

Activation Functions

1. Introduction about activation function.
2. Sigmoid activation function
3. Relu activation function



The main work of activation functions is activation or deactivate the neuron based on the value Y. The input of activation function is hypothesis value which is generated from below equation.

$$y = \sum_{i=1}^n w_i x_i + b_i$$

Types of Activation Functions:

1. Sigmoid activation function
2. Relu activation function

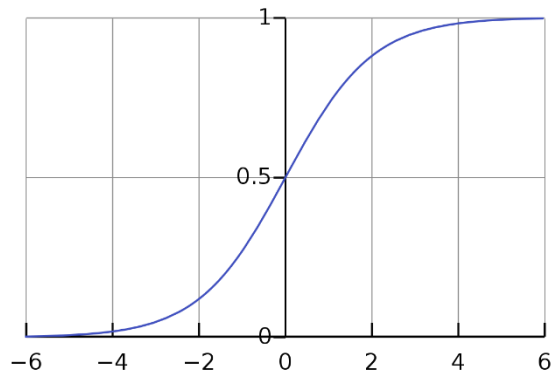
1. Sigmoid Activation Function

The formula of sigmoid activation function is:

$$\sigma = \frac{1}{1 + e^{-y}}$$

$$\sigma = \begin{cases} > 0.5 & \text{if } y > 0 \\ \leq 0.5 & \text{if } y \leq 0 \end{cases}$$

$$\text{Sigmoid act output} = \begin{cases} 1 & \text{if } \sigma > 0.5 \\ 0 & \text{if } \sigma \leq 0.5 \end{cases}$$



- The sigmoid function gives the values between 0 to 1 only. We can observe these levels in figure 1.
- The output of neuron considered as 1 if the $\sigma > 0.5$. It indicates that particular neuron is activated.
- The output of neuron considered as 0 if the $\sigma < 0.5$. It indicates that particular neuron is not activated.

Figure 1: Sigmoid function.

2. Relu Activation Function

The formula of sigmoid activation function is:

$$\text{Relu} = \max(y, 0)$$

$$\text{Relu} = \begin{cases} y & \text{if } y > 0 \\ 0 & \text{if } y \leq 0 \end{cases}$$

- This is most popular technique than sigmoid activation function.
- The Relu Activation function output will be “y” if the value of y is +ve ($y > 0$). This is the neuron activate case.
- The Relu Activation function output will be “0” if the value of y is -ve ($y \leq 0$). This is the neuron deactivate case.

