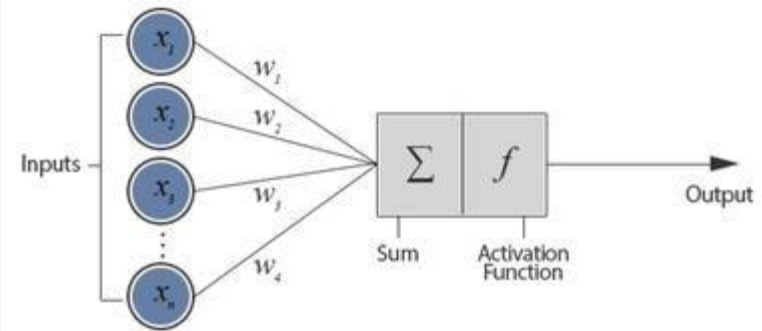
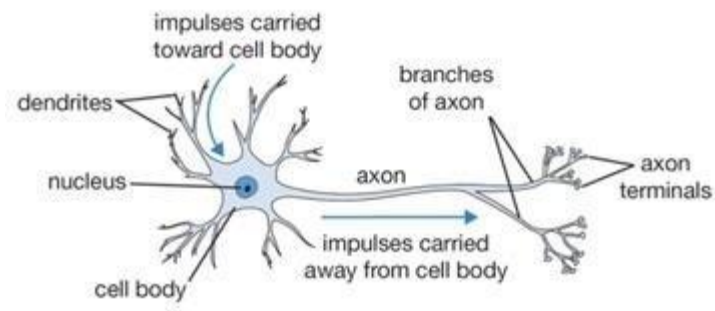


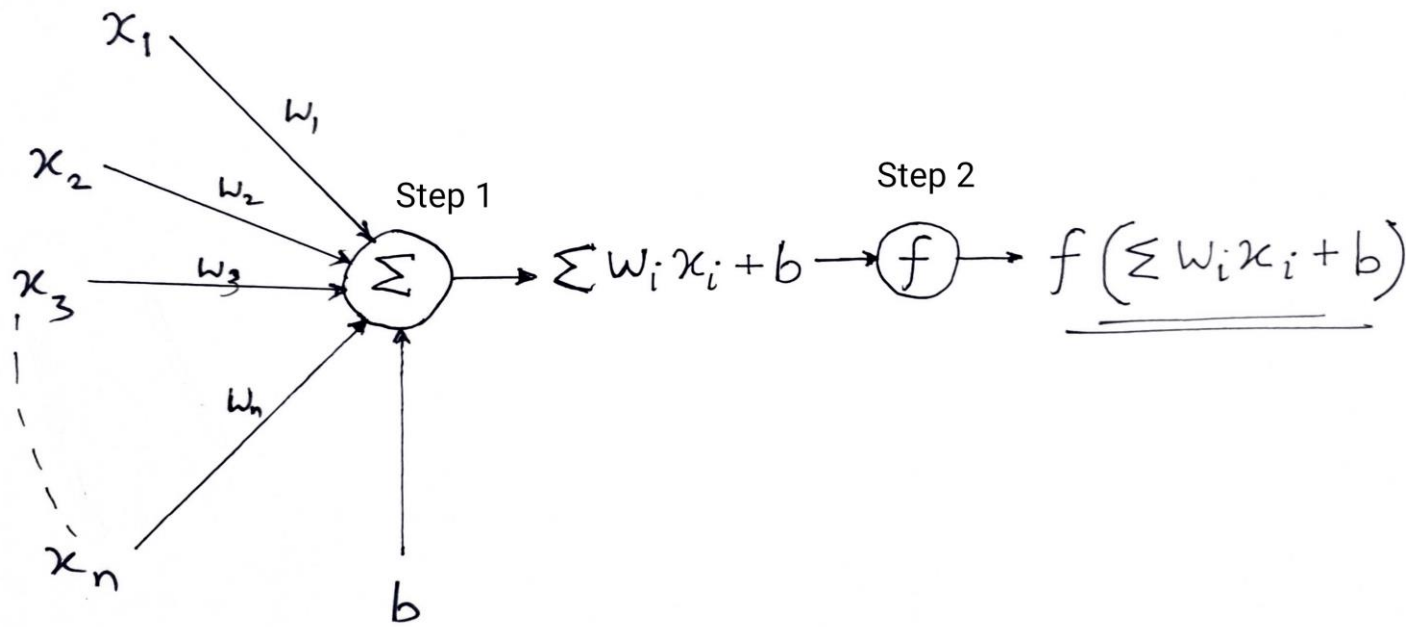
Perceptron

Biological Neuron versus Artificial Neural Network



Main Components

- Input nodes or input layer, Weights and bias and Activation function



→ Generalized
Equation

$$w_{\text{new}} = w_{\text{old}} + \alpha(t - o)x$$

where t = target-
value
(0,1)

and o →
output

of the model → 0 or 1. , α is the learning rate.

Algorithm: Perceptron Learning Algorithm

```
 $P \leftarrow$  inputs with label 1;  
 $N \leftarrow$  inputs with label 0;  
Initialize  $\mathbf{w}$  randomly;  
while !convergence do  
    Pick random  $\mathbf{x} \in P \cup N$  ;  
    if  $\mathbf{x} \in P$  and  $\sum_{i=0}^n w_i * x_i < 0$  then  
        |  $\mathbf{w} = \mathbf{w} + \mathbf{x}$  ;  
    end  
    if  $\mathbf{x} \in N$  and  $\sum_{i=0}^n w_i * x_i \geq 0$  then  
        |  $\mathbf{w} = \mathbf{w} - \mathbf{x}$  ;  
    end  
end  
//the algorithm converges when all the  
inputs are classified correctly
```

Reference

- <https://machinelearningmastery.com/perceptron-algorithm-for-classification-in-python/#:~:text=The%20Perceptron%20algorithm%20is%20a,and%20predicts%20a%20class%20label.>
- <https://towardsdatascience.com/perceptron-learning-algorithm-d5db0deab975>
- <https://www.youtube.com/watch?v=XNXzVfltWGY>