SNS COLLEGE OF ENGINEERING

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Department of Artificial Intelligence and Data Science

Course Name – Introduction to Artificial Intelligence

II Year / III Semester

Unit-4 Planning and Learning

Neural Networks

Simple Definition Of A Neural Network

Modeled in accordance with the human brain, a Neural Network was built to mimic the functionality of a human brain. The human brain is a neural network made up of multiple neurons, similarly, an Artificial Neural Network (ANN) is made up of multiple perceptrons (explained later).

Neural Network - What Is A Neural Network

A neural network consists of three important layers:

Input Layer: As the name suggests, this layer accepts all the inputs provided by the programmer.

Hidden Layer: Between the input and the output layer is a set of layers known as Hidden layers. In this layer, computations are performed which result in the output.

Output Layer: The inputs go through a series of transformations via the hidden layer which finally results in the output that is delivered via this layer.

Before we get into the depths of how a Neural Network functions, let's understand what Deep Learning is.

What Is Deep Learning?

Deep Learning is an advanced field of Machine Learning that uses the concepts of Neural Networks to solve highly-computational use cases that involve the analysis of multi-dimensional data. It automates the process of feature extraction, making sure that very minimal human intervention is needed.

Deep Learning is an advanced sub-field of Machine Learning that uses algorithms inspired by the structure and function of the brain called Artificial Neural Networks.

Difference Between AI, ML, and DL (Artificial Intelligence vs Machine Learning vs Deep Learning)

People often tend to think that Artificial Intelligence, Machine Learning, and Deep Learning are the same since they have common applications. For example, Siri is an application of AI, Machine learning and Deep learning.

Artificial Intelligence is the science of getting machines to mimic the behavior of humans. Machine learning is a subset of Artificial Intelligence (AI) that focuses on getting machines to make decisions by feeding them data.
Deep learning is a subset of Machine Learning that uses the concept of neural networks to solve complex problems.

To sum it up AI, Machine Learning and Deep Learning are interconnected fields. Machine Learning and Deep learning aids Artificial Intelligence by providing a set of algorithms and neural networks to solve data-driven problems.

Now that you're familiar with the basics, let's understand what led to the need for Deep Learning.
Need For Deep Learning: Limitations Of Traditional Machine Learning Algorithms and Techniques
Machine Learning was a major breakthrough in the technical world, it led to the automation of monotonous and time-consuming tasks, it helped in solving complex problems and making smarter decisions. However, there were a few drawbacks in Machine learning that led to the emergence of Deep Learning.

Deep Learning Use Case/ Applications

Did you know that PayPal processes over $235 billion in payments from four billion transactions by its more than 170 million customers? It uses this vast amount of data to identify possible fraudulent activities among other reasons

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With the help of Deep Learning algorithms, PayPal mined data from their customer's purchasing history in addition to reviewing patterns of likely fraud stored in its databases to predict whether a particular transaction is fraudulent or not.