# Introduction to Artificial Neural Network

Artificial Neural Networks contain artificial neurons which are called units. These units are arranged in a series of layers that together constitute the whole Artificial Neural Network in a system. This article provides the outline for understanding the Artificial Neural Network.

Characteristics of Artificial Neural Network

1. It is neuraly implemented mathematical model
2. It contains huge number of interconnected processing elements called neurons to do all operations
3. Information stored in the neurons are basically the weighted linkage of neurons
4. The input signals arrive at the processing elements through connections and connecting weights.
5. It has the ability to learn , recall and generalize from the given data by suitable assignment and adjustment of weights.
6. The collective behavior of the neurons describes its computational power, and no single neuron carries specific information .

How Simple Neuron Works ?

Let there are two neurons **X** and **Y** which is transmitting signal to another neuron **Z** . Then , **X** and **Y** are input neurons for transmitting signals and **Z** is output neuron for receiving signal . The input neurons are connected to the output neuron , over a interconnection links (**A** and **B**) as shown in figure .
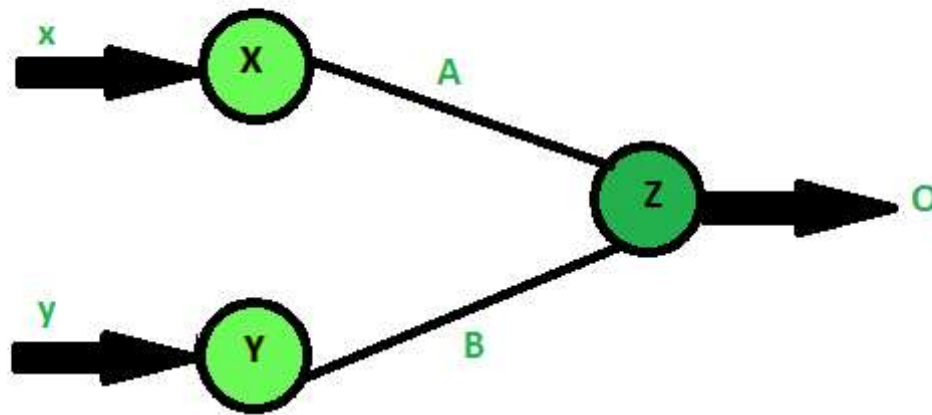
Architecture of a Simple Artificial Neuron Net

For above neuron architecture, the net input has to be calculated in the way. **I = xA + yB**

where x and y are the activations of the input neurons X and Y. The output z of the output neuron Z can be obtained by applying activations over the net input. **O = f(I), Output = Function (net input calculated)**

The function to be applied over the net input is called activation function. There are various activation function possible for this.

Application of Neural Network

1. Every new technology need assistance from the previous one i.e. data from previous ones and these data are analyzed so that every pros and cons should be studied correctly. All of these things are possible only through the help of neural network.
2. Neural network is suitable for the research on **Animal behavior, predator/prey relationships and population cycles**.
3. It would be easier to do **proper valuation** of property, buildings, automobiles, machinery etc. with the help of neural network.
4. Neural Network can be used in betting on horse races, sporting events, and most importantly in stock market.
5. It can be used to predict the correct judgment for any crime by using a large data of crime details as input and the resulting sentences as output.
6. By analyzing data and determining which of the data has any fault (files diverging from peers) called as **Data mining, cleaning and validation** can be achieved through neural network.

7. Neural Network can be used to predict targets with the help of echo patterns we get from sonar, radar, seismic and magnetic instruments.

8. It can be used efficiently in **Employee hiring** so that any company can hire the right employee depending upon the skills the employee has and what should be its productivity in future.

9. It has a large application in **Medical Research**.

10. It can be used to for **Fraud Detection** regarding credit cards , insurance or taxes by analyzing the past records .