Python for Data Analysis

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You're interested in getting into **Artificial Intelligence**... BUT:

- You don't know where to begin.
- You're LOST with a lot of resources.
- You don't believe you have the needed background.
- You're SCARED!

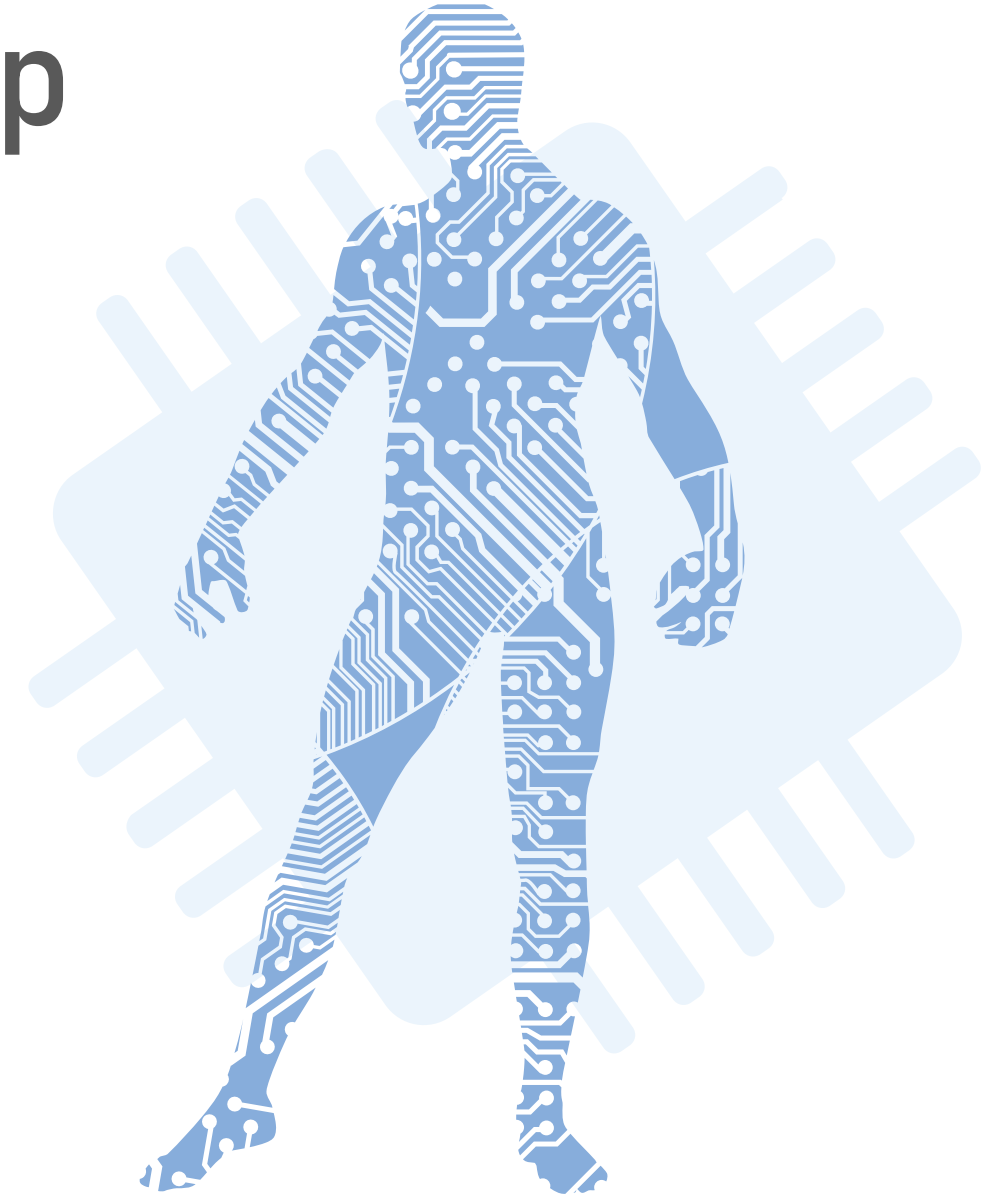
During this workshop

01 Get introduced to the world of **Artificial Intelligence** and **Machine Learning**

02 Check out different algorithms of ML

03 Apply **Machine Learning** algorithms to build solutions

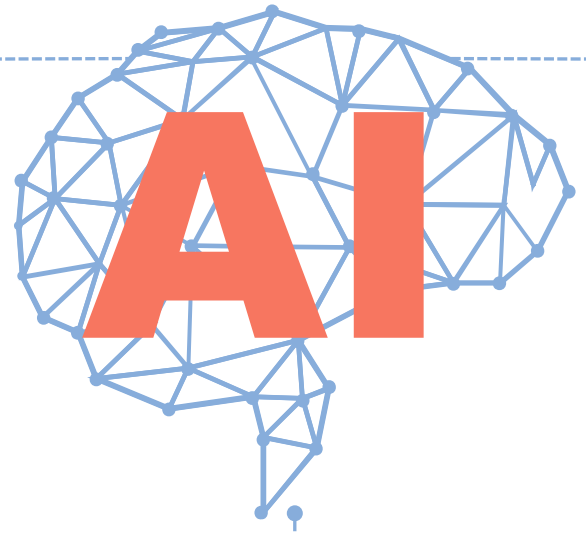
04 Roadmap to learn ML



What is Artificial Intelligence?

Building intelligent algorithms/agents which can:

Process large amounts of data.



Recognize hidden patterns in the data.

Perform human-like tasks (simulating human intelligence)

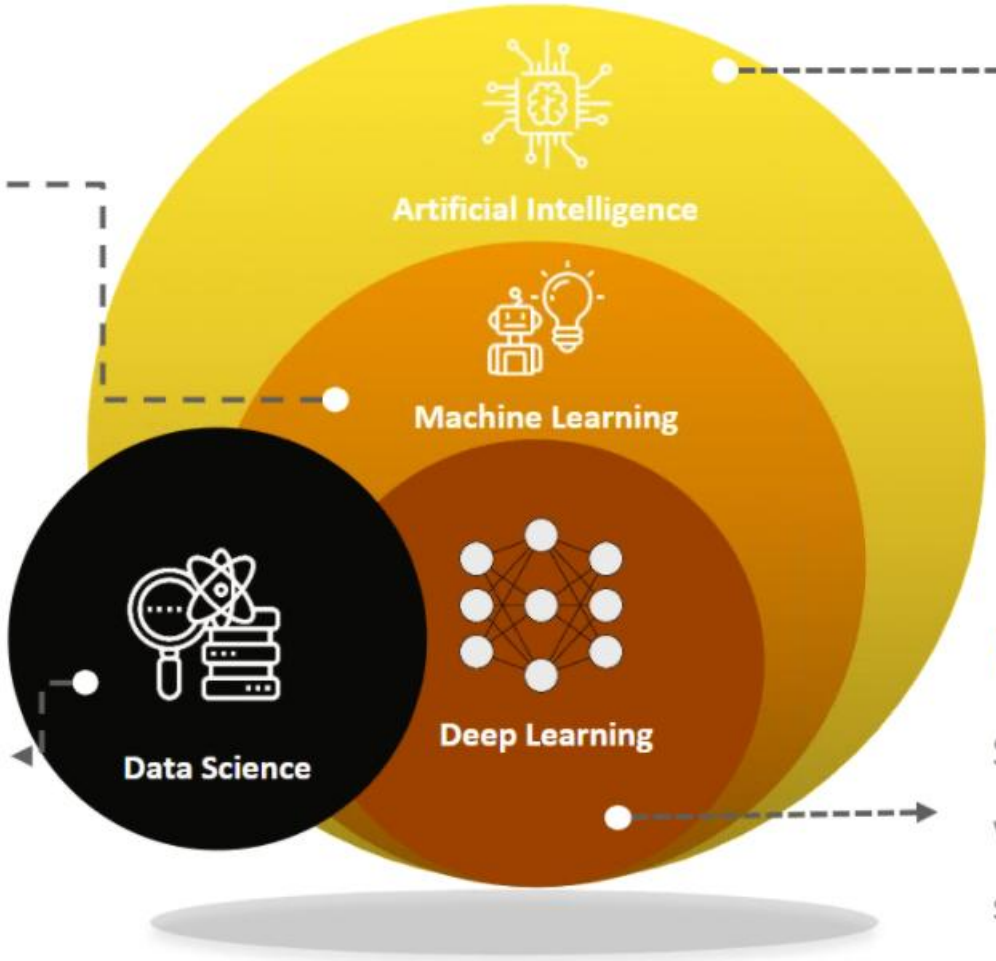
learn from experience .

Adjust to unseen data/input .

AI vs ML vs DL vs DS

Machine Learning

A subset of AI which gives a machine the ability to use the stat model to learn from the data.



Artificial Intelligence

Area of computer science that emphasizes on the creation of intelligent machines that work and react like humans.

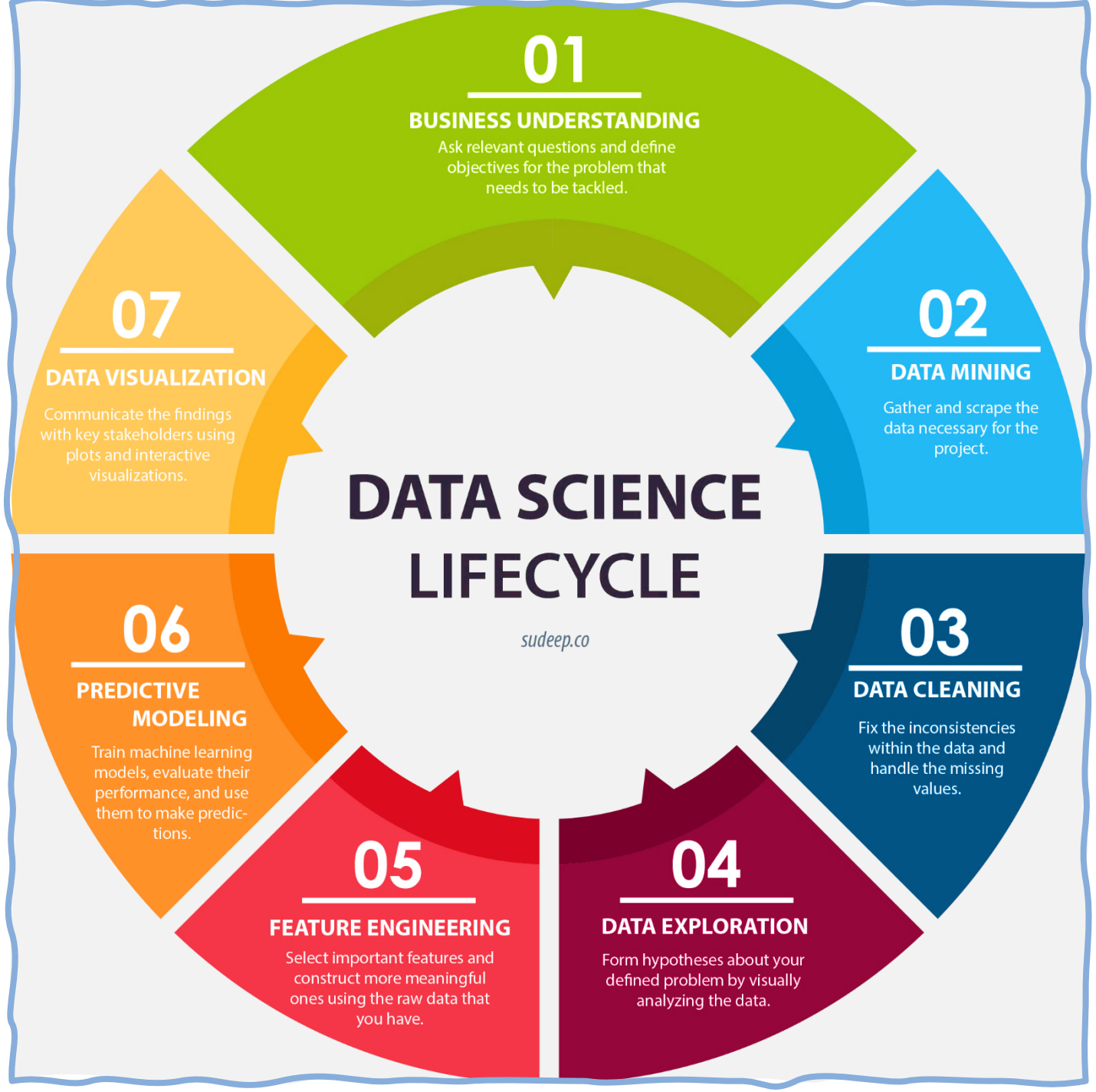
Data Science

Data science is not exactly a subset of ML, but it uses ML and DL to gain insights from both structured and unstructured data.

Deep Learning

Subset of machine learning concerned with algorithms inspired by the structure and function of the brain called artificial neural networks.

Data Science Lifecycle

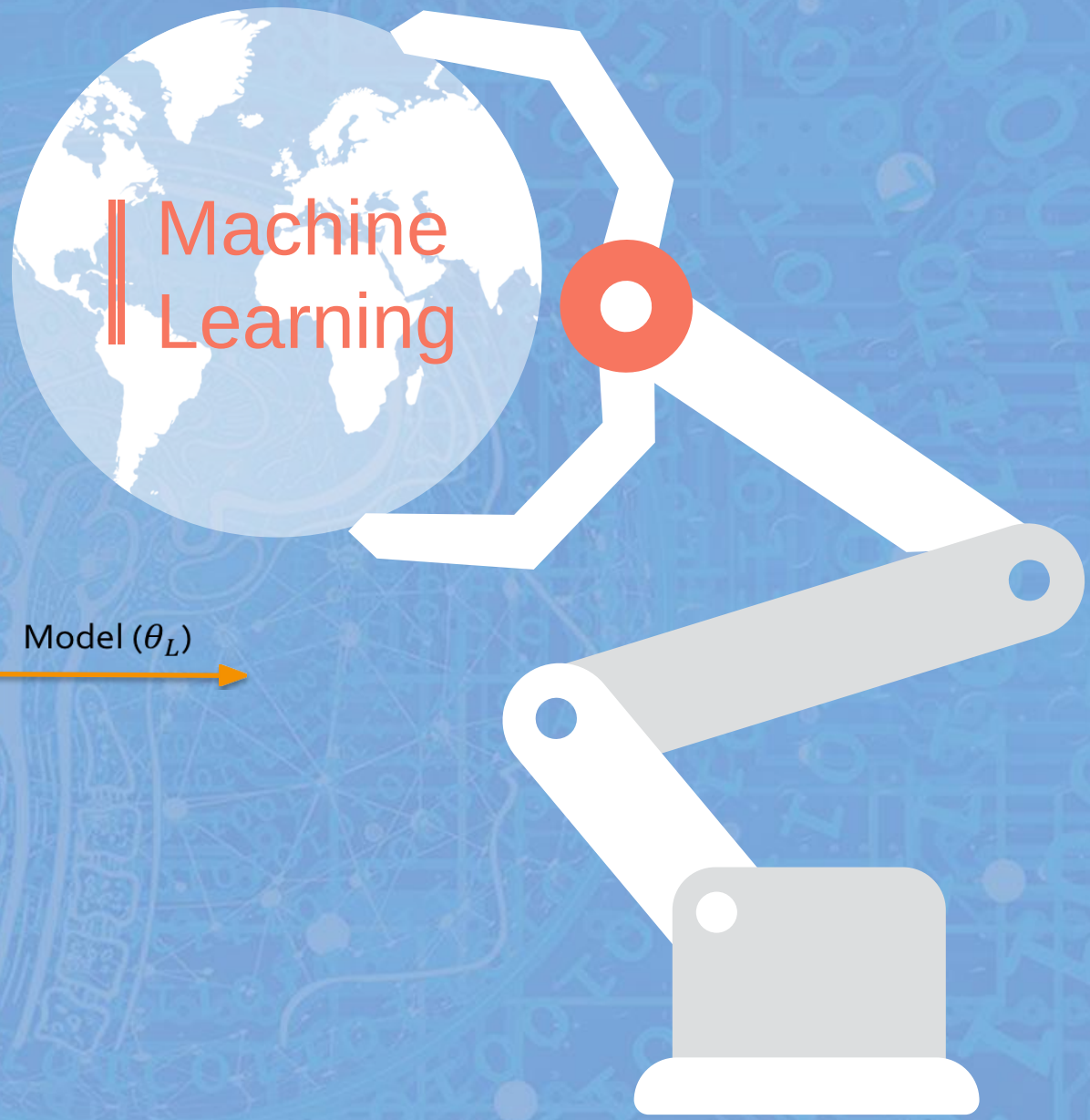


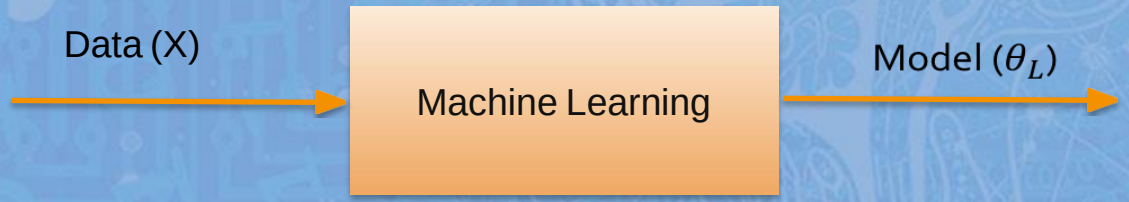
ARTIFICIAL INTELLIGENCE

What do you think you need to get started with ML?

Ready to dive deeper into Machine Learning?

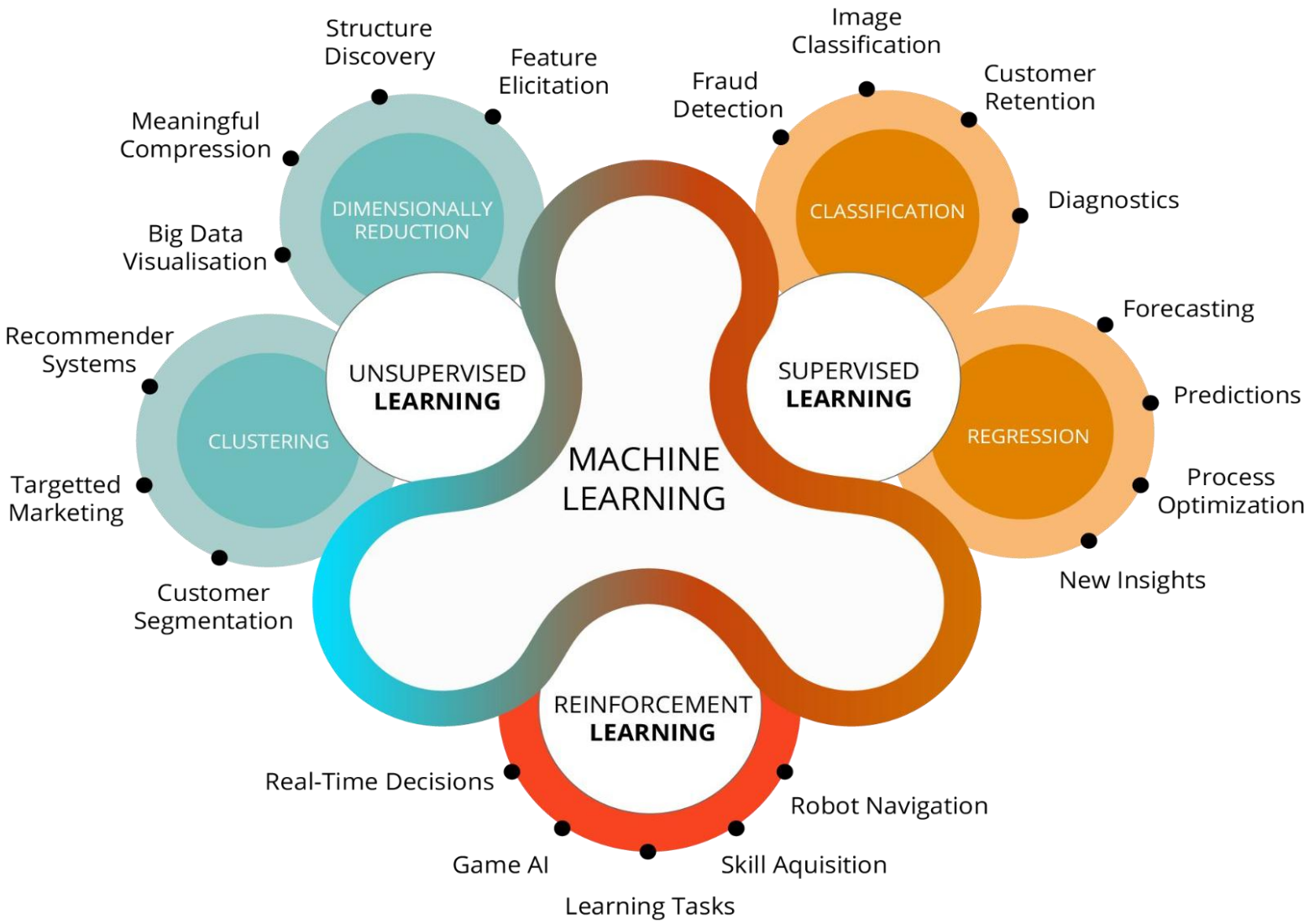
Machine learning aims at developing algorithms and models for machines to perform predictions or learn to perform human tasks.





Once the model is learned, it can be used for desired prediction of new unknown data

Types of Machine Learning



SUPERVISED LEARNING

Supervised Learning

Classification

Categorical

Discrete Values

Predicting a class

Example: Predict Spam/No-spam Email

Regression

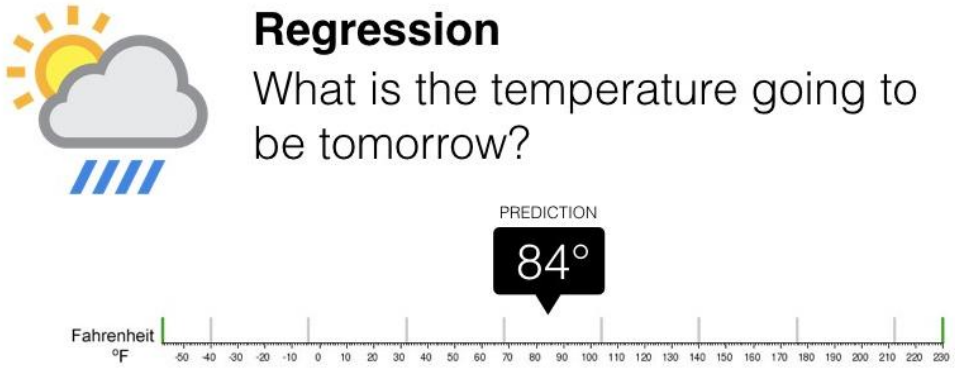
Numerical

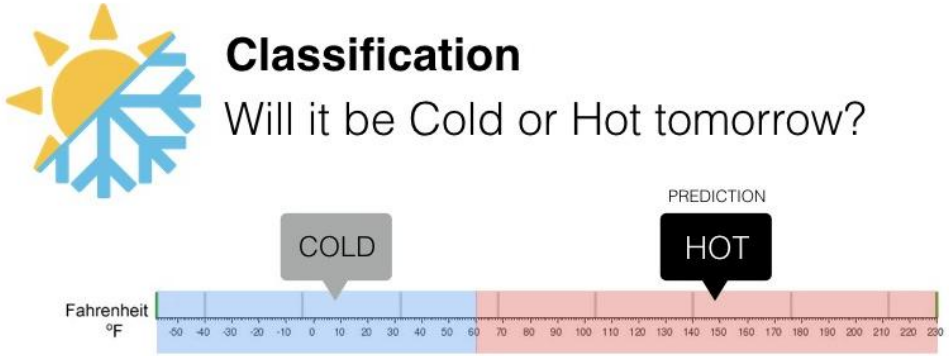
Continuous Values

Predicting a quantity/intensity

Example: Predicting GPA of students

Classification vs Regression models





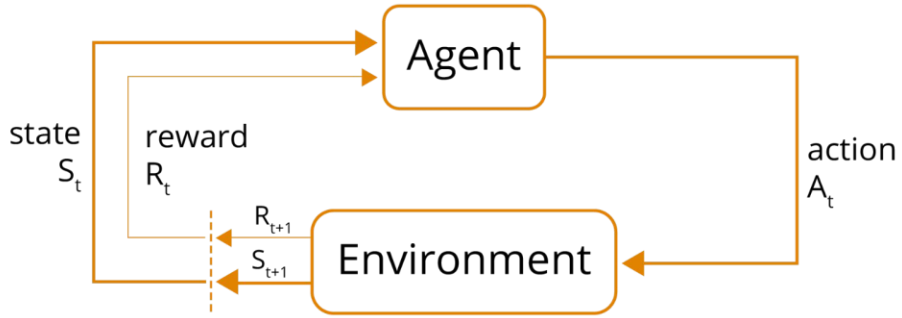
UNSUPERVISED LEARNING

Raw Data

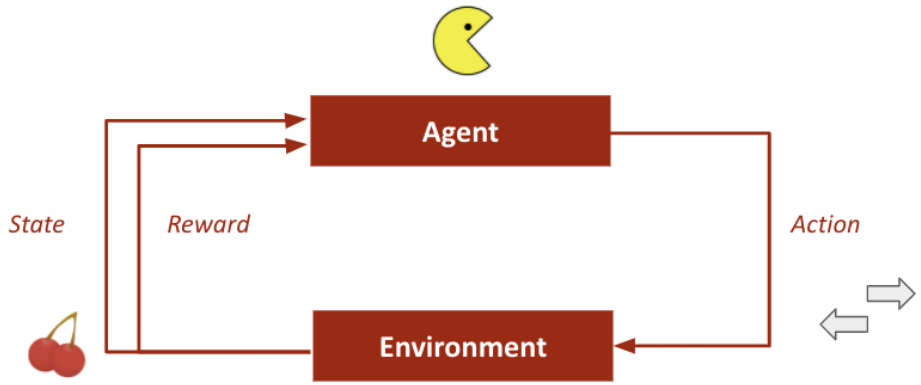
Unsupervised Machine Learning

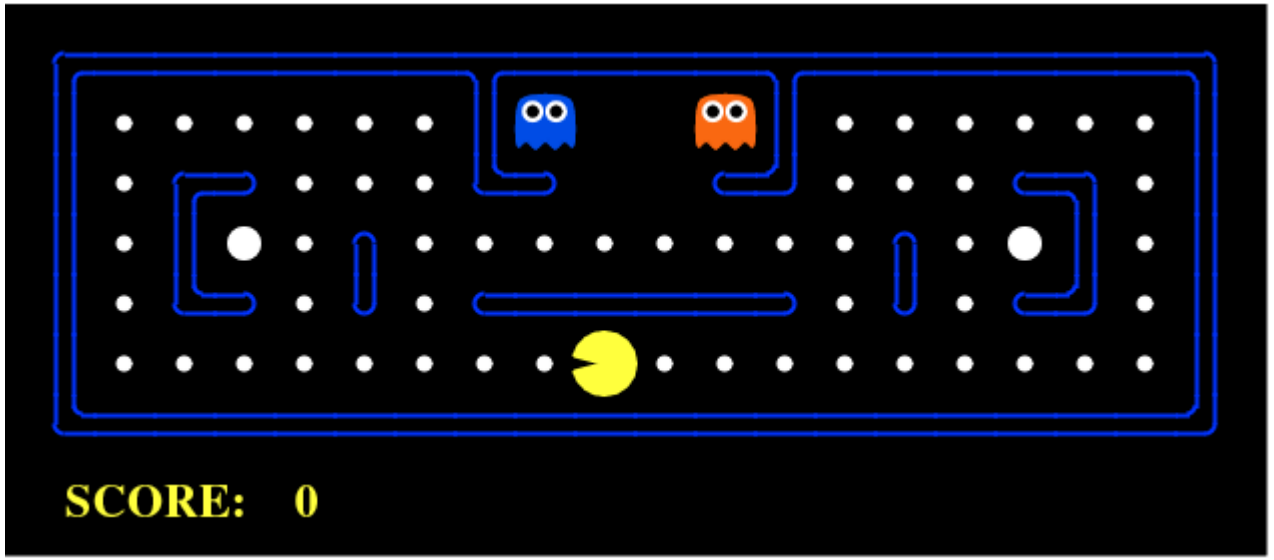
Reinforcement Learning

- An agent interacts with an environment and performs action
- Learns through experience (reward mechanism)



Reinforcement Learning

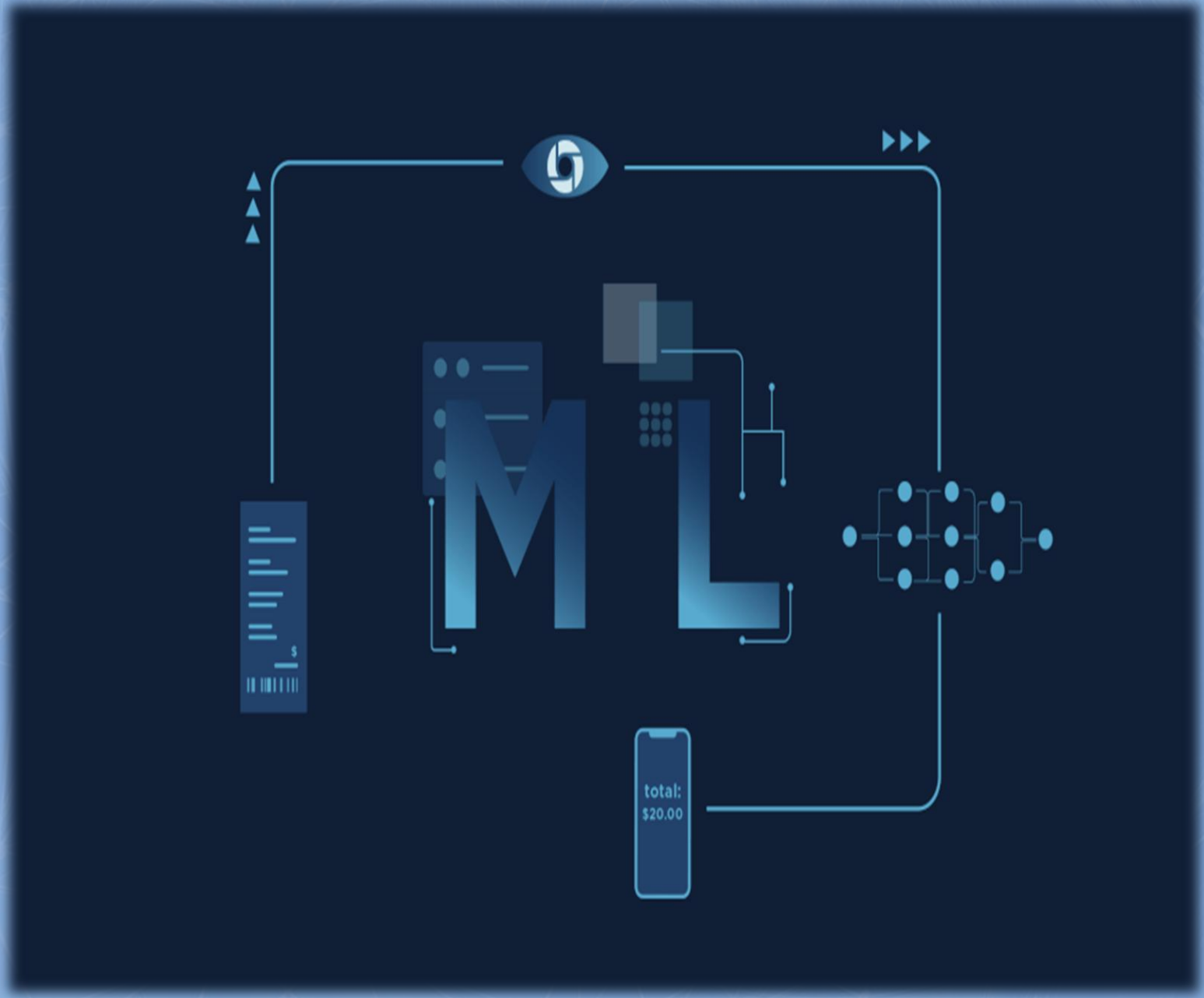




MACHINE

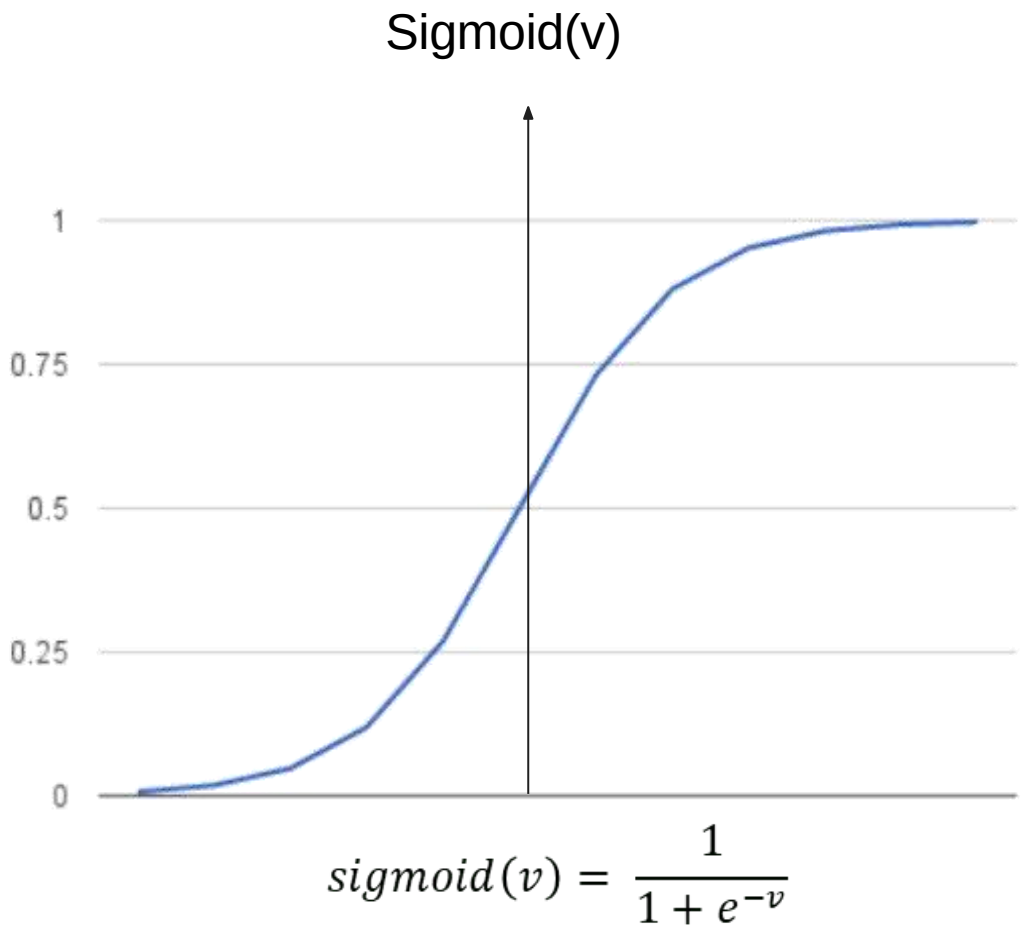
LEARNING

ALGORITHMS



Logistic Regression

- It is the go-to method for **binary classification** problems.
- The core of logistic regression is what we call the *logistic function* or the *sigmoid function*.
- This function maps values from all ranges to become between 0 and 1.



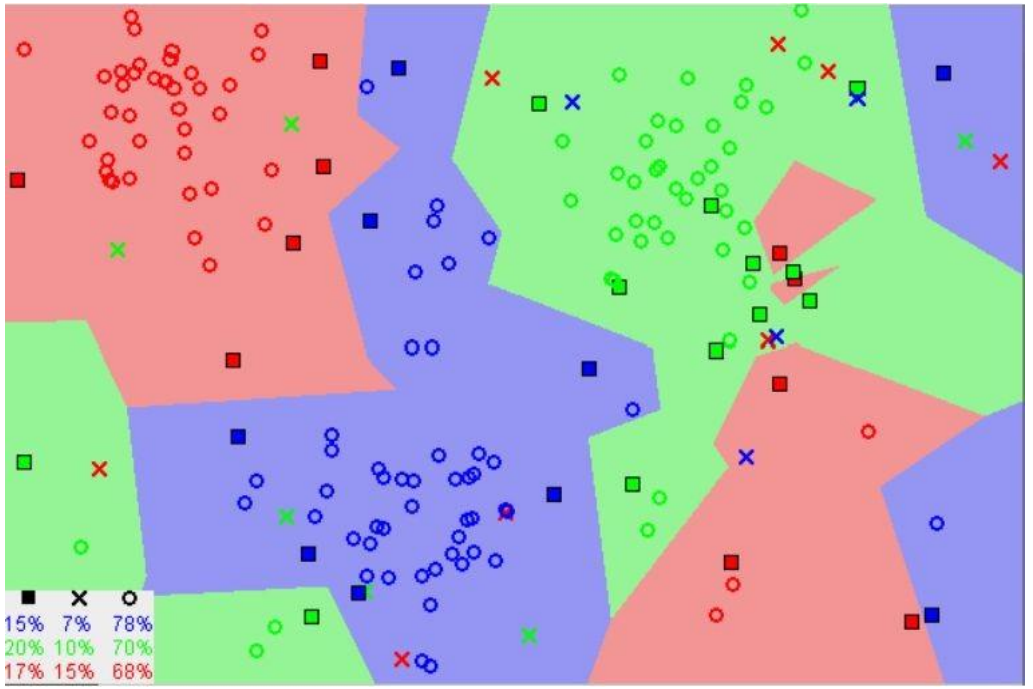
Logistic Regression

- We usually use this algorithm to obtain binary values (0 or 1)
- The output of this function is treated as a probability of an input sample belonging to a class
- If output > 0.5, we consider it 1, and else we consider it 0

Output of Sigmoid	Mapped Output
0.7	1
0.2	0
0.6	1
0.4	0

K- Nearest Neighbors (K-NN)

- Classification algorithm
- It classifies new data instances based on the **K** most similar training examples
- The K-NN algorithm assumes that similar things exist in close proximity. In other words, similar things are “close” to each other.



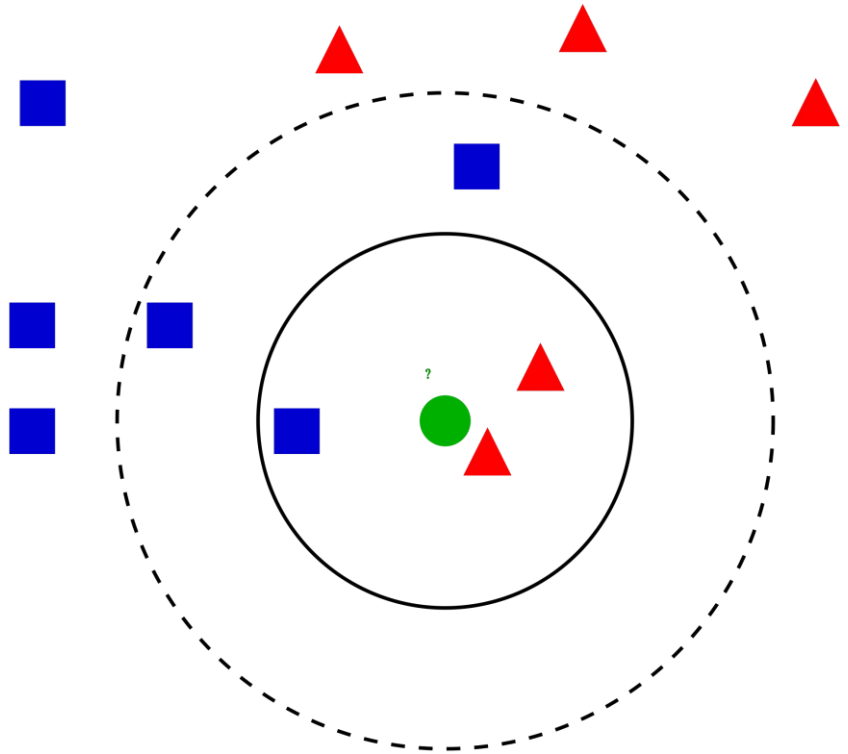
K- Nearest Neighbors (K-NN)

Basic Algorithm:

- We have initially labeled data points
- We need to predict the class of a new data point based on its k nearest neighbors
- Prediction is made by majority vote

K = 3?

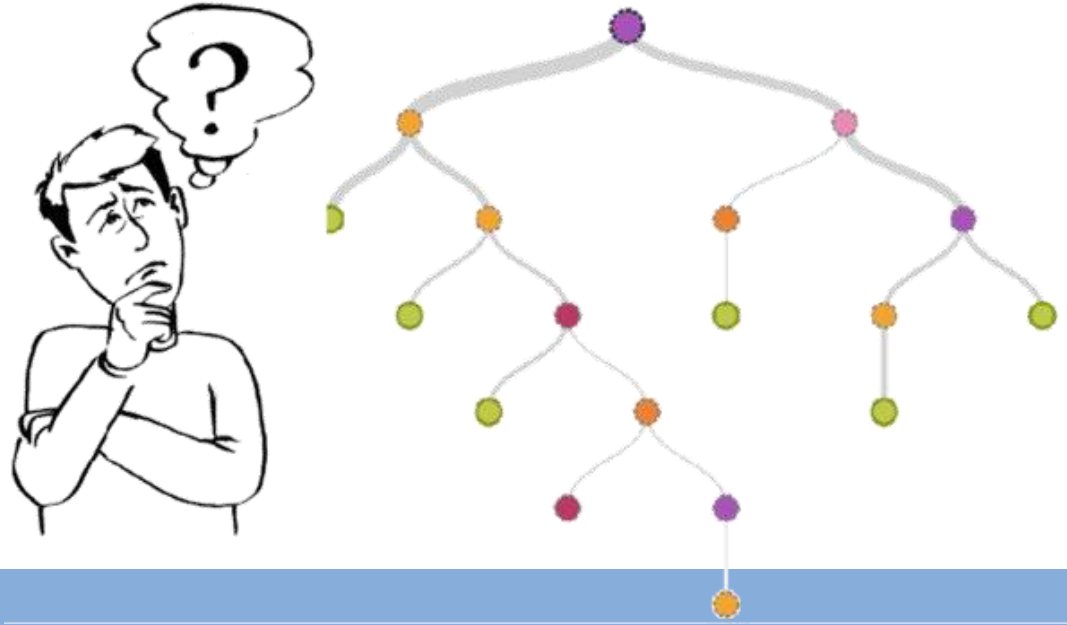
K = 5?



Decision Tree

- Decision tree is a **supervised learning** algorithm that creates a model that can predict a target variable by learning somewhat simple decision rules during training.

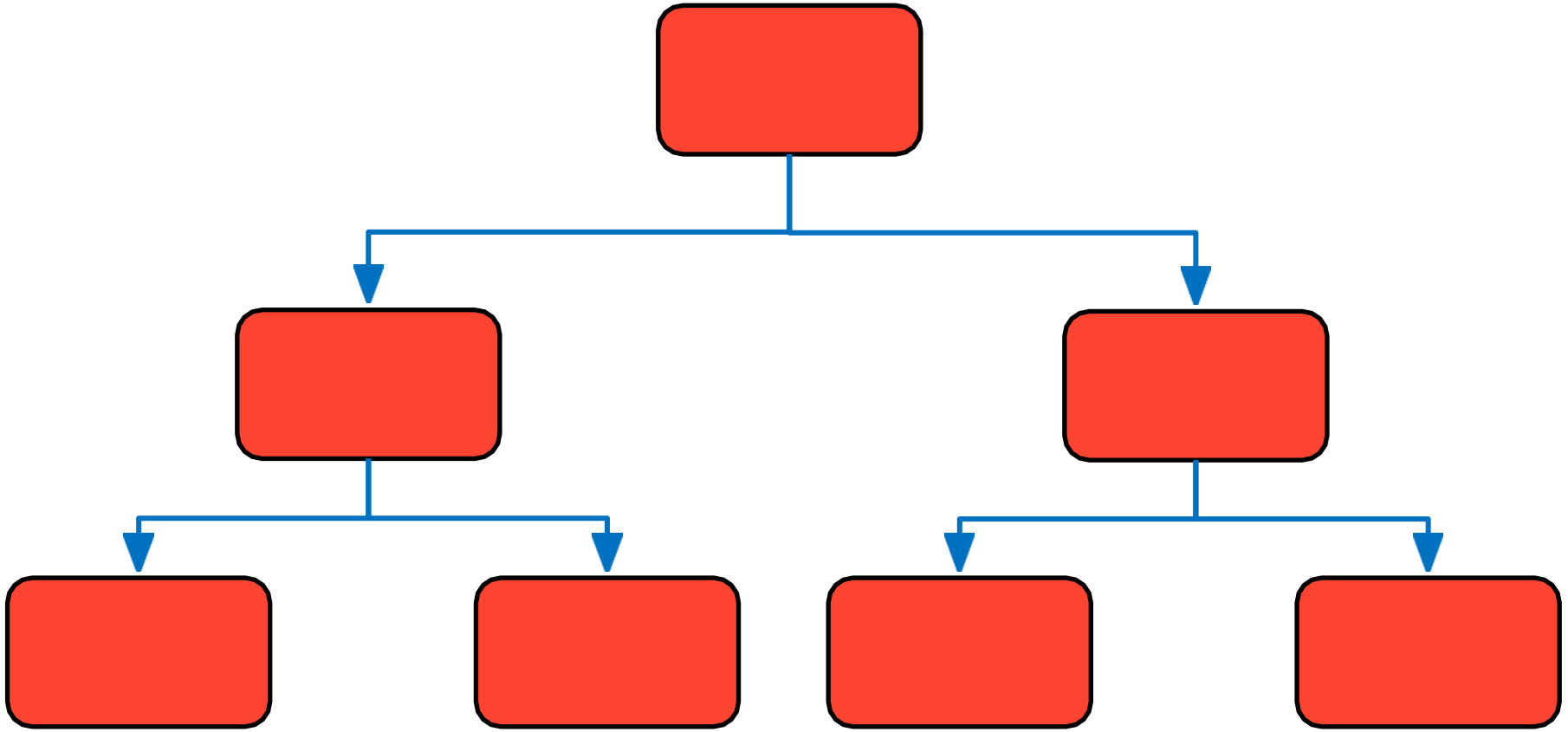
- It can be used to solve linear **regression** and **classification** problems.



Decision Tree Structure

Decision Trees contain 2 fundamental parts:

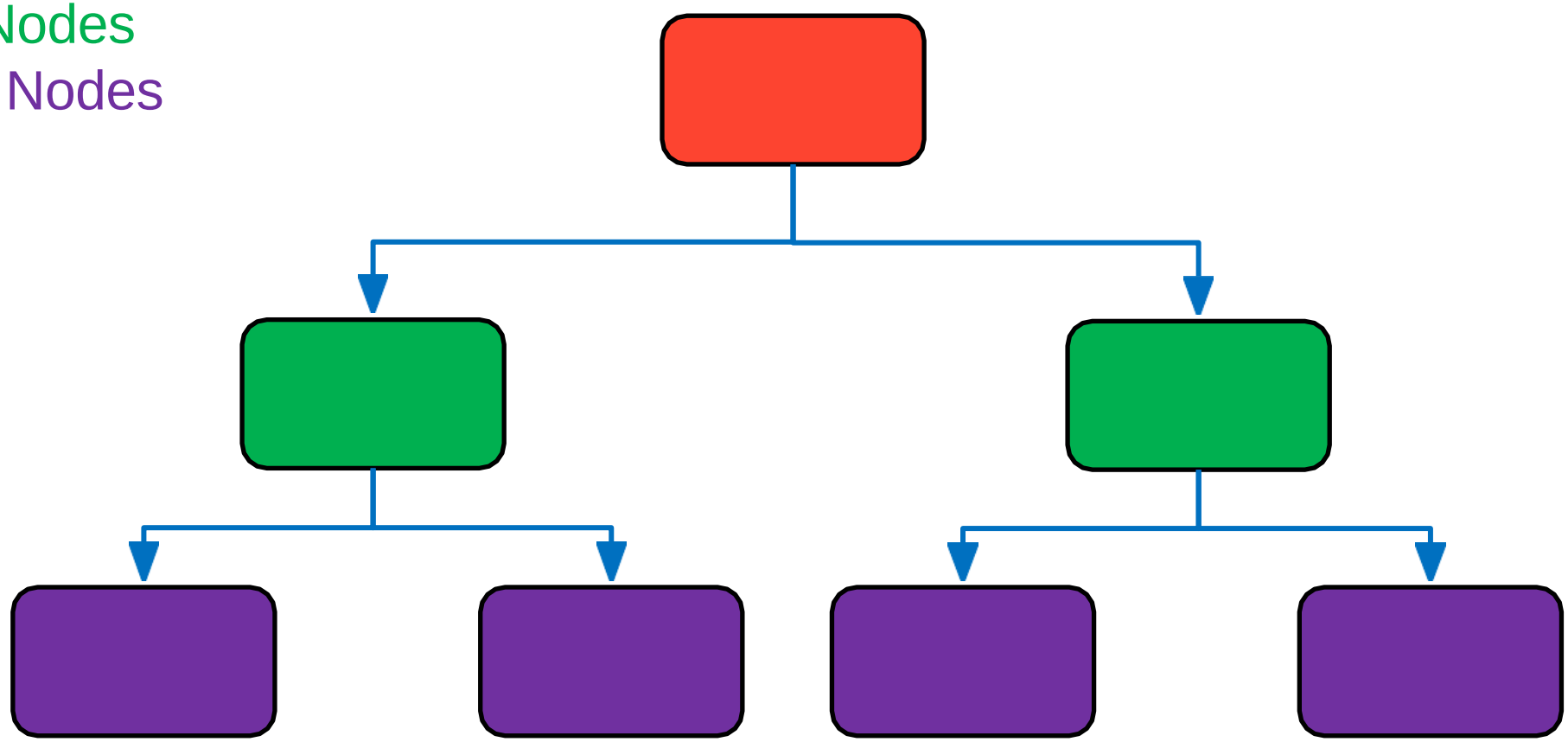
- Nodes
- Branches



Decision Tree Structure

We have 3 types of Nodes:

- Root Node
- Internal/Split Nodes
- Decision/Leaf Nodes



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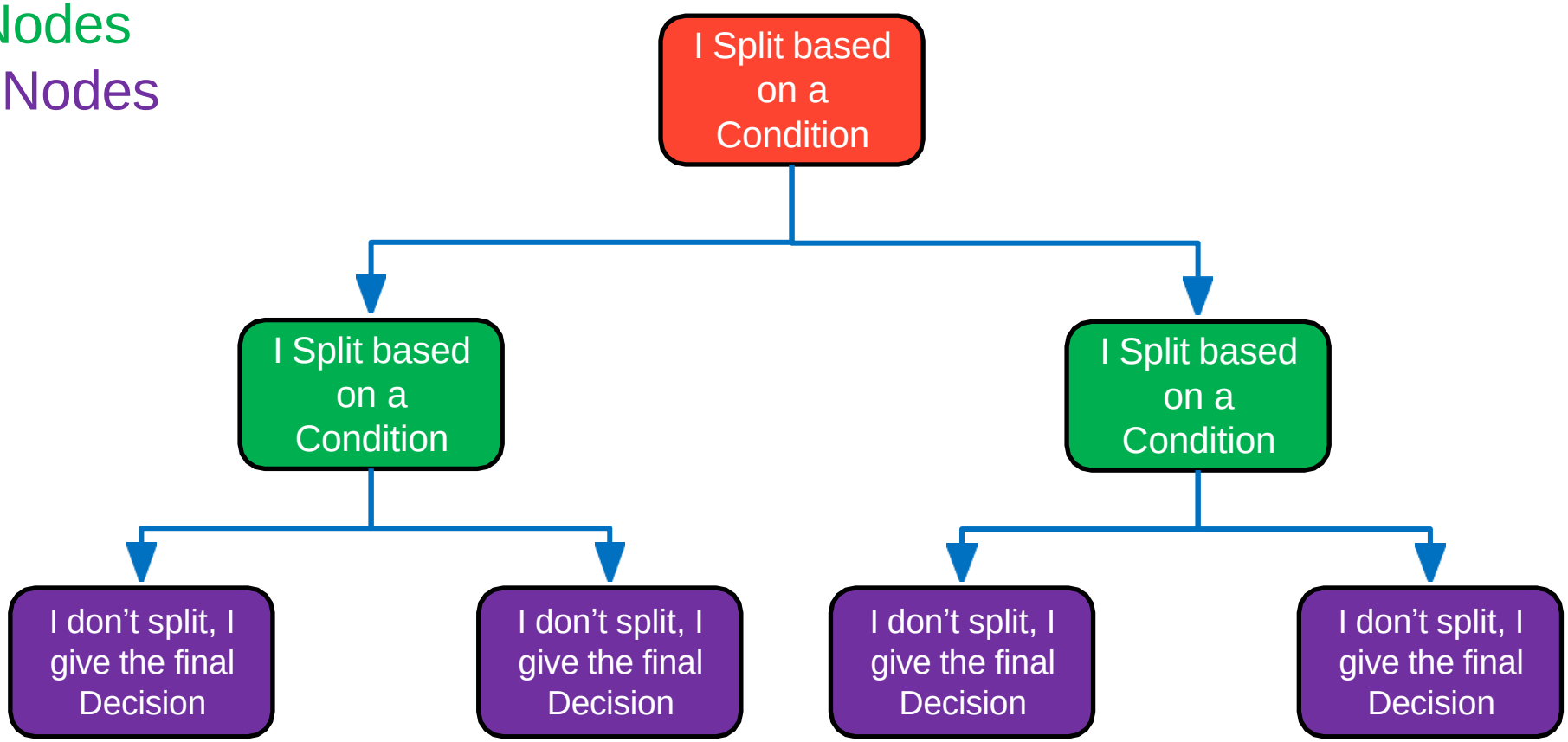
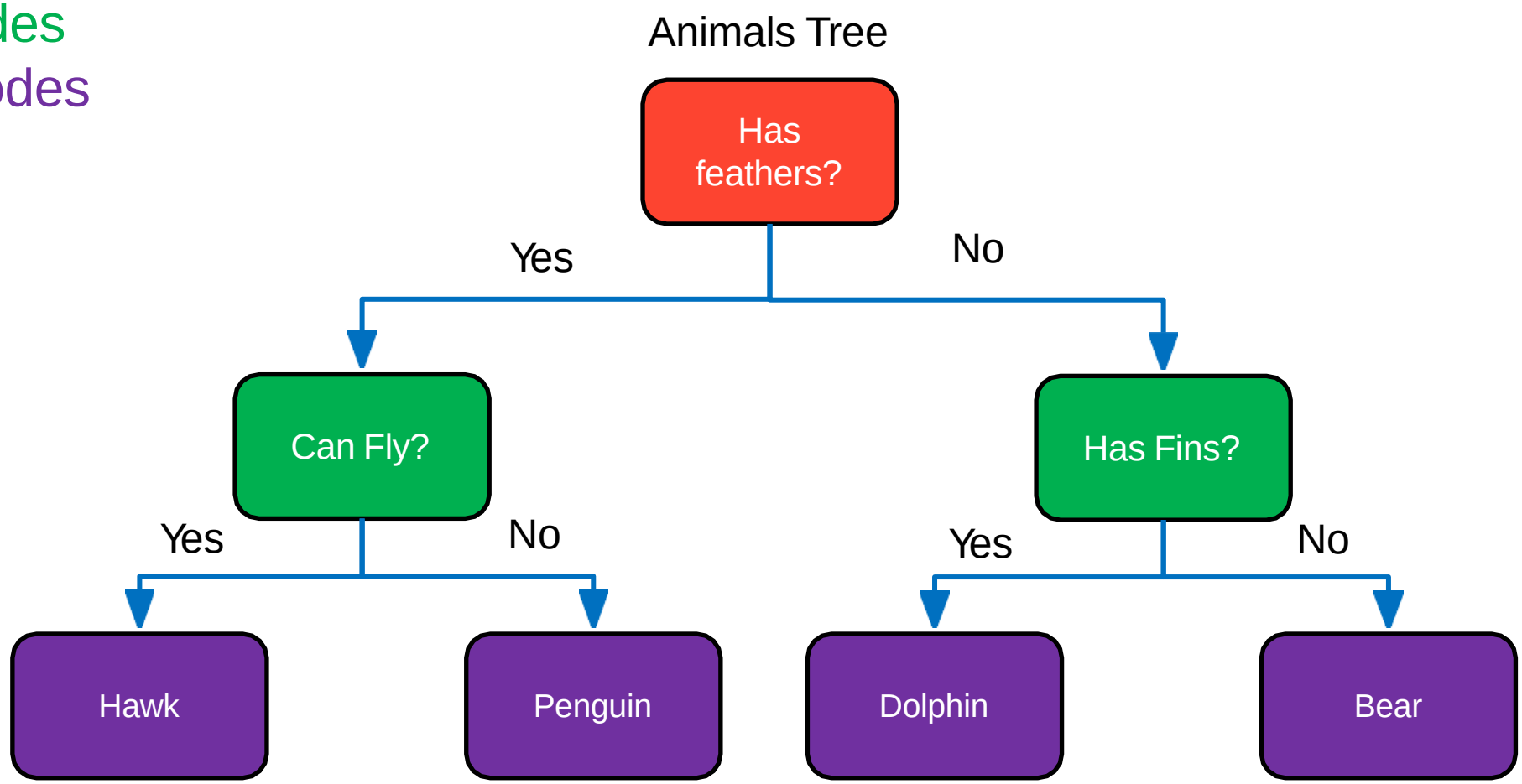


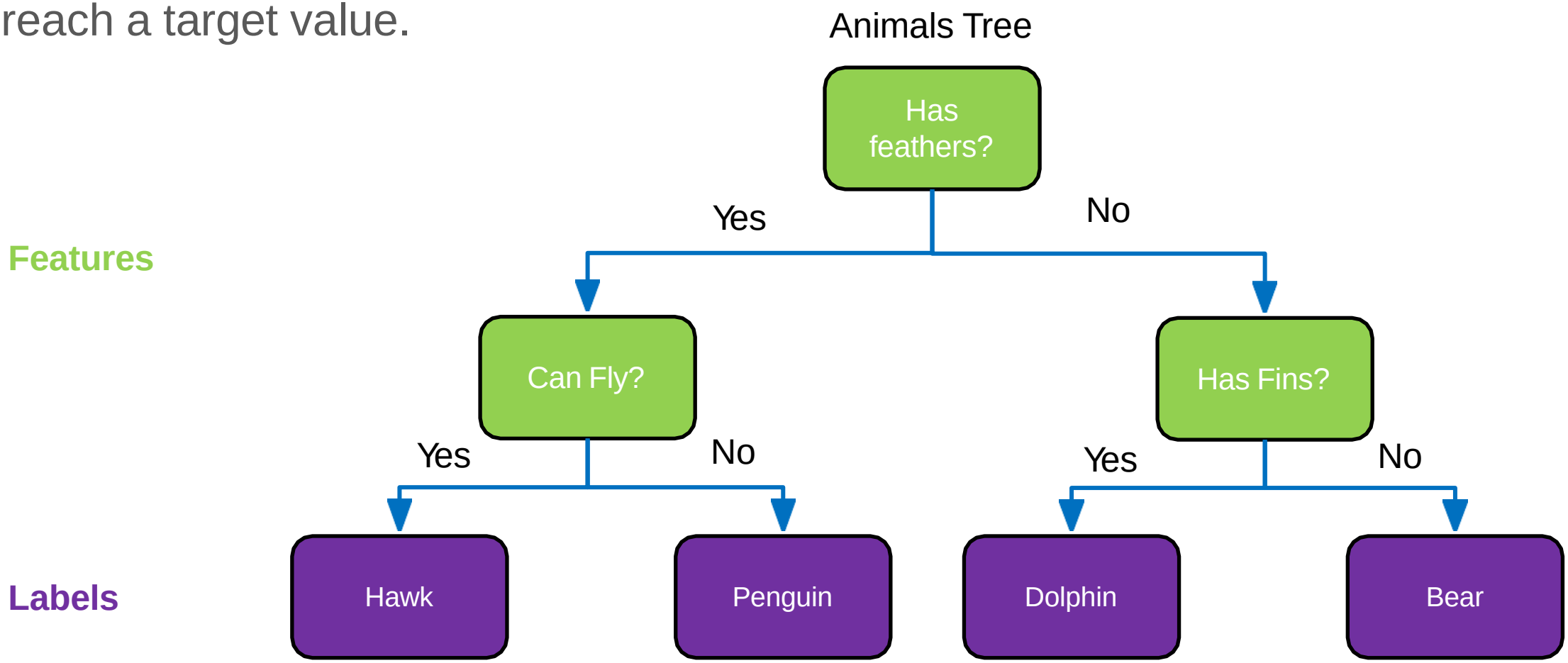
Decision Tree Structure - Example

Root Node
Internal/Split Nodes
Decision/Leaf Nodes



Decision Tree Structure - Example

- We can notice that the tree splits based on feature values until we reach a target value.



Price range prediction

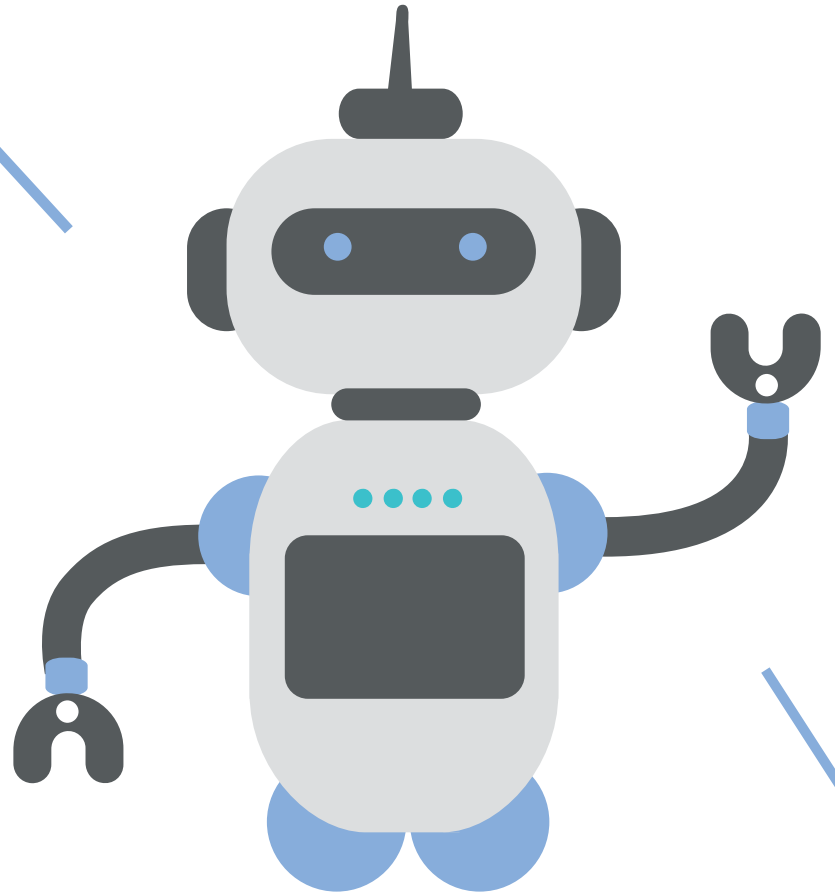
Application: Predict the Price Range of a Cell Phone

- **Input**: Information about cell phones (Battery power, Clock speed, Number of cores, Amount of RAM, WiFi, etc ...)
- **Output**: Price range:
  - low cost
  - medium cost
  - high cost
  - very high cost

Let’s code the predictive model!

Code

How can YOU start with Artificial Intelligence with **NO** previous experience?



Join our free course form oracle Artificial Intelligence with Machine Learning

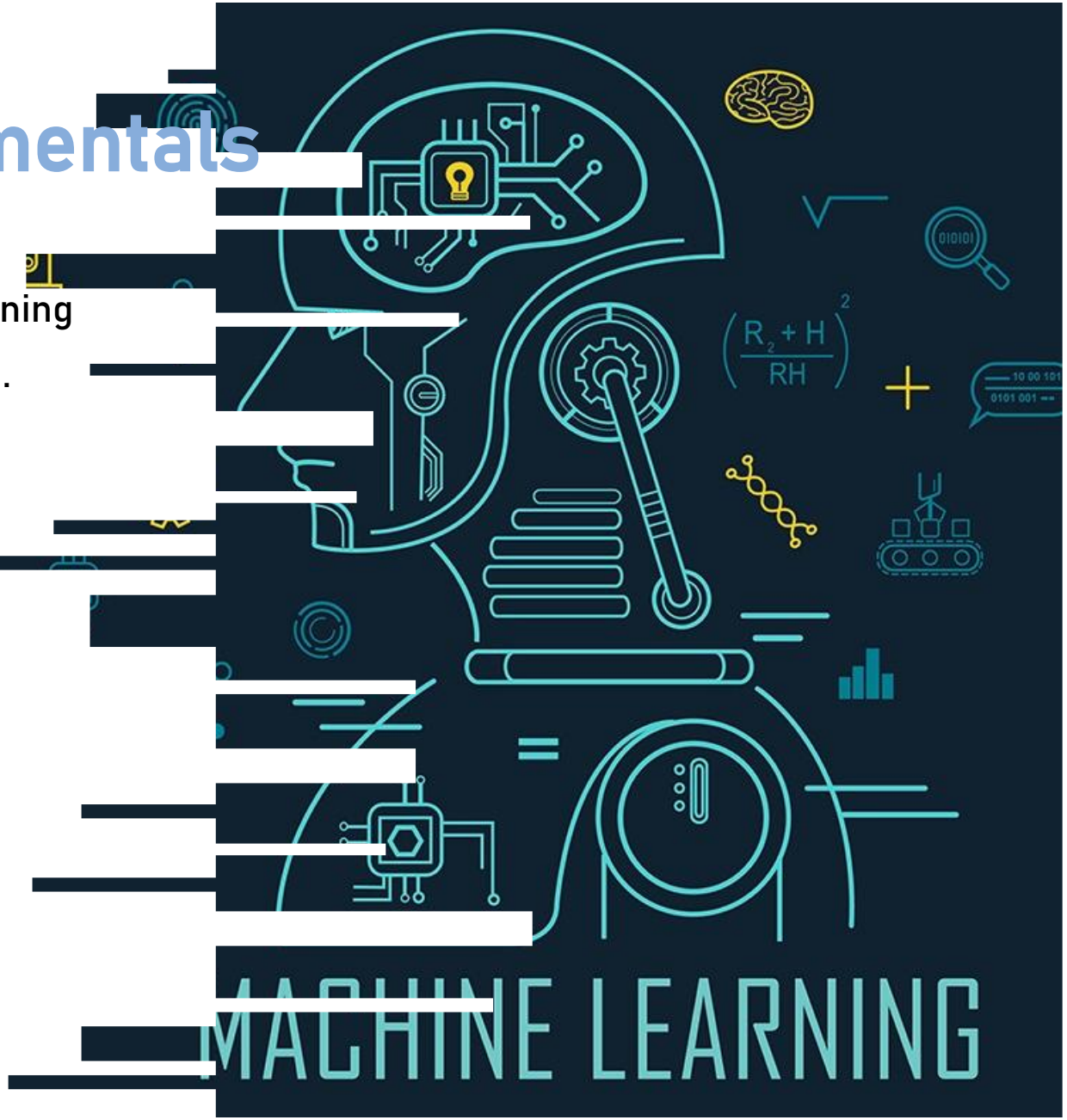
Step 1 : Programming Background

Any language would do but **Python** is the most popular due to the BIG community behind it.

- Installing Anaconda
- Introduction
- Variables Types
- Basic Operators
- Decision Making
- Loops
- Numbers
- Strings
- Lists , Tuples , Dictionaries
- Function
- Classes & Objects
- Working with files
- Numpy Library
- Matplotlib library
- pandas
- Kaggle
- Colab

Step 2 : Build a basic understanding of the fundamentals

- Introduction to Artificial intelligence & Machine Learning
- Classification & Regression and clustering definition.
- Linear regression with one variable
- Overfitting vs. under fitting
- Linear regression with multiple variables
- Logistic regression
- Support vector machine
- K nearest neighbor
- K-means clustering algorithm
- Decision Tree
- Niave base
- Cross validation techniques



Step 3 : Machine Learning(Sk learn)

A. **Data Preparation**
   1. Data files from SKlearn
   2. Data cleaning
   3. Metrics module
   4. Feature selection
   5. Data Scaling
   6. Data Split

B. **ML Algorithms**
   1. Linear Regression
   2. Logistic Regression
   3. Neural Network
   4. SVR
   5. SVC
   6. K-means
   7. PCA
   8. Decision Tree
   9. Ensemble Regression
   10. Random forest
   11. Ensemble Classifier
   12. K Nearest Neighbors
   13. Naïve Bayes
   14. LDA , QDA
   15. Hierarchical Clusters
   16. GridSearchCV

C. **Algorithm Evaluation**
   1. Model Check
   2. Pipeline Tool
   3. Grid Search
   4. Model Save

Let’s Stay Connected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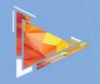
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Q&A

Introduction to Deep learning

Time: Mar 30, 2022 08:00 PM Baghdad

Join Zoom Meeting

https://zoom.us/j/93726818651?pwd=UkVJbGpzN2lQMW5UWlk2bVJCQUlLUT09

Meeting ID: 937 2681 8651

Passcode: QBga4C