WEIGHTS

Weights are the details used by the artificial neural networks to solve a certain problem. Weights are values that control the strength of the connection between two neurons. That is, inputs are typically multiplied by weights, and that defines how much influence the input will have on the output.

Example

If the task of the neural network is to classify whether the input image is an airplane or not, the weights used by the network would be the prominent features of a airplane like wings, propellers etc.

BIAS

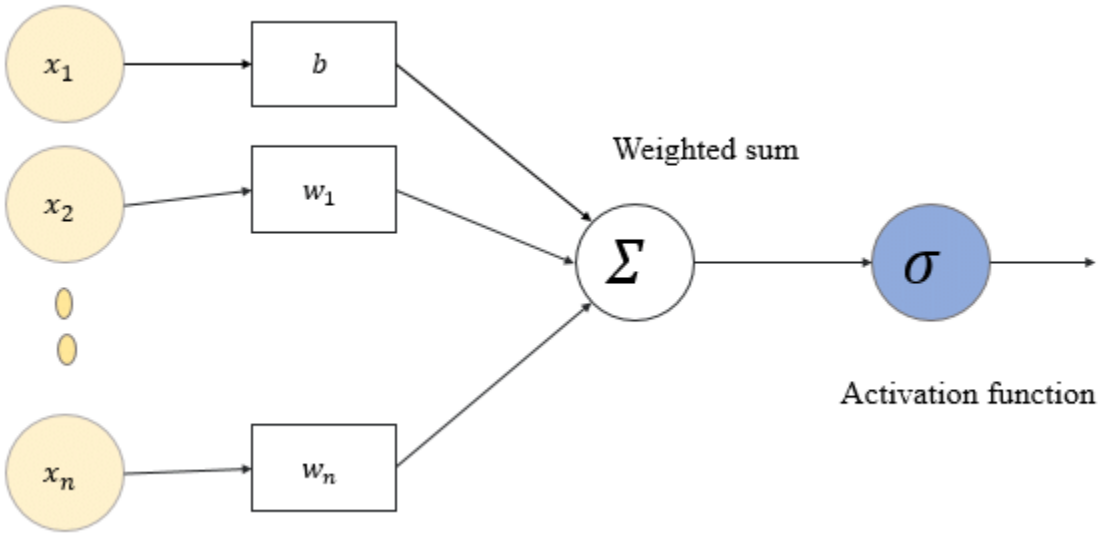
Bias are additional constants attached to neurons and added to the weighted input before the activation function is applied. The bias is known as the difference between the prediction of the values by the ML model and the correct value. The bias is used to shift the result of activation function towards the positive or negative side. Bias terms help models represent patterns that do not necessarily pass through the origin.

Example

If we are predicting the weather for today than, the hudimity, wind etc. will be the wights and rainfall can be treated as a bias, as we are trying to shift our result towards the question that is it going to rain today?

ACTIVATION FUNCTION

An **Activation Function** decides whether a neuron should be activated or not. This means that it will decide whether the neuron's input to the network is important or not in the process of prediction using simpler mathematical operations. The primary role of the Activation Function is to transform the summed weighted input from the node into an output value to be fed to the next hidden layer or as output.



WHY ACTIVATION FUNCTION SHOULD BE NON LINEAR?

A neural network without an activation function is essentially just a linear regression model. Without activation function it will give a liner output which will only be good for linearly separable data and does not have much scope for learning. Same will be the case if the activation function used are liner. The data will be separated linearly and this will not work good for complex data. Hence the activation function used are nonlinear so that it does the non-linear transformation to the input making it capable to learn and perform more complex tasks.

Example: a liner model can classify between dogs and cats images where they are clearly visible, in case the images are of different angle or closeup shots or has multiple objects then the data becomes linearly non separable. In linear model we will get a straight line separating the data points but in non linear model the line is not necessarily straight hence we get a better separation or classification of the data points.