signage especially maximum occupancies.
- On-campus and Off-campus Safety
- All Instructor and TF office hours will be held remotely.
- No face-to-face questions after class.
- Faculty will report to Associate Dean for Student Academic Life, Steven Jarvi, students who are not compliant in the classroom (e.g. a student is not properly wearing a mask).

## Facial Coverings

Facial coverings and masks are an effective tool to prevent the potential spread of illnesses like COVID-19. In order to be effective, facial coverings and masks should have a snug fit and [ideally consist of two or three layers of material](#) (e.g. two-ply or three-ply). While fitted N-95 masks provide the best level of protection, these are in short supply and generally should be reserved for health care workers. Similar levels of protection can be achieved with surgical masks, three-ply masks, or two-ply masks consisting of a layer of polypropylene and cotton or two layers of cotton, and two layers of polypropylene.

Gaiters, bandanas, neck fleeces, scarves and masks with exhalation valves should not be used given potentially increased risk of aerosol transmission associated with these types of facial coverings.

Make sure you wash your hands before donning a mask, place it over your nose and mouth, make sure it fits snugly so air is passing through the mask and not around the sides of the mask, and make sure you can breathe comfortably.

Judy Platt MD, Director of Student Health Services  
Ann Zaia PhD, CNP, SM, MSN, MHA Director of the Occupational Health Center  
Carrie Landa PhD, Associate Director of Student Health Services  
Davidson Hamer MD, Professor of Global Health and Medicine

# Switching to Remote

- This could happen for several reasons:
  - University decides to do so due to high COVID spread
  - Any failure in classroom setup making it not compliant
  - Instructor is not cleared to be on-campus
  - ...

***Please keep an eye out for any Piazza notifications***

# My Research

- <https://cs-people.bu.edu/sbargal/>
- Computer Vision and Machine Learning, with a current focus on Explainable AI and making AI systems accountable to humans and society.

Sample Misclassification



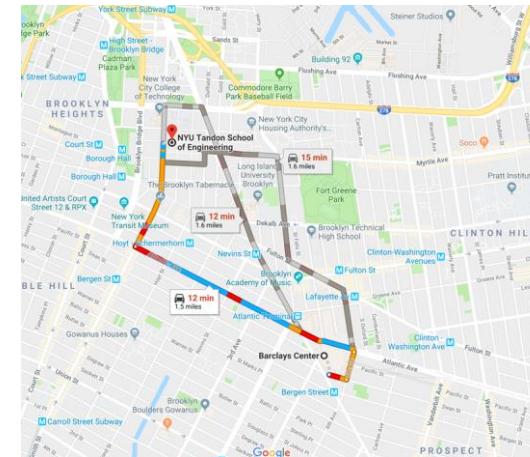
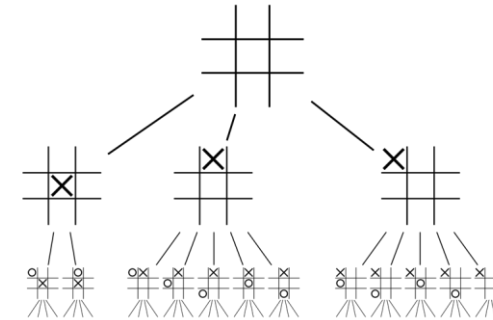
**Ground Truth:**  
*BabyCrawling*

**Classified as:**  
*Pushups*

Let's get started 😊

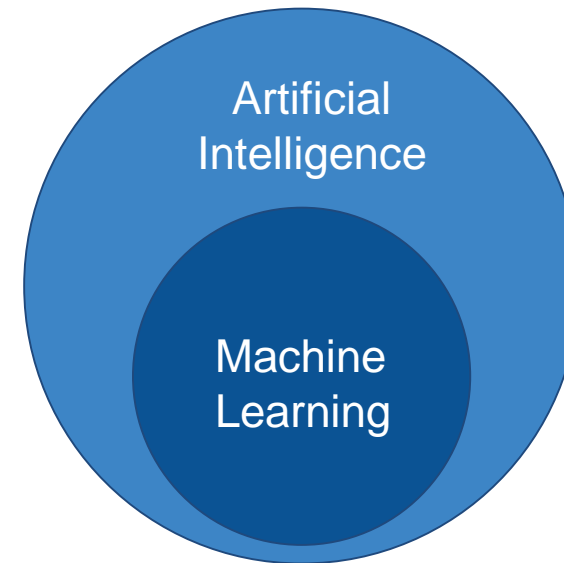
# Artificial Intelligence (AI)

- **Artificial Intelligence:** A branch of computer science that allows computers to make predictions and decisions
- **Dijkstra's Shortest Path Algorithm:** A search algorithm that finds the shortest path between two nodes on a weighted graph



# How is Machine Learning (ML) different from AI?

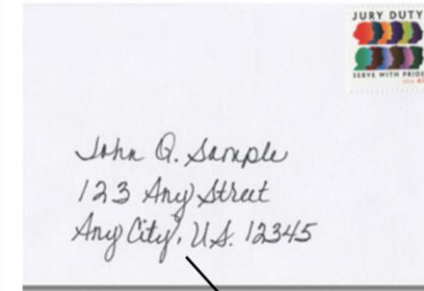
- Machine learning is a type of artificial intelligence
- Machine learning makes decisions based on data it has seen
- Not all AI algorithms need to do this
- Many of the latest AI systems all make use of ML
- For this reason, many people use the terms AI and ML interchangeably





# Why do we sometimes use ML?

- Some tasks are too complex for us to fully describe on our own
- Imagine a program to look at handwritten text and figure out what it says
- There are too many different handwriting styles for us to describe *all* variations
- ML gives us a way to tell the computer *how* to learn without needing to describe *what* to learn



John Q. Sample  
123 Any Street,  
US. 12345

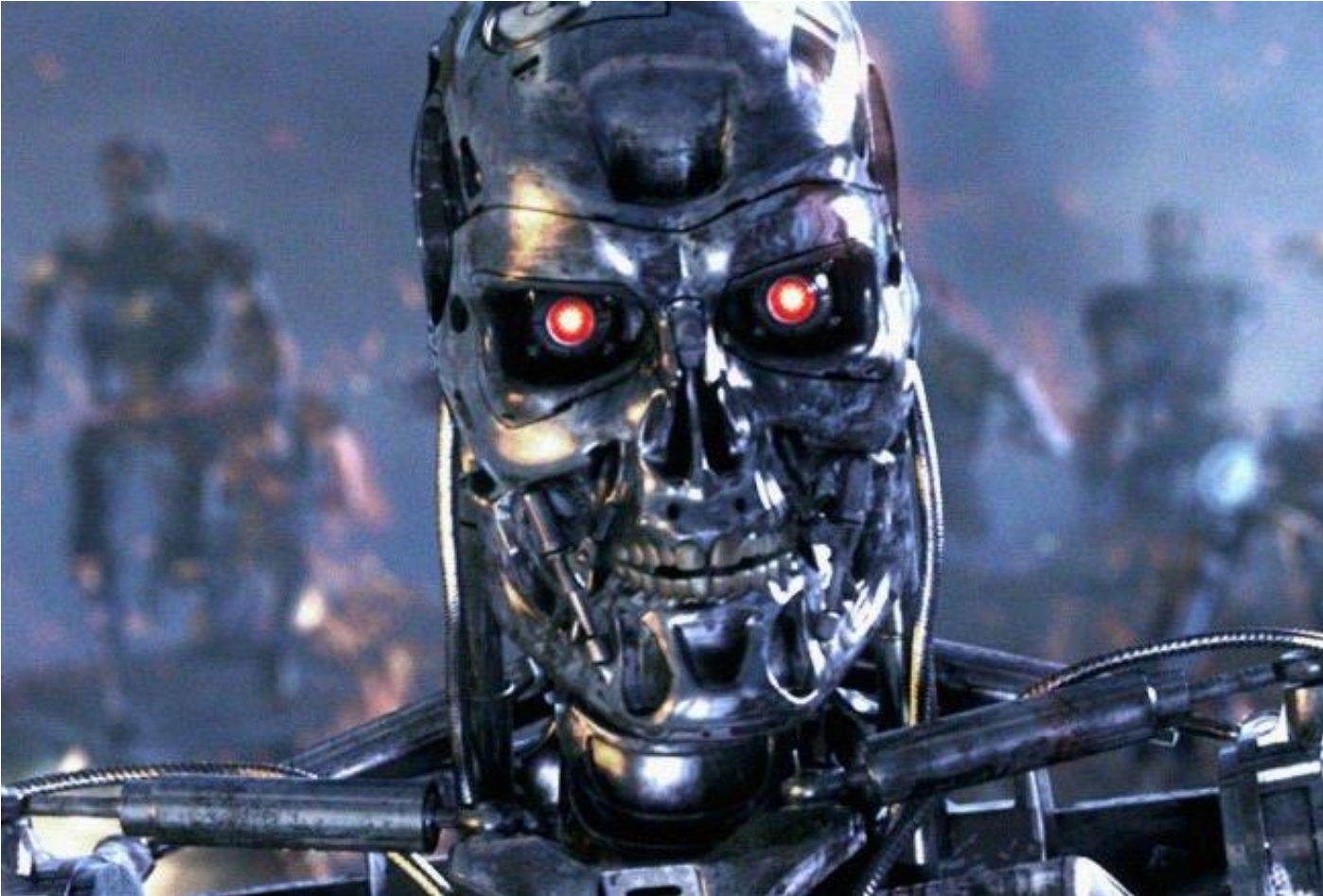
# Ethics in Artificial Intelligence

Kate Saenko



# AI Fears:

## Which of these has already happened?



A robot kills human

yes, Uber car accident

AI takes over our lives

yes? Youtube algorithm

AI is watching us

yes, virtual police lineup

Autonomous weapons

not yet?

Humans losing jobs

Yes, e.g. librarians