

Learning Paradigms in Machine Learning

How do computers learn from data??

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How do computers learn from data?

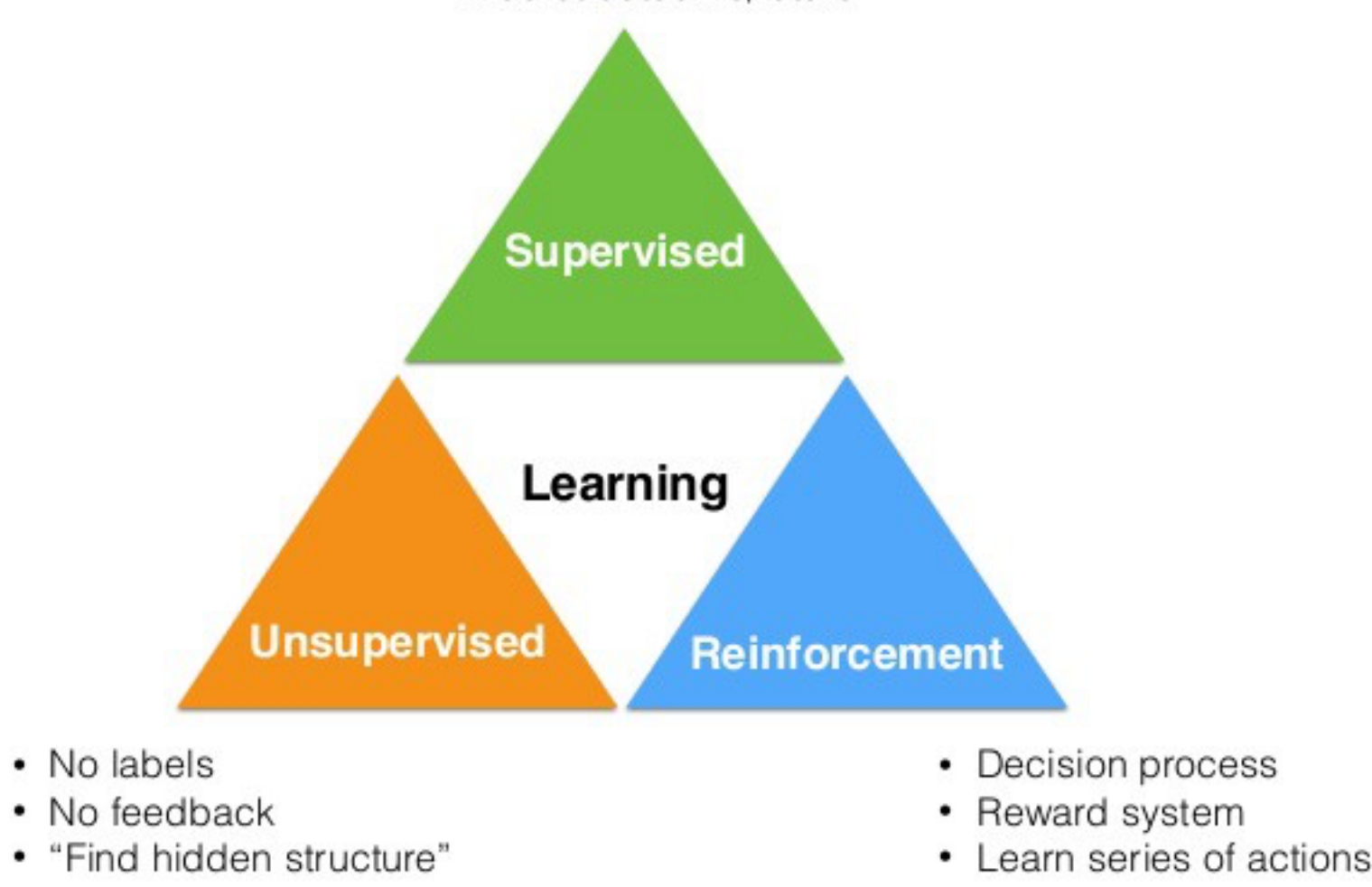


Learning Paradigms basically states a particular pattern on which something or someone learns. In this blog, we will talking about the Learning Paradigms related to machine learning, i.e how a machine learns when some data is given to it, its pattern of approach for some particular data.

There are three basic types of learning paradigms widely associated with machine learning, namely

1. **Supervised Learning**
2. **Unsupervised Learning**
3. **Reinforcement Learning**

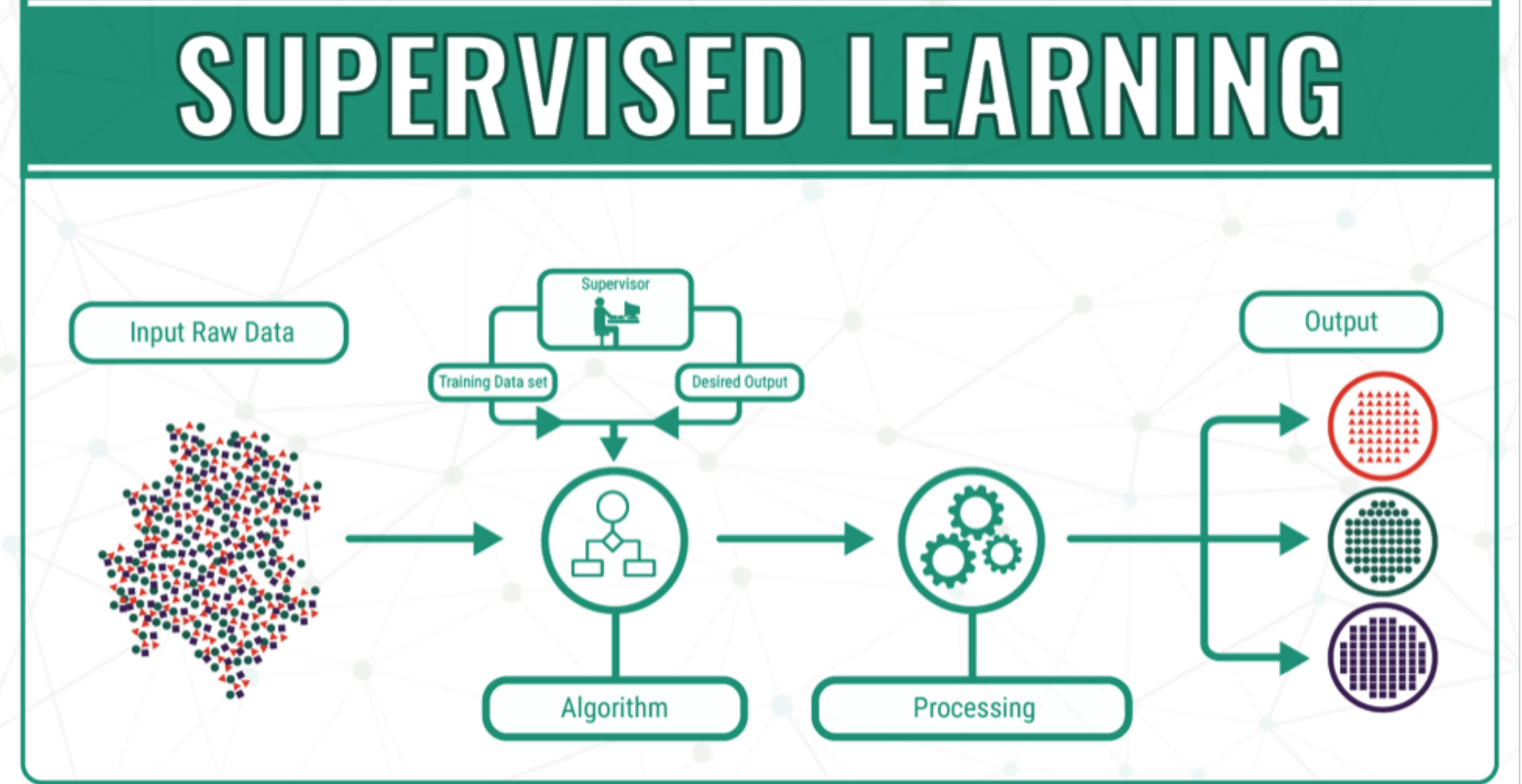
We will be talking in brief about all of them.



Supervised Learning

Supervised learning is a machine learning task in which a function maps the input to output data using the provided input-output pairs.

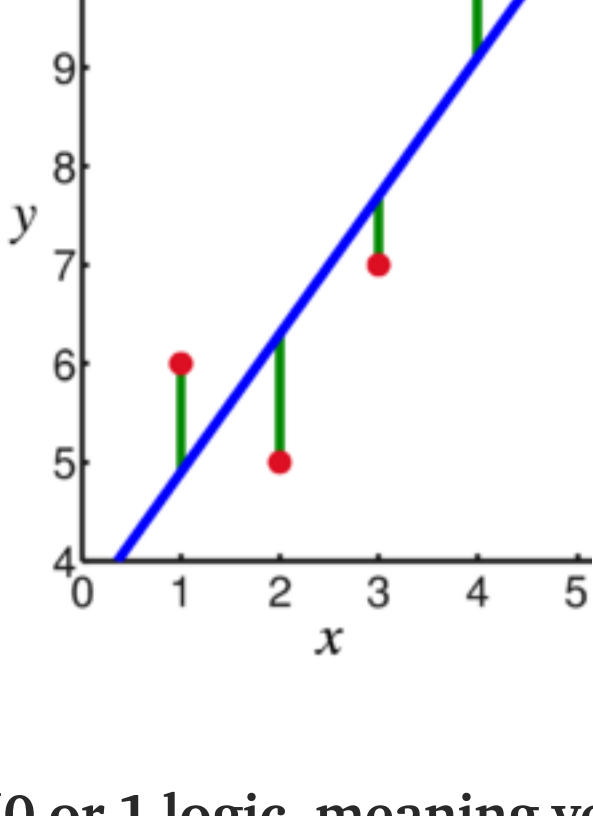
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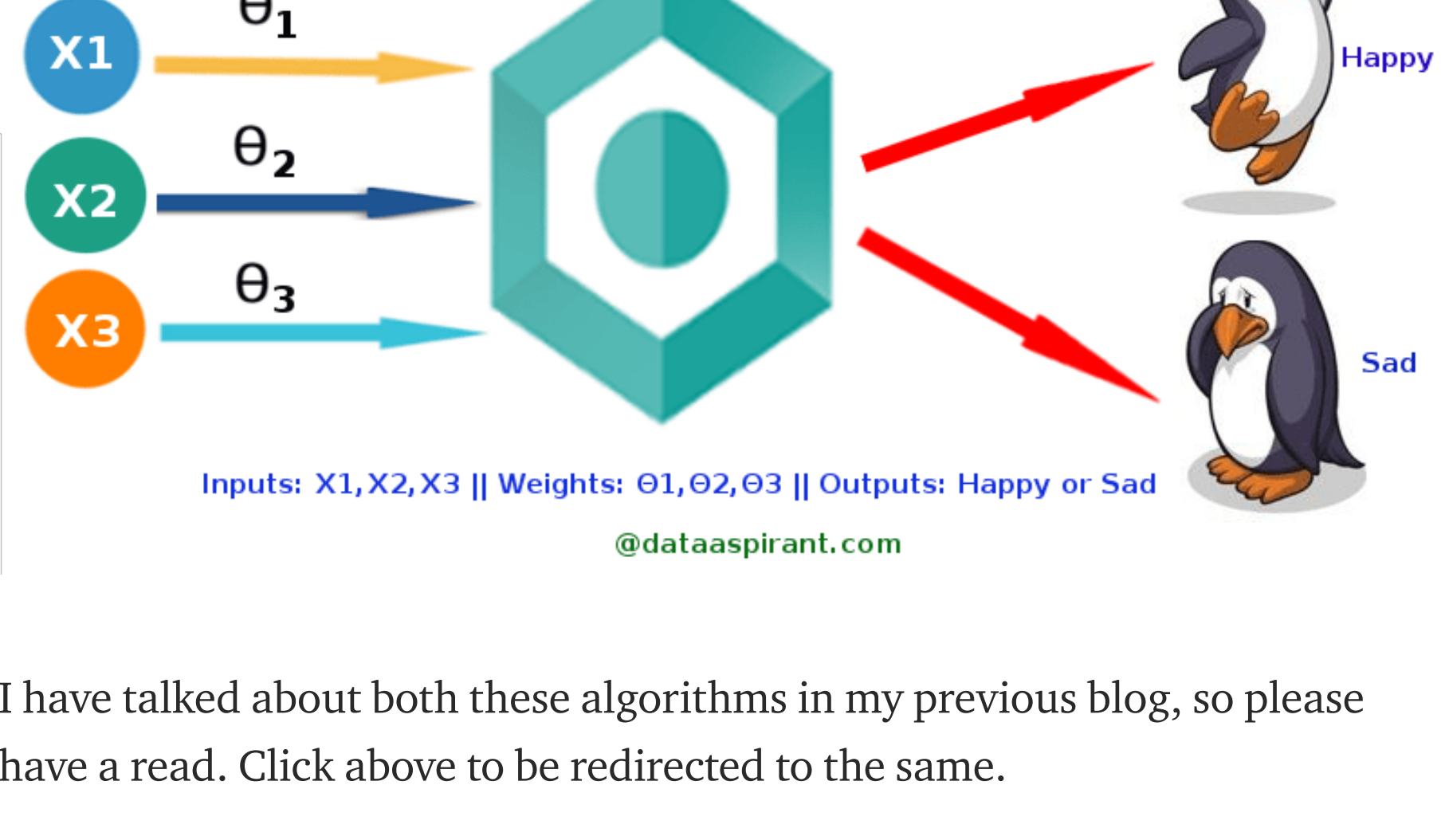
The above statement states that in this type of learning, you need to give both the input and output(usually in the form of labels) to the computer for it to learn from it. What the computer does is that it generates a function based on this data, which can be anything like a simple line, to a complex convex function, depending on the data provided.

This is the most basic type of learning paradigm, and most algorithms we learn today are based on this type of learning pattern. Some examples of these are :

1. **Linear Regression** (the simple Line Function!)



1. **Logistic Regression** (0 or 1 logic, meaning yes or no!)



I have talked about both these algorithms in my previous blog, so please have a read. Click above to be redirected to the same.

Some practical examples of the same are :

Reference : <https://www.geeksforgeeks.org/supervised-unsupervised-learning/>

Classification: Machine is trained to classify something into some class.

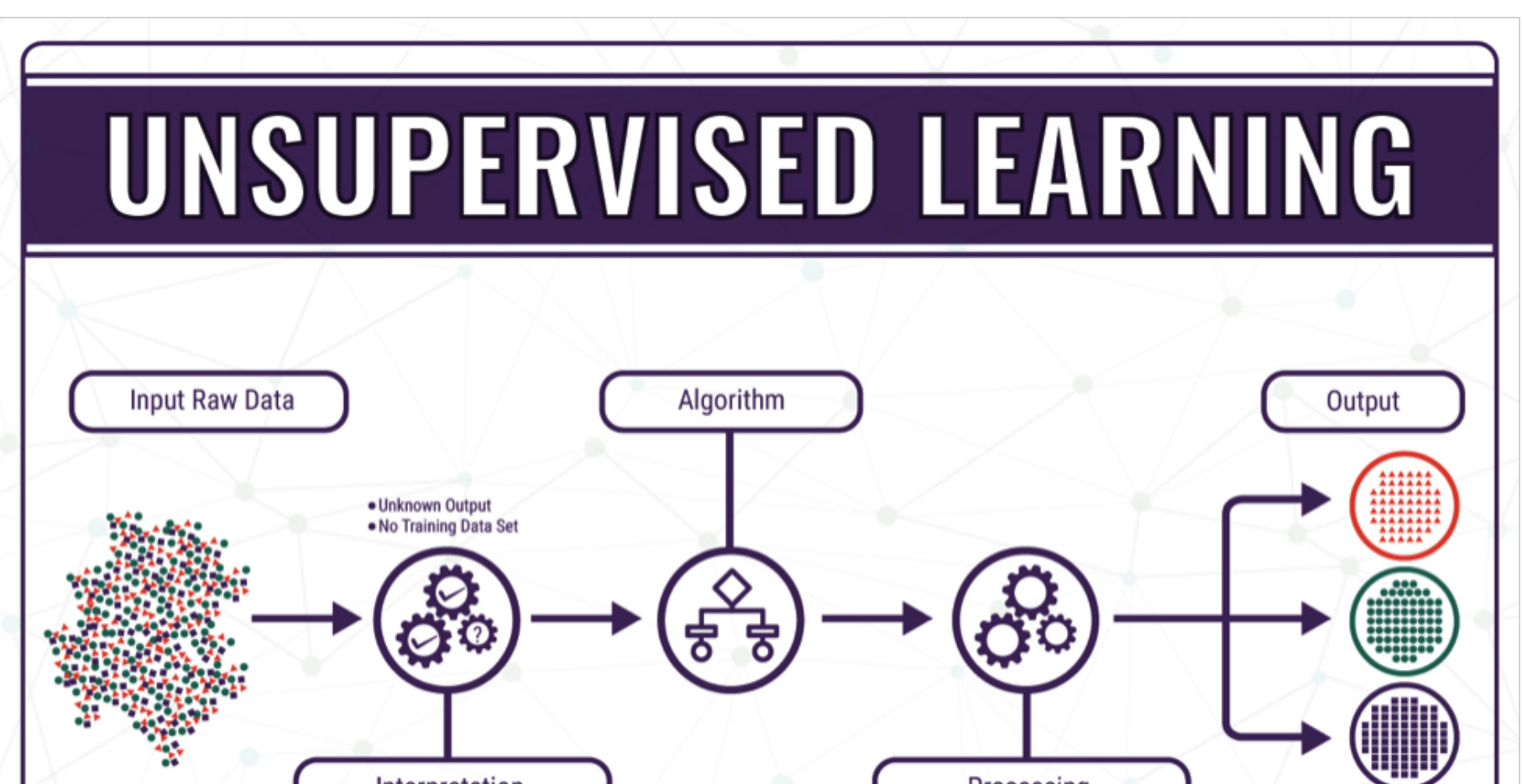
- classifying whether a patient has disease or not
- classifying whether an email is spam or not

Regression: Machine is trained to predict some value like price, weight or height.

- predicting house/property price
- predicting stock market price

Unsupervised Learning

In this type of learning paradigm, the computer is provided with just the input to develop a learning pattern. It is basically Learning from no results!!



This means that the computer has to recognize a pattern in the given input, and develop an learning algorithm accordingly. So we conclude that “**the machine learns through observation & find structures in data**”. This is still a very unexplored field of machine learning, and big tech giants like Google and Microsoft are currently researching on development in it.

Some real life examples of the same are:

Reference : <https://www.geeksforgeeks.org/supervised-unsupervised-learning/>

Clustering: A clustering problem is where you want to discover the inherent groupings in the data

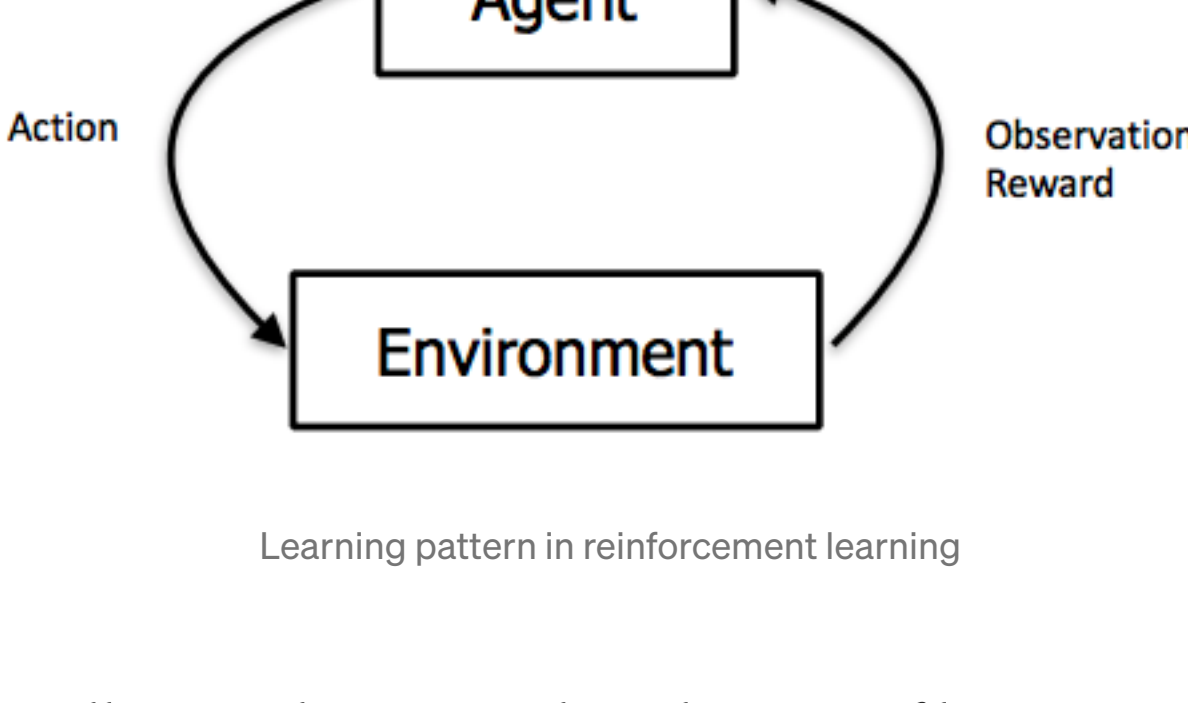
- such as grouping customers by purchasing behavior

Association: An association rule learning problem is where you want to discover rules that describe large portions of your data

- such as people that buy X also tend to buy Y

Reinforcement Learning

Reinforcement Learning is a type of Machine Learning, and thereby also a branch of Artificial Intelligence. It allows machines and software agents to automatically determine the ideal behavior within a specific context, in order to maximize its performance.



There is an excellent analogy to explain this type of learning paradigm, “**training a dog**”.

This learning paradigm is like a dog trainer, which teaches the dog how to respond to specific signs, like a whistle, clap, or anything else. Whenever the dog responds correctly, the trainer gives a reward to the dog, which can be a “Bone or a biscuit”.

Reference for the following text :
<https://www.cse.unsw.edu.au/~cs9417ml/RL1/introduction.html>
<http://vmayoral.github.io/robots/ai/deep/learning/rl/reinforcement/learning/2016/07/06/rl-intro/>

A variety of different problems can be solved using Reinforcement Learning. Because RL agents can learn without expert supervision, the type of problems that are best suited to RL are complex problems where there appears to be no obvious or easily programmable solution. Two of the main ones are:

Game playing — determining the best move to make in a game often depends on a number of different factors, hence the number of possible states that can exist in a particular game is usually very large.

Control problems — such as elevator scheduling. Again, it is not obvious what strategies would provide the best, most timely elevator service. For control problems such as this, RL agents can be left to learn in a simulated environment and eventually they will come up with good controlling policies.

So this is it for this blog. Like the content, if yes please give tons of applauds!

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A Tech Enthusiast!

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