Machine Learning

Machine Learning algorithms are categorised into three main categories:
1. Supervised
2. Unsupervised
3. Semi-supervised Learning
4. Reinforcement learning

Supervised learning algorithms try to *model relationships and dependencies between the target prediction output and the input features* **such that we can predict the output values for new data based on those relationships which it learned from the previous data sets.**

- The main types of supervised learning problems include regression and classification problems

Unsupervised learning algorithms is a category of machine learning in which we only have the input data to feed to the model but no corresponding output data.

- Algorithms try to find the similarity between different instances of input data by themselves using a defined similarity index. One of the similarity indexes can be the distance between two different data samples to sense whether they are close or far.
- mainly used in *pattern detection* and *descriptive modelling*
- the main types of unsupervised learning algorithms include *Clustering algorithms and Association rule learning algorithms*.
- ***Eg***. k-means clustering (simple procedure of classifying a given data set into a number of clusters, defined by the letter "k")

Semi-supervised Learning is partially supervised and partially unsupervised.

Reinforcement learning algorithm method aims at using observations gathered from the interaction with the environment to take actions that would maximise the reward or minimise the risk.

- Reinforcement learning algorithm (called the agent) continuously learns from the environment in an iterative fashion. In the process, the

agent learns from its experiences of the environment until it explores the full range of possible states.

Eg.

- Q-Learning
- Temporal Difference (TD)
- Deep Adversarial Networks