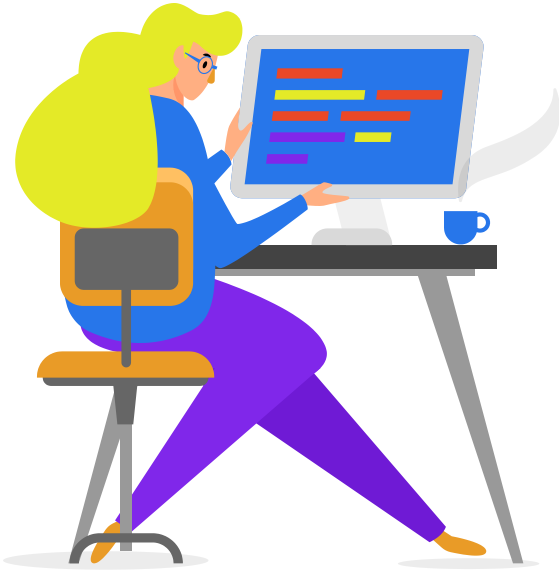




Machine Learning & Problems

Model Creation Roadmap



1

AI software

2

Framework

3

Train the model

4

Compact the model

5

Convert the
model

6

Integrate the model

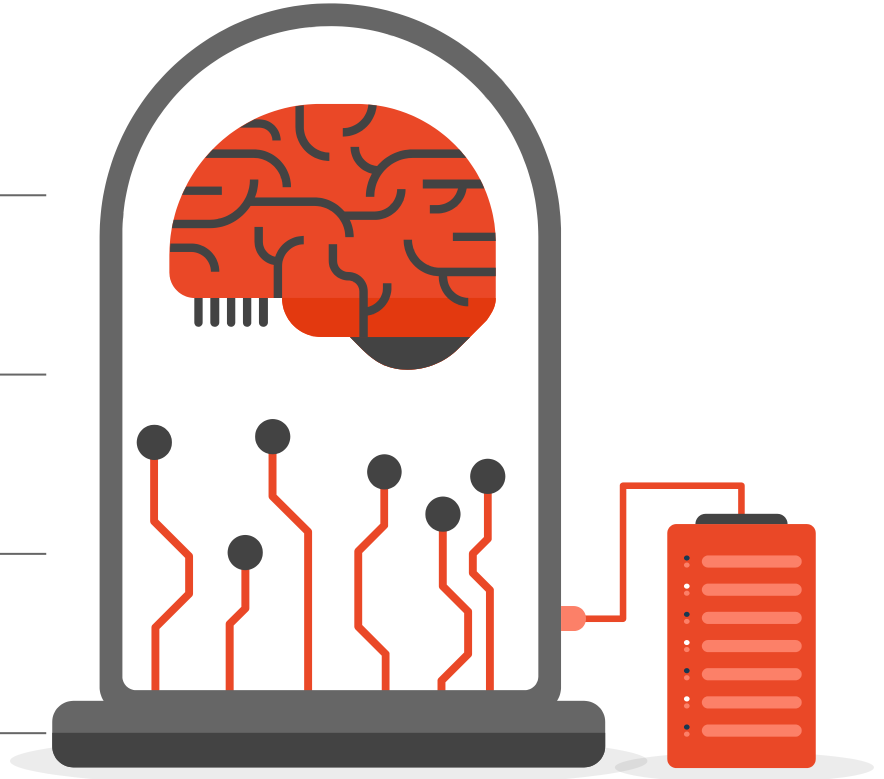
Machine Learning Types

01 Supervised learning

02 Unsupervised learning

03 Semi-Supervised learning

04 Reinforcement learning



Supervised Learning

Supervised learning is like teaching a computer how to do something by showing it examples.

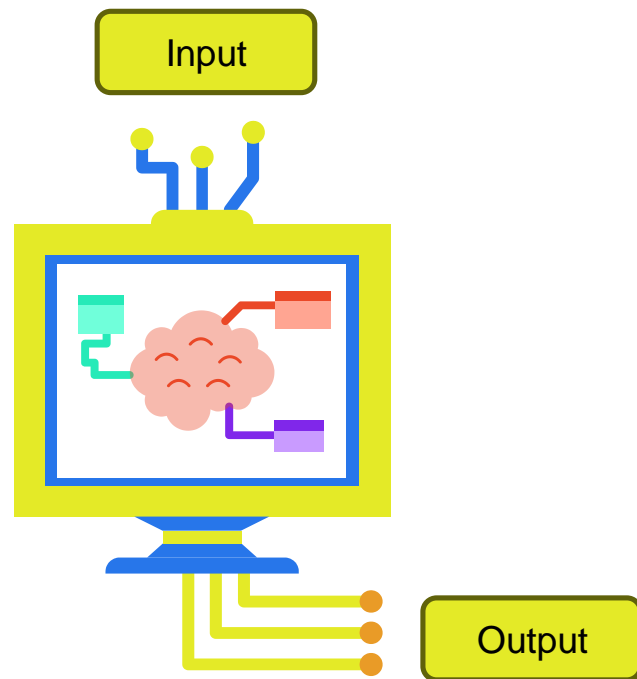
In supervised learning, the model trains from labeled training data and is tested upon the testing data.

Step 1 : Data Collection [labeled data]

Step 2 : Training [classification of spam or not spam]

Step 3 : Testing

Example : Spam email detection



Supervised vs Unsupervised



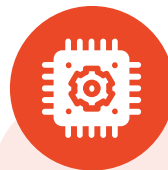
Supervised

Labeled Data

[i.e. data with input and output pair]

Ex: weather forecast

Vs



Unsupervised

Unlabeled Data

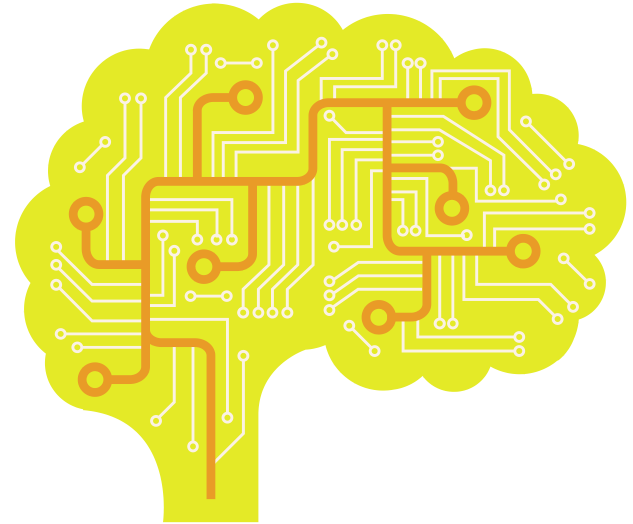
[i.e. data with only input]

Ex: identification of shapes

Semi-Supervised Learning

Semi-supervised learning is an hybrid between supervised and unsupervised learning. It uses both labelled data and unlabeled data during training.

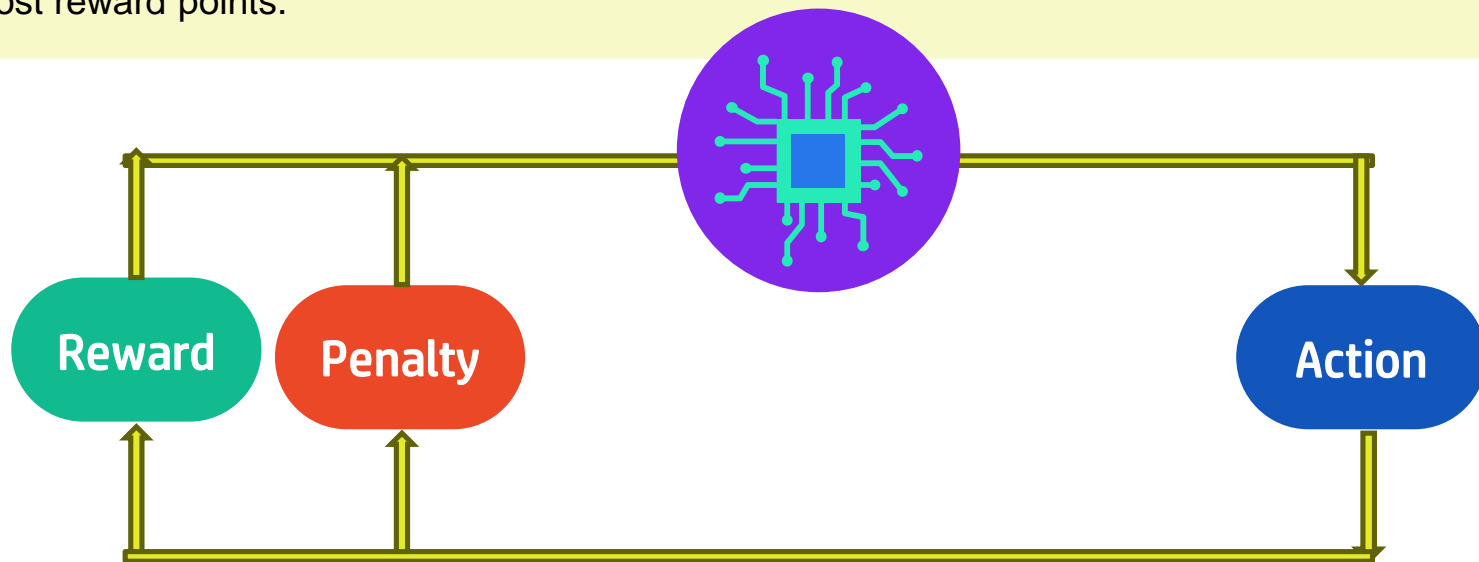
Labeled data is used to train the model which further classifies the unlabeled data into known and unknown clusters.



Reinforcement Learning

Reinforcement learning is a feedback-based learning method, in which a learning agent gets a reward for each right action and gets a penalty for each wrong action.

The agent learns automatically with the feedbacks and improve its performance as its goal is to get most reward points.



Machine Learning Applications

Supervised learning

Classification

- Fraud detection
- Email spam detection
- Diagnostics
- Image classification

Regression

- Risk assessment
- Score prediction

Unsupervised learning

Reduction

- Text mining
- Data visualization
- Face detection
- Voice detection

Regression

- City planning
- Targeted marketing

Reinforcement learning

- Finances
- Manufacturing
- Stock management
- Autonomous cars

Algorithms

Classification

Its goal is to assign input data to predefined categories or classes.

Algos like K-Nearest Neighbour [KNN], Decision trees and Neural Networks are commonly used for classification tasks.

Generally used for binary output data like yes/no.



Regression

Its goal is to predict a numerical value based on input features.

Algos like linear regression, Polynomial regression are used for regression tasks.

Generally used for continuous numeric data.

Linear Regression




Equation of linear regression : $Y = mx + c$

Step 1 : Data collection

Step 2 : Calculations

Step 3 : Prediction

Step 4 : Visualization

Diameter(X) In Inches	Price(Y) In Dollars	Mean(X)	Mean(Y)	Deviations(X)	Deviations(Y)	Product of Deviations	Sum of Product of Deviations	Square of Deviations for X
8 	10	10	13	-2	-3	6	12	4
10 	13			0	0	0		0
12 	16			2	3	6		4



Learning Algorithms

Supervised Learning	
Classification	Regression
Logistic Regression	Linear Regression
Native Bayes	Ridge Regression
Linear Discriminant Analysis	Lasso Regression
Decision Trees	
Random Forest	
Support Vector Machines (SVM)	
k-Nearest Neighbour (KNN)	
Gradient Boosting Algorithms	
Neural Networks	

Unsupervised Learning
K-mean Clustering
Hierarchical Clustering
DB Scan Clustering
PCA