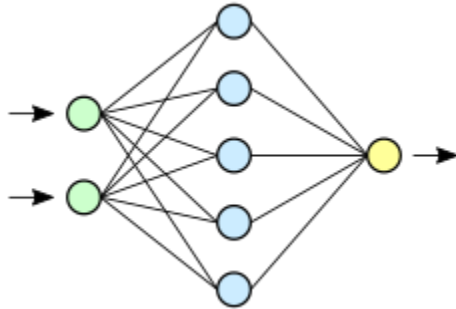


NEURAL NETWORK

Neural networks are a class of machine learning algorithms used to model complex patterns in datasets using multiple hidden layers and non-linear activation functions. A neural network takes an input, passes it through multiple layers of hidden neurons, and outputs a prediction representing the combined input of all the neurons.



ARTIFICIAL NEURAL NETWORK

Artificial Neural Networks can be best described as the biologically inspired simulations that are performed on the computer to do a specific set of tasks like clustering, classification, pattern recognition etc.

ARCHITECTURE

Input layer:

The Input layers contain those artificial neurons which are to receive input from the outside world. This is where the actual learning on the network happens, or recognition happens.

Output layer:

The output layers contain units that respond to the information that is fed into the system and also whether it learned any task or not.

Hidden layer:

The hidden layers are in between input layers and the output layers. The job of a hidden layer is to transform the input into something meaningful that the output layer can use in some way.

HOW?

- ✚ The Artificial Neural Network receives the input signal from the external world in the form of a pattern and image in the form of a vector.
- ✚ Each of the input is then multiplied by its corresponding weights (*weights are the details used by the artificial neural networks to solve a certain problem*)
- ✚ All the weighted inputs are summed up inside the computing unit

- ✚ If the weighted sum equates to zero, a bias is added to make the output non-zero or else to scale up to the system's response
- ✚ The sum of weighted inputs is passed through the activation function (*activation function, in general, is the set of transfer functions used to get the desired output of it*).

WHY? (Advantages)

Parallel processing capability:

Artificial neural networks have a numerical value that can perform more than one task simultaneously.

Storing data on the entire network:

Data that is used in traditional programming is stored on the whole network, not on a database. The disappearance of a couple of pieces of data in one place doesn't prevent the network from working.

Capability to work with incomplete knowledge:

After ANN training, the information may produce output even with inadequate data. The loss of performance here relies upon the significance of missing data.