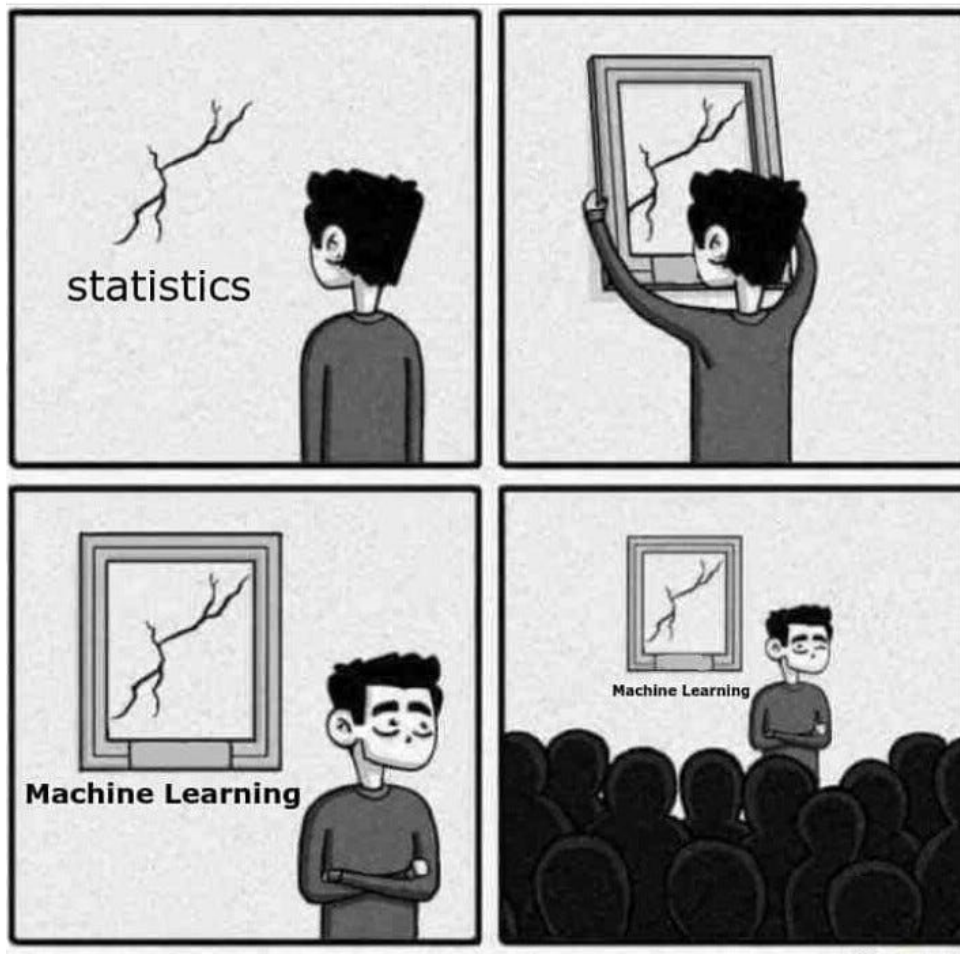


Agenda

- ① Journey so far
- ② ML vs Classical programming
 - ③ What is ML
 - ④ MLE vs SDE
 - ⑤ ML Tasks
 - ⑥ Types of Learning



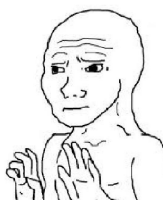
My neural network just failed the deep learning homework



Just train a bigger one!



No, you don't understand...



MY neural network failed the homework



Journey so far

① Programming Language:
Python

② Probability and statistics

- ① Correlation

- ① Mean Median Mode

- ① Hypothesis Testing

③ Libraries: Load and process Data

- ① Pandas and Numpy

- ① Matplotlib and Seaborn

④ Maths

- ① Optimization

- ① Vector and Matrix multiplication

Q Type of plot:

Univariate Analysis

① Numerical

o Histogram (KDE)

o Box plot

② Categorical

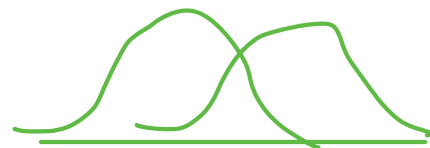
o Bar-plot

o Countplot

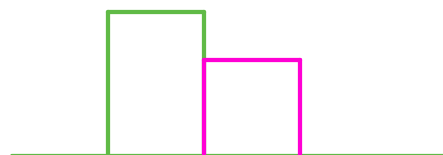
o Pie chart

Bivariate Analysis

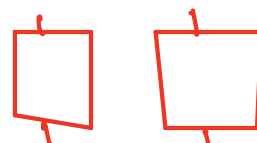
① Numerical - Numerical



② Categorical - Categorical



③ Numerical - Categorical

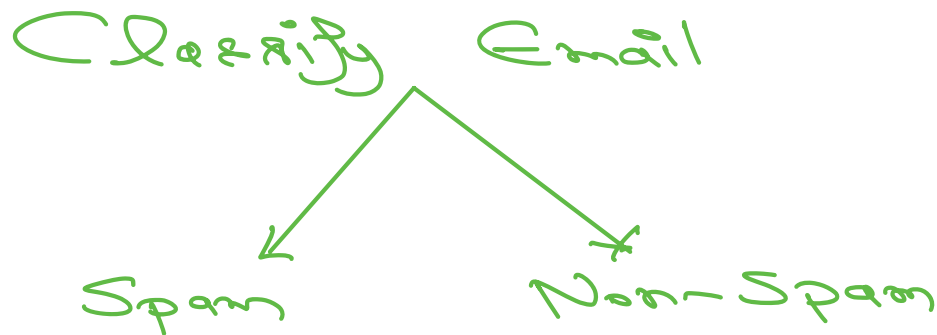
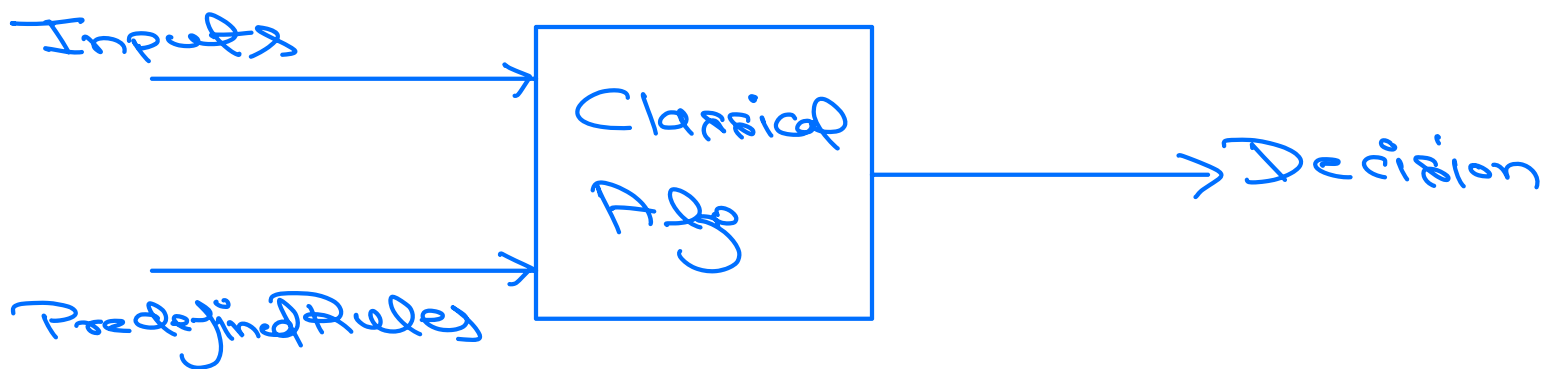


Scores of Students : Numerical

Distribution : Histogram (KDE)

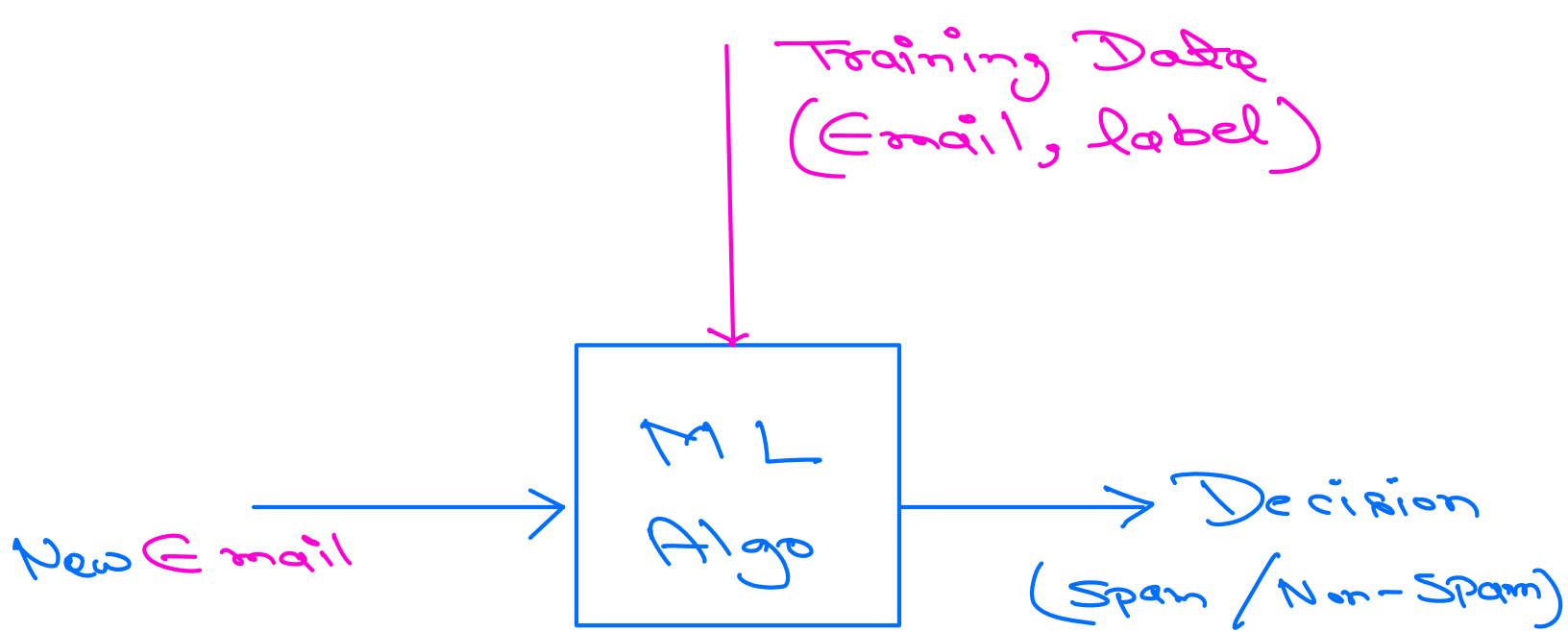
Normal Distribution

ML vs Classical programming



② Text/String Input

③ Rules : Certain keywords which are generally present in Spam Emails



Arthur Samuel

- ML provides ability to learn without being **Extremely** programming

Tom Mitchell



A ML Algo improves the performance on Given **Task** using **Experience**

ML Categorization

Types of ML Algos based on tasks

① Classification

Given data put into
predefined Category

Text → Spam and NonSpam
Classification

Image → Cat vs Dog
Classification Gun vs No Gun

Tabular Data → Loan Approval
Classification System
Fraud Detection

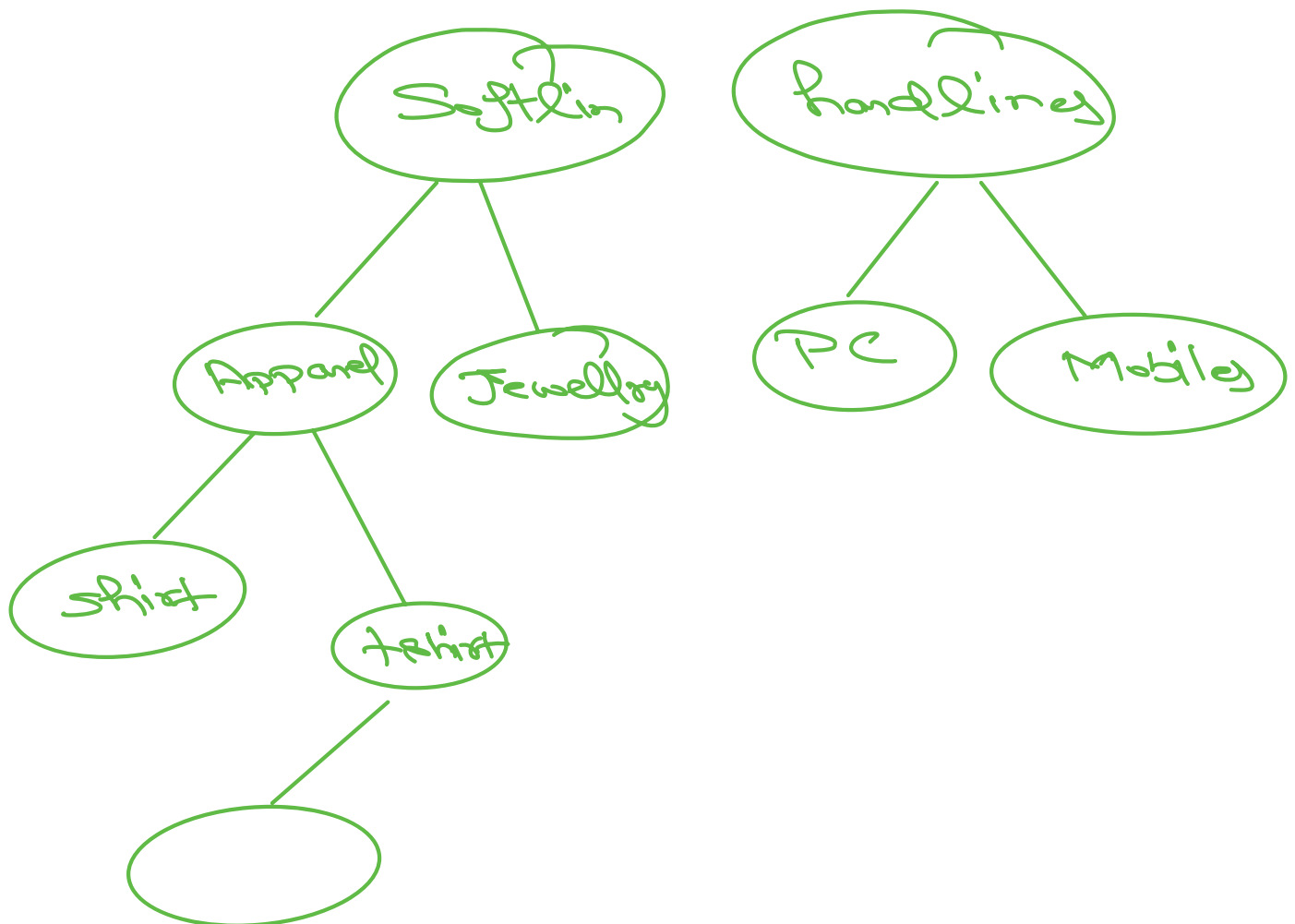
① Binary Classification
 ↳ Two categories

② Multi-Class Classification
 ↳ > 2 categories

 ↳ Missile, Drone, Jet

③ Multi-label Classification

 ↳ Nodes



③ Regression

models/predict
Continuous Variable

Ex: House price prediction
Car price prediction
Stock price Prediction
Temperature

$$D \ni \{x_{i \times d}, y_i\}$$

$y_i \ni$ Numeric (A, B)
(-inf, inf)

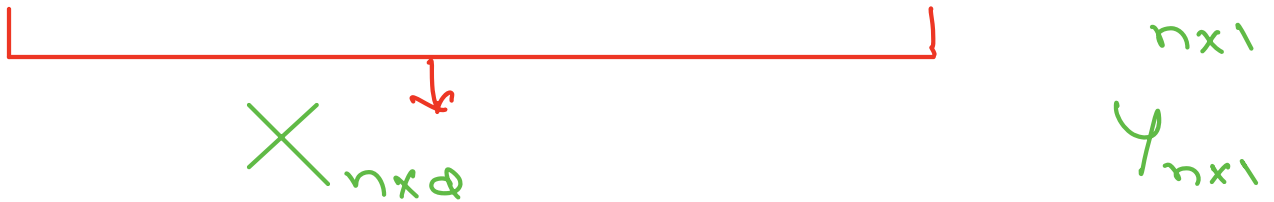
Forecasting

Previous Values

$$D \ni \{y_{i-k}, y_{i-k+1}, \dots, y_{i-1}, y_i\}$$

Temperature
 $T_{Today-k}, \dots, T_{Today-2}, T_{Today-1}, T_{Today}$

	area	Rooms	Age	Location	Price
1	1000	2	3	Maryota Tech park	10k
2	1200	3	1	Yelohank	15k
3	3000	5	10	Whitefield	20k
n					



Point \rightarrow 10000 dollar

Range \Rightarrow [8000 12000]
95% Confidence

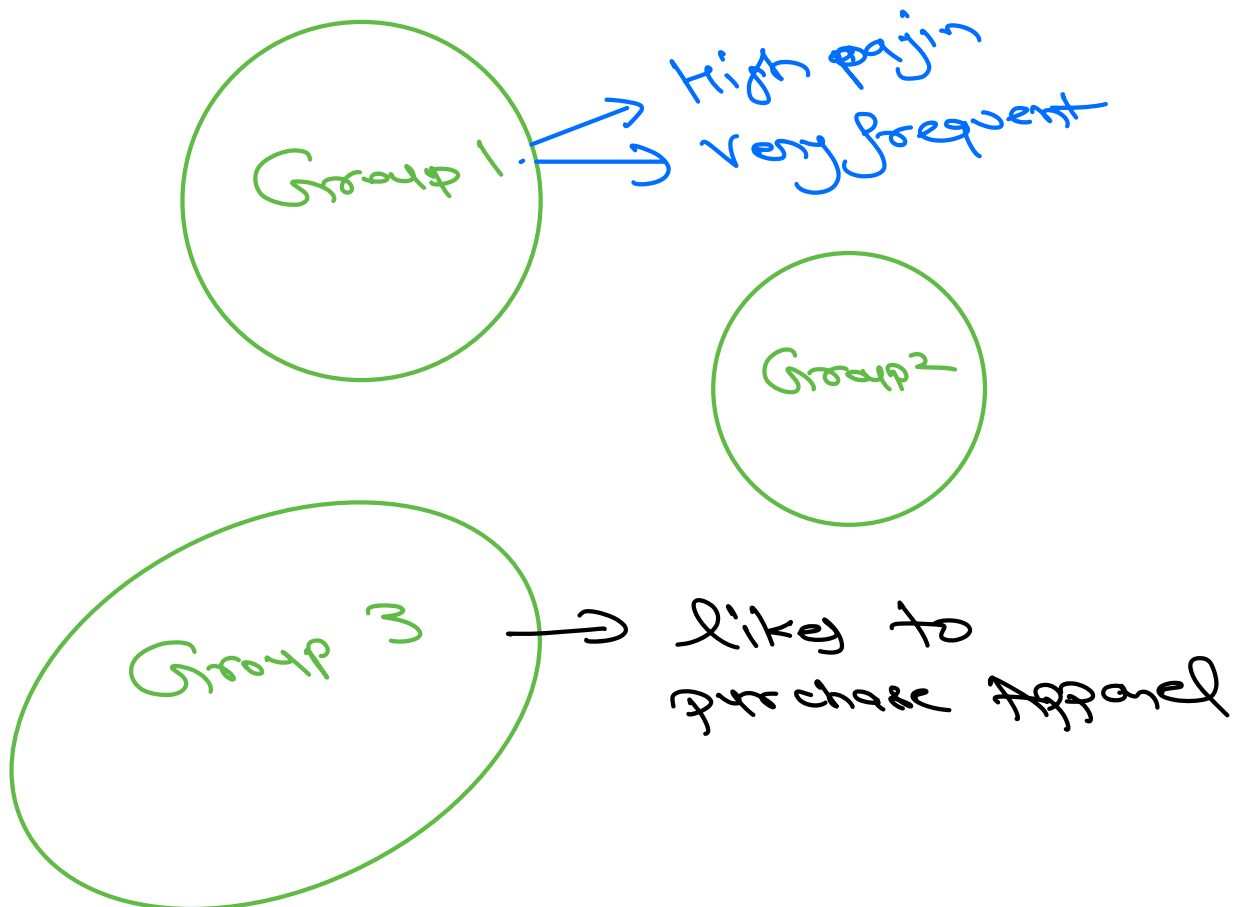
Clustering

$$D = \{x_{i \times d}\}$$

A set of customers and their purchase pattern

* Customer Segmentation

Create k groups



WHICH OF THE FOLLOWINGS IS/ARE TRUE ABOUT CLASSIFICATION?

4 options

Active Duration (Most preferred: 30 seconds)

Appears for 30 Secs

A

Classification can be defined as a predictive model mapping inputs to discrete outputs

B

Class label prob. enables classification algos to predict continuous values.

C

A classification algorithm can have both discrete and real-valued input variables.

D

All of the options

Logistic Regression } Prob
↓
Classification

Types of ML Algos based on Learning

↓
Target

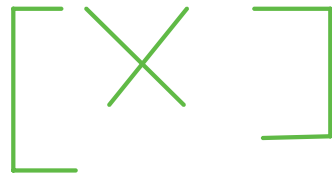
① Supervised Learning : Label in Dataset

[X %]

Regression

Classification

② Unsupervised : No Label

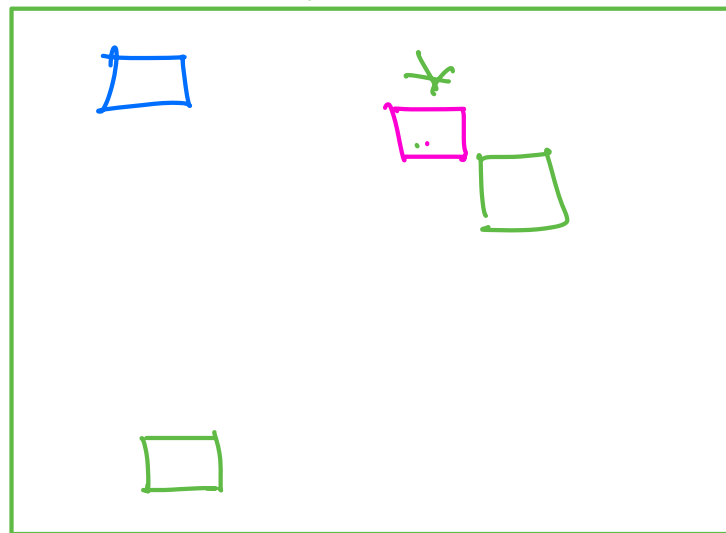


→ Clustering

③ Re-inforcement Learning

→ Environment

→ Action
 AI
 Reward
 Penalty



} Reward
 Penalty

You have a dataset of customer feedback comments, and you want to categorize them into different topics, such as product quality, customer service, and delivery.

Is this a supervised or unsupervised learning problem?

2 options

Active Duration (Most preferred: 30 seconds)

Appears for	30 Secs	▼
-------------	---------	---

A	Supervised learning
---	---------------------

B	Unsupervised learning
---	-----------------------



Topic Modeling \Rightarrow Unsupervised

