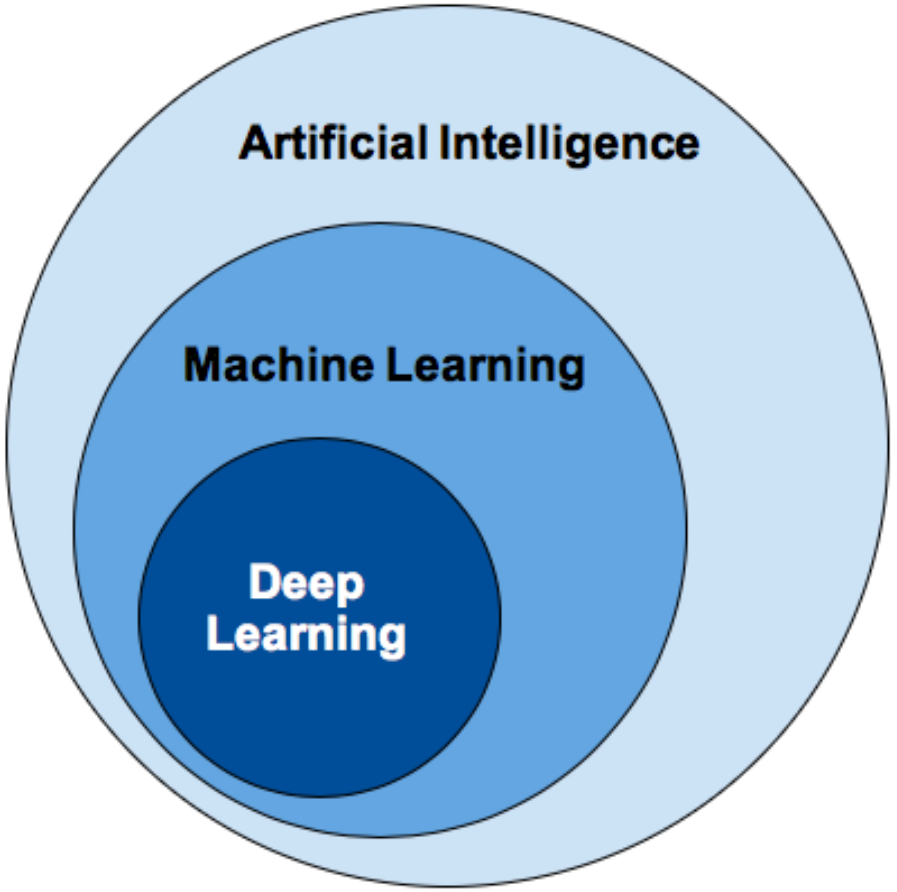

# Artificial intelligence

# ARTIFICAL INTELLIGENCE

- **Artificial Intelligence** is the ability for a computer to think, learn and simulate human mental processes, such as perceiving, reasoning, and learning.
- It can also independently perform complex tasks that once required human input.

# How Does Machine Learning Relate to AI?



# What is Learning?

"To gain **knowledge** or **understanding** of, or **skill** in **by study**, **instruction** or **experience**"

- Learning a set of new facts.
- Learning HOW to do something .
- Improving ability of something already learned.

# What is Machine Learning?

- **Machine Learning** is the study of methods for programming computers to learn.
- Building machines that automatically learn from experience.
- **Machine learning** usually refers to the changes in systems that perform tasks associated with artificial intelligence AI Such tasks involve recognition, diagnosis, planning, robot control, prediction, etc.

# Machine Learning Steps

## 1. Collecting Data:

- It is of the utmost importance to collect reliable data so that your machine learning model can find the correct patterns.
- The quality of the data that you feed to the machine will determine how accurate your model is.
- If you have incorrect or outdated data, you will have wrong outcomes or predictions which are not relevant.

# Machine Learning Steps

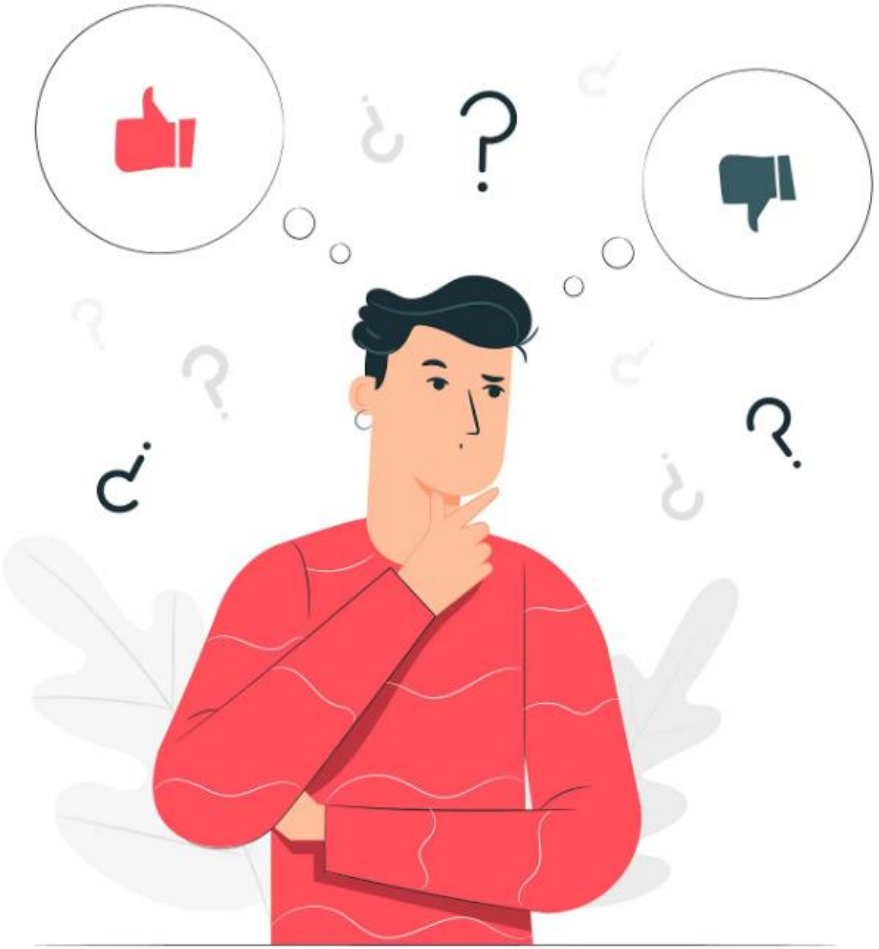
## 2. Preparing the Data:

- Cleaning the data to remove unwanted data, missing values, rows, and columns, duplicate values, data type conversion, etc. Visualize the data to understand how it is structured and understand the relationship between various variables and classes present.
- Splitting the cleaned data into two sets - a training set and a testing set. The training set is the set your model learns from. A testing set is used to check the accuracy of your model after training.

# Machine Learning Steps

## 3. Choosing a Model:

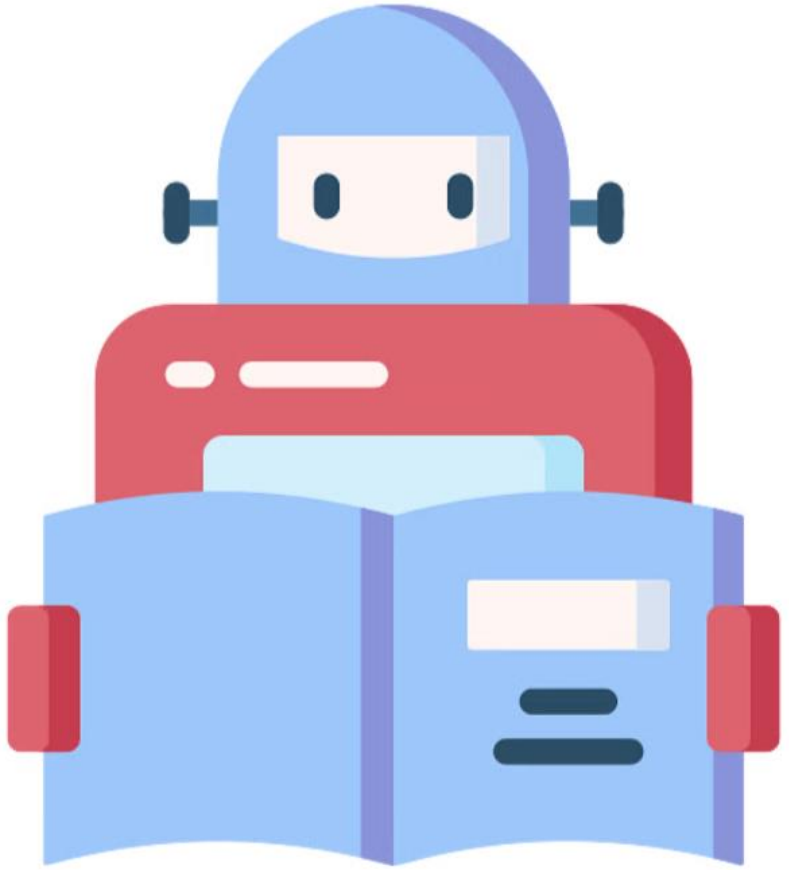
- A machine learning model determines the output you get after running a machine learning algorithm on the collected data.
- It is important to choose a model which is relevant to the task at hand.
- Over the years, scientists and engineers developed various models suited for different tasks like speech recognition, image recognition, prediction, etc.



# Machine Learning Steps

## 4. Training the Model:

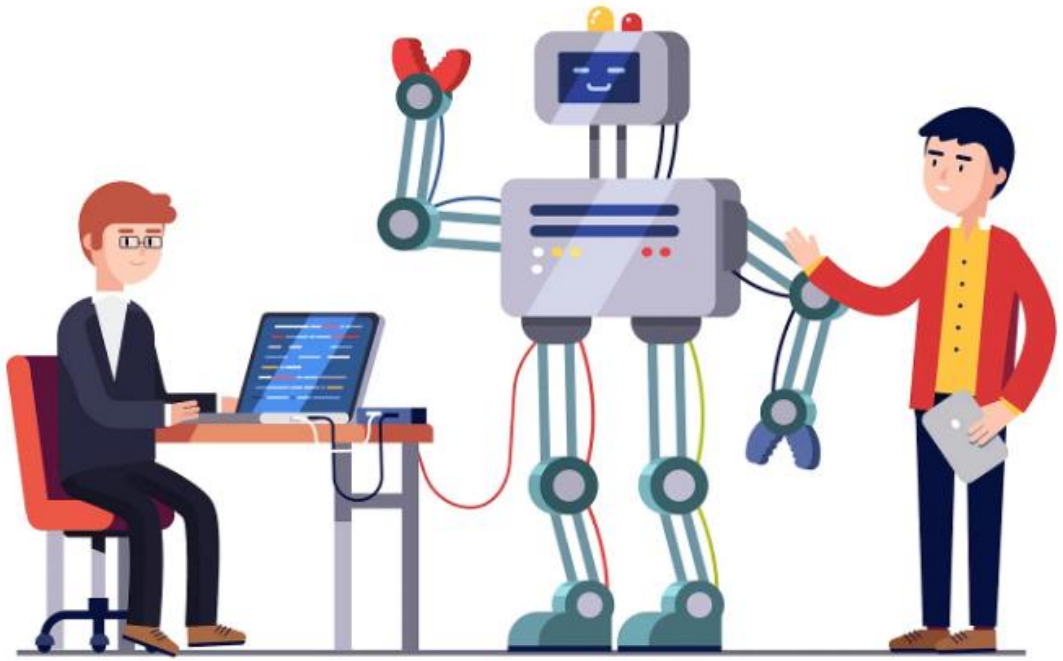
- Training is the most important step in machine learning.
- In training, you pass the prepared data to your machine learning model to find patterns and make predictions.
- It results in the model learning from the data so that it can accomplish the task set. Over time, with training, the model gets better at predicting.



# Machine Learning Steps

## 5. Evaluating the Model:

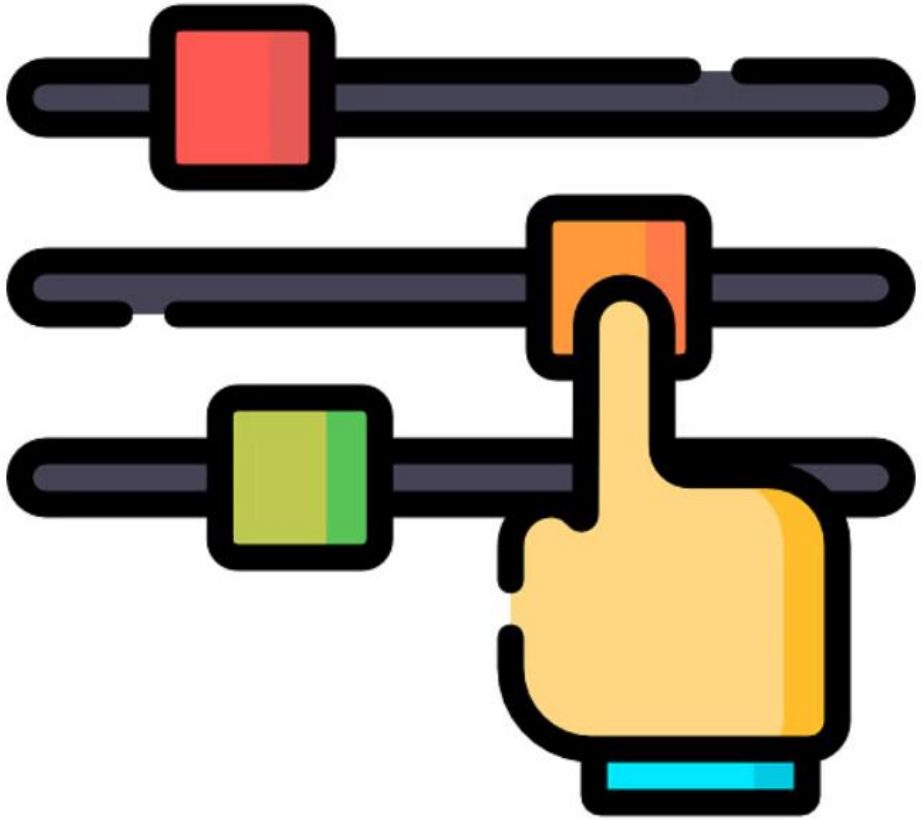
- After training your model, you have to check to see how it's performing.
- This is done by testing the performance of the model on previously unseen data.
- The unseen data used is the testing set that you split our data into earlier.



# Machine Learning Steps

## 6. Parameter Tuning:

- Once you have created and evaluated your model, see if its accuracy can be improved in any way.
- This is done by tuning the parameters present in your model.
- Parameters are the variables in the model that the programmer generally decides.



# Machine Learning Steps

## 7. Making Predictions:

- In the end, you can use your model on unseen data to make predictions accurately.
- After the processes of collecting data, preparing the data, selecting a machine learning algorithm, training the model and evaluating the model & tuning the parameters, **we need to make predictions**.

# Types of machine Learning

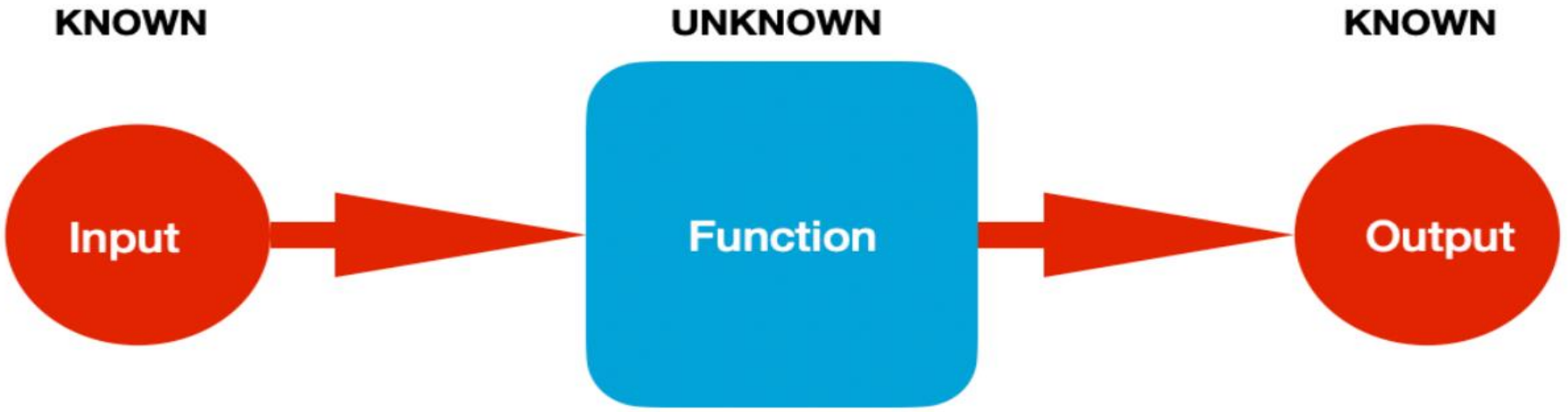
**1) Unsupervised Learning.**

**2) Semi-Supervised (reinforcement).**

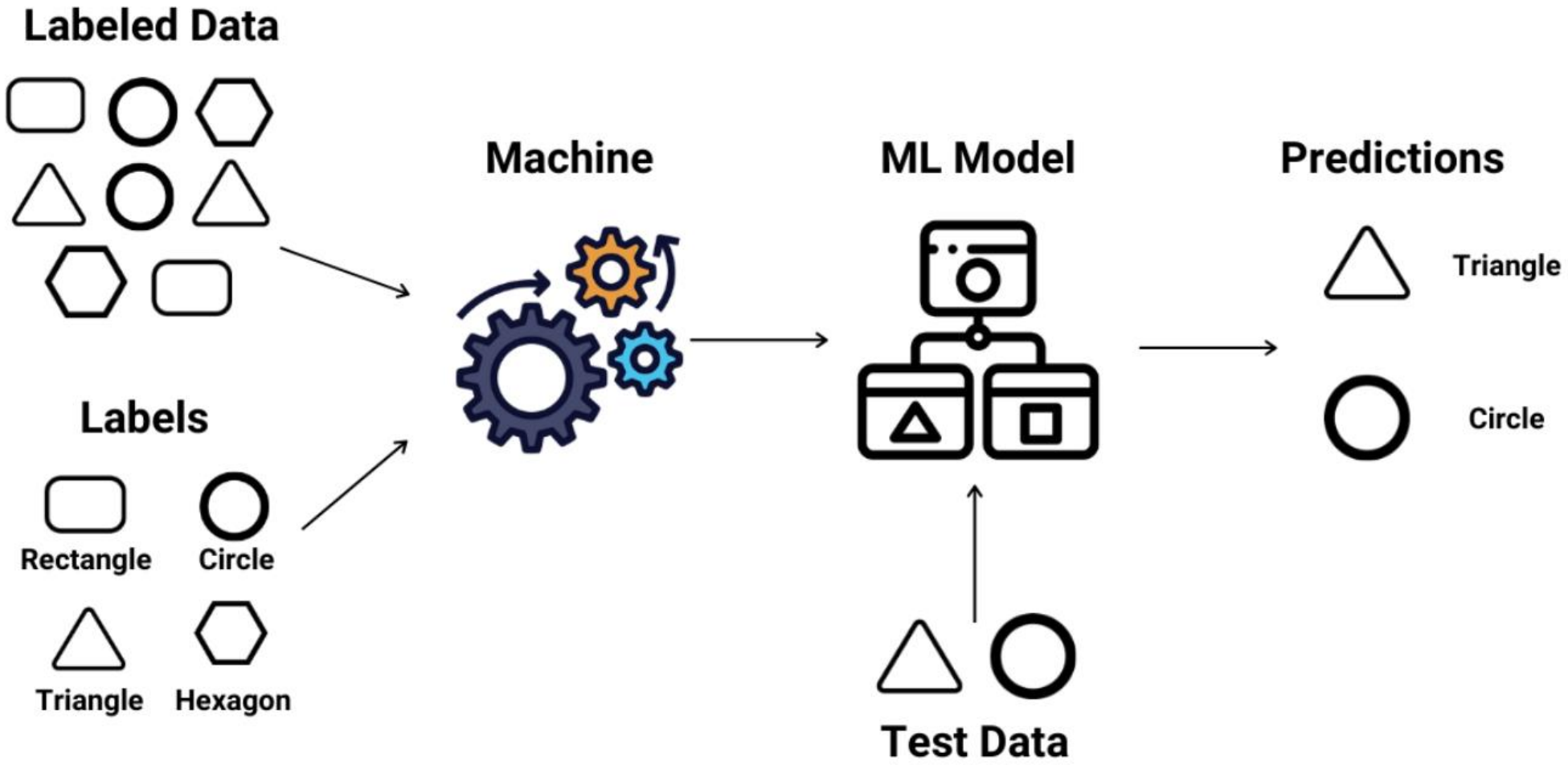
**3) Supervised Learning.**

# Supervised Learning

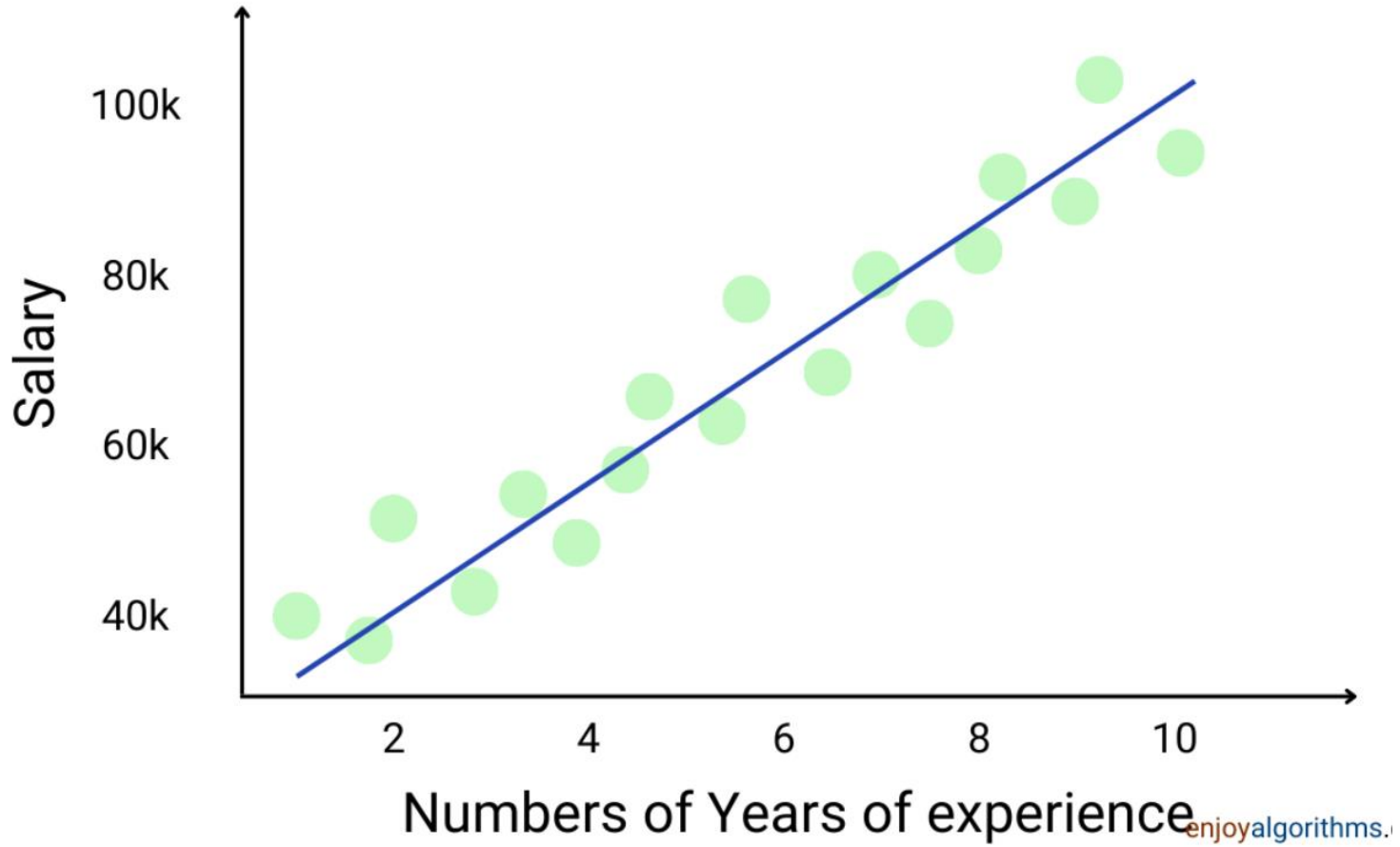
- Supervised learning is a technique consisting of providing labeled data to a machine learning model. The labeled dataset is usually data gathered from experience, also called empirical data. In addition, the data often requires preparation to increase its quality, fill its gaps or simply optimize it for training.



- Supervised learning is divided into classification and regression:
- Classification algorithms decide the category of an entity, object or event as represented in the data. The simplest classification algorithms answer binary questions such as yes/no, sales/not-sales or cat/not-cat. More complicated algorithms lump things into multiple categories like cat, dog or mouse. Popular classification algorithms include decision trees, logistic regression, random forest and support vector machines.
- Classifiers as: Logistic regression, Random forest, Decision tree, Support vector machine, and *k*-nearest neighbors.

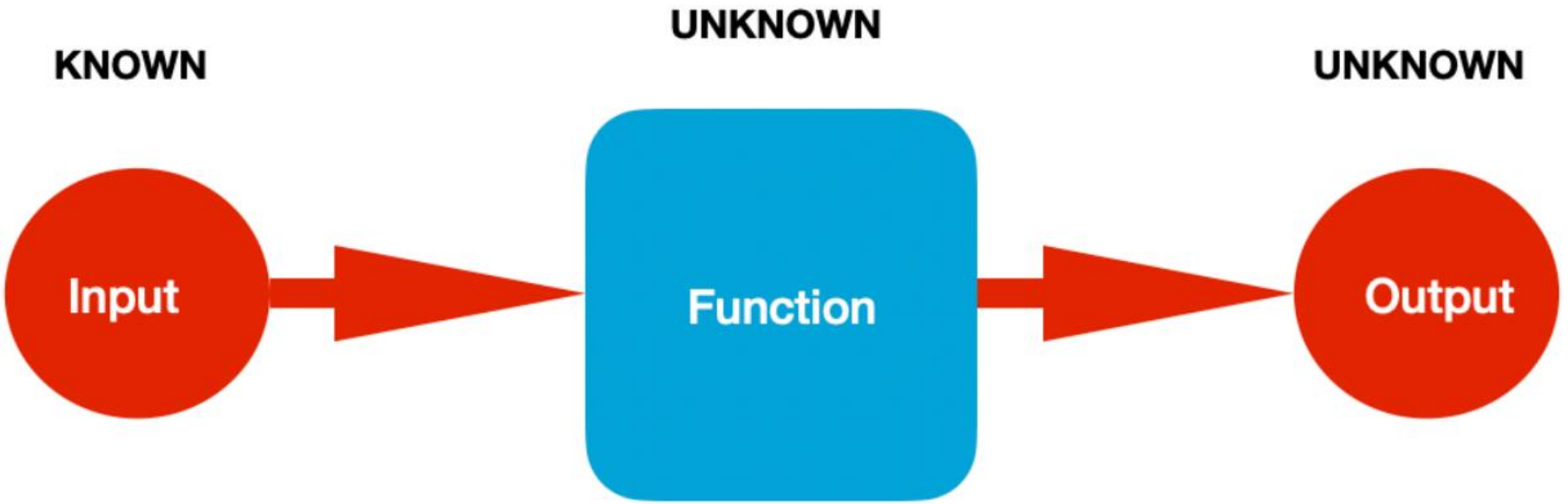

Labeled Data
Labels
Rectangle
Circle
Triangle
Hexagon
Machine
ML Model
Predictions
Triangle
Circle
Test Data

- Regression algorithms identify relationships within multiple variables represented in a data set. This approach is useful when analyzing how a specific variable such as product sales correlates with changing variables like price, temperature, day of week or shelf location. Popular regression algorithms include linear regression, multivariate regression, decision tree and least absolute shrinkage and selection operator (lasso) regression.
- Regression algorithms as: Linear regression, Random forest, Decision tree, Support vector regressor, and *k*-nearest neighbors.

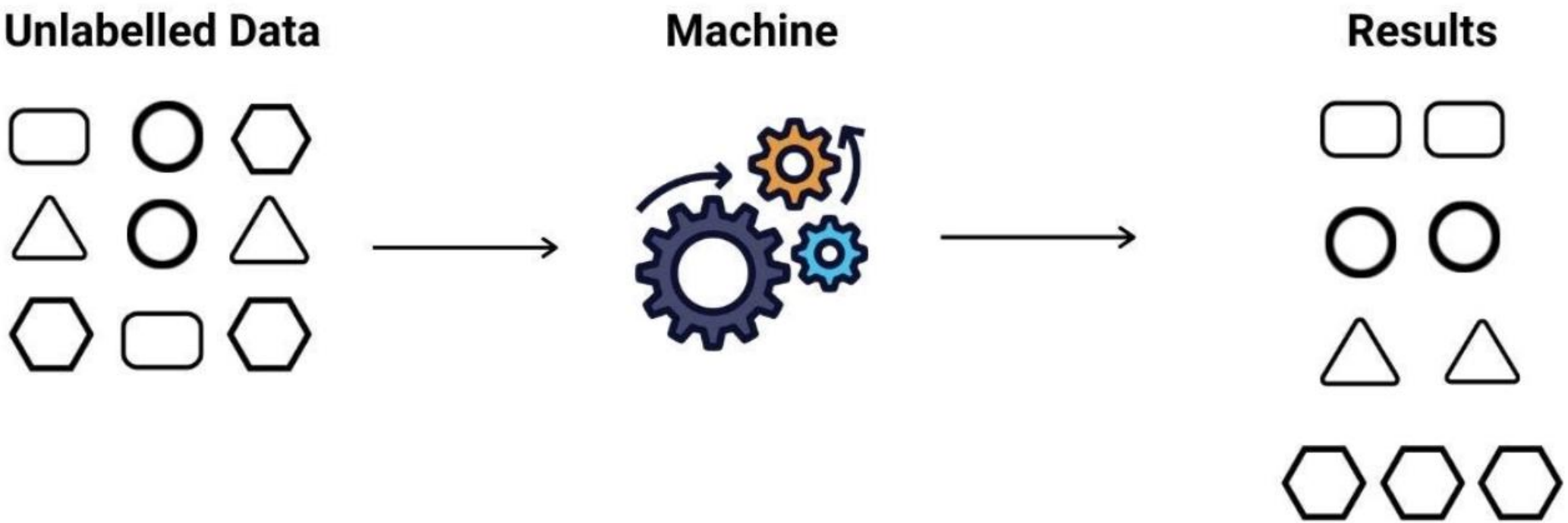

100k
80k
60k
40k
Salary
2
4
6
8
10
Numbers of Years of experience
enjoyalgorithms.

# Un supervised Learning

- **In contrast with supervised learning, unsupervised learning consists of working with unlabeled data.** In fact, the labels in these use cases are often difficult to obtain. For instance, there is not enough knowledge of the data or the labeling is too expensive.

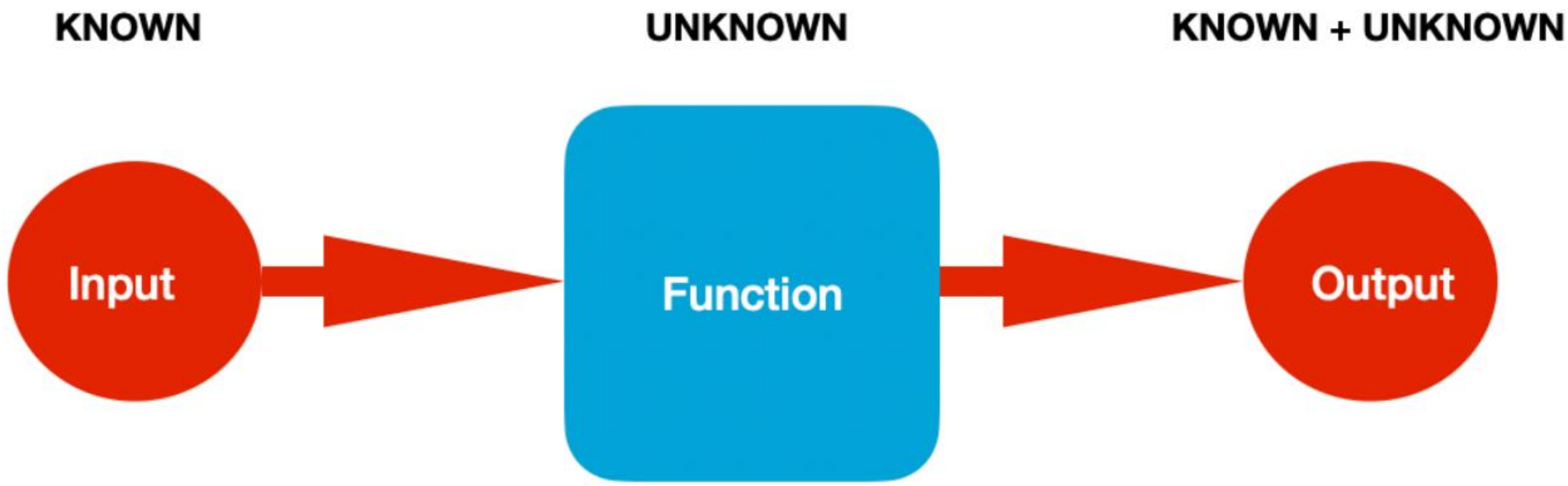


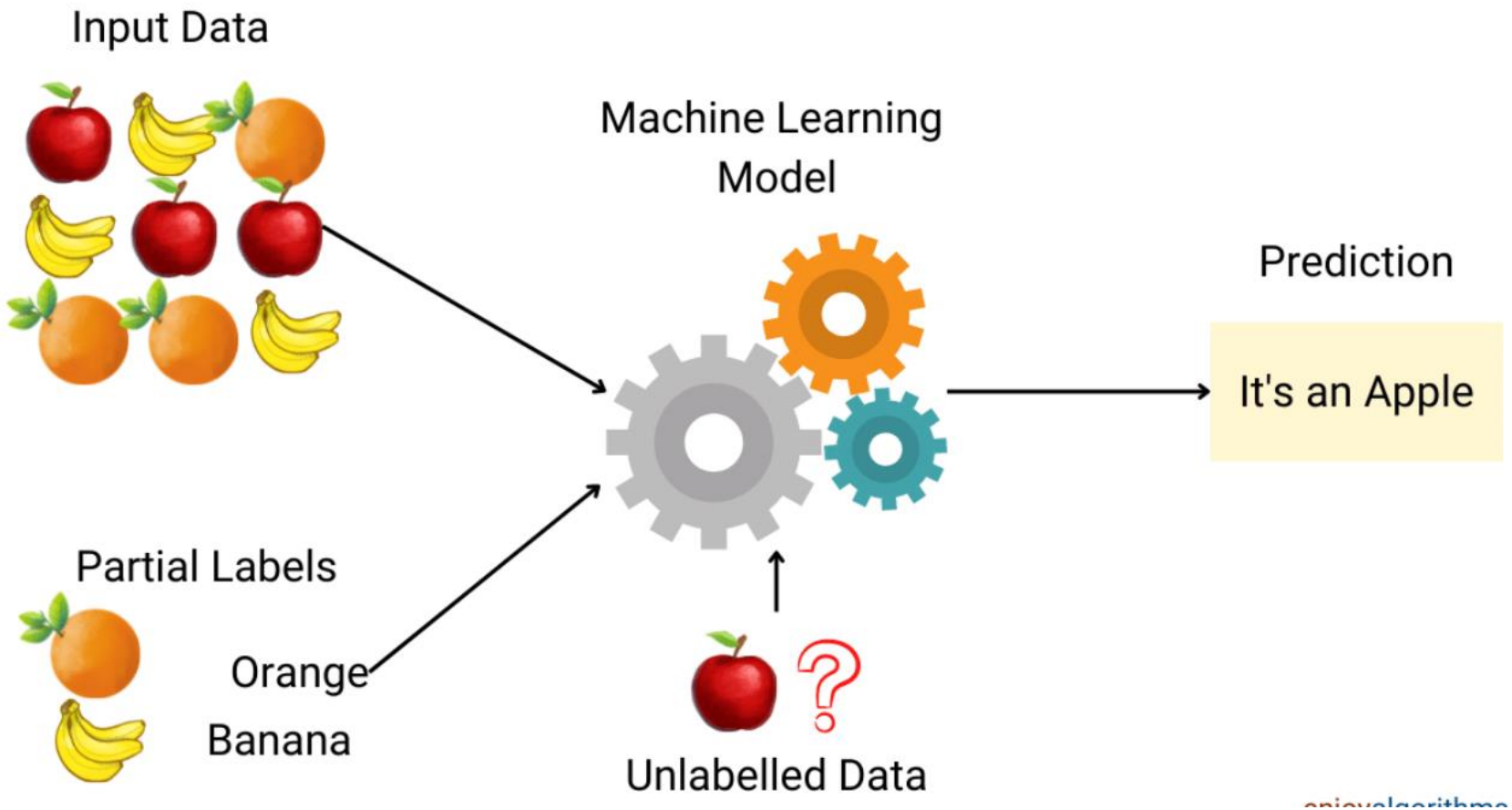
- Clustering and dimensional reduction are two common unsupervised learning algorithmic types.
- Clustering algorithms help group similar sets of data together based on various criteria. Practitioners can segment data into different groups to identify patterns within each group.
- Dimension reduction algorithms explore ways to compact multiple variables efficiently for a specific problem.


Unlabelled Data
Machine
Results

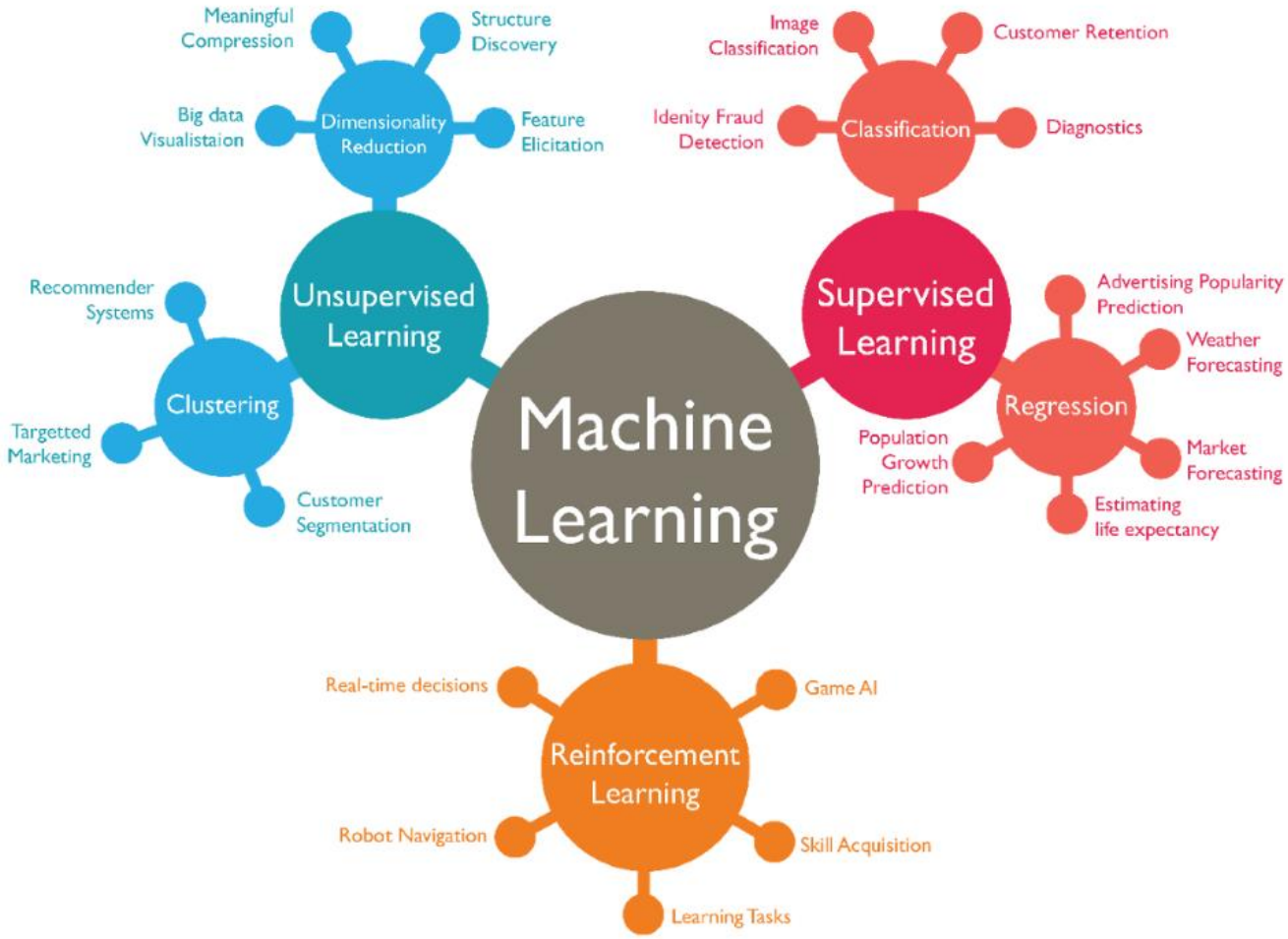
# Semi-supervised learning

- Semi-supervised learning models characterize processes that use unsupervised learning algorithms to automatically generate labels for data that can be consumed by supervised techniques.

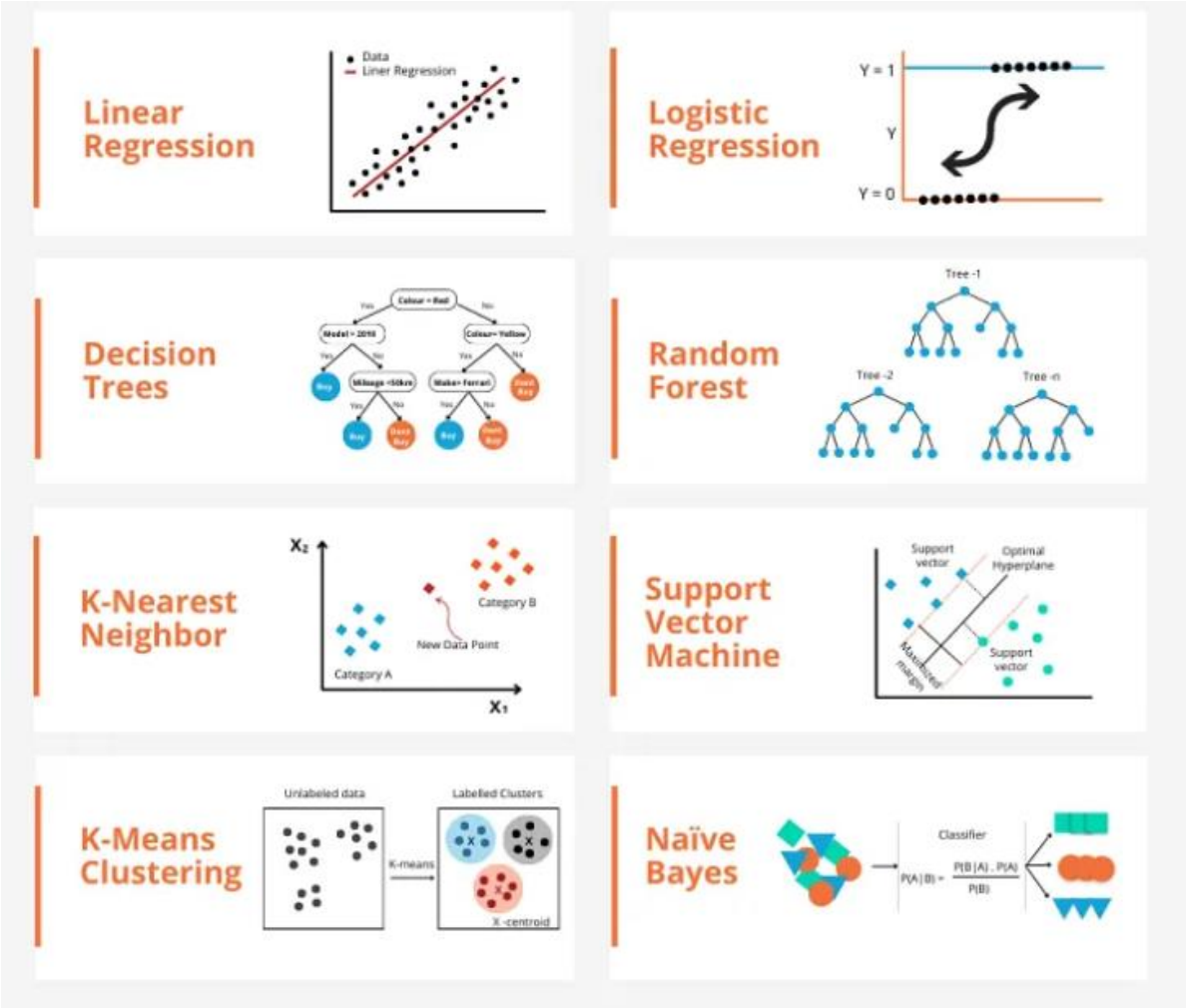



Input Data
Machine Learning Model
Prediction
It's an Apple
Partial Labels
Orange
Banana
Unlabelled Data

# Types of machine Learning



# TOP 8 ML MODELS



# Thank you