**Neural Networks-Application Scope of Neural Networks**

Artificial Neural Networks, commonly referred to as "Neural Networks", has been motivated right from its inception by the recognition that the human brain computes in an entirely different way from the conventional digital computer. The brain is a highly complex, nonlinear, and parallel computer (information-processing system). It has the capability to organize its structural constituents, known as neurons, so as to perform certain computations (e.g., pattern recognition, perception, and motor control) many times faster than the fastest digital computer in existence today.

To be specific, the brain routinely accomplishes perceptual recognition tasks (e.g., recognizing familiar face embedded in an unfamiliar scene) in approximately 100–200 ms, whereas tasks of much lesser than the powerful computer.

A neural network is a machine that is designed to model the way in which the brain performs a particular task or function of interest; the network is usually implemented by using electronic components or is simulated in software on a digital computer. To achieve good performance, neural networks employ a massive interconnection of simple computing cells referred to as "neurons" or "processing units."

What Is a Neural Network?
To understand how an artificial neuron works, we should first understand how a biological neuron works.
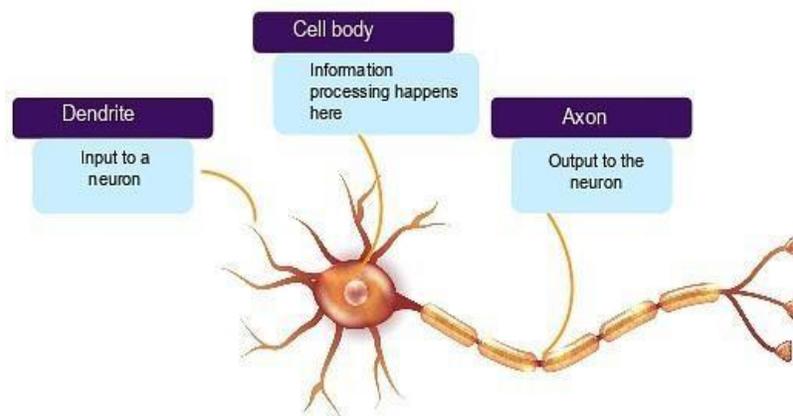
Dendrites
These receive information or signals from other neurons that get connected to it.

Cell Body

Information processing happens in a cell body. These take in all the information coming from the different dendrites and process that information.

Axon

It sends the output signal to another neuron for the flow of information. Here, each of the flanges connects to the dendrite or the hairs on the next one.

The image shown below depicts an ANN.

The network starts with an input layer that receives input in data form.

Input layer

Hidden layers
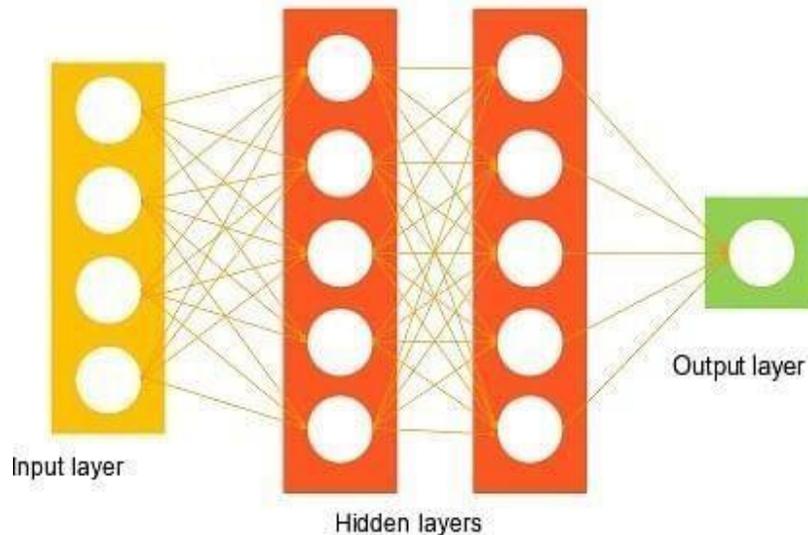
Output layer

The lines connected to the hidden layers are called weights, and they add up on the hidden layers. Each dot in the hidden layer processes the inputs, and it puts an output into the next hidden layer and, lastly, into the output layer.

Looking at the above two images, you can observe how an ANN replicates a biological neuron.

- Input to a neuron - input layer
- Neuron - hidden layer
- Output to the next neuron - output layer

A neural network is a system of hardware or software patterned after the operation of neurons in the human brain. Neural networks, also called artificial neural networks, are a means of achieving deep learning.

Applications of Neural Network

With an enormous number of applications implementations every day, now is the most appropriate time to know about the applications of neural networks, machine learning, and artificial intelligence. Some of them are discussed below:

Handwriting Recognition

Neural networks are used to convert handwritten characters into digital characters that a machine can recognize.

Stock-Exchange prediction

The stock exchange is affected by many different factors, making it difficult to track and difficult to understand. However, a neural network can examine many of these factors and predict the prices daily, which would help stockbrokers.

Currently, this operation is still in its initial phases. However, you should know that over three terabytes of data a day are generated from the United States stock exchange alone. That's a lot of data to dig through, and you must sort it out before you start focusing on even a single stock.

Traveling Issues of sales professionals

This application refers to finding an optimal path to travel between cities in a given area. Neural networks help solve the problem of providing higher revenue at minimal costs. However, the Logistical considerations are enormous, and we must find optimal travel paths for sales professionals moving from town to town.

Image compression

The idea behind neural network data compression is to store, encrypt, and recreate the actual image again. Therefore, we can optimize the size of our data using image compression neural networks. It is the ideal application to save memory and optimize it.

So, what does the future of neural networks look like?

Future of Neural Networks

With the rapid pace that AI and machine learning are being adopted by companies today, we could see more advancements in the applications of neural networks in the foreseeable future. AI and machine learning will offer a wealth of personalized choices for users worldwide. For example, all mobile and web applications try to give you an enhanced customized experience based on your search history, and neural networks can make that possible.

Hyper-intelligent virtual assistants will make life easier. If you have ever used Google assistant, Siri, or any other products, you can see how they're slowly evolving. They may even predict your email responses in the future!

We can also expect intriguing discoveries on algorithms to support learning methods. However, we are just in the infant stage of applying artificial intelligence and neural networks to the real world.

Neural networks will be a lot faster in the future, and neural network tools can get embedded in every design surface. We already have a little mini neural network that plugs into an inexpensive processing board or even into your laptop. Instead of the software, focusing on the hardware would make such devices even faster.

Neural networks will also find their way into the fields of medicine, agriculture, physics, research, and anything else you can imagine. Neural networks will also find its way into the fields of medicine, agriculture, physics, research, and anything else you can imagine.