Artificial Intelligence Masterclass

Introduction to Machine Learning

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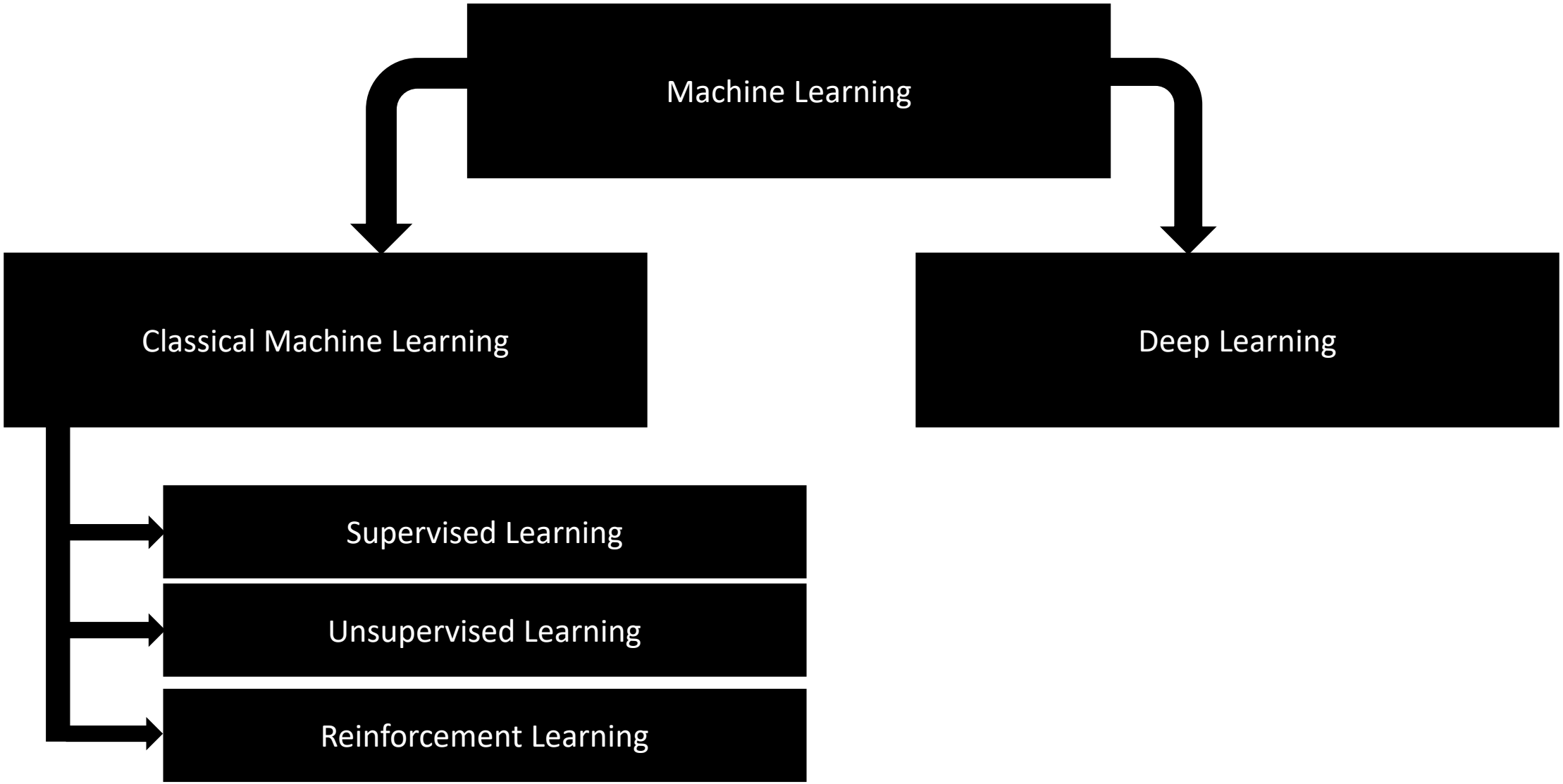
Types of Machine Learning Algorithms



Supervised Learning

Supervised learning is where you have input variables (X) and an output variable (Y) and you use an algorithm to learn the mapping function from the input to the output.

$$Y = f(X)$$

In supervised learning, an algorithm is trained using a training dataset and that process can be thought of as a teacher supervising the learning process.

We know the correct answers, the algorithm iteratively makes predictions on the training data and is corrected by the teacher Learning stops when the algorithm achieves an acceptable level of performance.

Accuracy of the model will be tested using testing dataset by calculating the error for the testing data.

Supervised learning methods can be grouped into two categories

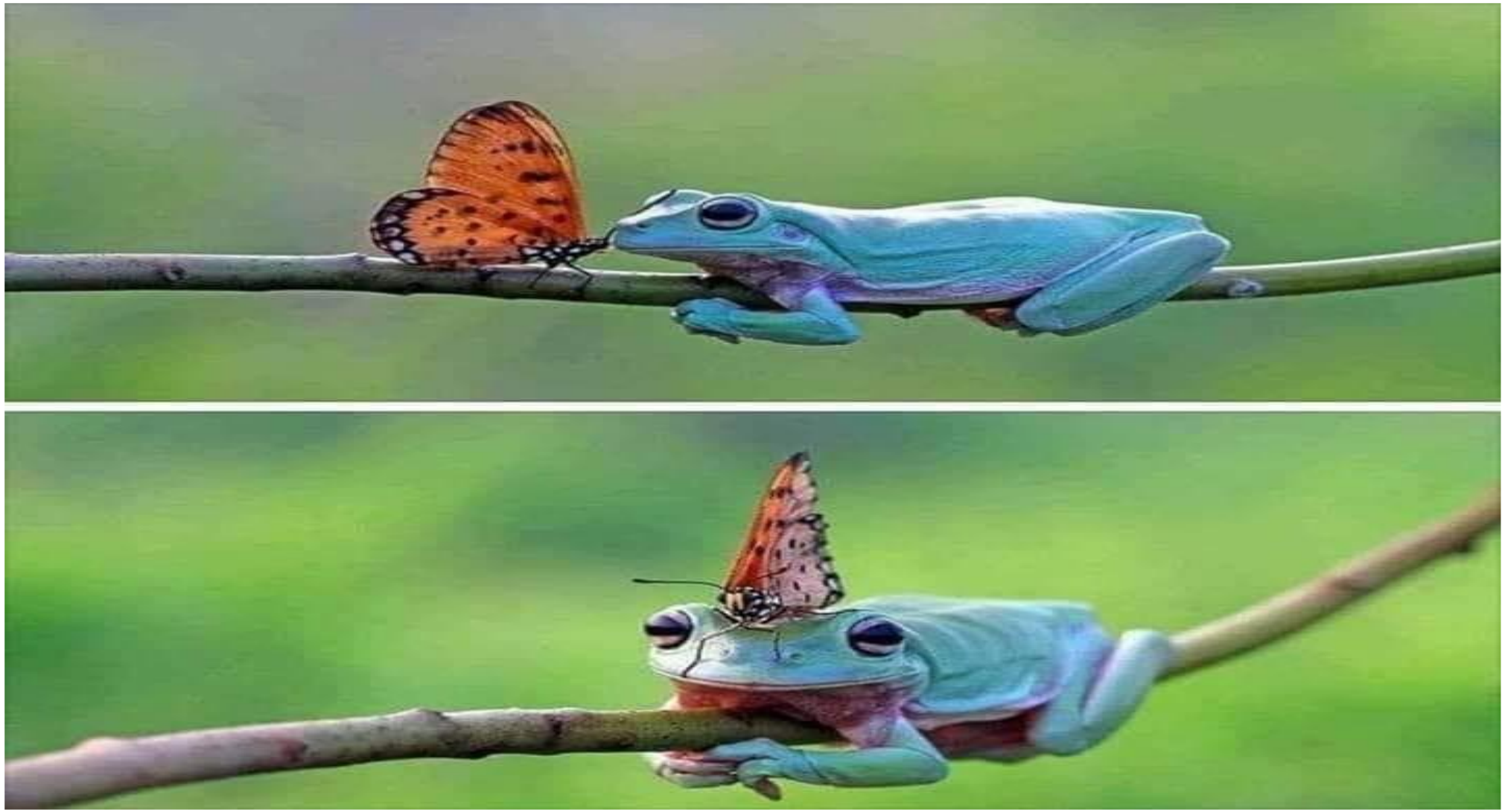
- **Classification** : when the output variable is a category
- **Regression** : when the output variable is a real value

Supervised Learning

Algorithms are used for implementing these learning processes. These are called as Supervisesd Learning Algorithms.

We will be discussing these in detail.

What happens next ?



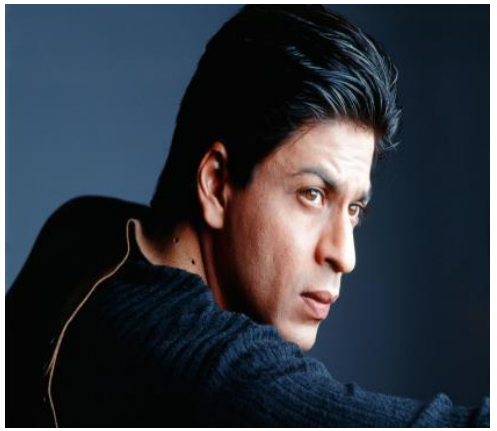
Sometimes the actual results may not be as expectations. In supervised learning these are called the errors Then the errors should be minimized

Unsupervised Learning

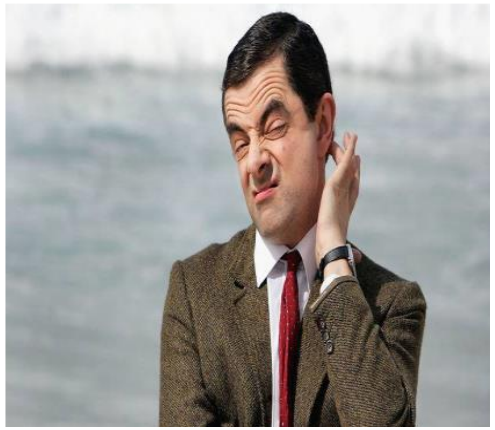
Unsupervised learning, is where you only have input data (X) and no corresponding output variables. Derive some structure or pattern from the “unlabeled data” by just looking at the relationship between the data themselves. There are few methods to check the accuracy of these models.

No teacher is in the class room. Children will play freely

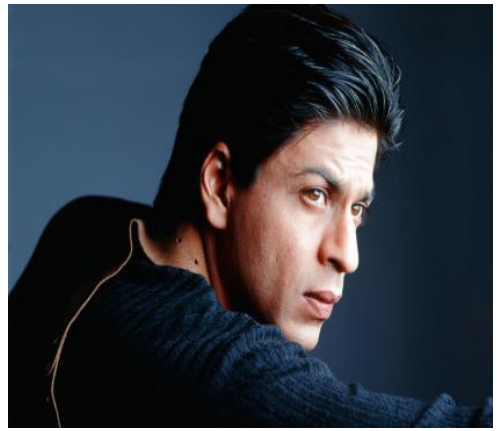




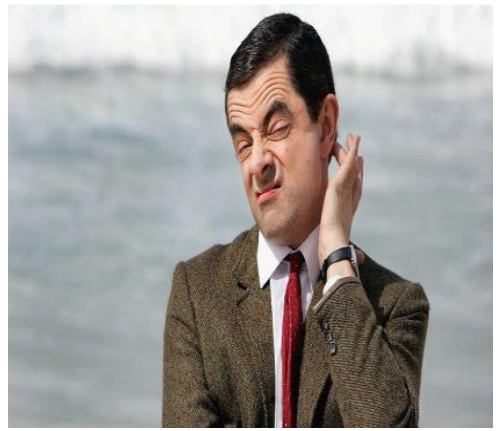




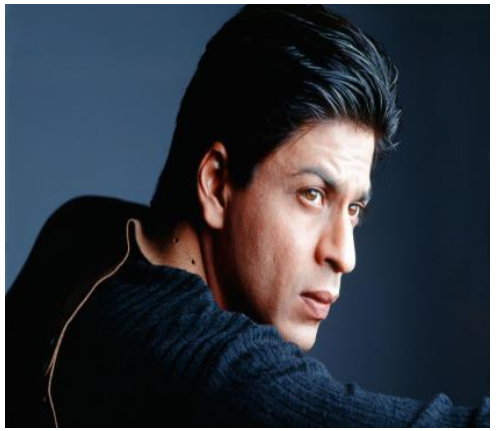




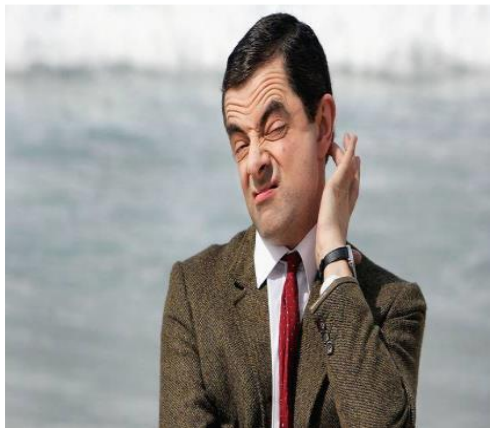




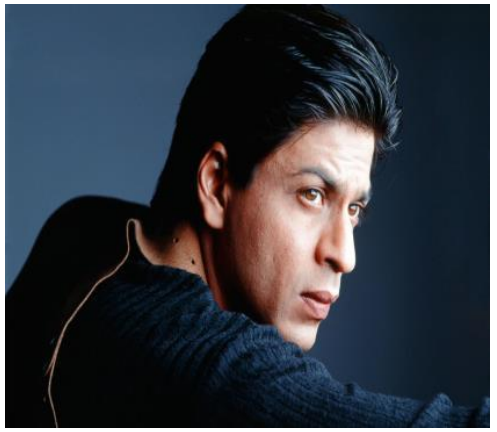




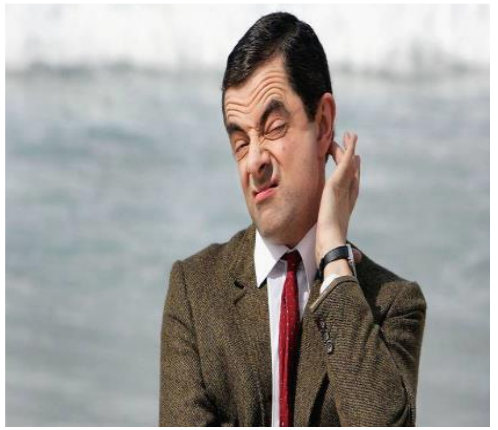


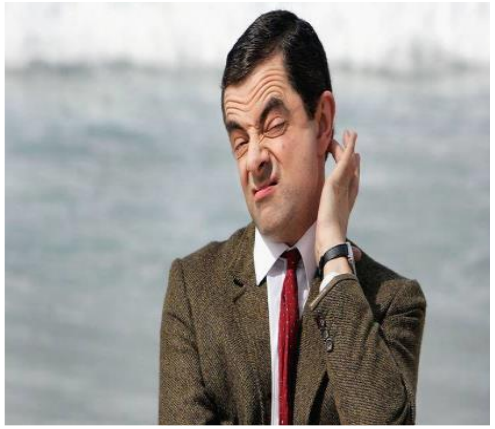


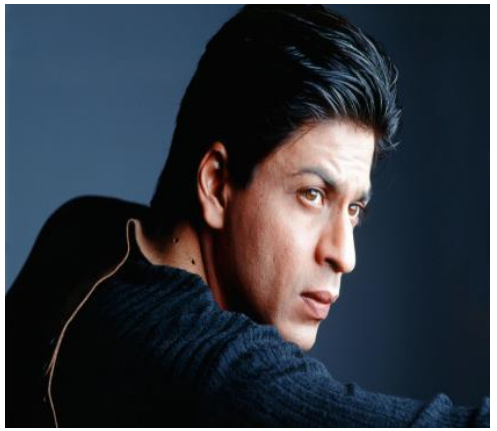


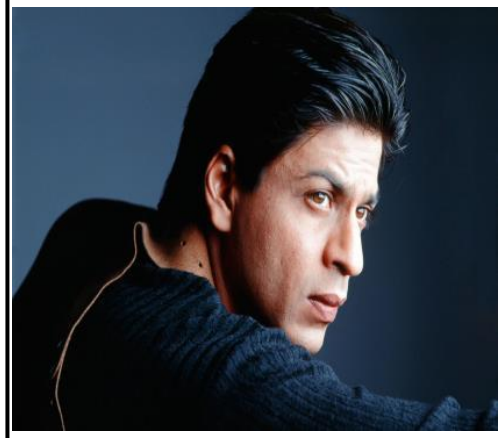






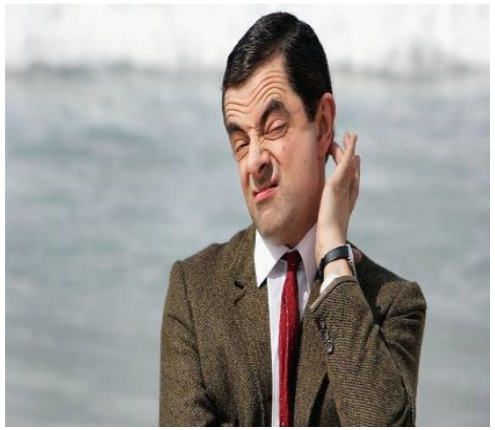











Unsupervised Learning

Unsupervised learning methods can be grouped into two categories.

- **Clustering** : Grouping data.
    - Method by which large sets of data are grouped into clusters of smaller sets of similar data.
- **Association Rule Discovery** : Identifying the associations.
    - Method of identifying associated items and identifying rules of associations.

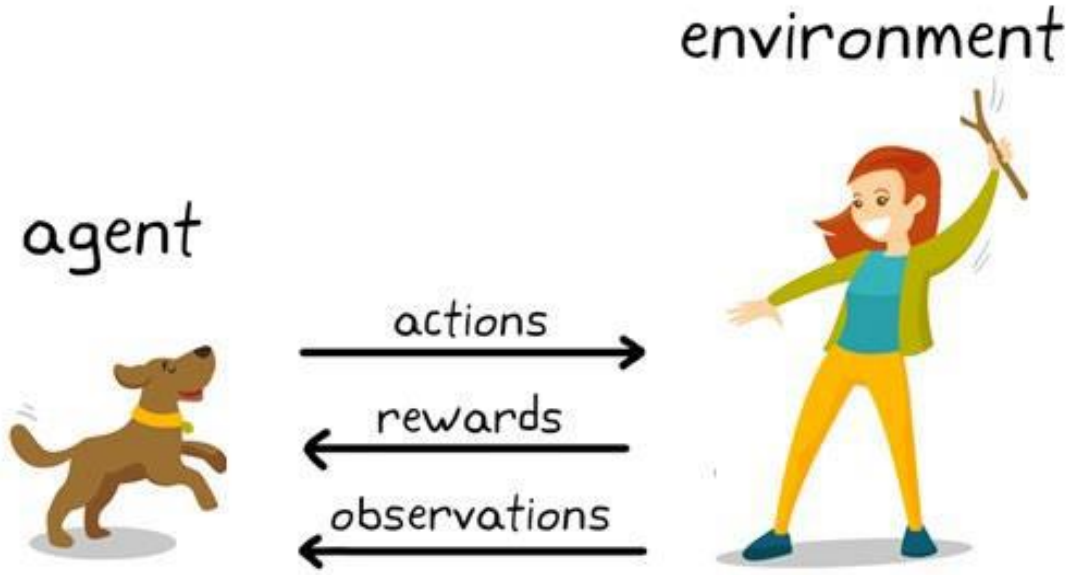
Algorithms are used for implementing these learning processes. These are called as Unsupervised Learning Algorithms.

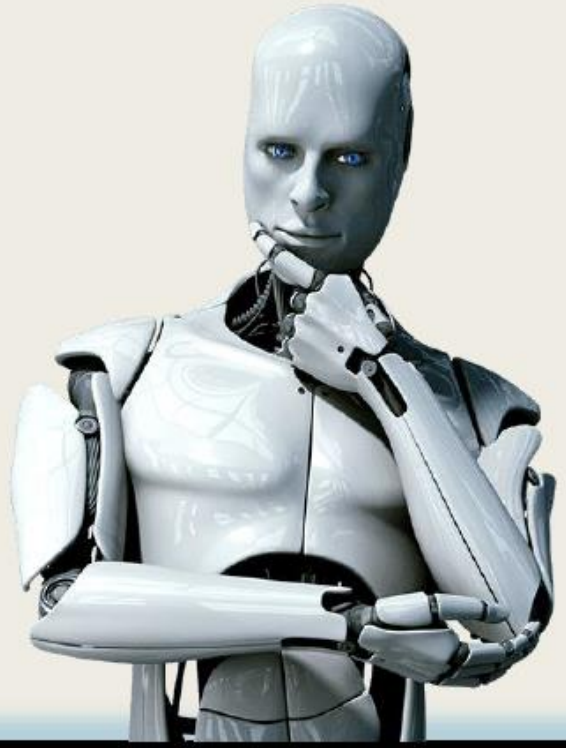
We will be discussing these in detail.

Reinforcement Learning

It is about taking suitable action to maximize reward in a particular situation. It is employed by various software and machines to find the best possible behavior or path it should take in a specific situation.

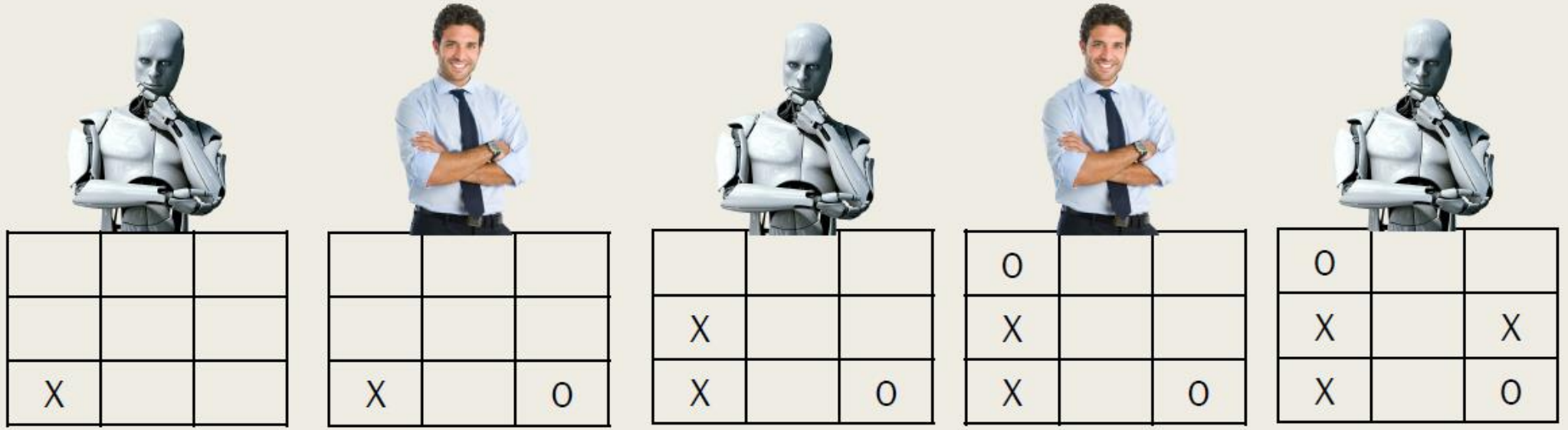
Reinforcement learning differs from the supervised learning in a way that in supervised learning the training data has the answer key with it so the model is trained with the correct answer itself whereas in reinforcement learning, there is no answer but the reinforcement agent decides what to do to perform the given task





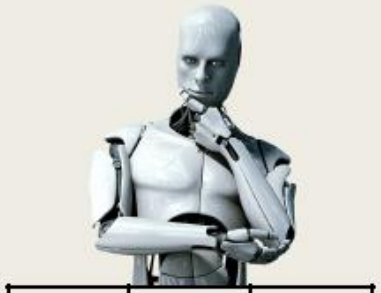
Lets Play **Tic Tac Toe**

Game 01




Learning through
mistakes

Game 02



		X

		O
		X

		O
	X	
		X

O		O
	X	
		X

O		O
	X	
X		X

O	O	O
	X	
X		X


Learning through
mistakes

Game 03

	X	

	O	
	X	

	O	
	X	
	X	

	O	
O	X	
	X	

	O	
O	X	
	X	X

O	O	
O	X	
	X	X

O	O	
O	X	
X	X	X


Never make past
mistakes

Reinforcement Learning

Here also we have Reinforcement Learning algorithms. We will discuss them.

Machine Learning Libraries in Python

There are several algorithms in Python for Machine Learning. Among them, the most popular and the most powerful library is,

We will be discussing this library as well as other needful libraries in detail.