Machine Learning

AI Labs

Gourav & Anant

Sessions

- Machine Learning Session 1

Machine Learning Session One

Agenda

Introduction to ML

ML Lifecycle

Exploratory Data Analysis

Feature Selection

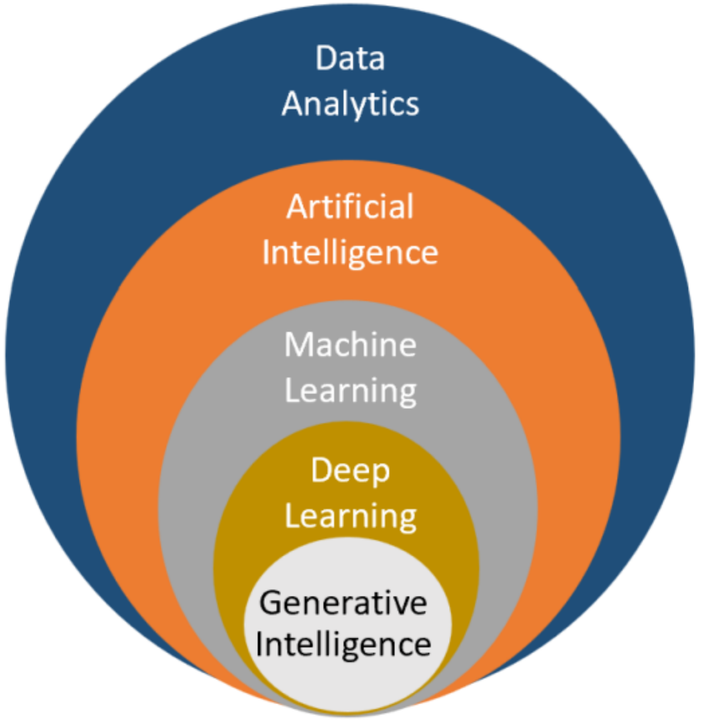
Feature Engineering

Model Selection and Creation

Evaluation Metrics

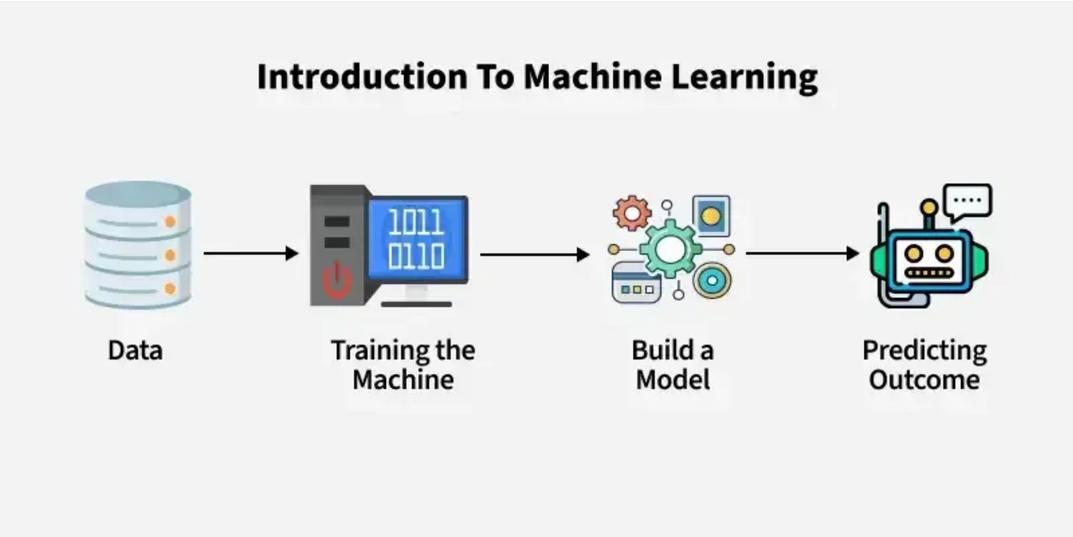
Overfitting and Underfitting Problem

AI, ML, DL and GI – How it all fits together!



Source: Anang B Singh, 20231010

Introduction to ML

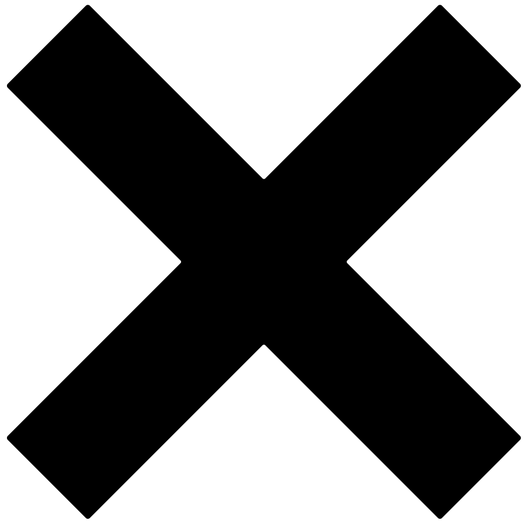


Machine Learning (ML) allow computers to learn and make decisions without being explicitly programmed

Example:

1. Netflix
2. Gmail
3. Siri/Alexa
4. Self Driving Cars

Does This Mean Machine is Actually Learning



Machine Learning Involves Algorithms that allow the machine to find patterns in data, make predictions, or take actions based on the data it has been given

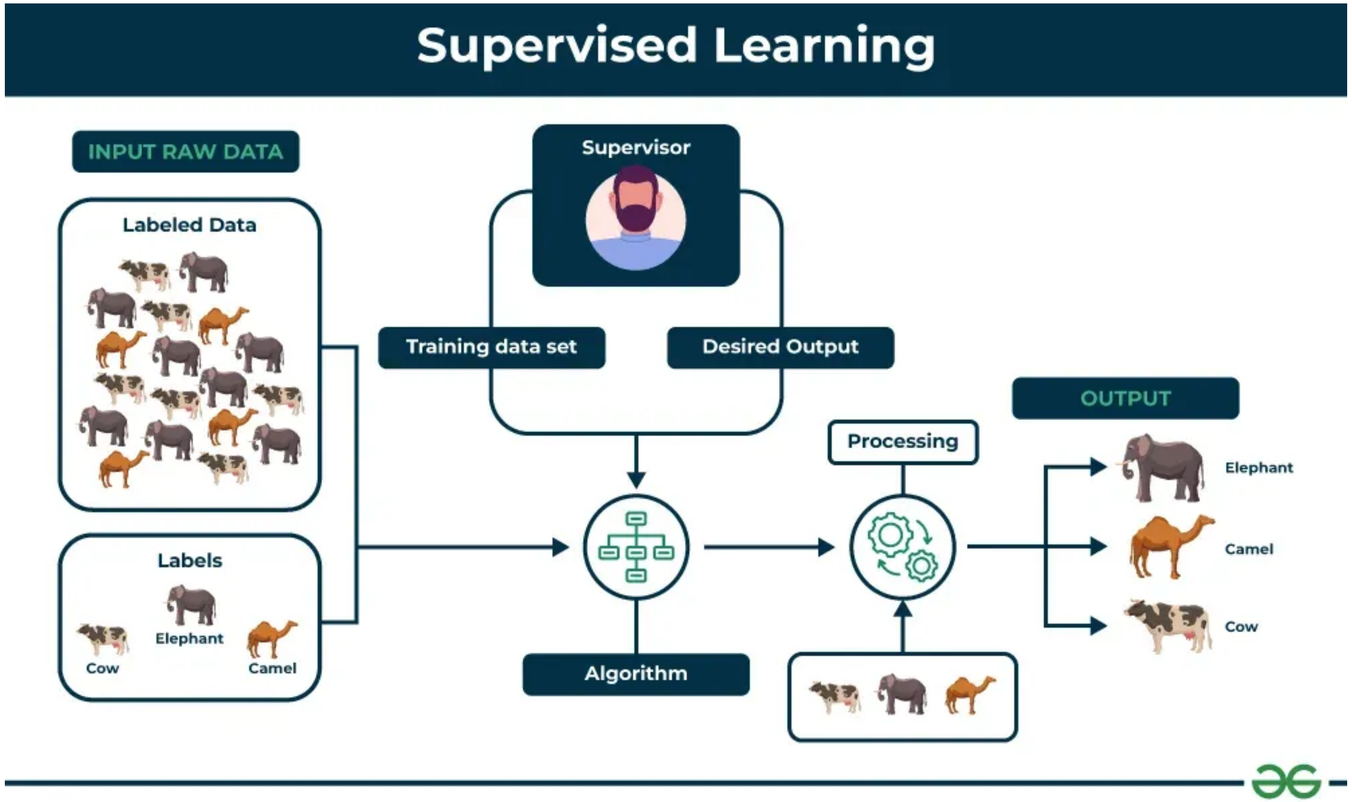
Types of Machine Learning

Supervised Learning

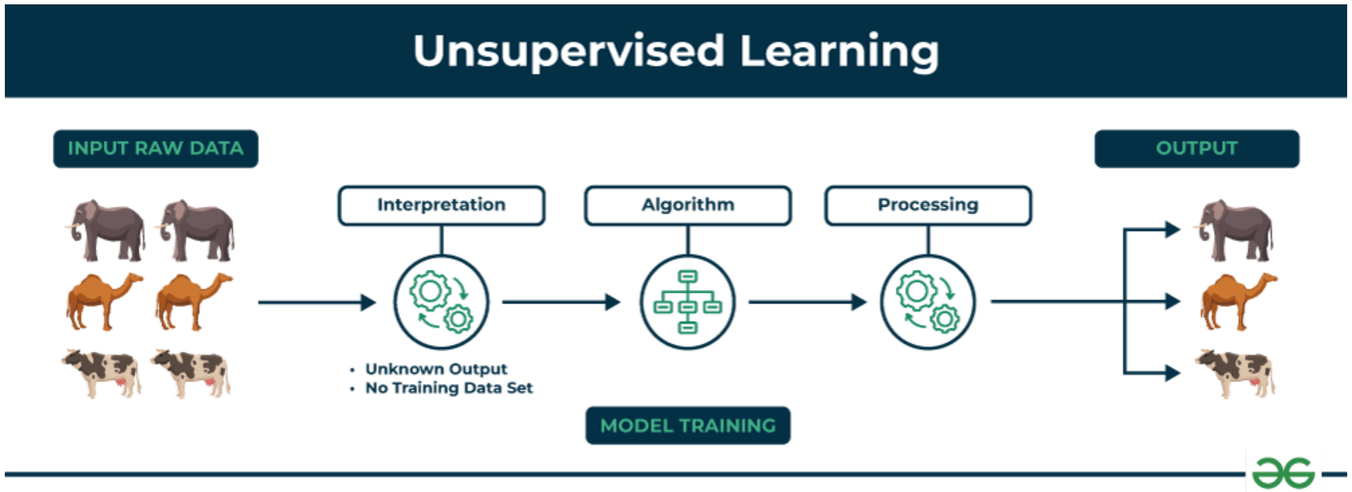
Unsupervised Learning

Reinforcement Learning

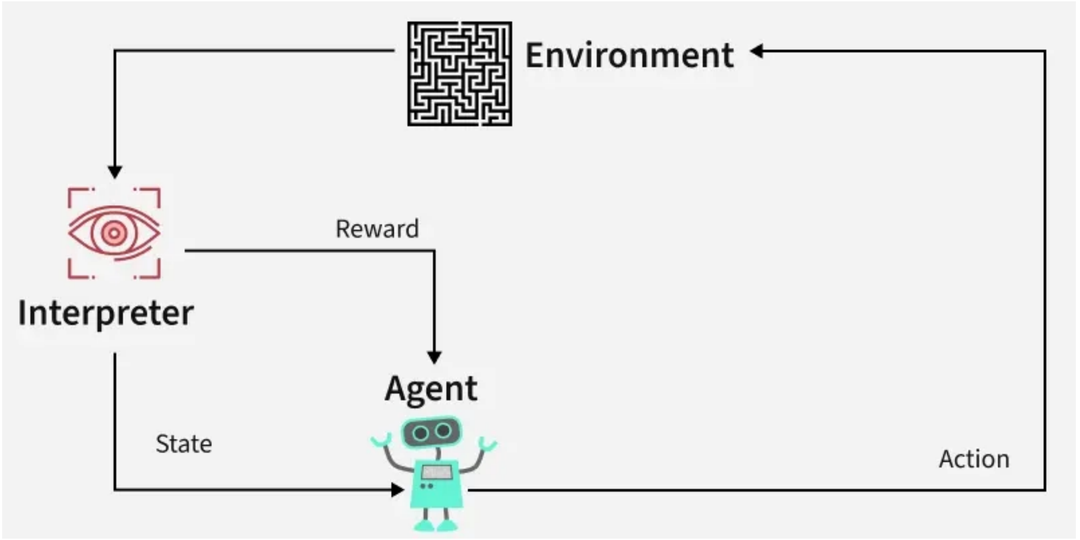
Supervised Machine Learning



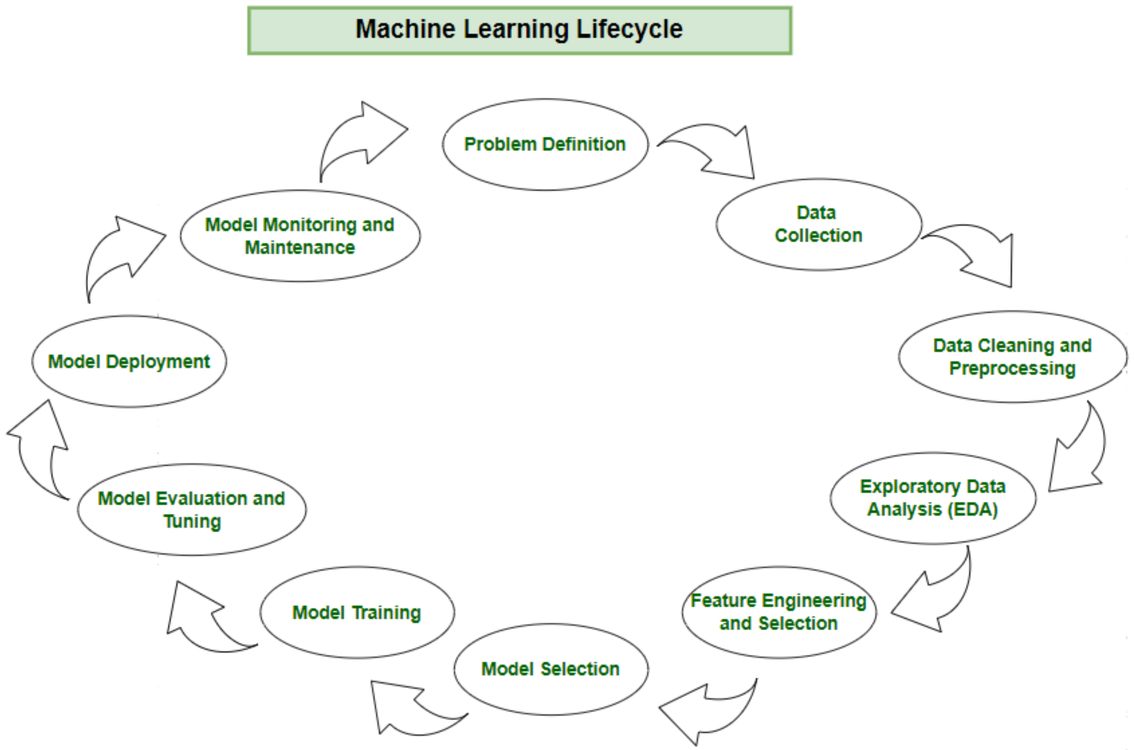
Unsupervised Learning



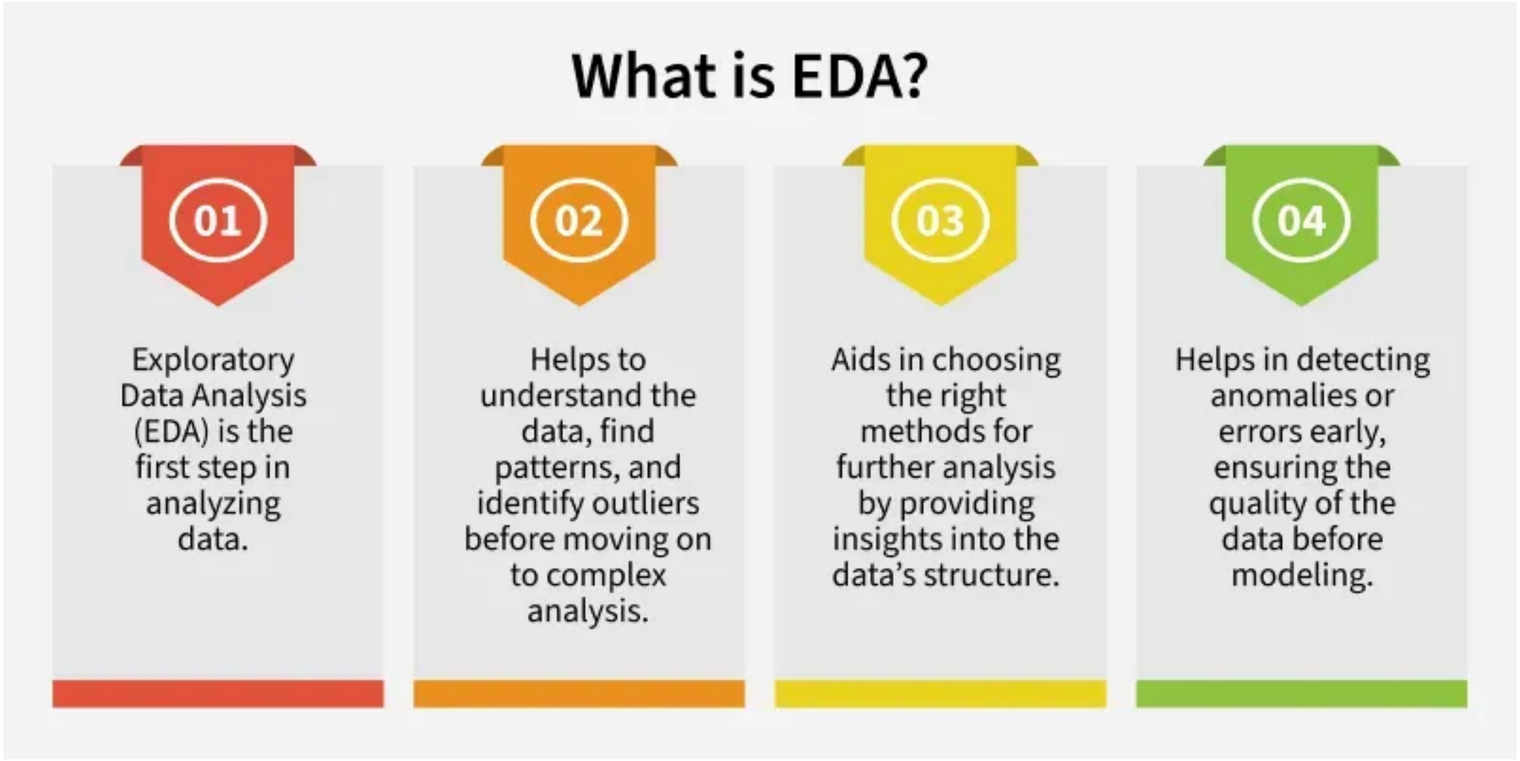
Reinforcement Learning



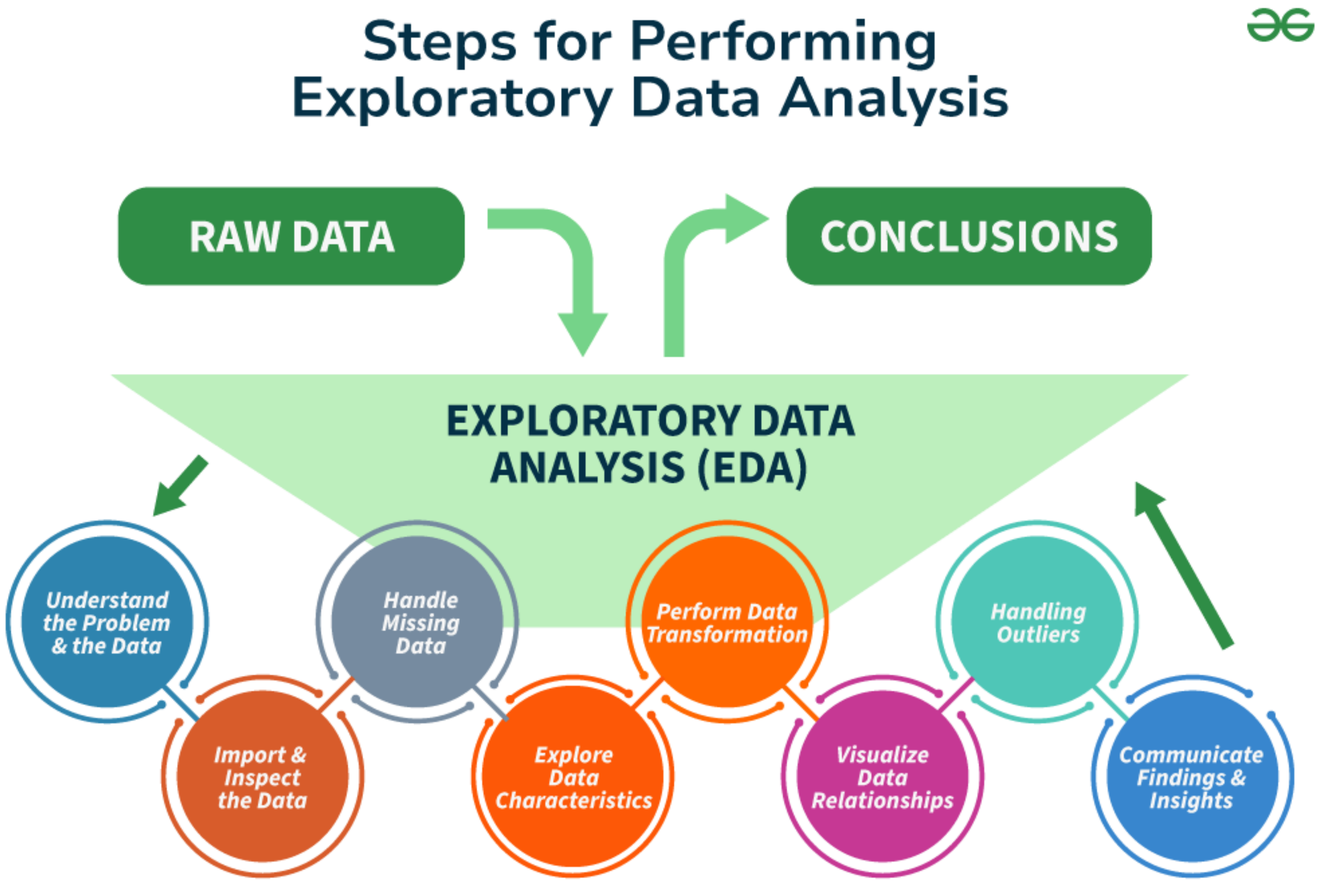
Machine Learning Lifecycle



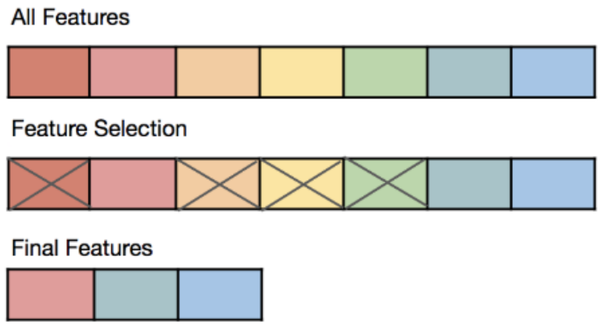
Exploratory Data Analysis



Step for EDA

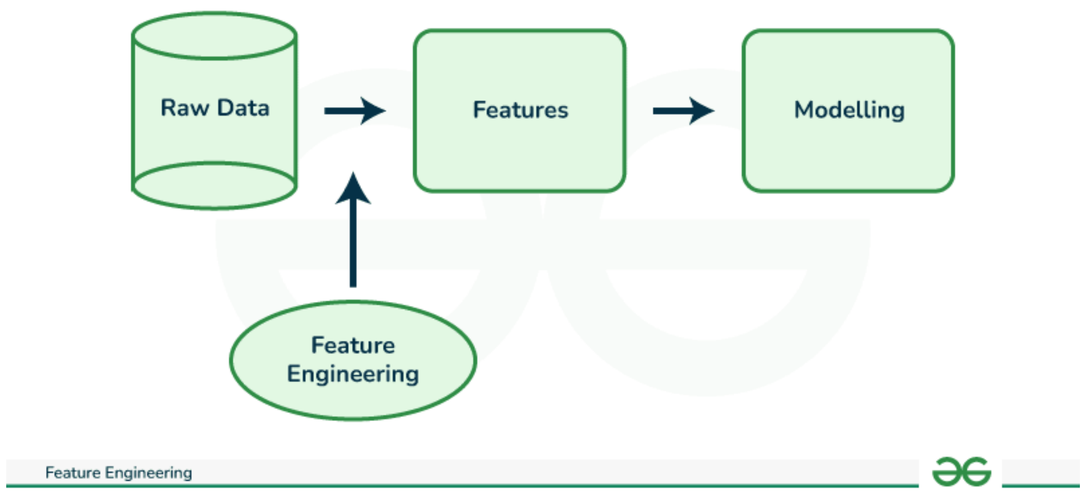

Steps for Performing
Exploratory Data Analysis
RAW DATA
CONCLUSIONS
EXPLORATORY DATA
ANALYSIS (EDA)
Understand the Problem & the Data
Import & Inspect the Data
Handle Missing Data
Explore Data Characteristics
Perform Data Transformation
Visualize Data Relationships
Handling Outliers
Communicate Findings & Insights

FEATURE Selection



Feature Selection is the process of selecting
the most relevant features of a dataset to use when
Building and training a machine learning model.
By reducing the feature space to a selected
subset, feature selection improves AI model performance
While lowering its computational deman

Feature Engineering



Feature engineering is the process of transforming raw data into features that are suitable for machine learning models. In other words, it is the process of selecting, extracting and transforming the most relevant features from the available data to build more accurate and efficient machine learning models.

Model Selection and Creation

Model Selection is the process of deciding which algorithm and model architecture is best suited for particular tast or dataset.

Model creation involves building and training the chosen machine learning model.

Evaluation Metrics

Evaluation Metrics are quantitative measures used to assess the performance and effectiveness of a statistical or machine learning model. These metrics provide insights into how well the model is performing and help in comparing different models or algorithms

Metrics for Classification

		Actual	
		Positive	Negative
Predicted	Positive	True Positive	False Positive
	Negative	False Negative	True Negative

Accuracy

Precision

Recall

F1-Score

Specificity

Area Under Curve

Confusion Matrix

Metrics for Regression

In the regression task, we are supposed to predict the target variable which is in the form of continuous values. To evaluate the performance of such a model below mentioned evaluation metrics are used.

Meam Absolute Error

Mean Squared Error

Root Mean Square Error

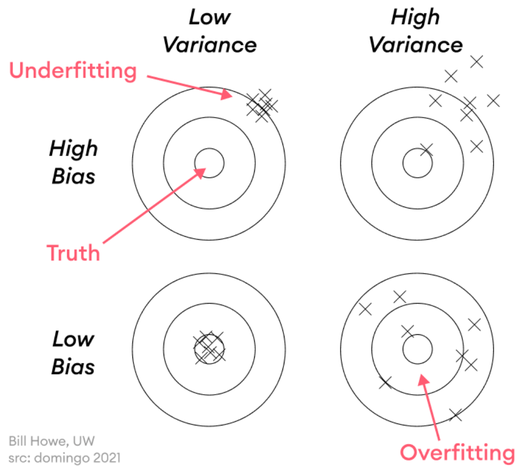
Root Mean Square Logarithmic Error

R2-Score

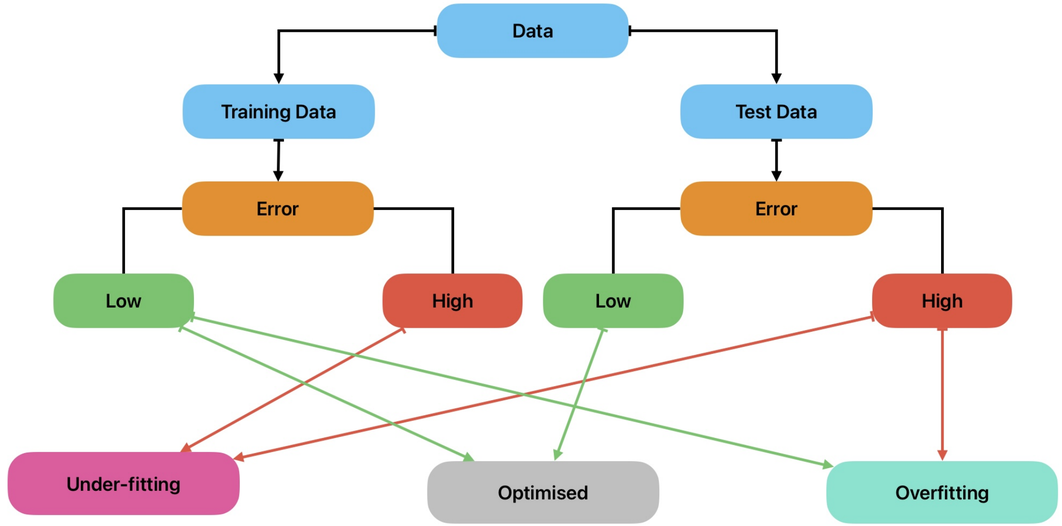
Overfitting and Underfitting

Bias is simply defined as the inability of the model because of that there is some difference or error occurring between the model's predicted value and the actual value

Variance is the variability of the model that how much it is sensitive to another subset of the training dataset, I.e how much it can adjust on the new subset of the training dataset



Bill Howe, UW
src: domingo 2021



Notebook

Kaggle :

https://www.kaggle.com/code/ohanvi/ml-introduction

GitHub:
https://github.com/Ohanvi/machine-learning-module

Donate to India Army

- Indian Army
- NDF - National Defense Fund

(a) Name of Fund	**: Army Central Welfare Fund.**
Bank Name	: Union Bank of India
Branch	: Chandni Chowk, Delhi – 110006
IFSC Code	: UBIN0530778
Account No	: 520101236373338
Type of Acct	: Saving

(b) Name of Fund	**: Armed Forces Battle Casualties Welfare Fund.**
Bank Name	: Canara Bank,
Branch	: South Block, Defence Headquarters, New Delhi - 110011
IFSC Code	: CNRB0019055
Account No	: 90552010165915
Type of Acct	: Saving

The End