

INTRODUCTION AND APPLICATIONS OF MACHINE LEARNING



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What is Machine Learning

- Machine learning is the study of computer algorithms that improve automatically through experience and data. It is seen as a subset of Artificial intelligence
- We come across various applications of machine learning everyday, ranging from the results on your google search as well as the recommendations you get on Netflix.
- Machine Learning has become an integral part of new age technology. Technologies like Self Driving Cars, GPT3 and Deepfake are all applications of machine learning.


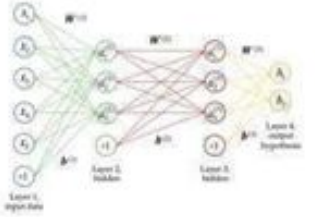
What will be covered?

- Introduction to Machine Learning Theory, Libraries, Methods and Algorithms
- Introduction to Deep Learning



Will this course be too challenging?

- Absolutely not!
- Beginner friendly course which covers basic machine learning algorithms
- Fun to work with hands-on projects from start to finish
- Abundant resources available online

	A parrot	Machine learning algorithm
		
Learns random phrases	✓	✓
Doesn't understand shit about what it learns	✓	✓
Occasionally speaks nonsense	✓	✓
Is a cute birdie parrot	✓	✗

Basic terms for Machine Learning

- **Model** - A machine learning model is an expression of an algorithm that has been trained over a dataset to recognize certain types of patterns.
- **Labels** - Label is the output the model predicts.
- **Dataset** - The data fed to the model has the data which the model will make its predictions on *as well as the correct labels for the same* (not always).
- **Train / Test** - The data that is fed to the model is split into train and test data. The train data is used to train the model and the test data is used to test the accuracy of the model on unseen data.

Important Tools for Machine Learning

- Python
 - NumPy
 - Pandas
 - Matplotlib
- Google Colab

* Click on the topics of the respective slides to open the documentation

Python

- Python is among the best-suited programming languages for machine learning. It has multiple libraries which makes manipulating and visualizing data as well as performing functions on the same very easy.
- It has various frameworks such as PyTorch and Tensorflow which encapsulates a lot of different functions and algorithms which makes building and testing models a relatively simple task

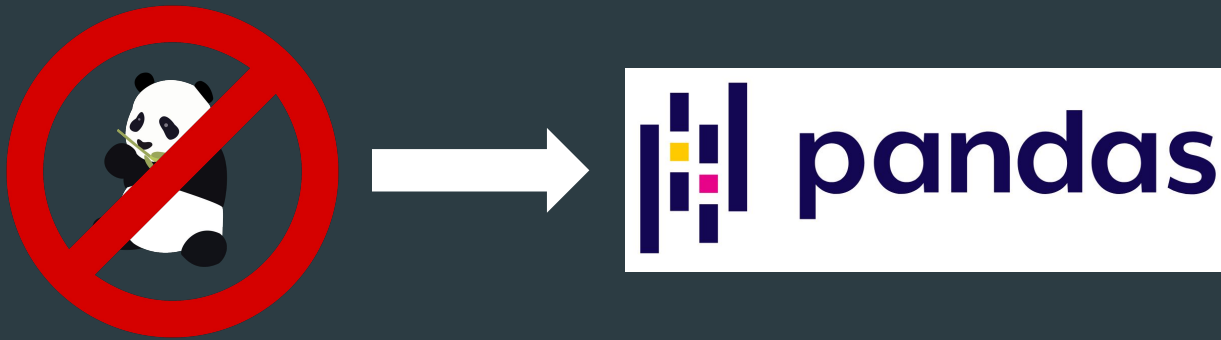
Data Analysis and Visualization	NumPy, Pandas, Matplotlib, Seaborn
Machine learning	PyTorch, TensorFlow, Keras, Scikit-learn
Computer Vision	OpenCV
Natural Language Processing	NLTK, spaCy

NumPy

- NumPy stands for Numerical Python and is one of the most useful scientific libraries in Python programming. It is extremely useful when it comes to machine learning.
- NumPy adds support for large, multi-dimensional arrays and matrices, along with a large collection of high-level mathematical functions to operate on these arrays.

Pandas

- Pandas is a Python library used for working with data sets.
- It is used for data cleaning and analysis and has features which are used for exploring, cleaning, transforming and visualizing from data.



Matplotlib

- Matplotlib is a low level graph plotting library in python that serves as a visualization utility.
- Using matplotlib we can plot graphs such as :-
 - Bar Graph
 - Pie Chart
 - Box Plot
 - Histogram
 - Line Chart and Subplots
 - Scatter Plot

Google Colab

- In this course we'll be using Google Colab notebooks. Colab allows anybody to write and execute arbitrary python code through the browser, and is especially well suited to machine learning. More technically, Colab is a hosted Jupyter notebook service that requires no setup to use, while providing free access to computing resources including RAM and GPUs.
- Jupyter Notebook is an open-source web application that allows you to create and share documents that contain live code, equations, visualizations and narrative text.

THANK YOU!

