The Learning Journey

Imagine the life of a newborn baby. From the moment he opens his eyes until the day he closes them forever, he encounters an enormous number of events, experiences a wide range of emotions daily, and forms opinions about nearly everything he comes into contact with. At birth, he is inexperienced and knows nothing about emotions or the general notion of life. However, by the time he reaches the end of his life, this cannot be said. Throughout his life, he learns continuously. He makes mistakes, realizes them, and strives to do better. He observes, makes judgments about his surroundings, people, and emotions, and thus, this cycle of improvement continues until the end.

At the center of all this learning and development is the brain. The brain is the organ that is trained and refined over time.

Now, imagine yourself as the brain of an infant. An infant cries whenever he is hungry or needs attention. This behavior is learned through experience. The baby has observed a series of patterns: whenever he needs something, he cries, and his needs are met. This is his learning process, akin to training through experience and observation. As a teenager, his needs are to fit as best as he could. How did this need arise? Because he was constantly surrounded by people and situations from which he drove some conclusions that led him to do what he is doing right now. Just like that a human keeps on living with certain experiences from the past and with every experience he changes the way he acts to situations.

In a similar way, we can define a machine learning model. The analogy is between a human brain and a machine learning model. Like a human brain, an ML model is provided with a vast amount of data to train on. After the training process, it emerges as a well-experienced entity.

Why do we need Machine Learning?

We need machine learning for when we encounter three types of problems in life:

- When we encounter problems, whose solutions consist of a large number of ifs or flags.
- For solving problems which becomes impossible to approach with traditional programming.
- For data which change too frequently. If we try to change our approach to problems constantly for data subjected to changes over a small span of time, it becomes impractical at some point. Machine learning models do this constantly on the fly without any conscious supervision.

Types of Machine Learning:

2 examples will help us lead forward to the most famous classification of ML models. For this first go through the following analogy:

A father and his 3-year-old son are sitting on a bridge on a bright Sunday observing a rainbow in the sky. The dad is telling him about the colors of the rainbow. On the way home, he points out the color of everything that passes by.

Read another one. A 3-year-old boy has to assemble his blocks after playing in different boxes. He places every block in boxes based on its color.

Done with the analogies. Have you observed that in the first example the boy's father was there to help him remember the names of the seven colors of the rainbow and that was how he was able to pick out

the colors of different things, but in the second one, there was no one with him to guide him whether he should place his blocks randomly in boxes or he should use another approach. Here lies the basic difference: the presence or absence of a supervisor.
So, ML can be classified into 2 types based on whether there is the output variable available or not. Supervised machine learning and unsupervised machine learning. In supervised version, we have the end result but in unsupervised, we do not know where we have to go. We just go with the flow and detect the pattern in the data and proceed accordingly.

Here are some common examples to solidify the difference between the two types:
An example to illustrate the concept of supervised machine learning is the classification of spam and ham emails. Initially, the model doesn't know the difference between the two. However, after being trained on a large dataset of emails labeled as spam or ham, it learns to distinguish between them accurately, much like a person learns to differentiate between what is important and what is not through experience.
Unsupervised machine learning examples: If you want to characterize your customers based on a certain criterion. Initially you yourself don't know about the similar categories. So, you do not give the algorithm any sort of additional knowledge. This type of problem in which the algorithm itself figures out the labels is called and unsupervised learning algorithm.