**DAY 1 [16/01/2022]: AI, ML and DL**

**1.Difference between AI, ML and DL**

**AI: Stands for Artificial Intelligence.**

**Intelligence is a complex thing, made up of multiple things. It includes pattern recognition (coding, puzzles), creativity and imagination, also includes emotional intelligence. Hence AI is a subset of actual intelligence which focuses on pattern recognition which is measurable (quantifiable) unless like creativity and imagination which is unpredictable.**

**In the initial days, there was one system based on intelligence named Symbolic AI where we build large knowledge systems using if else conditions. From this Symbolic AI, Expert Systems came into arise. Expert systems consist of inference engine which makes decision from the knowledge base which is collected from experts. Ex: Chess, lung cancer detection.**

**But the flaw in this expert system was, it works only for specific problems as mentioned above. The problems with fuzzy logic such as image classification, voice recognition for example, detecting the dog in the given image, there are many breeds in it and if we try to write code with if else, we cannot write all the conditions so as to build an expert system which classifies dog from the image.**

**Thus, the symbolic AI logic wasn’t applicable in these cases. Henceforth to solve this, Machine Learning came into existence.**

**ML: Stands for Machine Learning.**

**Here we use statistical techniques to find pattern in our data. Instead of writing different conditions of if else as in symbolic Al, here we give the data with lot of samples which is the same thinking process of humans (ex: identifying dogs as we see different ones, same here in ML by giving data).**

**Hence the Learning is inspired from our own evolution.**

**Machine learning is the study of computer algorithms that can improve automatically through experience and by the use of data. It is seen as a part of artificial intelligence. Machine learning algorithms build a model based on sample data, known as "training data", in order to make predictions or decisions (to reduce the error) without being explicitly programmed to do so. Machine learning algorithms are used in a wide variety of applications, such as in medicine, email filtering, speech recognition, and computer vision, where it is difficult or unfeasible to develop conventional algorithms to perform the needed tasks.**

**DL: Stands for Deep Learning.**

**It has the same process as in machine learning. But the algorithms used is different which is inspired from neurons (biology). It doesn’t work as our brain. It’s a mathematical model where the core unit neuron/perceptron is biological neuron based.**

**In ML, we have to provide features. We have to tell what’s there in the data. But in deep learning, it automatically detects the features by itself. If in the fuzzy logic problems where we don’t know whether that feature exist or not, we use DL. Here features are created from the raw data given.**

**In DL, as we add more and more neuron layers, prediction would be much more efficient and accurate. More the layers added, deeper we get into the data and fetch it. In ML, till a point its accuracy would increase, later it would be stabilized when plotted in a graph. But in DL, More the data, higher the performance. It won’t be stagnant.**

**Because of all these advantages, it’s been used in image, text classification and other things.**

**Since deep learning uses powerful technologies, we use it for large complex data. If we have small data then ML is sufficient enough to handle it.**