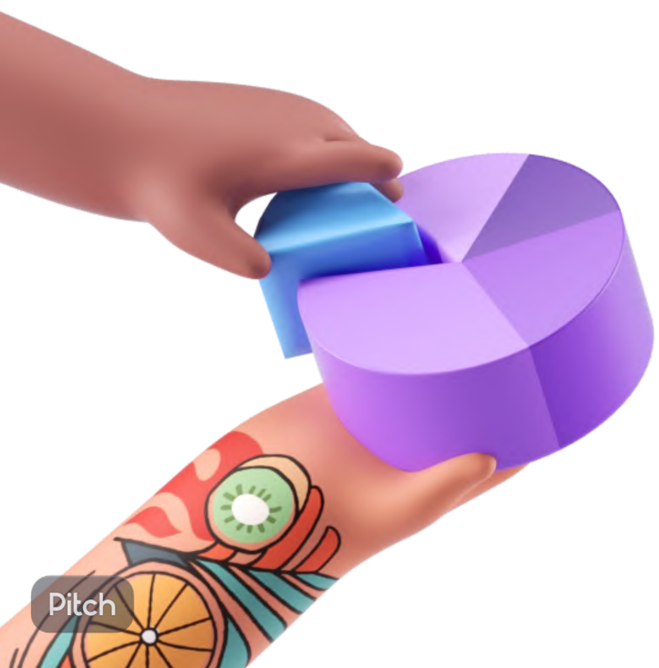
Machine Learning

Machine Learning is the last invention that humanity will ever need to make.

Avdhut Kamble

194033



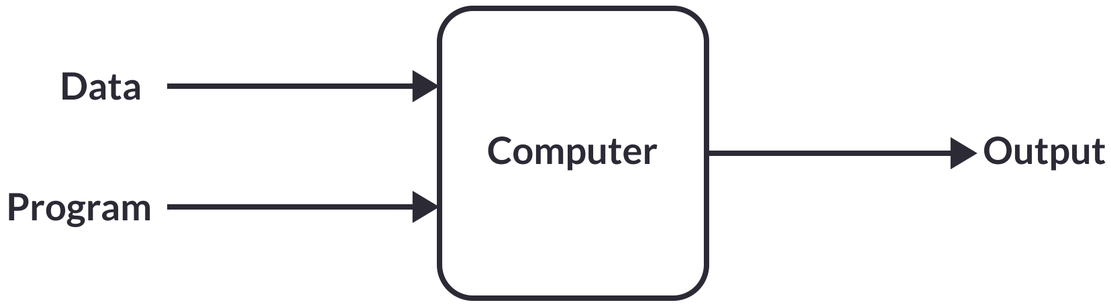
What is Machine Learning ?

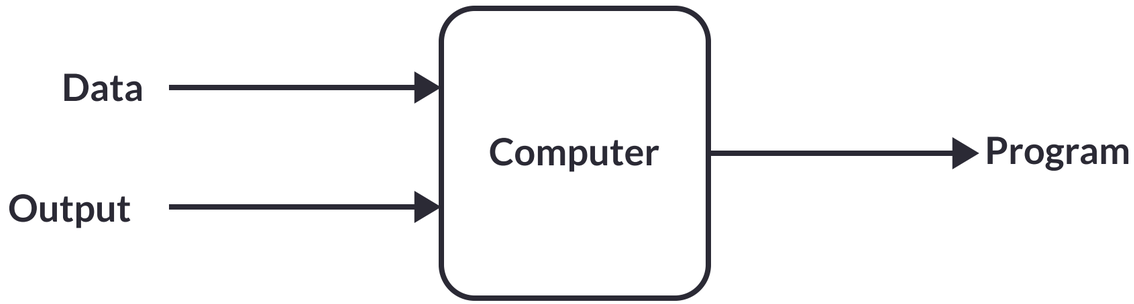
“Learning is any process by which a system improves performance from experience.”

~Herbert Alexander Simon

It is a subfield of artificial intelligence, which is broadly defined as **the capability of a machine to imitate intelligent human behavior**.

Traditional Programming Vs Machine Learning





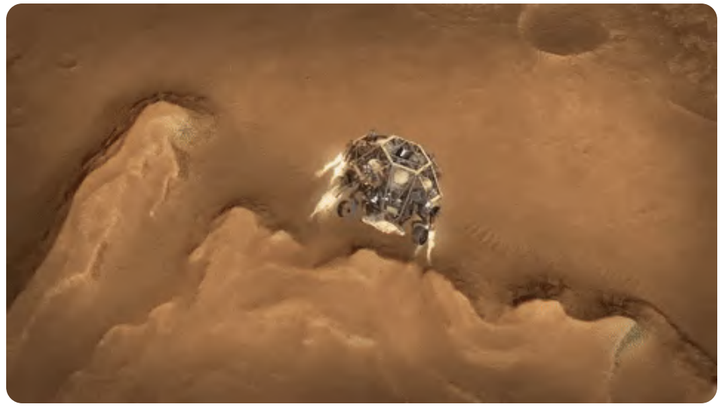
Traditional Programming

Data and Program as Input. After Computation returns desired Output.

Machine Learning

Desired Output and data as input. After Computation returns a logic which creates the desired output w.r. to the input.

When Do we use Machine Learning?

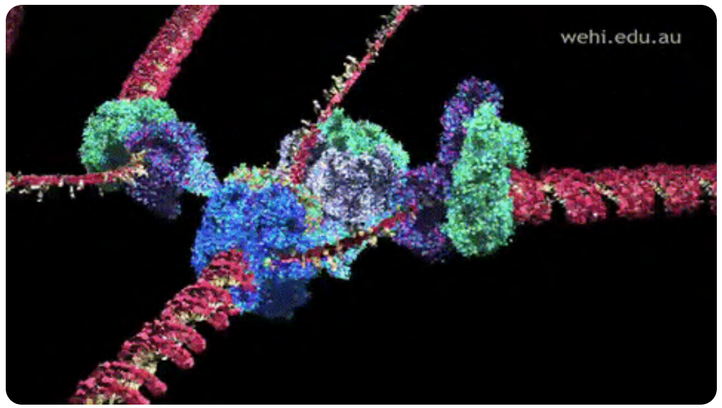


Human expertise does not exist

Navigating on Mars.

Humans can’t explain their expertise

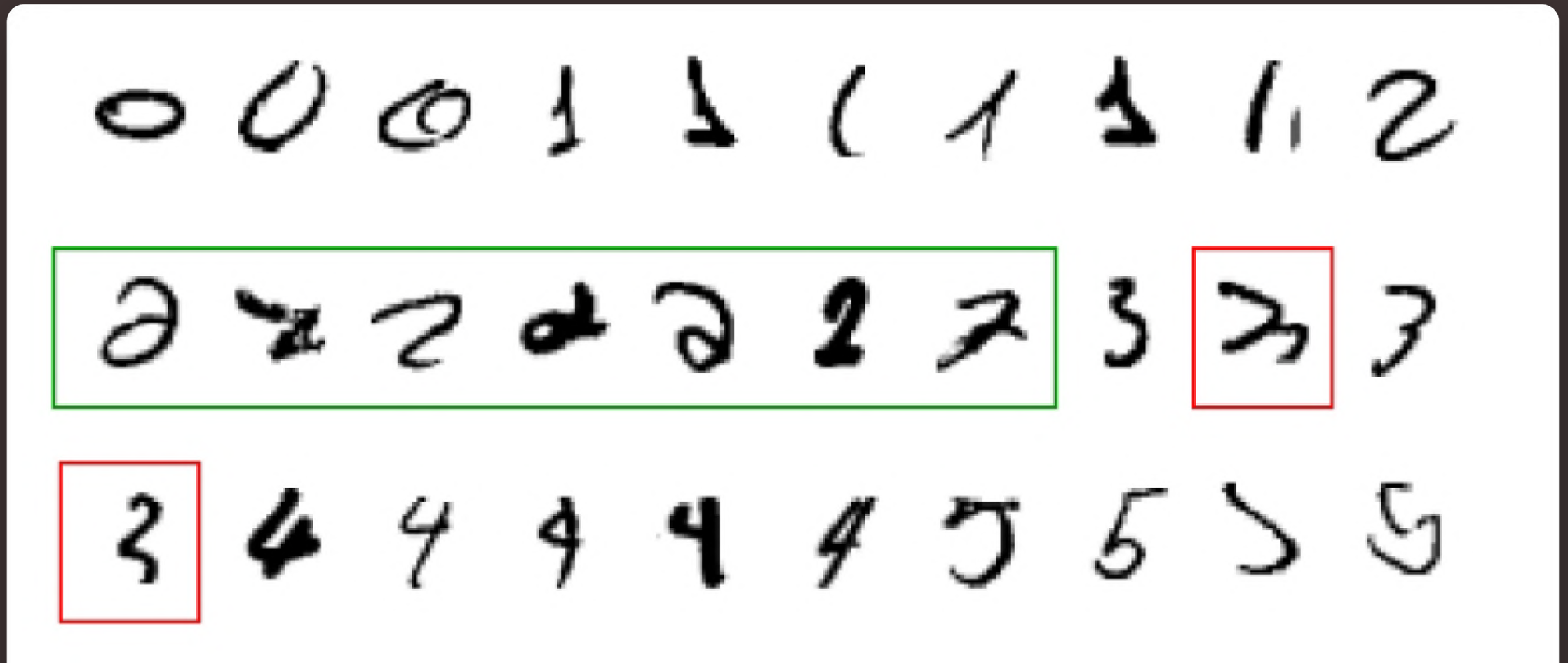
Speech Recognition, for eg. Google Assistant, Alexa, Siri.



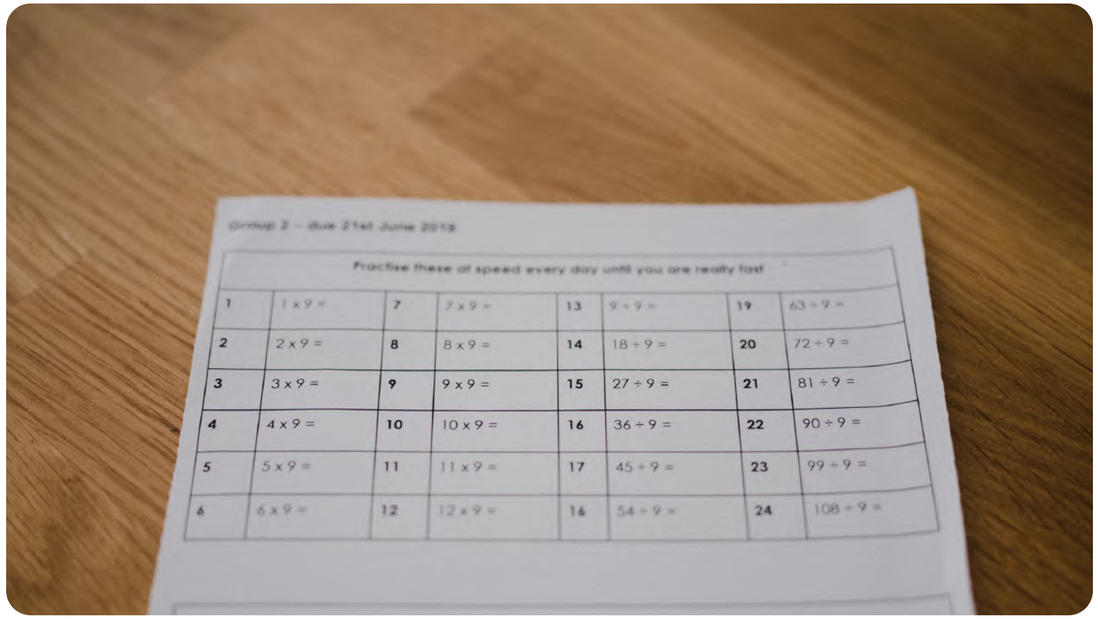
Models are based on huge amounts of data

Genomics

Try to Guess which of the follow is a "2"

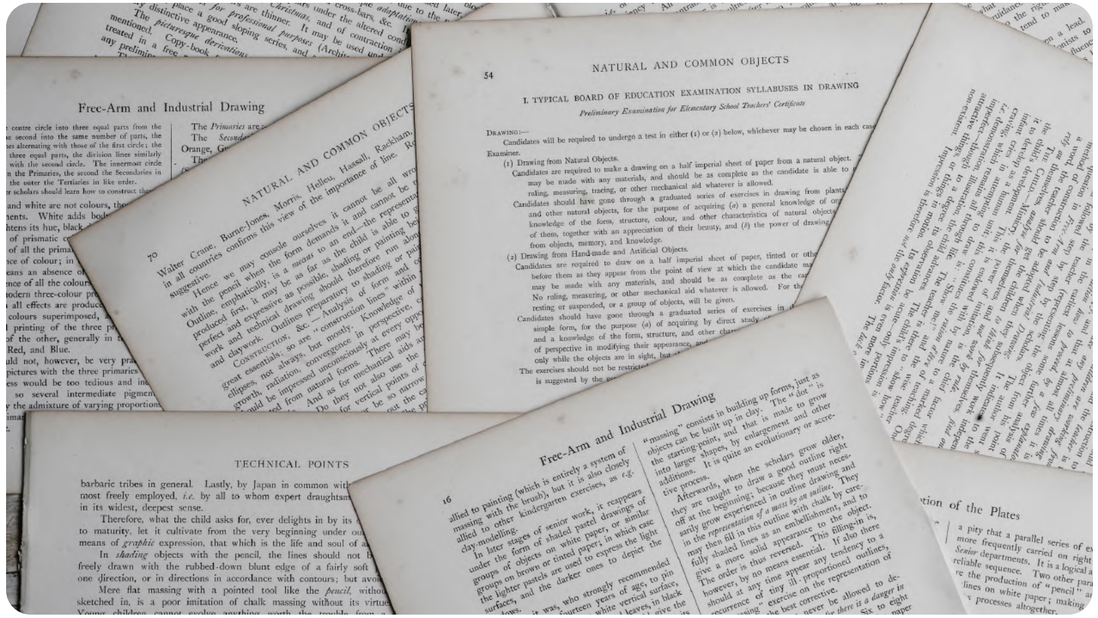


Types of Machine Learning



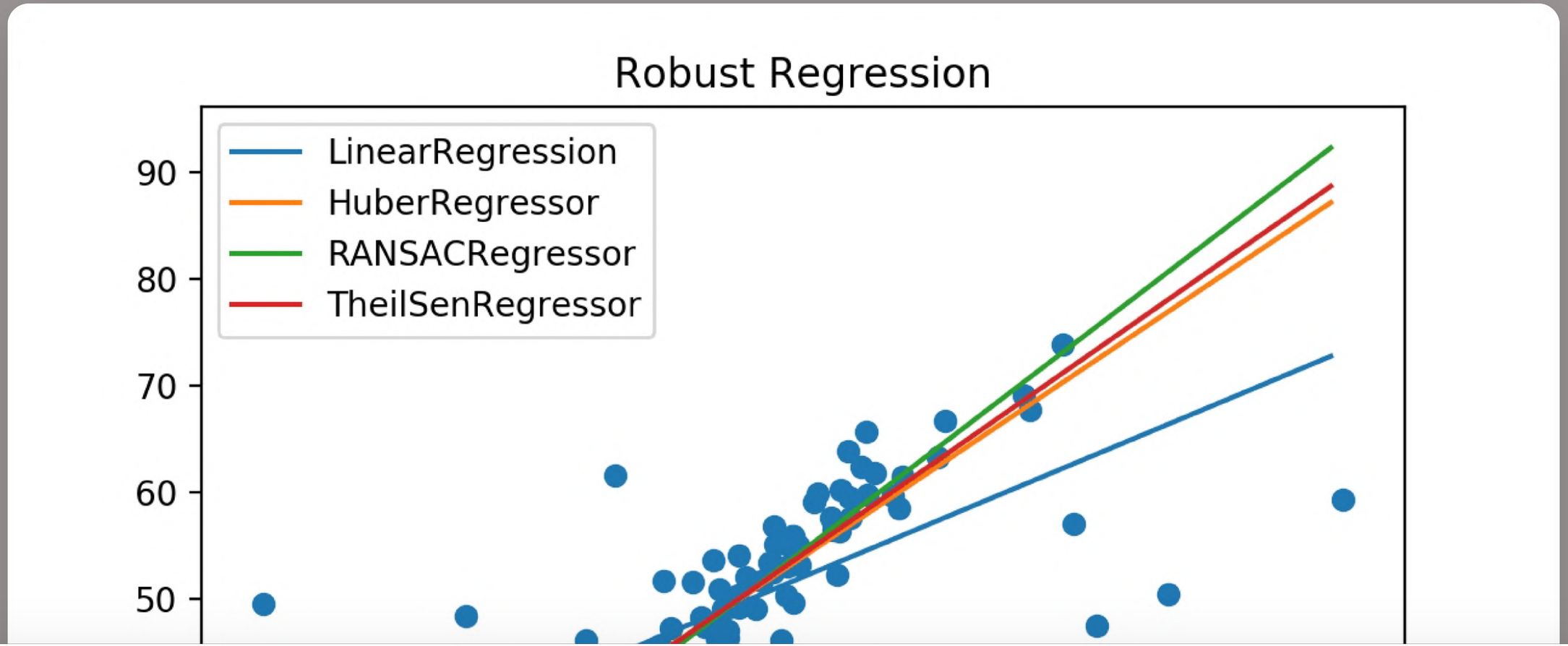
Supervised Learning

Task Driven algorithm.



Unsupervised Learning

Data Driven Algorithm.



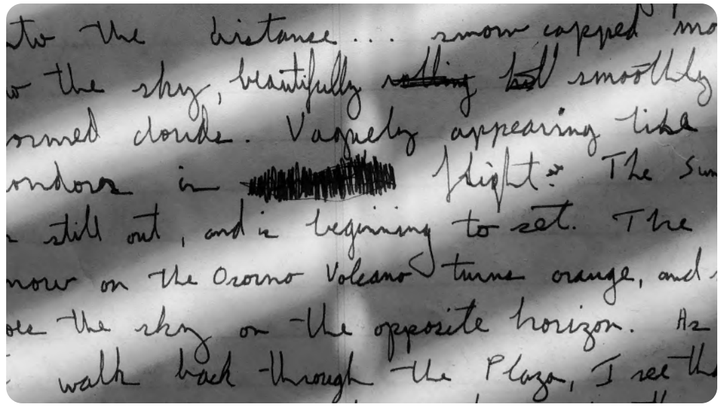
Supervised Learning

- Structured Data Given
- Task Driven Learning
- Example Problem :

  Given (x1, y1), (x2, y2) .....

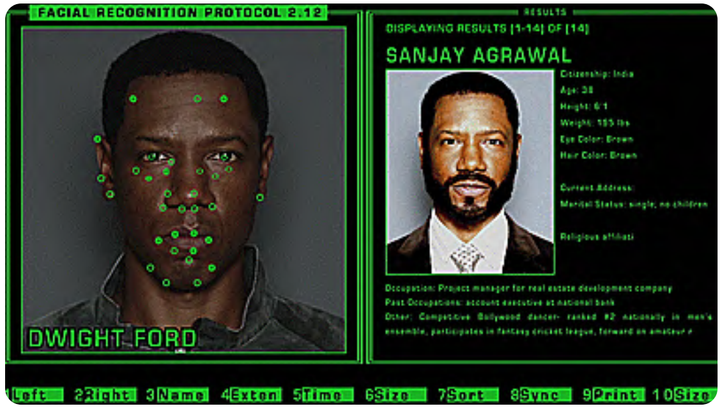
  Learn a function f(x) which predicts y when given x

Supervised Learning Applications



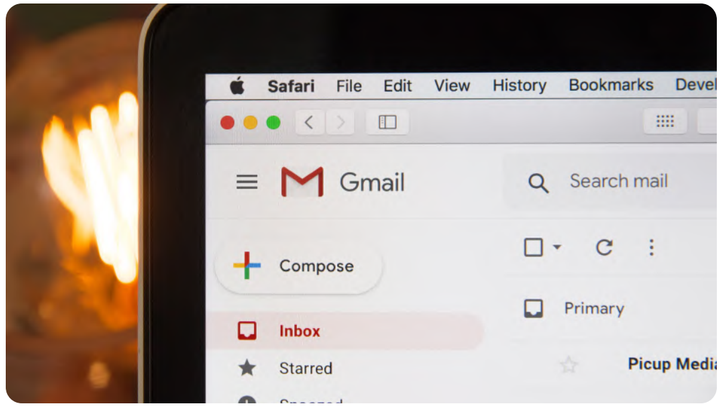
Text Recognition

Recognizing handwritten text.



Face Detection

Detecting faces which match in known database.

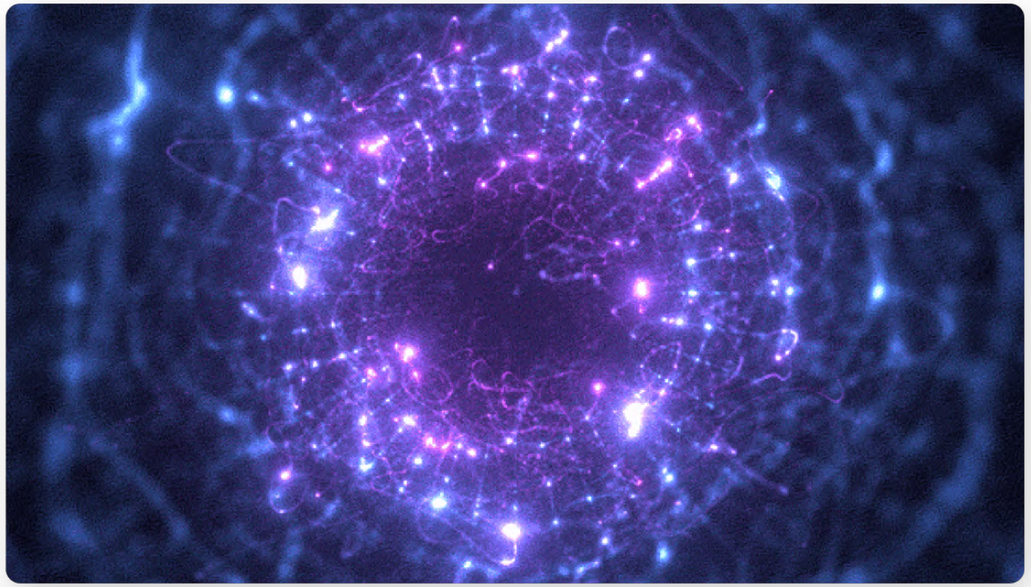


Spam Detection

Detecting Spam emails.

Supervised Learning Algorithms

Consists a huge variety of them so listing the popular ones.

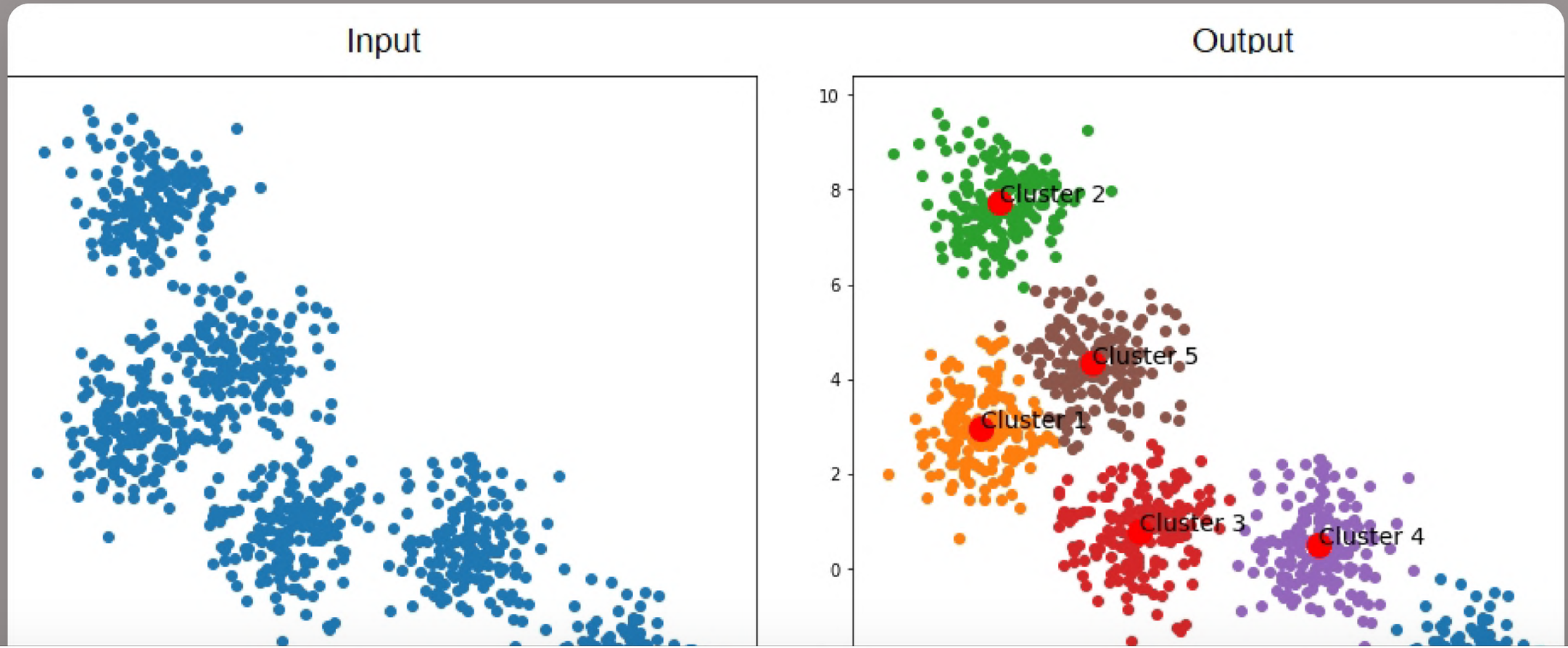


Regression

- Linear Regression
- Regression Trees
- Non-Linear Regression
- Bayesian Linear Regression
- Polynomial Regression

Classification

- Random Forest
- Decision Trees
- Logistic Regression
- Support vector Machines



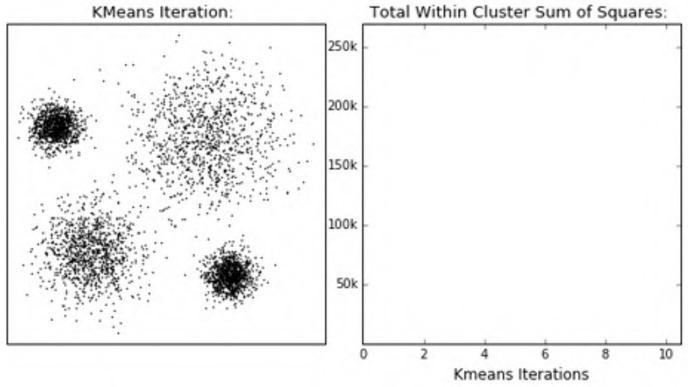
UnSupervised Learning

- UnStructured Data Given
- Data Driven Learning
- Example Problem :

  Given x1, x2, x3…….

  Output hidden structure behind the x’s

Unsupervised Learning Applications



Customer Segmentation.

Separating Customers on platform usage data.

Recommendation System

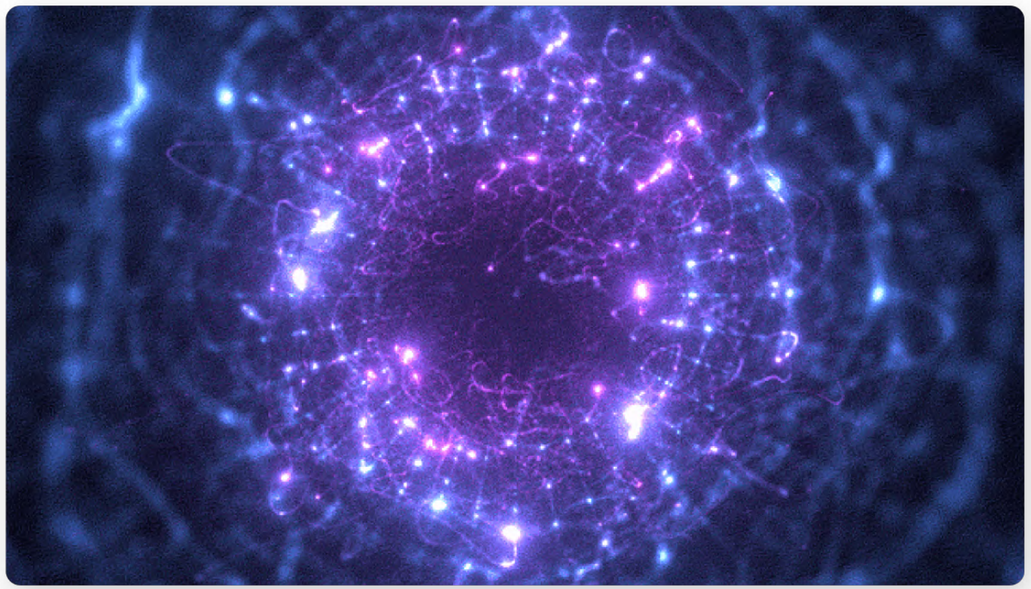
Recommending relevant goods / services to given input.

Similarity Detection

Clustering data into similar clusters.

Unsupervised Learning Algorithms

Consists a huge variety of them so listing the popular ones.



Popular Algorithms

- K-means clustering
- KNN (k-nearest neighbors)
- Hierarchal clustering
- Anomaly detection
- Neural Networks
- Principle Component Analysis
- Independent Component Analysis
- Apriori algorithm
- Singular value decomposition

Thank You!

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Avdhut Kamble

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