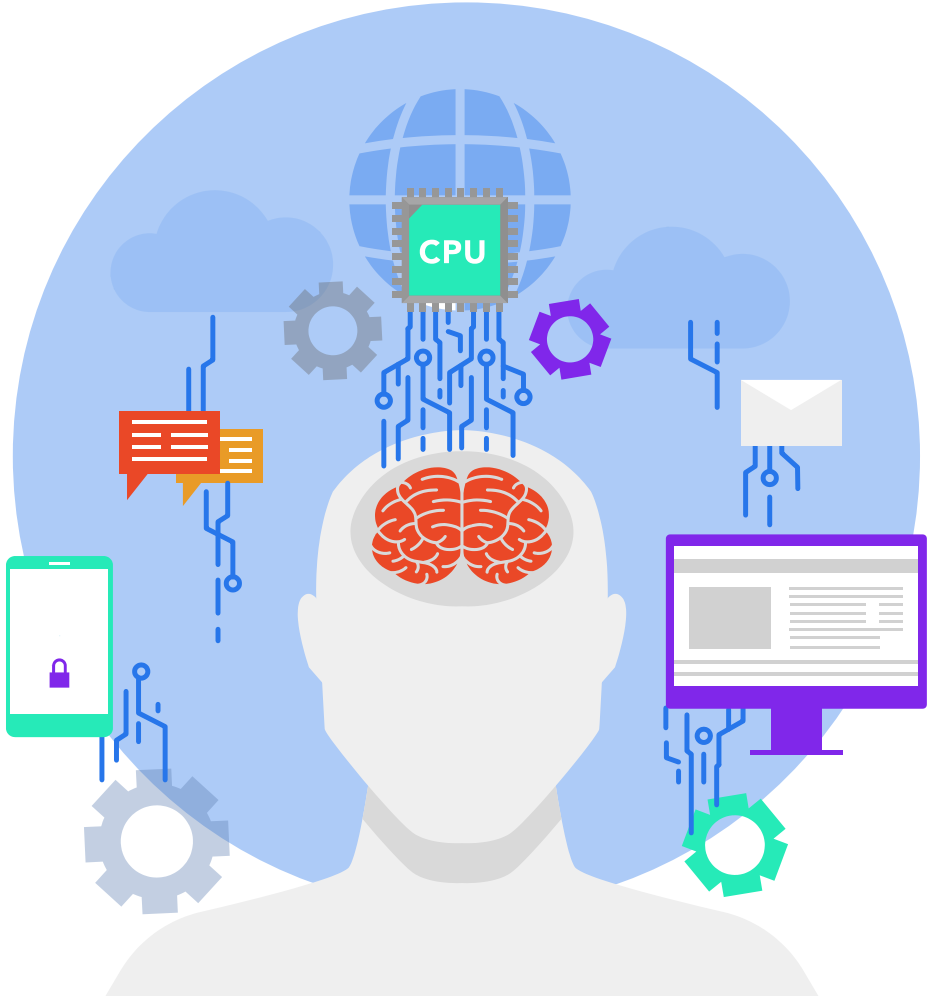
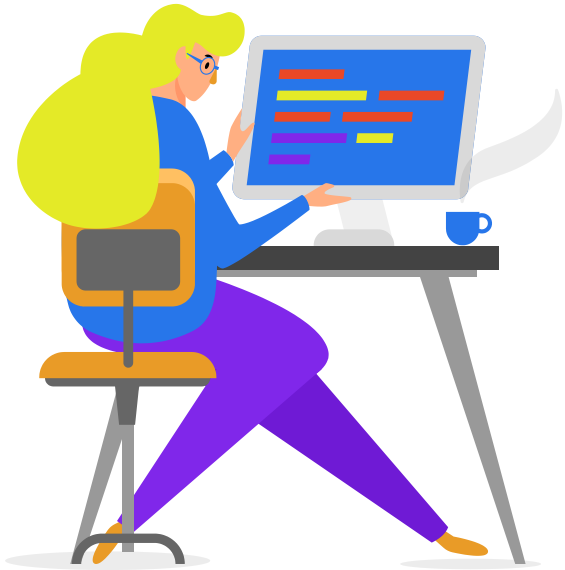


AI & Deep Learning Bootcamp

Sayed Husain Mohamed

Introduction to Machine Learning



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Introduction to the topic of the workshop.

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Non-technical overview

We will cover non-technical aspects of Machine Learning.

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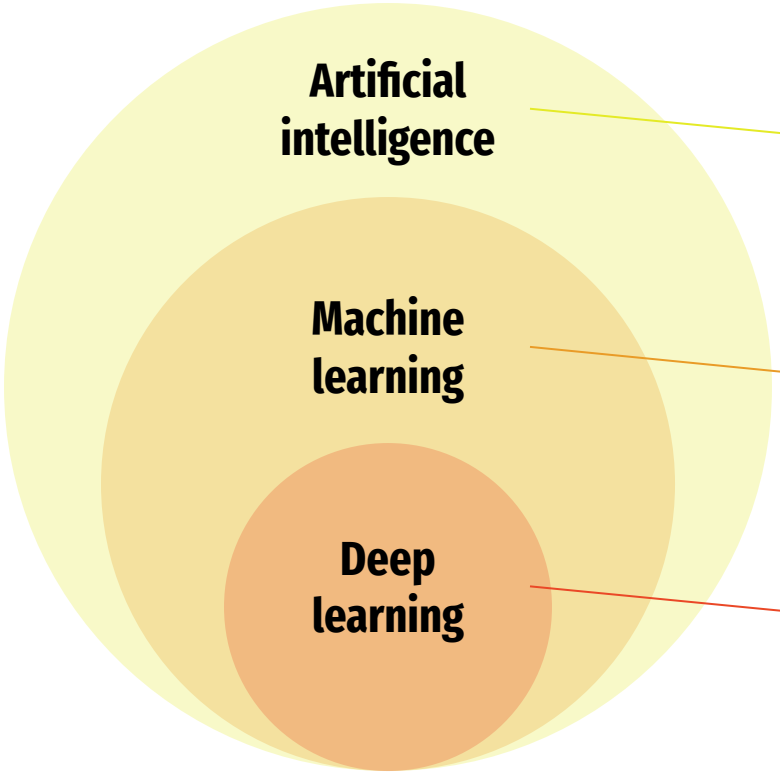
A quick look on some of the technologies we will be using during the bootcamp.

AI vs. ML vs. DL



Programs with the ability to mimic human behaviour.

Getting programs to act without being explicitly programmed.

Subset of ML based on artificial multi-layers neural networks.

General AI vs. Narrow AI

01

Narrow AI

AI focused on a specific task.

02

General AI

AI that possesses common sense, creativity, emotions, ...

Typical Programming vs. Machine Learning

Typical Programming

- Developer pass the inputs and the rules, and the program returns the outputs.
- The developer must be able to fully and clearly breakdown the problem.
- Difficulties in dealing with non-numerical data.

Vs

Machine learning

- Developer pass the inputs and outputs, and the program figures out the rules.
- A fully breakdown of the problem is not required.
- Ability to work with non-numerical data.

Why ML: History of Data

01

4000 BC

Physical Records

Giant shelves containing huge number of papers.

02

1960s

Spreadsheets Applications

Spreadsheets applications like Excel and csv files.

03

1970s

Relational Databases

Structured databases in the form of tables.

04

1980s

SQL

SQL became the standard query language.

05

1990s

Advancement of databases

The Internet led to exponential growth of the data industry

06

2000s

NoSQL – Big Data

Big data that cannot be saved in a structured form.

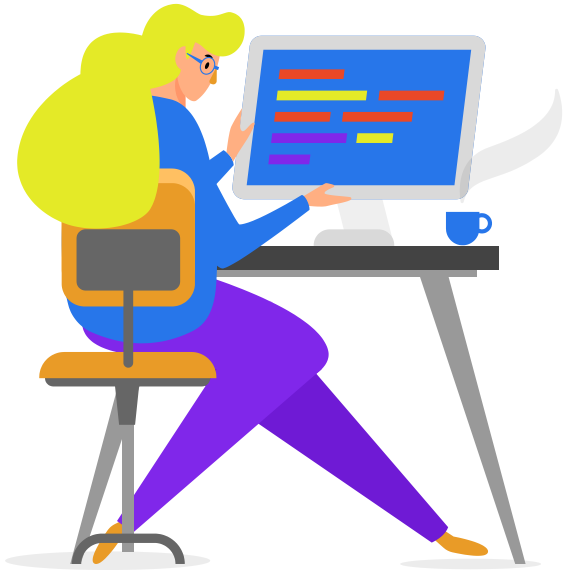
07

Today

Clouds

Exponential growth of datasets gone to the clouds.

Introduction to Machine Learning



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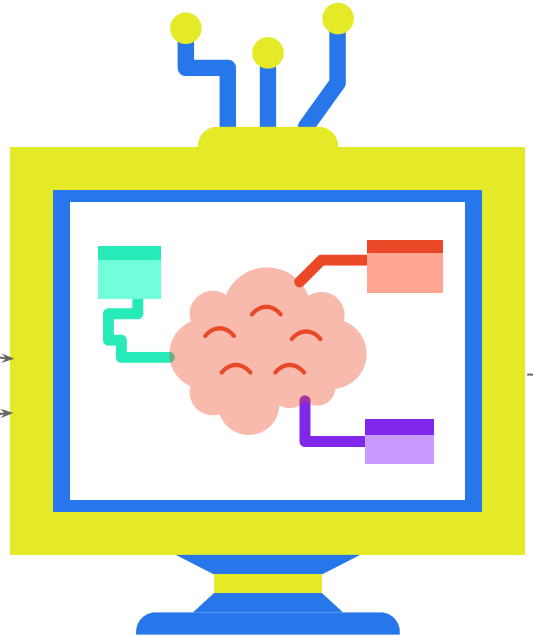
What is a ML Model

Inputs

- 1
- 2
- 3

Outputs

- 2
- 4
- 6



Training the model

Rules

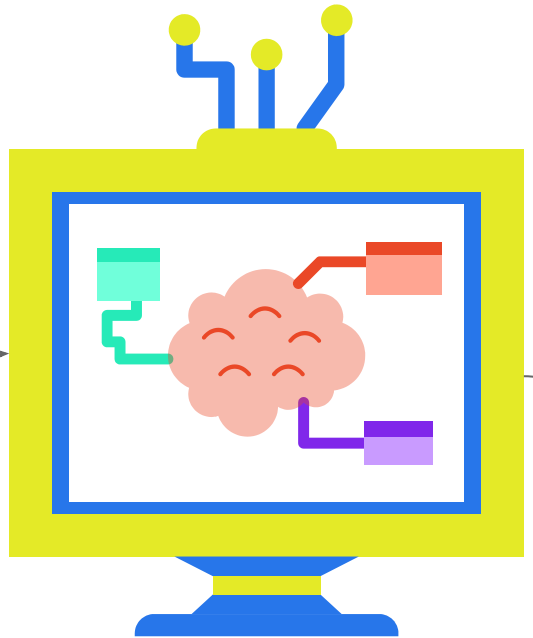
Output = Input x 2

What is a ML Model

Inputs

Previously unseen dataset

- 5
- 6
- 7



Outputs

Predicted output based on the rules figured out in the training stage

- 10
- 12
- 14

Using the trained model to predict outputs

Types of Machine Learning

Supervised learning

Classification

- Email spam detection
- Diagnostics
- Image classification

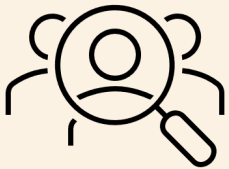
Regression

- Risk assessment
- Score prediction

Unsupervised learning

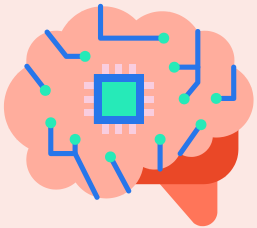
Clustering

- Customer segmentation
- Recommendation systems

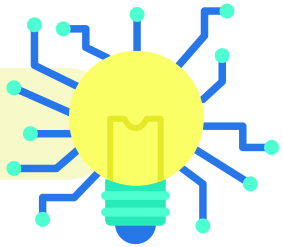


Reinforcement learning

- Video games bots
- Autonomous cars
- Robots



Machine Learning Data types



Types of ML datasets

Structured Data

Tables containing columns and rows, every row being a single example/value.

For Example: Spreadsheets

Unstructured Data

Data not saved in structured format:

- Images
- Text
- Audio
- Videos

Machine Learning modelling data

Definitions of Train, Validation, and Test Datasets

Train data

The data that the model is going to train on

Can be thought of as the exercises that a student solve to learn the subject

Validation Data

The data used to optimize and tune the model based on

Can be thought of as the practice test a student take before the actual test

Test Data

The data used to evaluate our model

Can be thought of as the actual test that the student is assessed based on.

Generalization: Overfitting and Underfitting

Reasons for poor Generalization

01

Overfitting

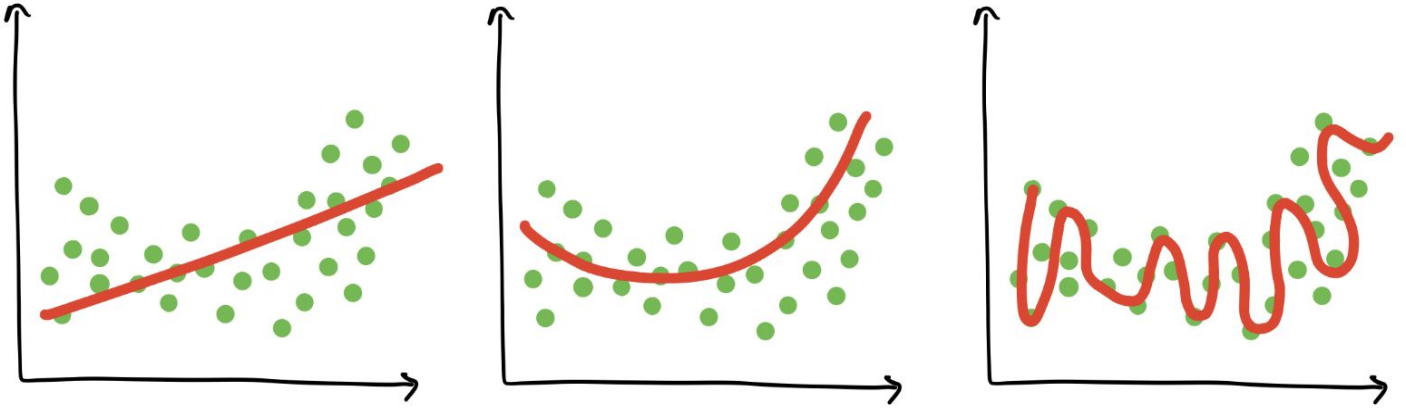
When the model is too complex for the data.

02

Underfitting

When the model is too simple for the data.

Generalization: Overfitting and Underfitting



Underfitting

Balanced

Overfitting

@mrdbourke

Unable to accurately learn the patterns

Learn the patterns with great generalization

Learn the patterns of the training data too well, resulting in bad generalization

Our Machine Learning WorkFlow

Collect the data

Get a dataset from the internet

Define the problem

whether Classification or Regression

Choose the model

Choose the appropriate ML model

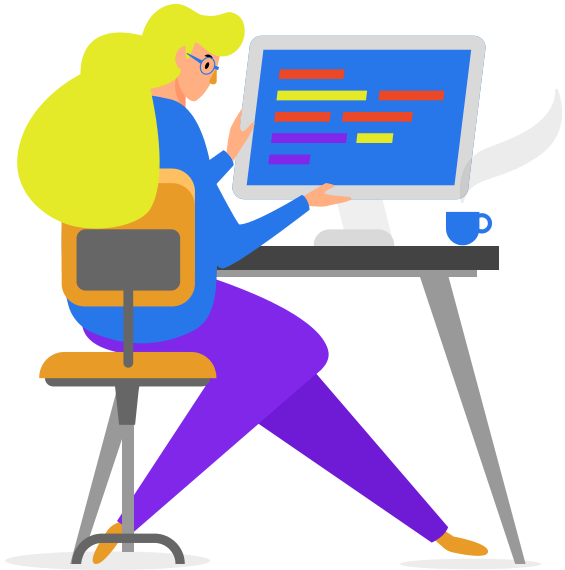
Train a model

Train the model using training data

Evaluate the model

Evaluate the model using testing data

Introduction to Machine Learning



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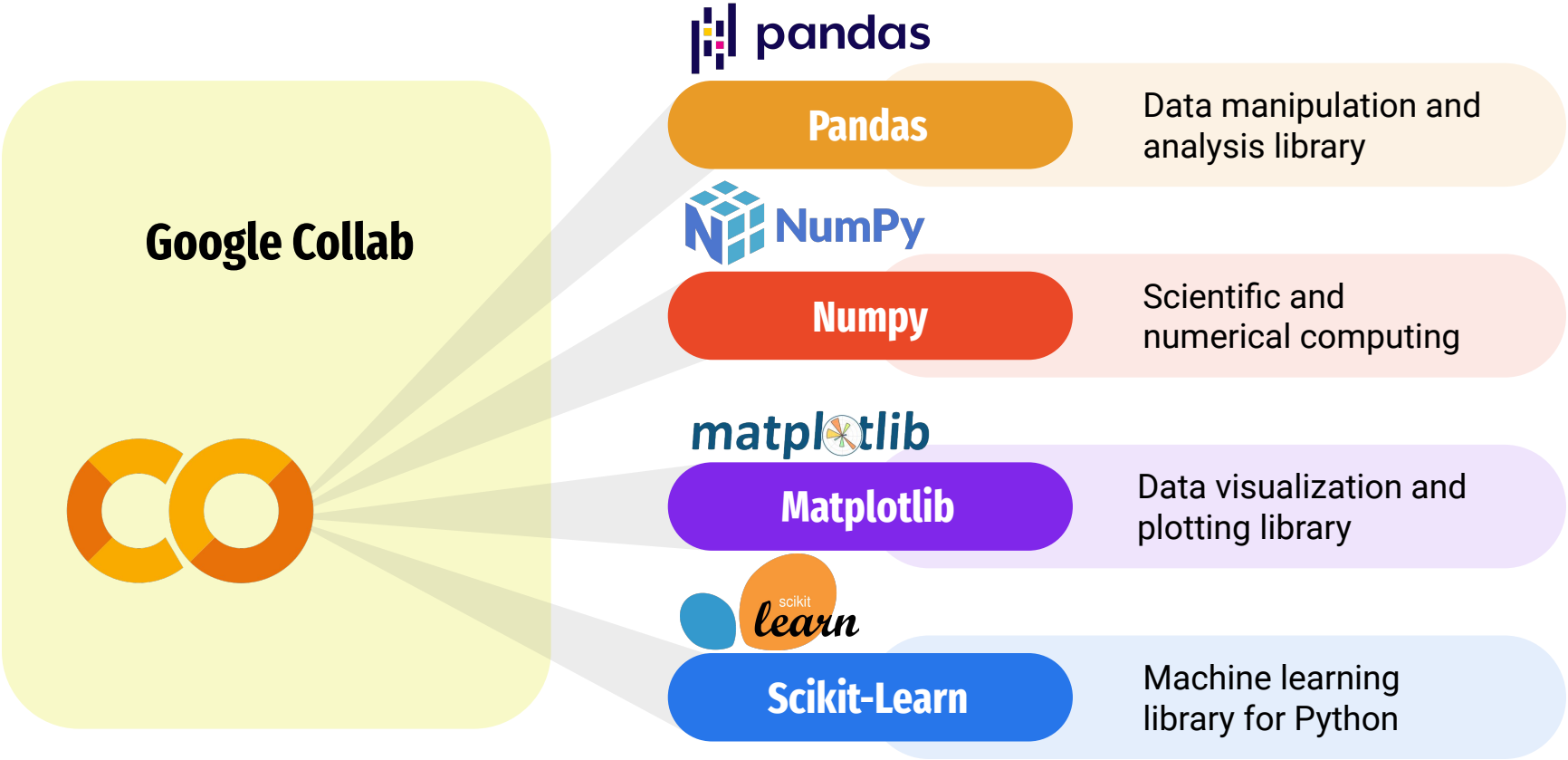
Technologies we are going to use

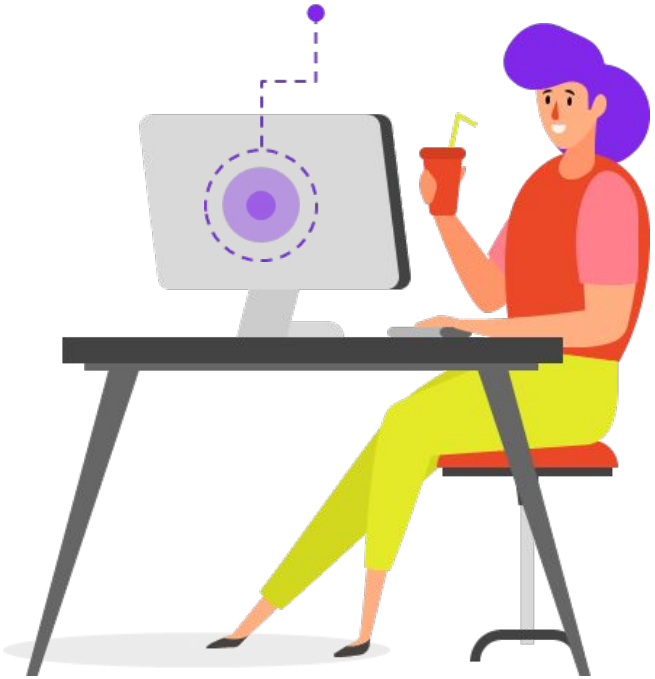


ChatGPT vs. Bard AI

Generative AI

ChatGPT

Bard AI



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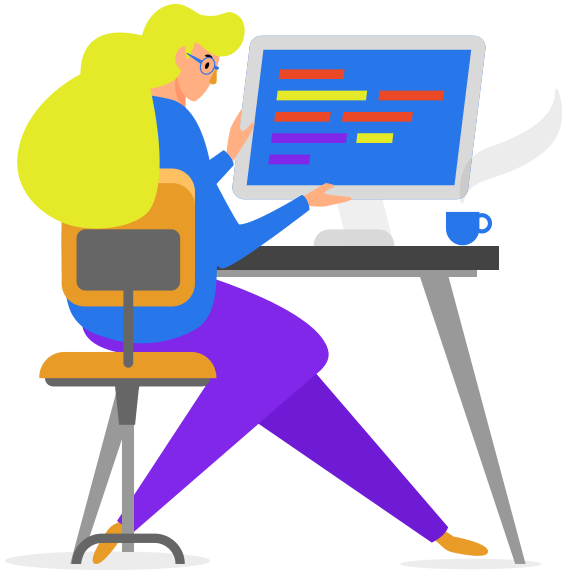

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Thanks for listening

More than happy to listen to your questions, concerns, and comments