

ARTIFICIAL NEURAL NETWORK

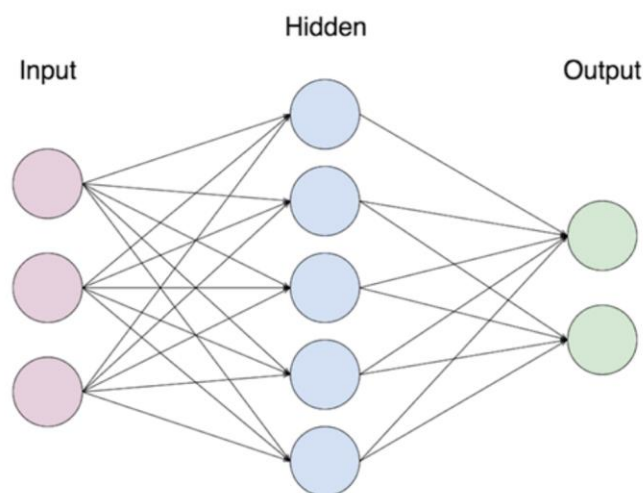
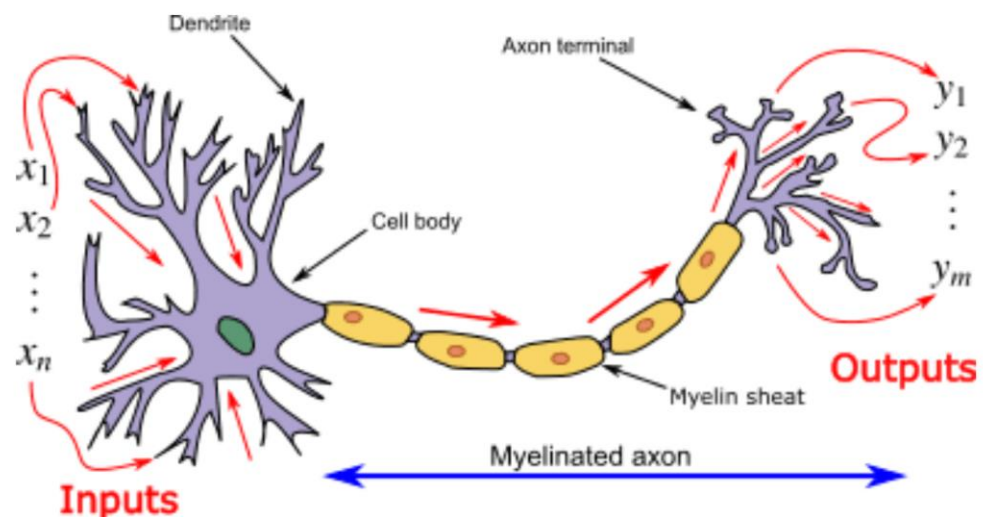


INTRODUCTION

The term "**Artificial Neural Network**" is derived from Biological neural networks that develop the structure of a human brain. Human brain is a complex system made of billions of neurons that opens up new mysteries with every discovery about it. And the attempts to mimic the structure and function of the human brain led to a new field of study called Deep Learning. Artificial Neural Networks also known as Neural Networks, inspired from the neural networks of the human brain is a component of Artificial Intelligence. With hundreds of applications in day to day life, the field has seen exponential growth in the last few years. From spell check, machine translation to facial recognition it finds its application everywhere in the real world.

Working mechanism of Artificial Neural networks:

Artificial Neural Networks work in a way similar to that of their biological inspiration. They can be considered as weighted directed graphs where the neurons could be compared to the nodes and the connection between two neurons as weighted edges. The processing element of a neuron receives many signals (both from other neurons and as input signals from the external world).



Signals are sometimes modified at the receiving synapse and the weighted inputs are summed at the processing element. If it crosses the threshold, it goes as input to other neurons (or as output to the external world) and the process repeats.

Types of Artificial Neural Networks

- **Feed Back ANN**

In this type of ANN, the output returns into the network to accomplish the best-evolved results internally. The feedback networks feed information back into itself and are well suited to solve optimization issues. The Internal system error corrections utilize feedback ANNs. it allows feedback loops. Also, used in content addressable memories.

- **Feed Forward ANN**

In this network flow of information is unidirectional. A unit used to send information to another unit that does not receive any information. Also, no feedback loops are present in this.

The primary advantage of this network is that it figures out how to evaluate and recognize input patterns.

Advantages of ANN

- Artificial neural networks can learn and generalize from large amounts of data. They can be trained using large datasets and this allows them to make predictions and decisions based on patterns.
- Another advantage of artificial neural networks is that they remain functional despite noise or errors in data. This makes them suitable in situations with noisy, incomplete, or corrupted data.
- They can extract features from data. This eliminates manual feature editing. They can also be trained to handle multiple tasks simultaneously. This makes them useful in advanced AI applications.
- ANNs can be optimized and used efficiently on hardware accelerators or dedicated **AI processors** such as graphic processing units and artificial intelligence accelerators for fast and parallel processing.

