Introductory AI/ML Course

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Course Curriculum

- **Week 1:** Introduction to Artificial Intelligence (AI) and Machine Learning (ML)
- **Week 2:** Overview of Machine Learning concepts
- **Week 3**: Machine Learning Code
- **Week 4:** Overview of Deep Learning
- **Week 5:** Convolutional Neural Networks
- **Week 6:** Keras CNN Walkthrough
- **Week 7-8:** Projects

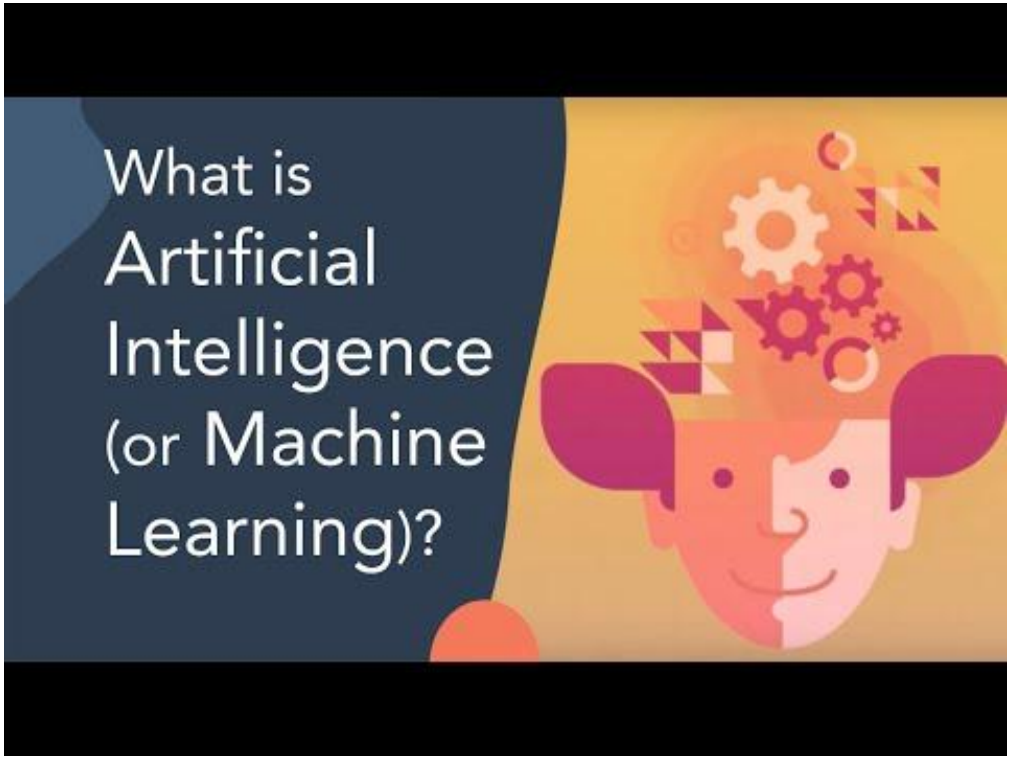
- Our Github Repository: https://github.com/Intro-Course-AI-ML/LessonMaterials

Week 1: Intro to AI/ML

Prerequisites

- To succeed, you will need some familiarity with computer programming. Artificial Intelligence is a pretty complicated topic, so you should definitely brush up on basic computer programming beforehand
- We will be using Python in this course
- If you are a bit rusty or not familiar with Python, however, you should still be fine.
    -

Intro Video



AI is everywhere

- AI is not the common misconception of robots taking over. In fact, AI is already widely in use in all different fields!
  - AI is used in:
    - Virtual Assistants
    - Security
    - Healthcare and Medical Imaging Analysis
    - Your phone
    - Netflix
    - Google searches are AI

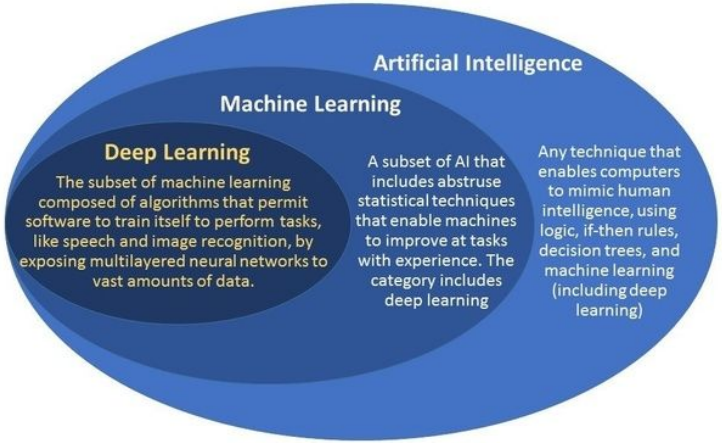
What is AI?

- **Definition:** The simulation of human intelligence in machines that are programmed to think and act like humans.
- **A program learns from its own results, using thousands of tests to gradually get closer to its goals**
- The program mimics how humans gradually learn from their surroundings by doing the same in their virtual environment
- There are multiple types of AI used for different situations -- Computer Vision for understanding images, NLP for understanding human communication (e.g. speech and text), and many more

AI vs ML

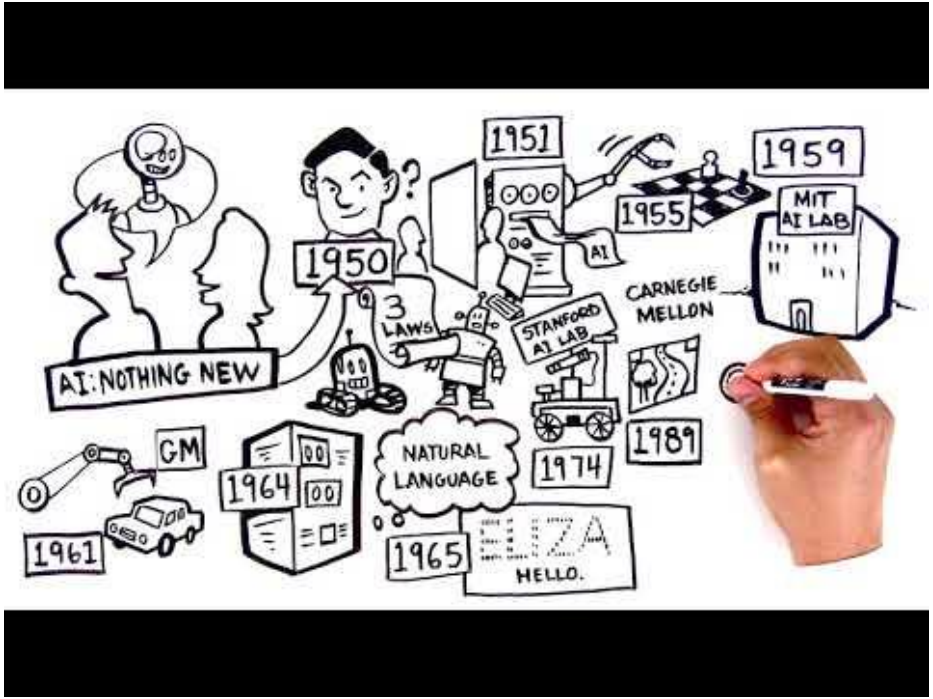
AI Definition: The simulation of human intelligence in machines that are programmed to think and act like humans.

ML Definition: The practice of using algorithms to analyze data, learn from that data, and then make a determination or prediction about new data.



History of AI

- The field of AI wasn't formally founded until 1956 at a conference at Dartmouth College, where the term "artificial intelligence" was coined.
- In 1997, IBM's Deep Blue became the first computer to beat a chess champion when it defeated Russian grandmaster Garry Kasparov. And in 2011, the computer giant's question-answering system Watson won the quiz show "Jeopardy!" by beating reigning champions Brad Rutter and Ken Jennings.



Types of AI

- Computer Vision: https://machinelearningmastery.com/what-is-computer-vision/
- NLP: https://machinelearningmastery.com/natural-language-processing/
- Recommendation Systems: https://developers.google.com/machine-learning/recommendation/collaborative/basics
- Deep Learning: https://machinelearningmastery.com/what-is-deep-learning/

Practical Applications of AI

AI is extensively used in:

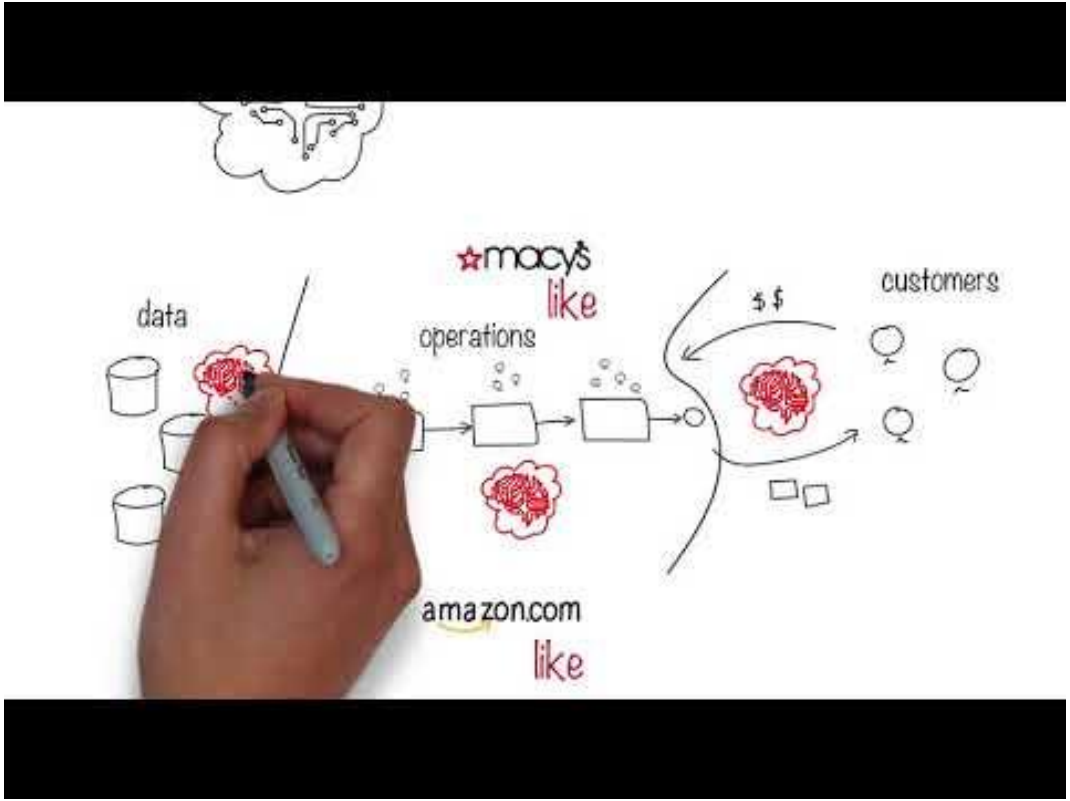
- Healthcare:

  https://www.forbes.com/sites/bernardmarr/2018/07/27/how-is-ai-used-in-healthcare-5-powerful-real-world-examples-that-show-the-latest-advances/#3dd5aeb95dfb
- Sustainability: https://www.youtube.com/watch?v=mJ6rjJiIHyo
- Business: https://www.youtube.com/watch?v=N_eHmaRf9T4
- Economics: https://www.youtube.com/watch?v=0BAFOJbo4W4

Ethics of AI

- There is very little regulation surrounding AI considering how new it is, but there are various ethical questions about how far to take this technology
- Stanford article summarizing ethics of AI
- Some of the big questions:
  - How can we ensure a right to privacy and knowledge of surveillance?
  - Will AI ever be able to do things on its own?
    - Far reached example, but think Ultron from Avengers
  - How will AI impact employment and jobs?
  - How do we hold AI accountable? Who is responsible for their actions when they fail?
  - **^there are many more questions like this that ethicists have to grapple with**

Video -- Ethics of AI(How it hurts employees)



Data

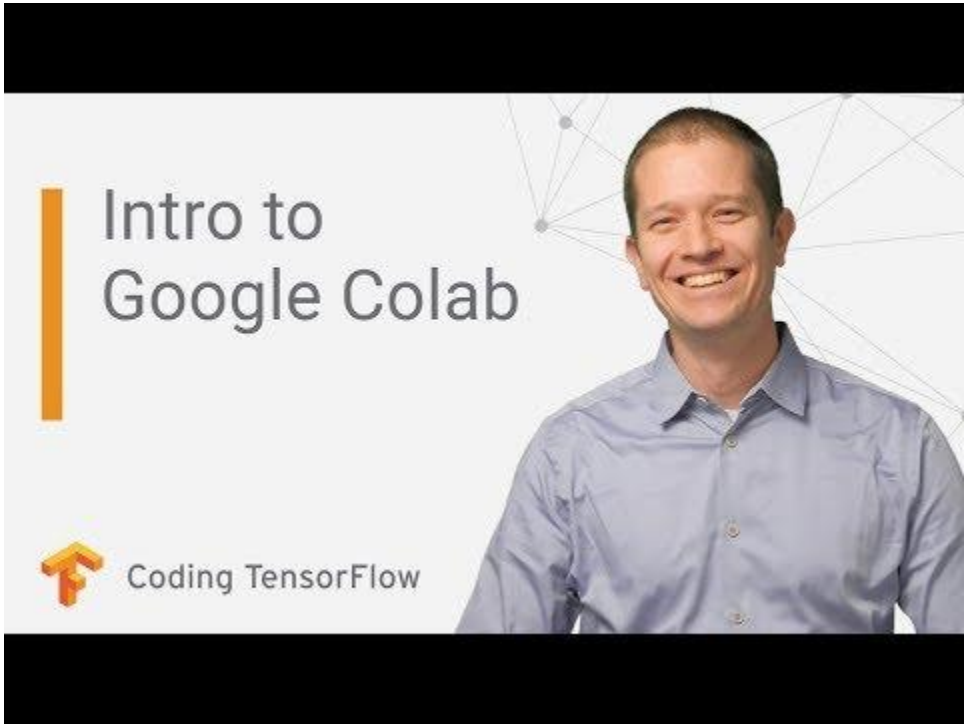
- **Data is extremely important for Machine Learning specifically**
- Machines learn from being exposed to huge amounts of data, and the more data that is present, the more these machines are able to adapt and learn
- Larger data is important
- One of the best resources for data:
    - https://www.kaggle.com/

How AI will help you

- **College Applications:**
  - Potential Major in CS, Engineering
    - Then AI will be very useful
  - There's no AI/ML major yet, but it might be a thing in the future
- **AI is the future in careers:**
  - Every career is gradually integrating AI, and developing a foundation in AI will assist you wherever you choose to go
  - Regardless of what you want to pursue, AI will most likely be important
    - Viraaj wants to be a doctor, but he still learns AI because of its vast potential and application in healthcare

Setting up google colaboratory

- Google colab: A free integrated development environment (IDE) hosted by Google that allows you to run your Python code



Learning Github

- We will be using Github as our primary source of storing and sharing code and materials for this course
- All of you should make Github accounts and we will teach you how to share your code on github using Github Desktop.
    - All of you should make your own repository where you will make a folder for your practice code as well as a folder for your actual project when you make it
- https://lab.github.com/githubtraining/introduction-to-github

Important Python Libraries

- Pandas
- Numpy
- Tensorflow/Keras
- Matplotlib
- Pytorch
- Sci-kit Learn
- In this course, we will use Pandas, Numpy, and Keras

HW: Python Brush Up

General python reference center: https://www.w3schools.com/python/

Using python with google colab:
https://towardsdatascience.com/how-to-practice-python-with-google-colab-45fc6b7d118b

While not all of you may have experience with Python, as long as you understand the basic concepts of coding, you should be fine. If not, make sure to ask questions and we will do our best to support you.

Check out these notebooks and learn them:

https://colab.research.google.com/notebooks/intro.ipynb

https://colab.research.google.com/notebooks/charts.ipynb

Questions?

If you guys have any questions, just leave them in the comments! We will answer quickly.

You can also create an issue on our Github repository. We will be quickest to respond there, and if you ever have code issues, you can copy your code there and it will be the nicest.

Lastly, we would love if you guys would join the Github organization! You can follow along with our code and upload your code and share it with the rest of the members.

- To be invited, create an issue or shoot one of us an email
  - ayaanzhaque@gmail.com, viraajreddi@gmail.com