Welcome to Beginner Track!

Intro To Machine Learning: Beginner Track #1

Attendance code: incredibles
Slides: www.tinyurl.com/f20btrack1

acm.ai

Beginner Track

Jenson Choi

Sudhanshu Agrawal

Adithya Nair

Who's it for?

- no experience in machine learning
- minimal experience coding
- want a solid foundation in the theory behind ML

What's covered?

- basics of machine learning
- theory and implementation of simple models
- introduction to useful ML libraries

When and where are meetings?

- **Location:** https://ucla.zoom.us/j/98508489562
- **Time:** Tuesdays 7-9 PM (PST)

acm.ai

Our Mission

To build and develop a community of students interested in **Artificial Intelligence** at UCLA and beyond.

Our Values

- Technical Proficiency and Awareness in Artificial Intelligence
- Creating a Positive Impact on Society
- Diversity and Inclusion

ACM AI Initiatives

Workshops

Events

Outreach

Projects

Our Workshops

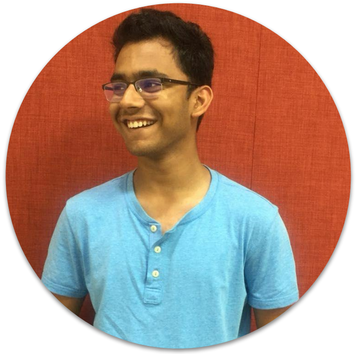
- Beginner Track - *What is ML?*
  - Basics of machine learning
  - implement linear and logistic regression

- Advanced Track - *Deep Learning*
  - Concepts like deep neural networks, CNNs, RNNs
  - Basic knowledge of ML concepts expected

- Apply ML - *How do I use ML?*
  - Structuring your ML project from the ground-up
  - (more on next slide)

Apply ML

- Who's it for?
  - beginners looking to build their first ML model
- What's covered?
  - data visualization, model implementation (using Sklearn), model evaluation
  - introduction to other powerful libraries
- When and where are meetings?
  - Time: Thursdays 6-8pm
  - 1st Meeting: 10/15 (this Thursday)



Varun Sivashankar

Harsh Chobisa

acm.ai

Projects: Daily Bruin View Predictor

What?

- Build an automatic system for predicting, given a pair of articles, which one will receive more views

Why?

- Help Daily Bruin decide how to best position its articles to maximize readership

How to get involved

- Take Advanced track and Apply!
- Will be taking people during Winter Quarter and Spring Quarter

acm.ai

Beginner Track: what topics are we covering?

- Workshop 1 (10/13): Intro to ML
- Workshop 2 (10/20): Linear Regression
- Workshop 3 (10/27): Logistic Regression
- Workshop 4 (11/3): K-Nearest Neighbours and ML techniques
- Workshop 5 (11/10): Intro to Python
- Workshop 6 (11/17): Data Analytics
- Workshop 7 (11/24): Project 1
- Workshop 8 (12/1): Project 2

Don’t worry!

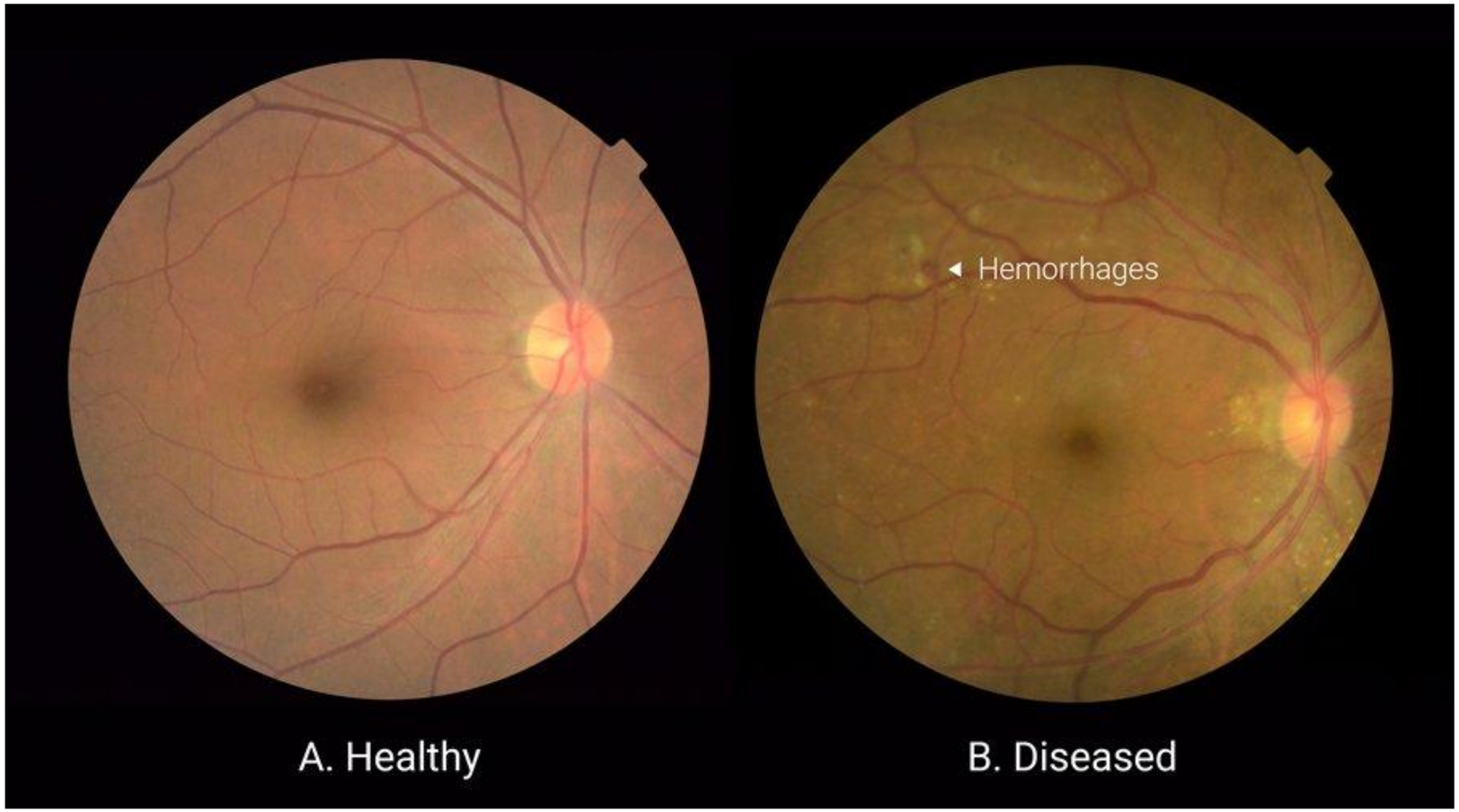
- Machine Learning can be daunting!
- If you’ve ever tried to read a paper on ML, you’ve probably seen a lot of calculus and linear algebra involved.
- There are some non-trivial terms, e.g. gradient descent, backpropagation
- We’ve got you. We’ll walk you through all these technicalities and try to get you as comfortable with the math as possible

AI and ML in real life

Computer vision

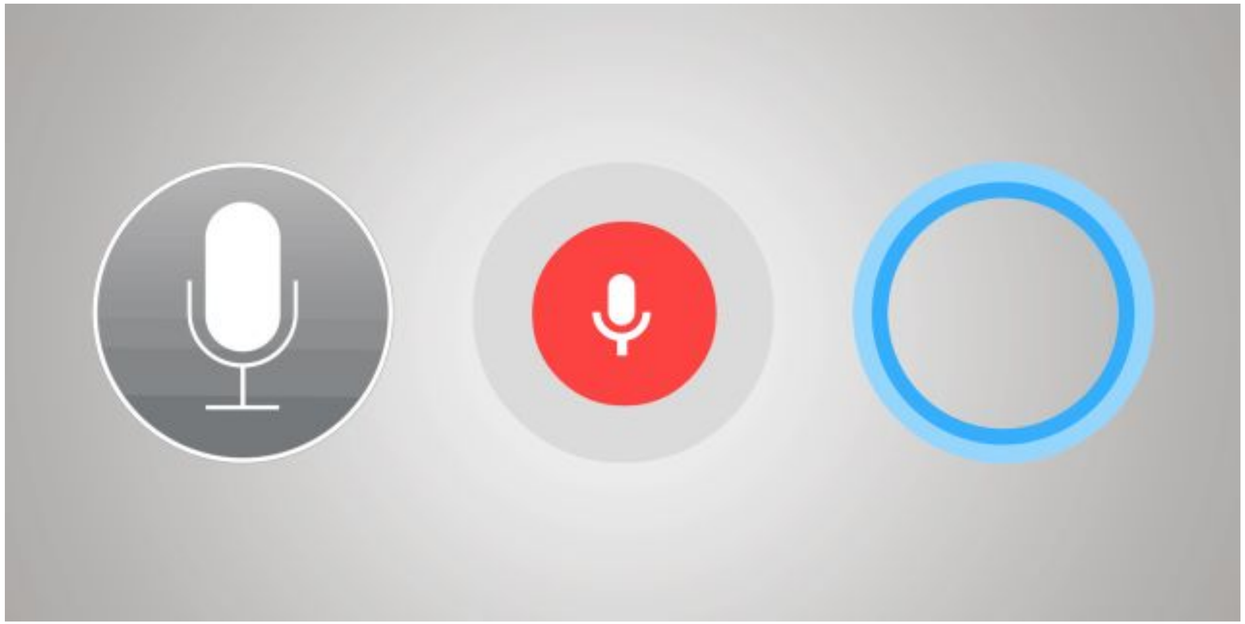
Convolutional neural networks have achieved stunning results in computer vision!

Healthcare



Deep Learning techniques **outperform** trained specialists in some medical recognition tasks.

Natural language processing



- https://www.technologyreview.com/2020/08/14/1006780/ai-gpt-3-fake-blog-reached-top-of-hacker-news/

In the beginning, there was regression

- At the heart of all AI systems
- Simple but powerful tool
- Covered in detail in Workshop 2
- Today, let’s try and get some intuition on this concept!

Intuition behind ML

Let’s play a game

acm.ai

50-50

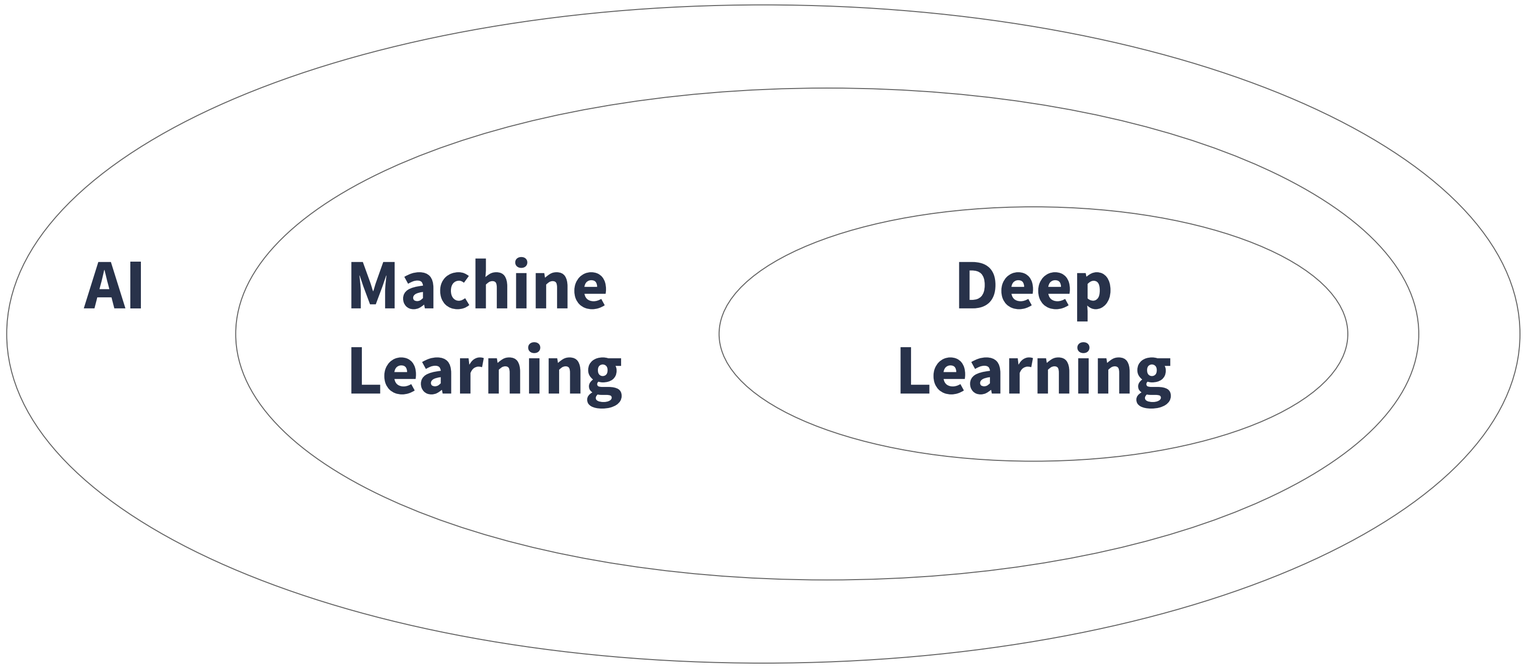
- We’re going to play a game using the poll feature on Zoom
- The objective of the game is to find the **letter of the alphabet** such that **50%** of the audience’s first names come **before** this letter, and 50% **after**
- We’re going to start off by choosing a random letter
- On your screen now you should see a poll with 3 options:

  Before current letter, After current letter, At current letter
- Vote for one of these options. What does the result tell us?

What is ML?


THIS IS YOUR MACHINE LEARNING SYSTEM?
YUP! YOU POUR THE DATA INTO THIS BIG PILE OF LINEAR ALGEBRA, THEN COLLECT THE ANSWERS ON THE OTHER SIDE.
WHAT IF THE ANSWERS ARE WRONG?
JUST STIR THE PILE UNTIL THEY START LOOKING RIGHT.
DATA
ANSWERS

AI vs ML vs Deep Learning



Definitions

Artificial Intelligence - A concept

- The theory and development of computer systems able to perform tasks that normally require human intelligence,
- E.g visual perception, decision-making, and translation between languages.

Machine Learning - A type of AI

- A type of AI that provides computers with the ability to learn without being explicitly programmed.

ML Pipeline

- This can be in the form of a text file, spreadsheet, etc.
- Learn a formula to represent the trend of data
- Gain insight from data
- Apply the model to real word problems

With more detail...

Training and testing data
The more data we have, the better

Scaling data, removing outliers, etc.

Choosing the **function** and representing the data in that form; Training data is used to develop model

Evaluating the model using testing data

Apply the generated model

Let's Discuss

- Say you were asked to estimate what a house's price was
- What are some possible inputs for our model?
    - Think about what you would need yourself to tell how expensive a house is
- What would the output of our model look like?
    - Would it be continuous, or would it be a "this or that"?

More on the intuition

Do you remember how you learned to walk?

- You made a lot of mistakes at first too.
- No one really gave you the formula for how to walk
- You just kept trying different techniques
- Every time you fell, your brain probably realized you were doing something wrong
- Eventually, after all that trial and error, you took your first step

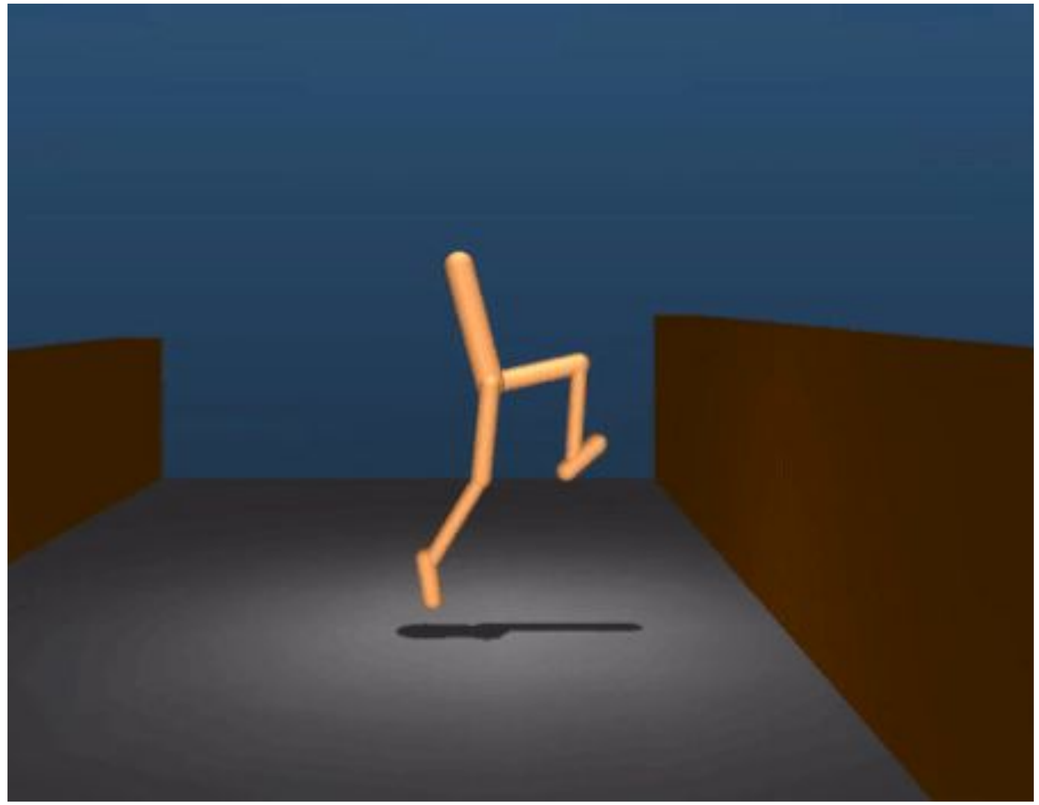
Google's DeepMind AI learning how to walk

The only objective it was given was :

Move as far forward as you possibly can

The AI ***learned*** how to walk/climb/jump on its own because it figured out that those were the optimal ways to move forward.

How cool is that ?!



A Machine Learning Model tries again, again & again

- The machine learning model “guesses” the answer from what information it has.
- Initially it has no information at all, so its guesses are bad.
- As we train it, we tell the model that it’s making wrong guesses, and that it should think of the situation (problem) a little differently
- We do this many times, until the model starts guessing accurately

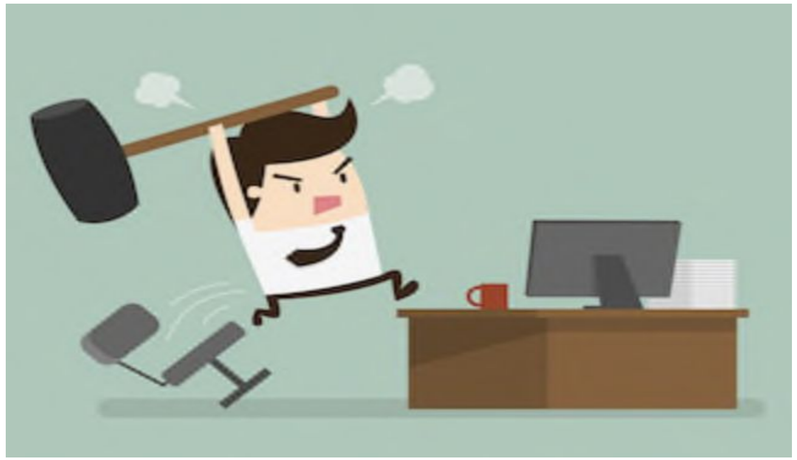
Python + Environment setup

- We will be using **Google Colab** notebooks, which will come with all the packages pre-installed.

- The **Anaconda Distribution** is not required for this workshop series, but it's a great tool to work with Jupyter notebooks in general.

Thank you! We'll see you next week!

Please fill out our feedback form:
forms.gle/BKpjKsRk7JRafhQN8



Next week: Linear Regression

How do we tell the computer it's wrong? And how do we punish it?

FB group: **facebook.com/groups/uclaacmai**

Github: **github.com/uclaacmai/beginner-track-fall-2020**