Chapter 1: Intro to Machine Learning

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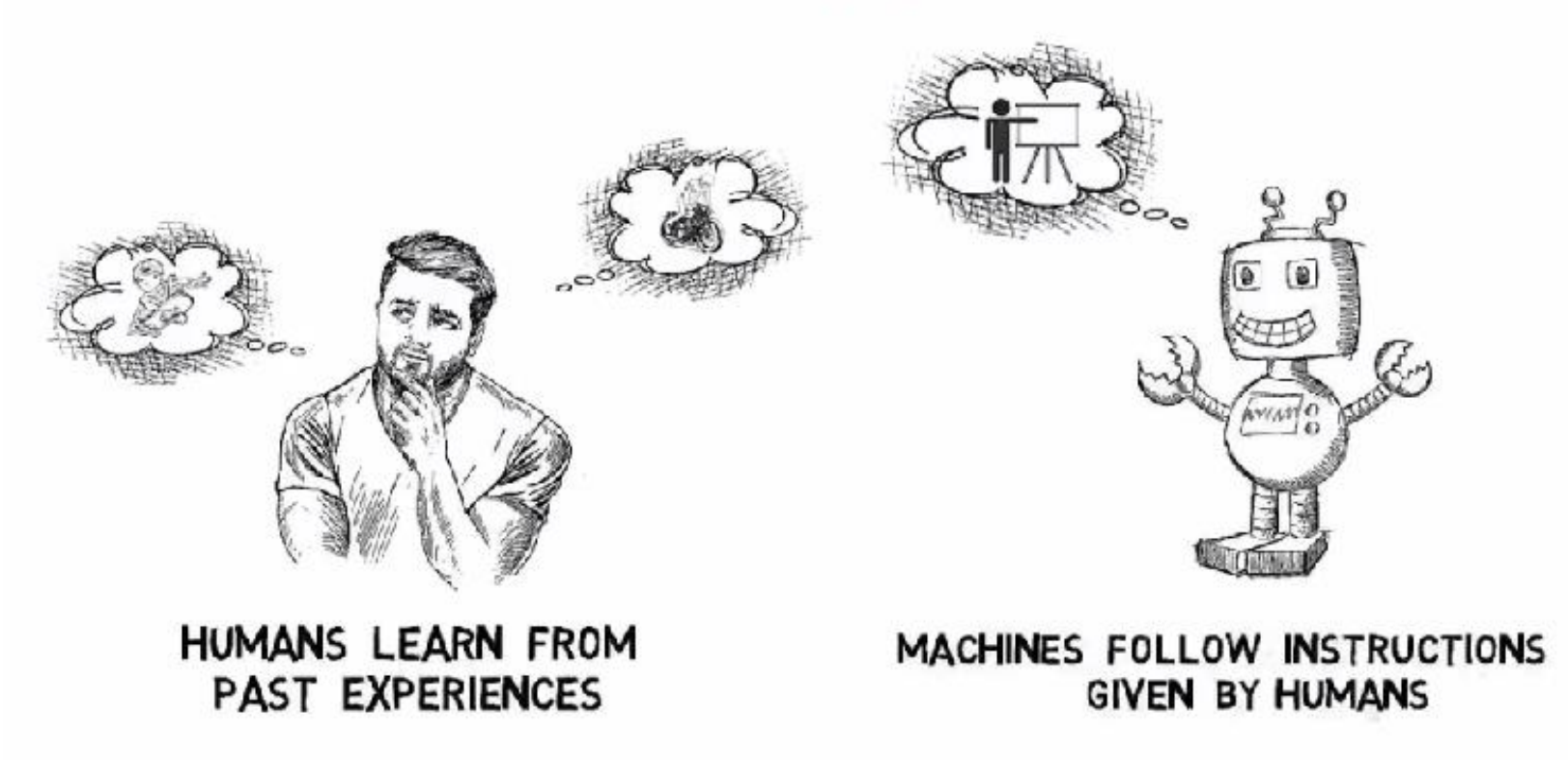
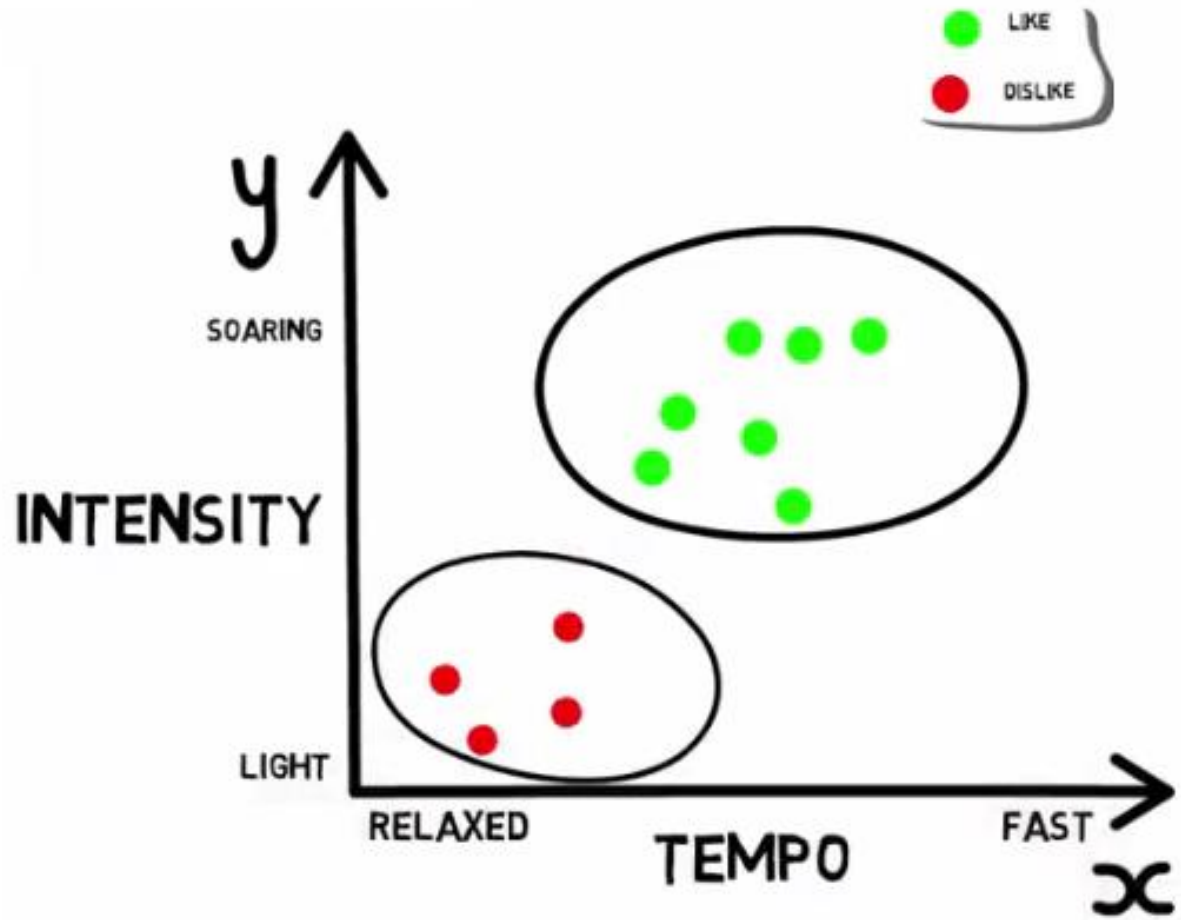
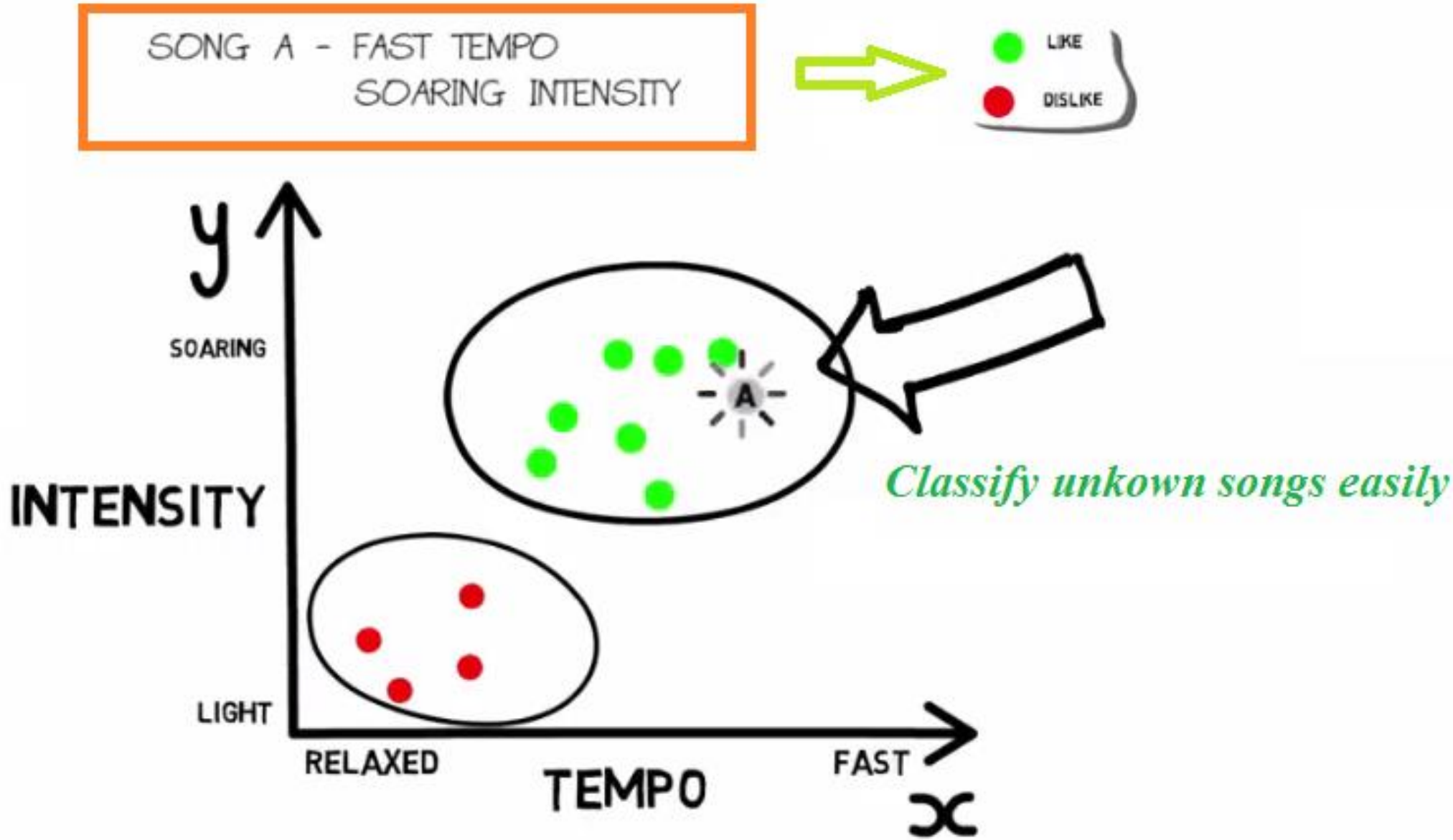


LISTENING TO SONGS...

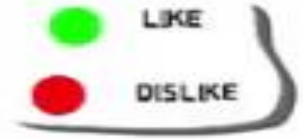
- TEMPO
- GENRE
- INTENSITY
- GENDER OF VOICE

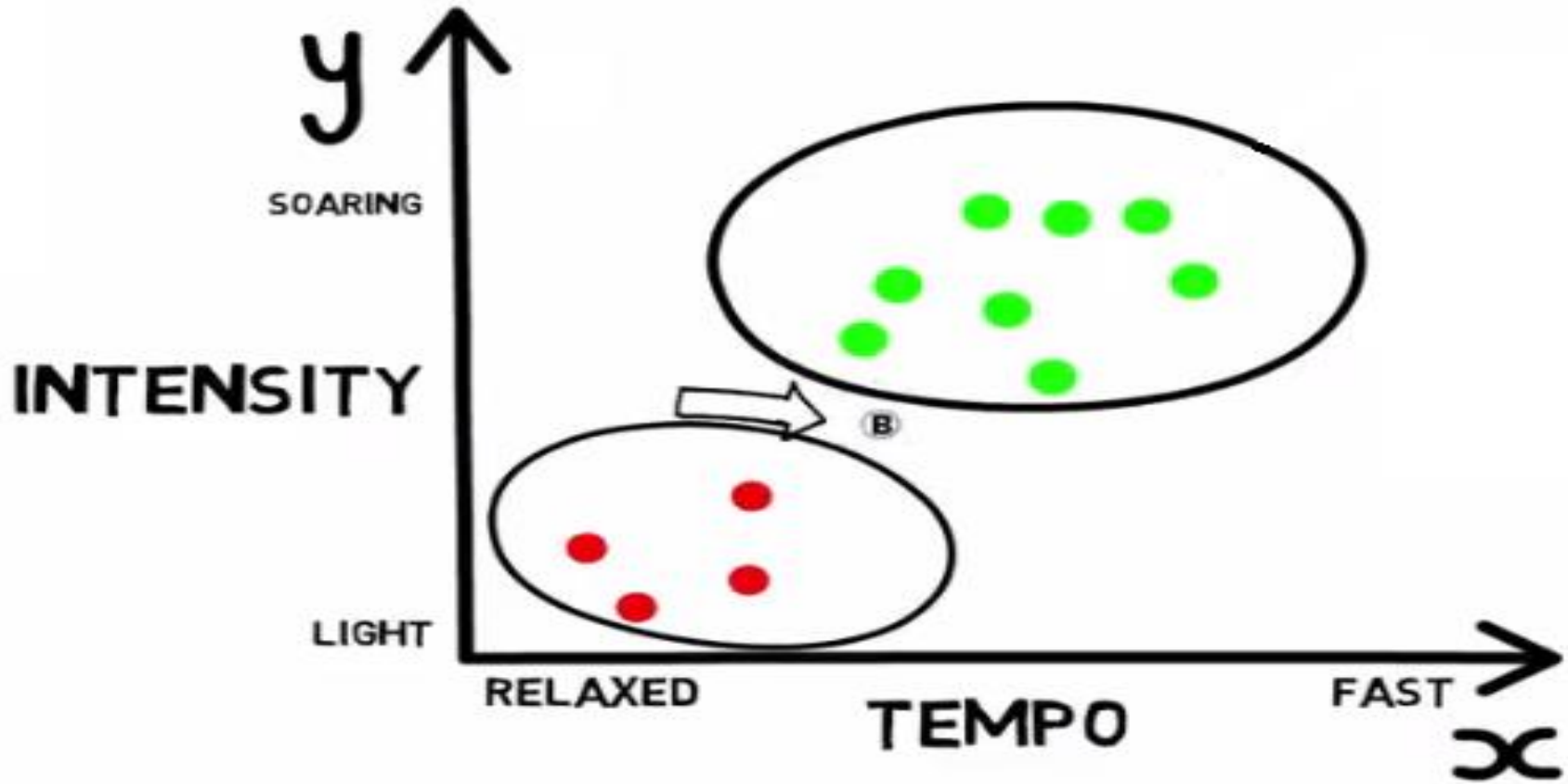




Classify unkown songs easily

SONG B - MEDIUM TEMPO
MEDIUM INTENSITY





THATS WHERE MACHINE LEARNING COMES IN...

Need Algorithm to predict to which side it goes

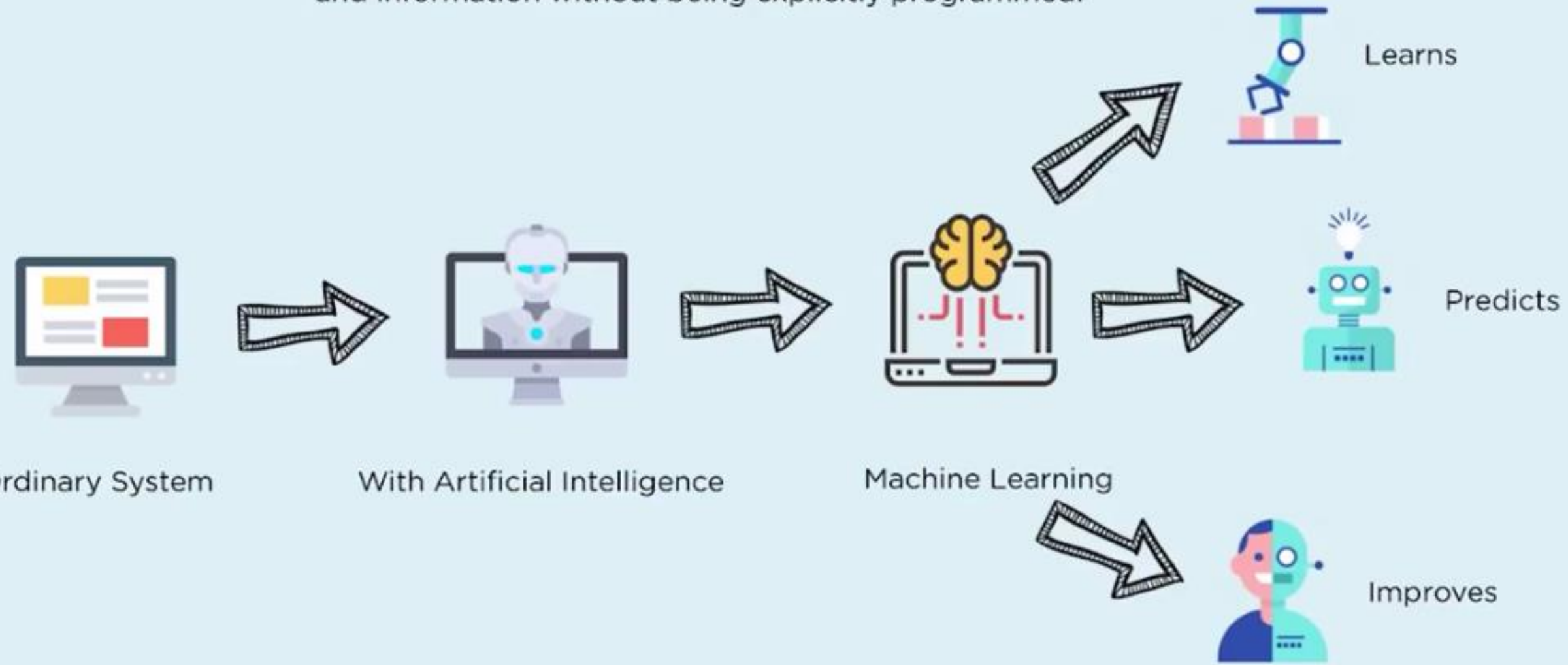
Algorithm is named Model

Need also more Data to make better prediction

MORE DATA > BETTER MODEL > HIGHER ACCURACY

What is Machine Learning?

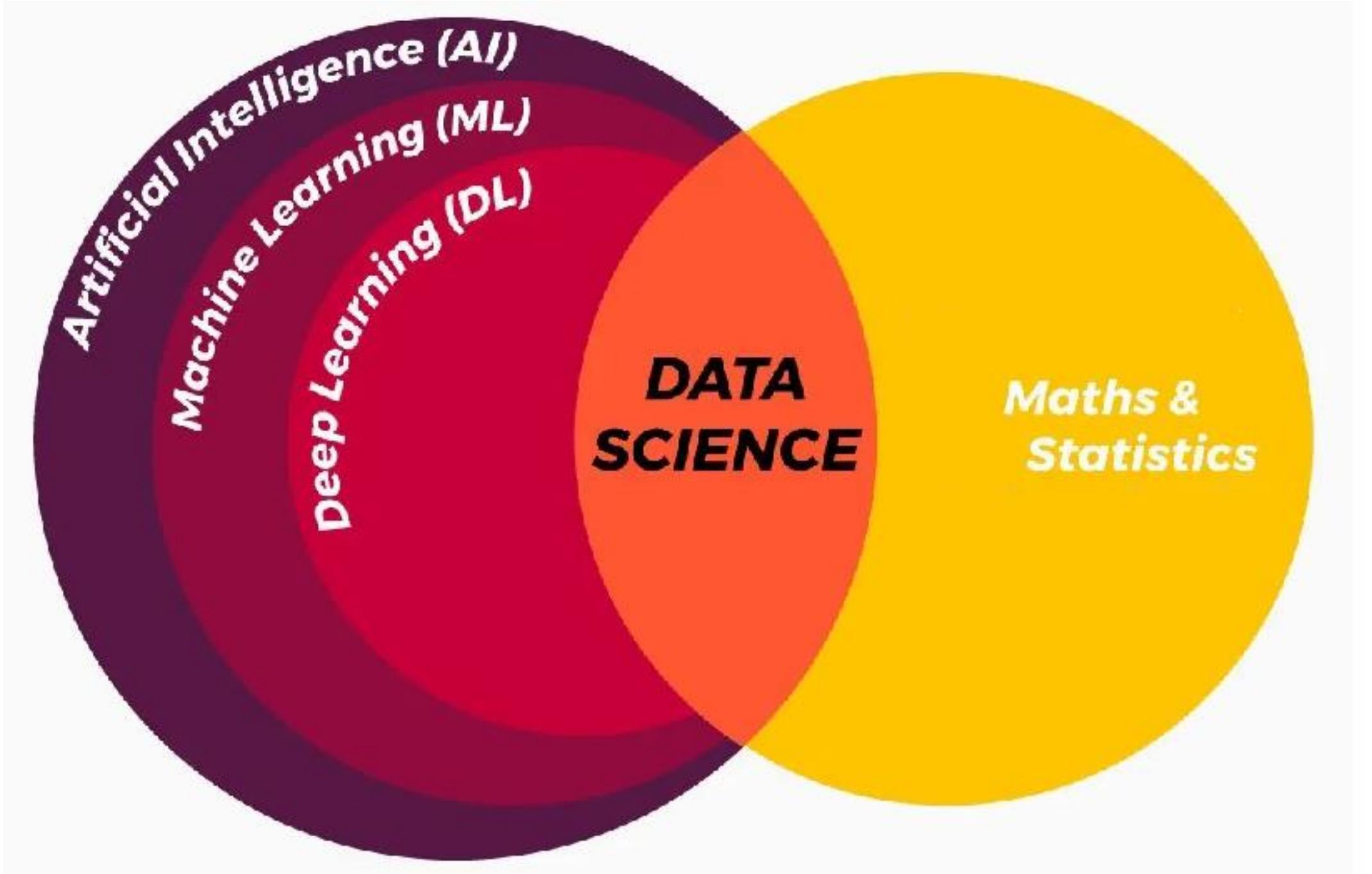
Machine learning is the science of making computers learn and act like humans by feeding data and information without being explicitly programmed!



Machine Learning (ML)

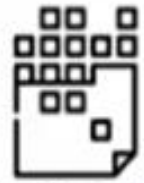
- Traditional programming **uses known algorithms** to produce results from data: Data + Algorithms = **Results**
- Machine learning **creates new algorithms** from data and results:

  Data + Results = **Algorithms (Model)**


Artificial Intelligence (AI)
Machine Learning (ML)
Deep Learning (DL)
DATA SCIENCE
Maths & Statistics

Types of Machine Learning

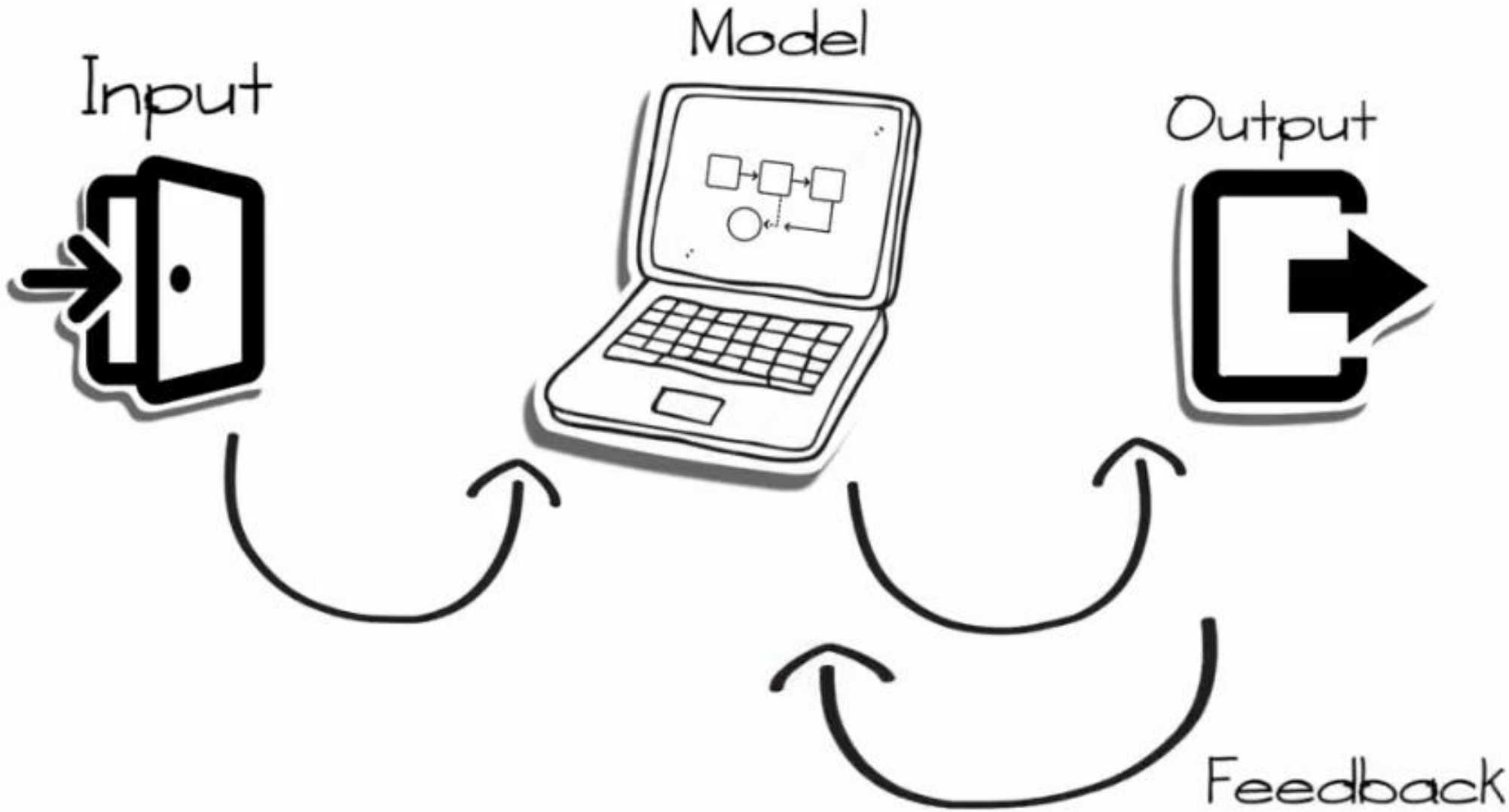
Supervised Learning
The machine learns from the training data that is labeled



Unsupervised Learning
Non-labeled training data

Reinforcement Learning
The machine learns on its own

MACHINE LEARNING MODEL



SCENARIO - 1

Facebook
Face Recognition

SCENARIO - 2

Netflix Movie
Recommendation

SCENARIO - 3

Fraud
Detection

APPLICATIONS OF MACHINE LEARNING

HEALTHCARE

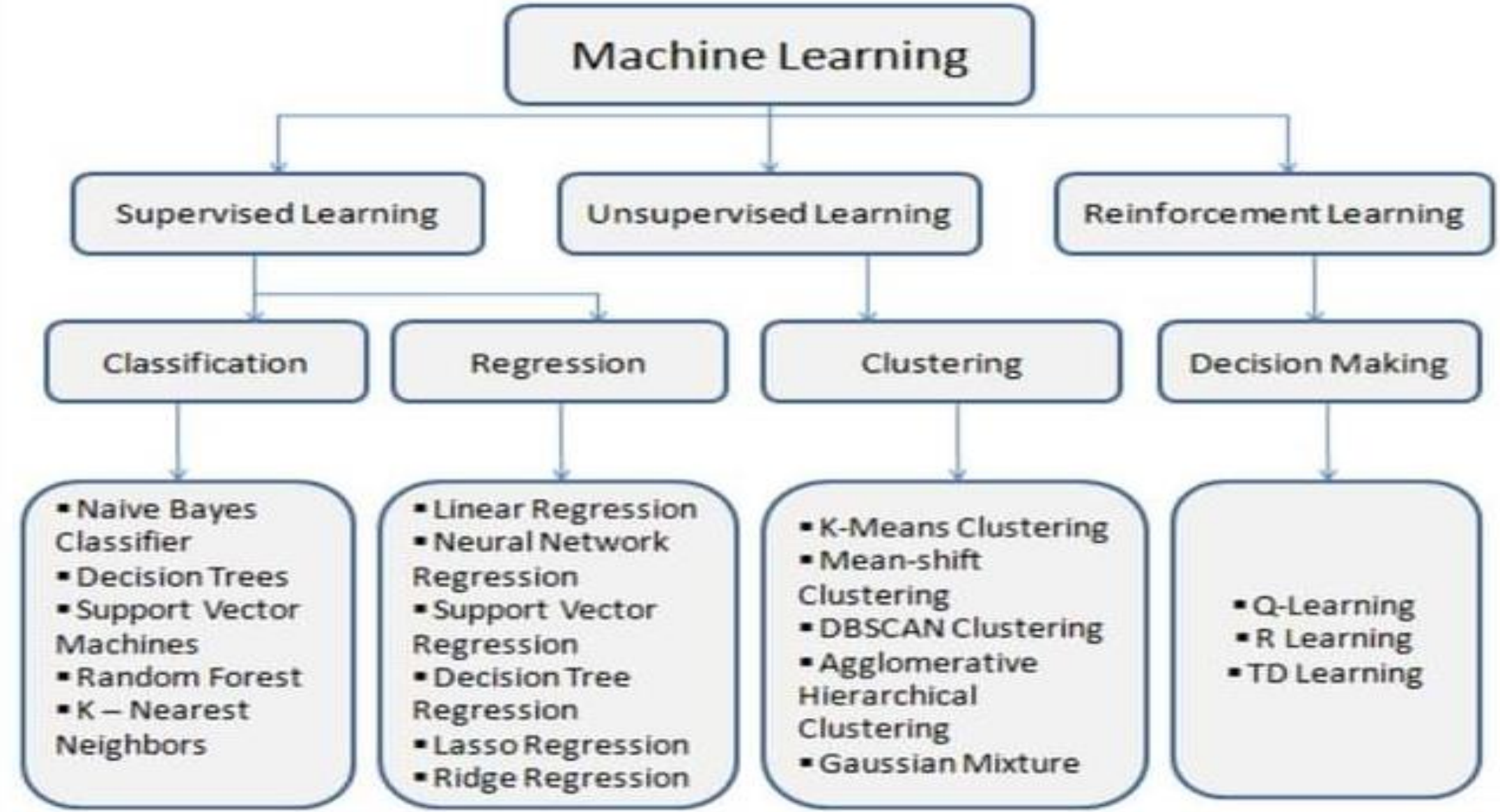
SENTIMENT ANALYSIS

FRAUD DETECTION

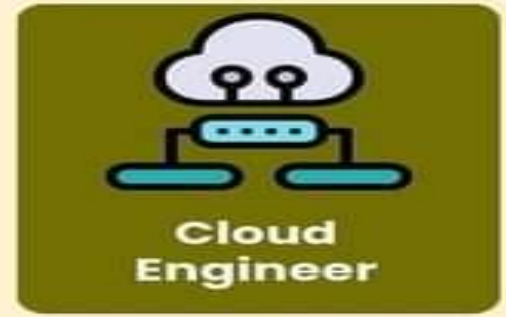
E-COMMERCE

DIFFERENTIAL PRICING IN REAL TIME BASED ON:

- DEMAND
- NUMBER OF CARS AVAILABLE
- BAD WEATHER
- RUSH HOUR

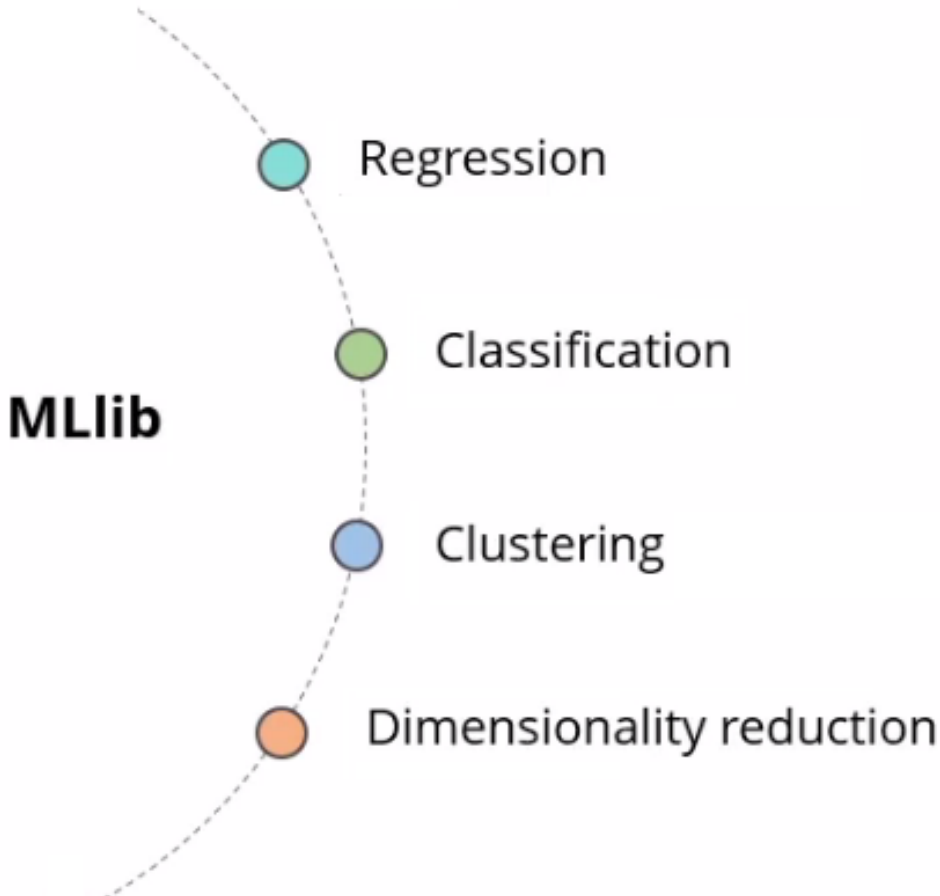

Machine Learning
Supervised Learning
Unsupervised Learning
Reinforcement Learning
Classification
Regression
Clustering
Decision Making
▪ Naive Bayes Classifier
▪ Decision Trees
▪ Support Vector Machines
▪ Random Forest
▪ K – Nearest Neighbors
▪ Linear Regression
▪ Neural Network Regression
▪ Support Vector Regression
▪ Decision Tree Regression
▪ Lasso Regression
▪ Ridge Regression
▪ K-Means Clustering
▪ Mean-shift Clustering
▪ DBSCAN Clustering
▪ Agglomerative Hierarchical Clustering
▪ Gaussian Mixture
▪ Q-Learning
▪ R Learning
▪ TD Learning

12 Highest Paying Programming Jobs



CRITERIA	COMPUTER VISION	VS	MACHINE LEARNING
DEFINITION	Computer vision is a subset of artificial intelligence that deals with enabling computers to interpret and understand visual information from the world, much like humans do with their eyes and brains.		Machine learning is a broader field within artificial intelligence that focuses on the development of algorithms and models that allow computers to learn andpredictions or decisions.
PRIMARY GOAL	The main goal of computer vision is to process and analyze visual data (images or videos) to extract meaningful information or make decisions based on what is seen.		The main goal of machine learning is to enable computers to learn from data and generalize patterns in order to make accurate predictions, classifications, or decisions on new, unseen data.
TECHNIQUES	Computer vision often involves techniques such as image processing, feature extraction, pattern recognition, and various specialized algorithms for tasks like object detection, image segmentation, recognition.		Machine learning encompasses a wide range of techniques including supervised learning, unsupervised learning, and reinforcement learning.
APPLICATIONS	Common applications of computer vision include tasks like image recognition, object detection, pose estimation, and 3D reconstruction. It is widely used in areas like autonomous vehicles, robotics etc		Machine learning is applicable to a wide array of tasks beyond computer vision. It is used in areas like natural language processing (NLP), recommendation systems, fraud detection, gaming, finance etc

Machine Learning in Spark



Do you want to predict a category? That's classification!

For instance, whether the stock price will increase or decrease

Do you want to predict a quantity? That's regression!

For instance, predicting the age of a person based on the height, weight, health and other factors

Do you want to discover structure in unexplored data? That's clustering

For instance: Finding groups of customers with similar behavior given a large database of customer data containing their demographics and past buying records

Do you want to detect an anomaly? That's anomaly detection!

For instance, you want to detect money withdrawal anomalies

Applications of Machine Learning

GOOGLE MAPS PREDICTS WHETHER THE TRAFFIC IS CLEAR, SLOW-MOVING OR HEAVILY CONGESTED BASED ON TWO MEASURES:

- ❑ AVERAGE TIME TAKEN ON SPECIFIC DAYS AT SPECIFIC TIMES ON THAT ROUTE
- ❑ REAL TIME LOCATION DATA OF VEHICLES FROM GOOGLE MAPS APPLICATION AND SENSORS

Applications of Machine Learning

GMAIL IS ONE OF THE MANY POPULAR EMAIL PROVIDERS WHO HAVE AN INBUILT SPAM FILTER:

SPAM FILTERS ARE OF THE FOLLOWING TYPES:

- ❑ CONTENT FILTERS
- ❑ HEADER FILTERS
- ❑ GENERAL BLACKLIST FILTERS
- ❑ RULES-BASED FILTERS
- ❑ PERMISSION FILTERS
- ❑ CHALLENGE-RESPONSE FILTERS

Steps of General Machine Learning Pipeline