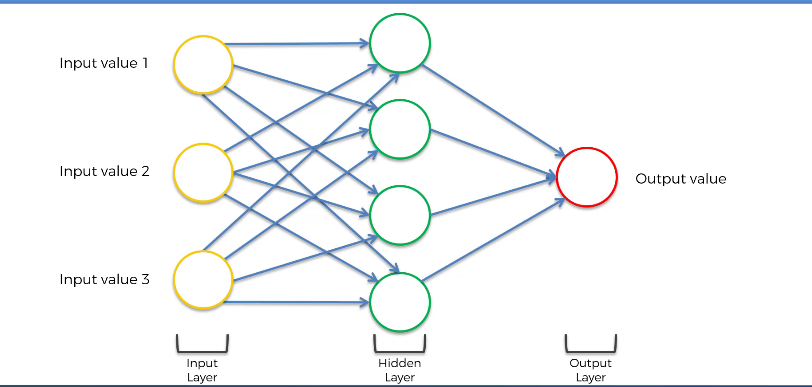
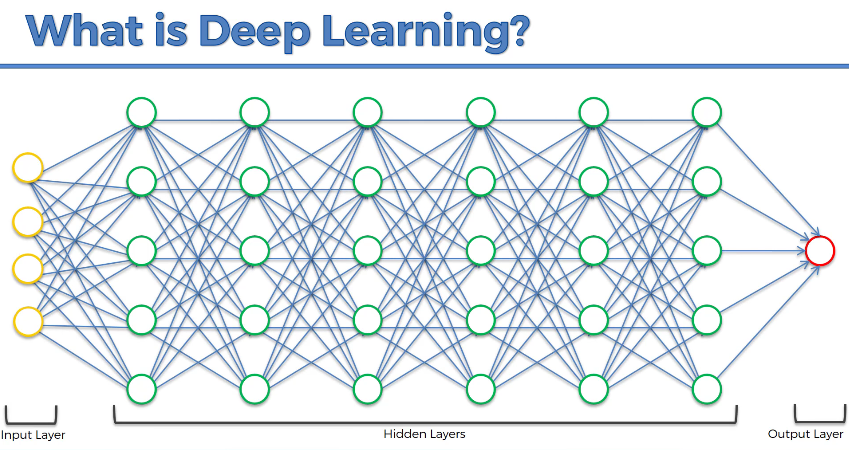
# Introduction

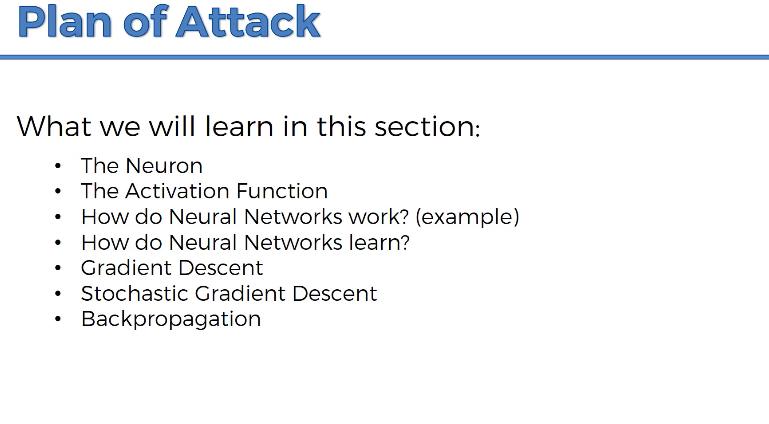




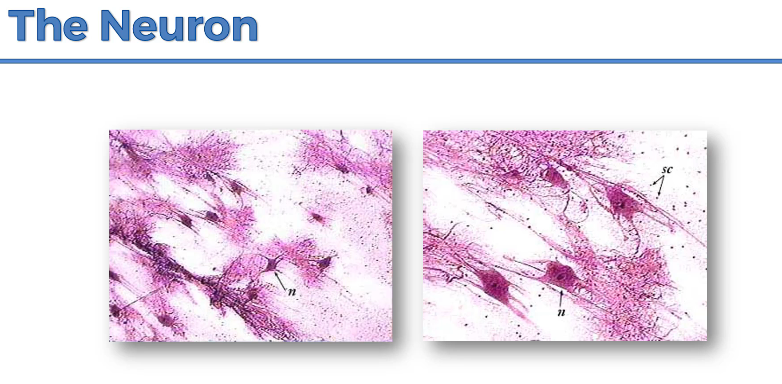
# Codes and Datasets

<https://www.superdatascience.com/deep-learning>

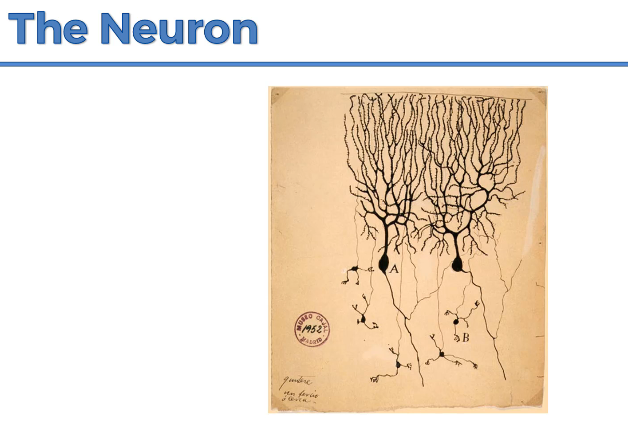
# Plan

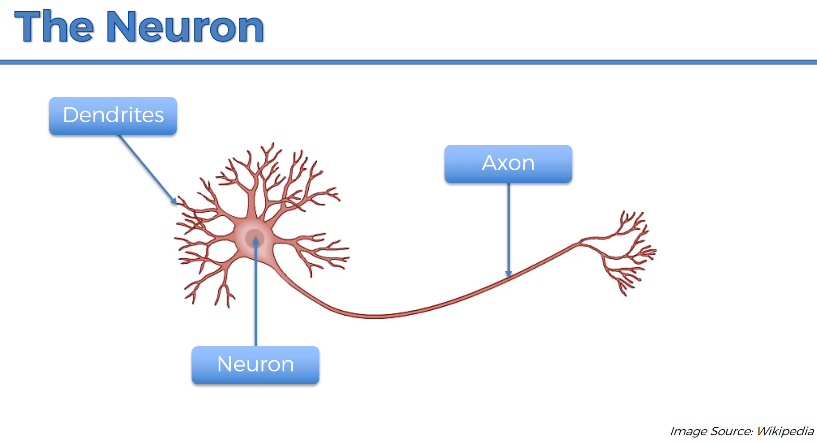


# Neurons



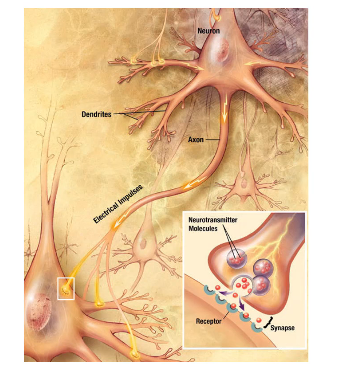
Neurons in human mind.

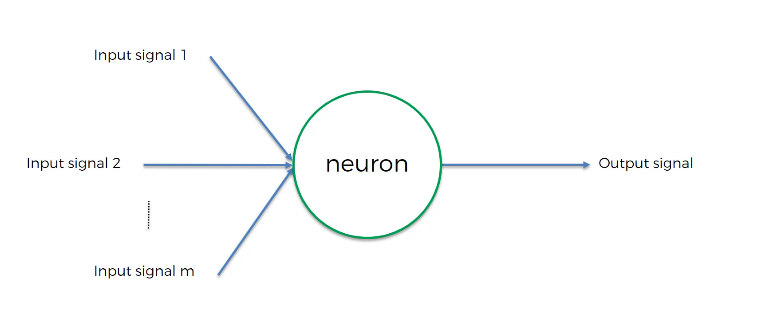


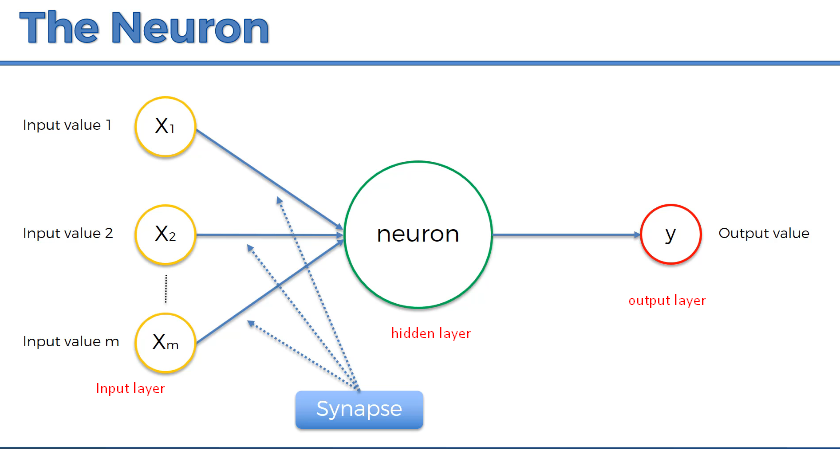


Dendrites – receivers of the signals

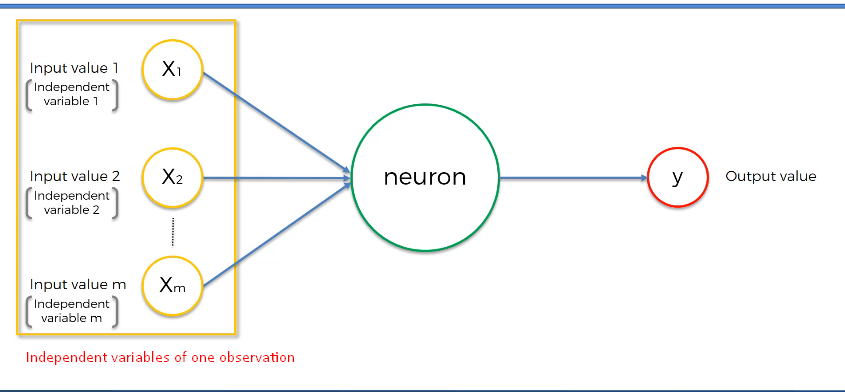
Axon – transmitter of the signals

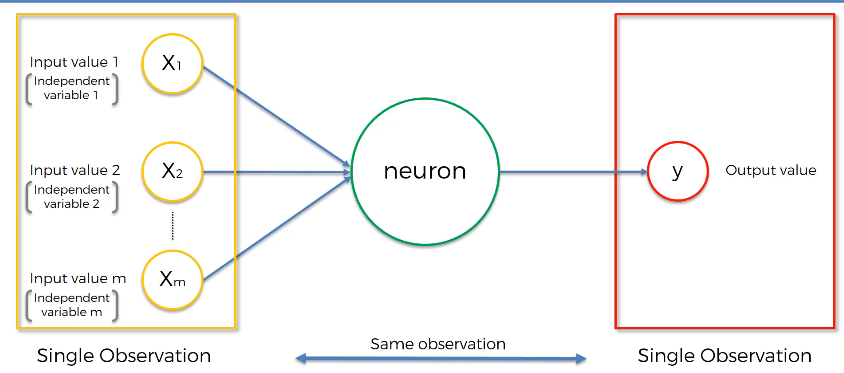


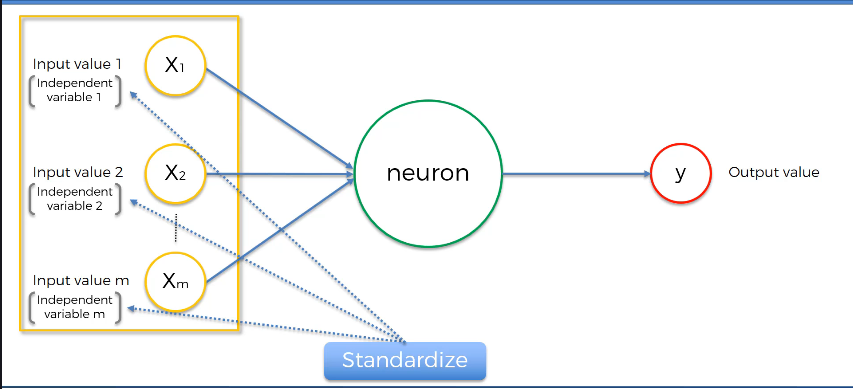




In case of humans, input neurons are like 5 senses.

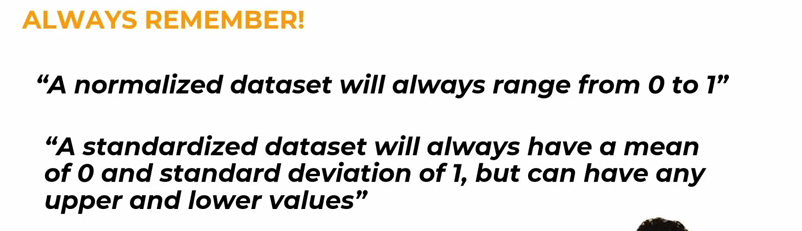




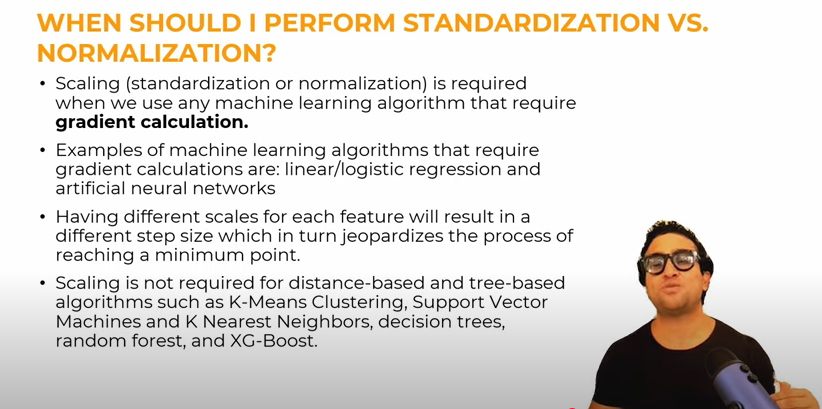


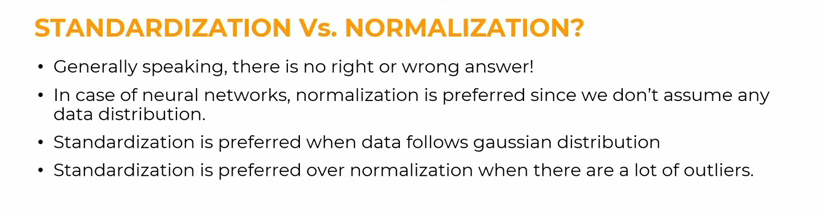
Normalization and Standardization

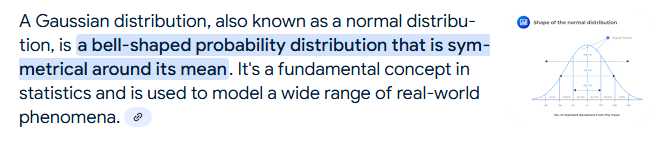
<https://www.youtube.com/watch?v=bqhQ2LWBheQ&t=84s>

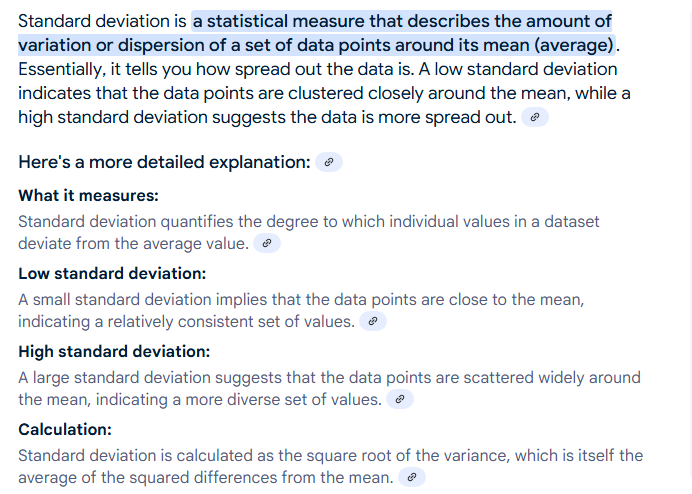


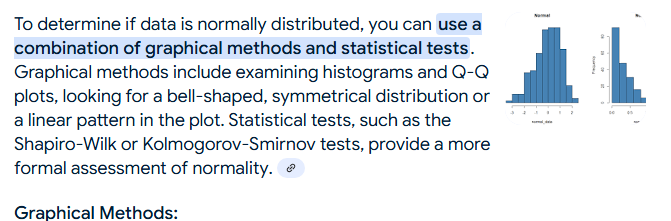
Standardization is also called Z-score Normalization.

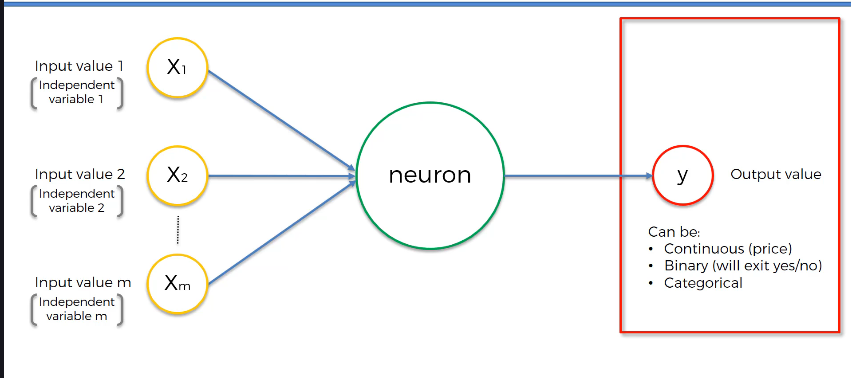


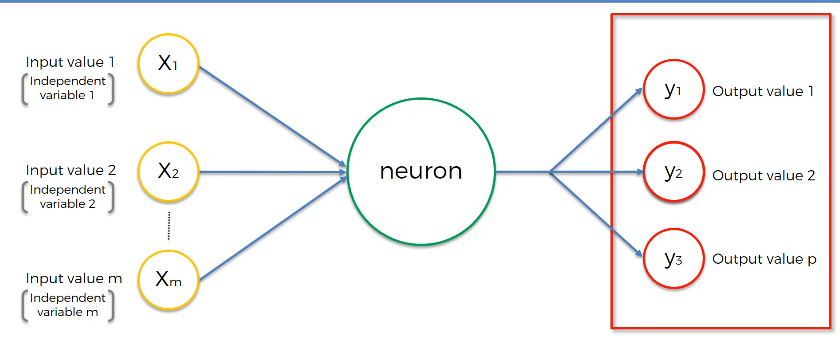




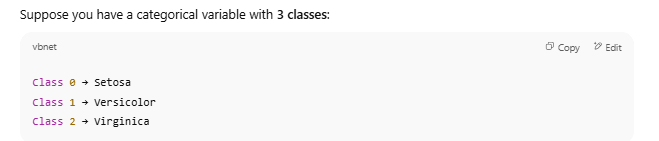






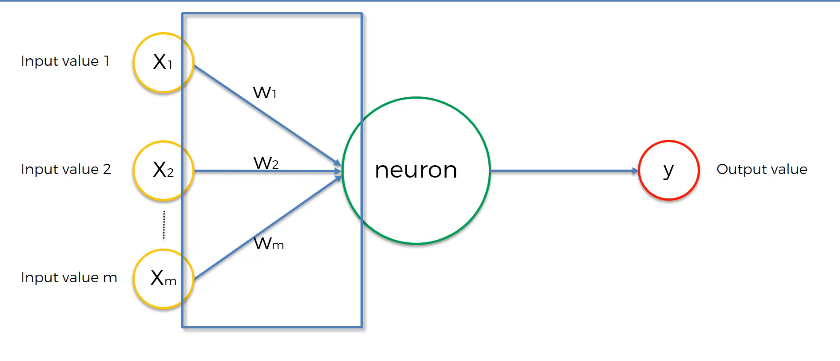


In case of categorical output, you need multiple output neurons (one for each category).

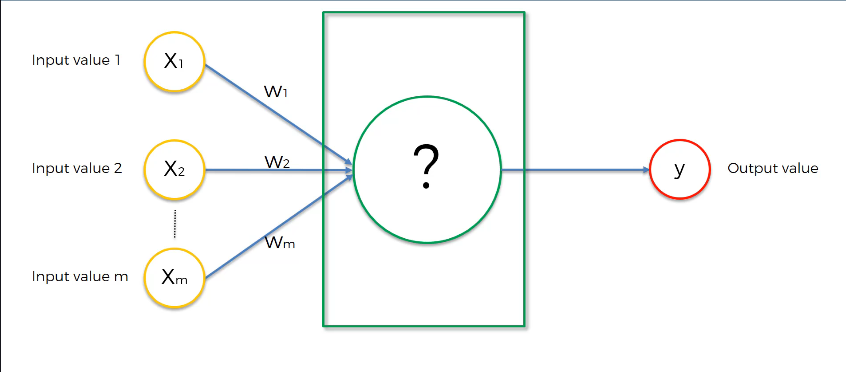


If you only had **1 output neuron**, it couldn’t distinguish among **3+ classes** — it can only give a yes/no signal.

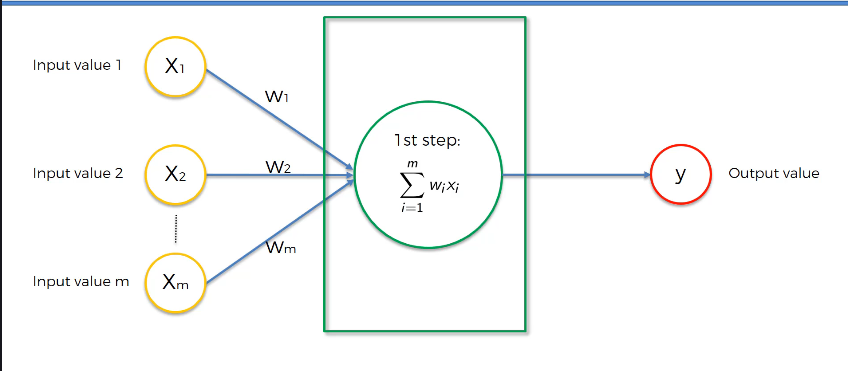




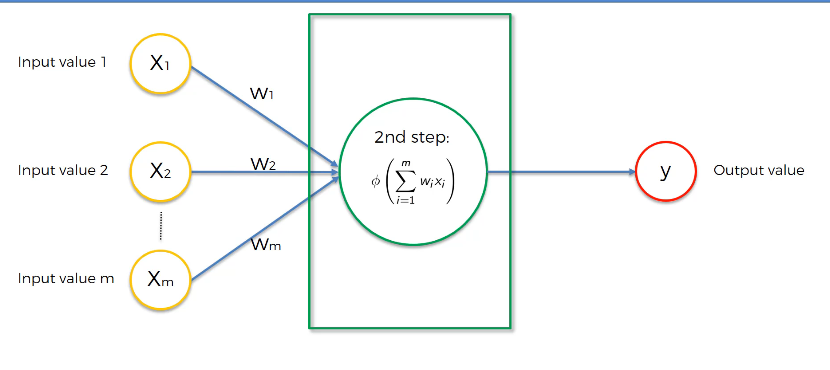
Weights get adjusted during the process of training the Neural Network. That is when Gradient Descent and Back Propagation come into play.



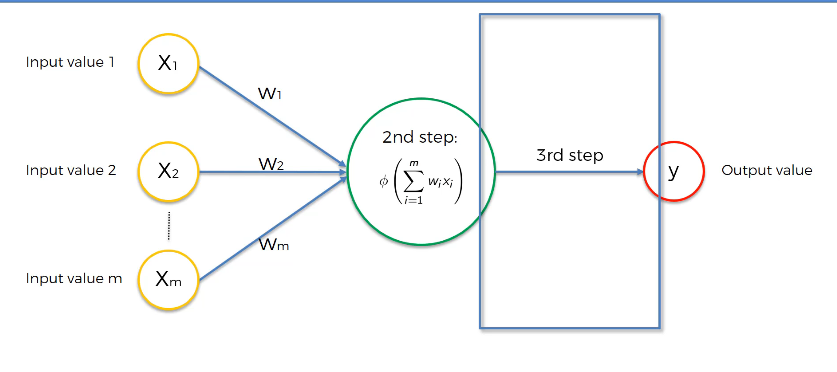
What happens in the neuron?



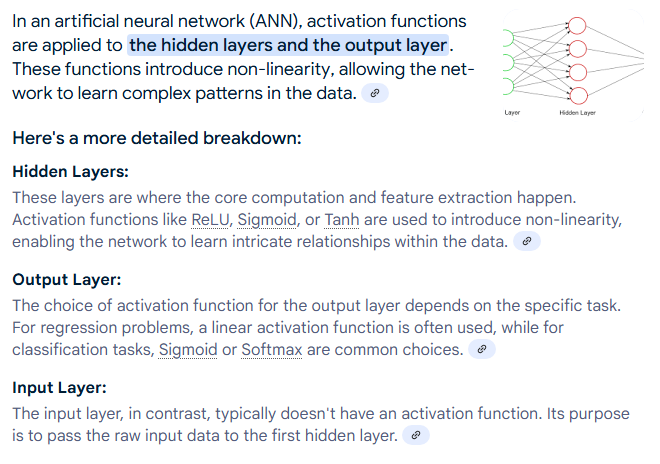
First step is to just do x1w1+x2w2+…..+xmwm



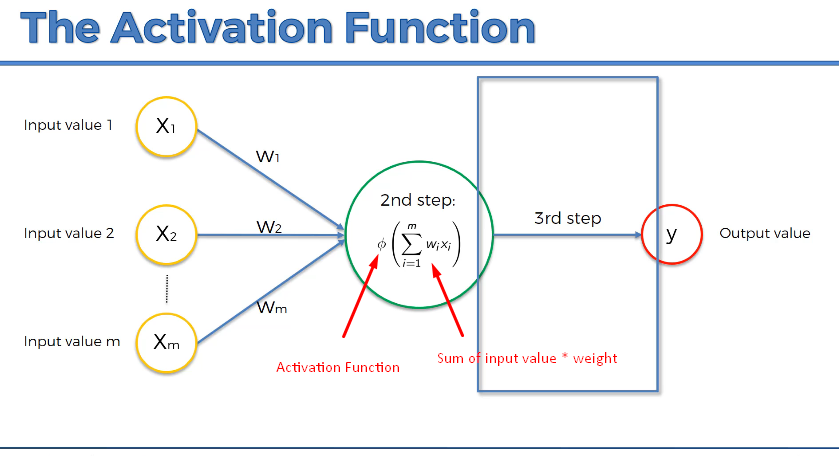
Second step is to apply Activation Function.



Third step is passing the data to the next neuron down the line.

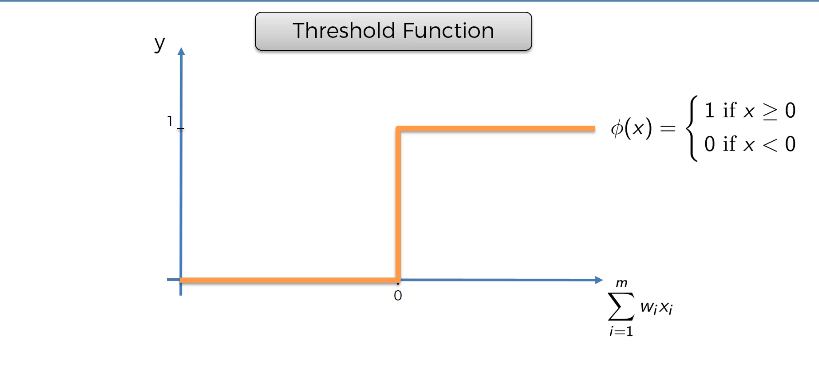


# Activation Function



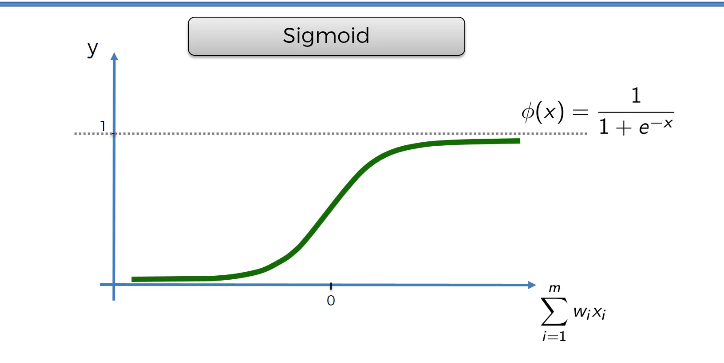
Activation function is applied on hidden layers and output layer.

## Threshold Function



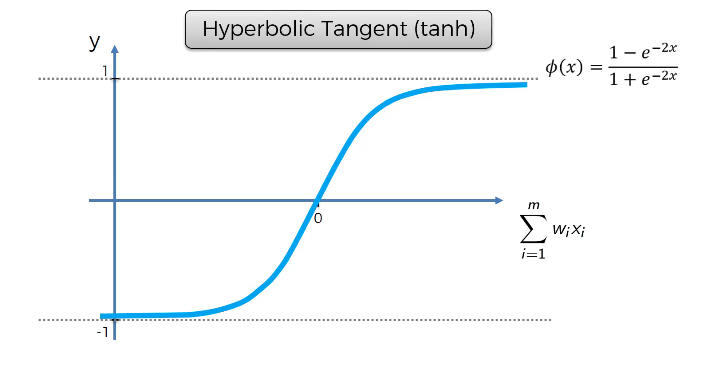
If  is <0, threshold function returns 0, otherwise it returns 1. There is no in between value.

## Sigmoid Function



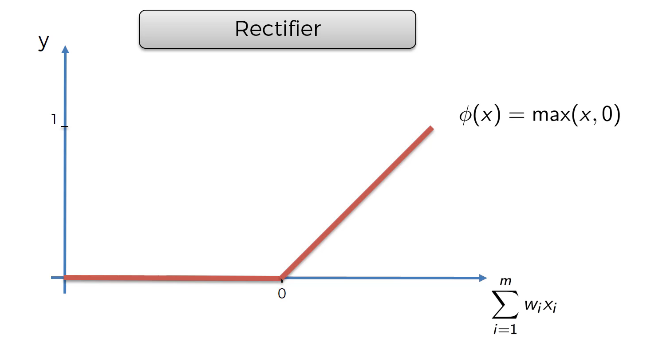
Sigmoid function . This function is also used in Logistic Regression. It is very useful for output layer. It returns any value in between 0 and 1. Unlike to Threshold Function, it is not exactly 0 or 1.

## Hyperbolic Tangent (tanh) Function



It is very much similar to Sigmoid Function. Instead of 0 to 1, it goes from -1 to 1. It is zero-centered.

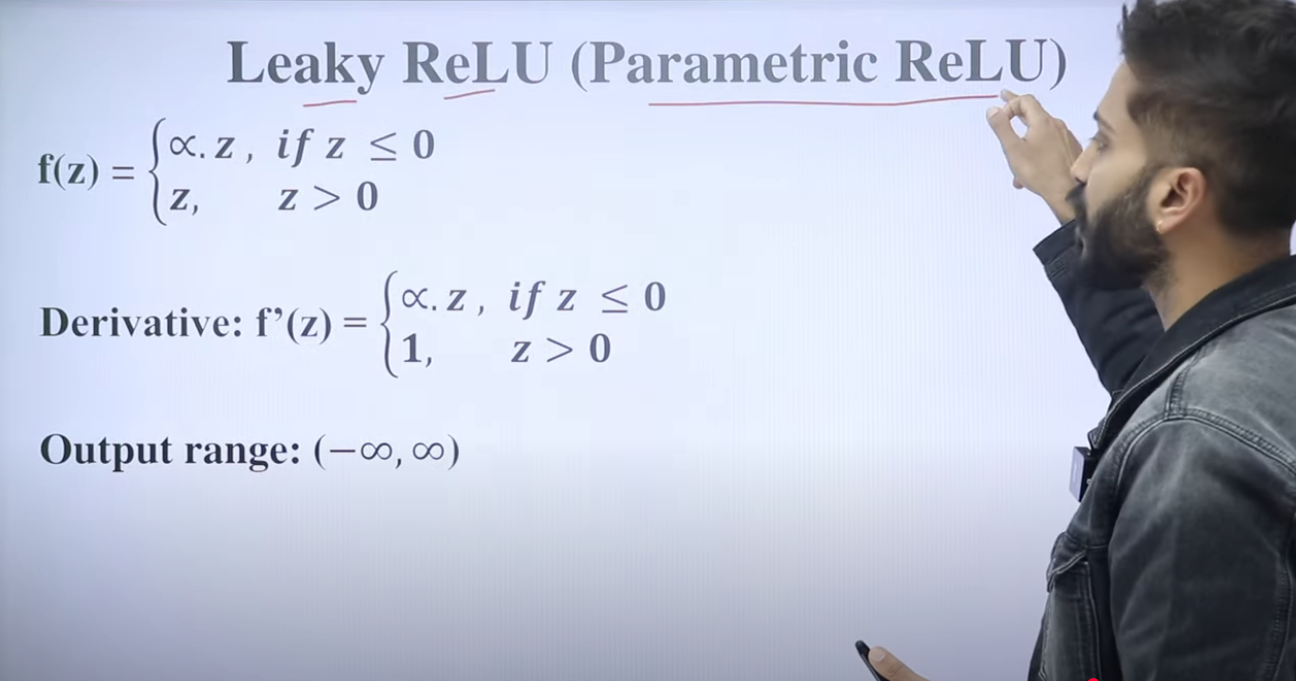
## ReLU (Rectified Linear Unit) Function



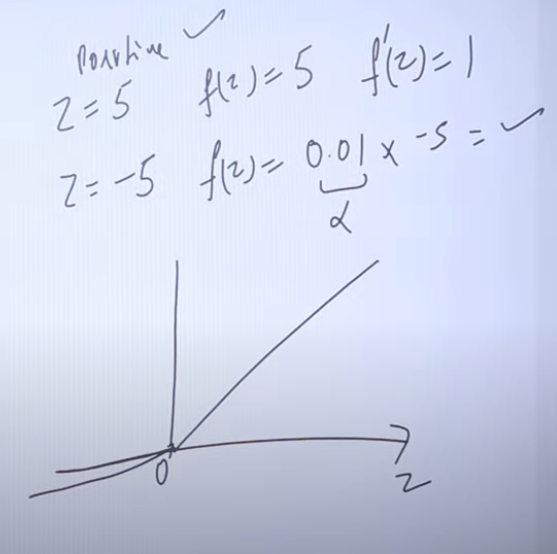
Rectifier function. It is one of the most used and important Activation Function.

## Leaky ReLU (Parametric ReLU)

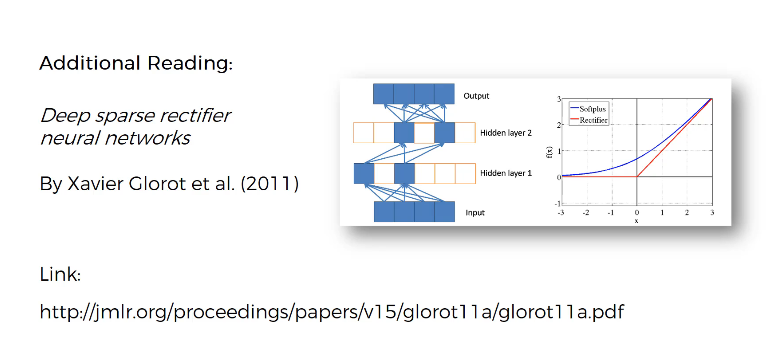
From Neural Network.docx document



 is a very small positive constant like 0.01, 0.02.



## More Information



## Which Activation Function to use?

If Dependent Variable is binary, 0 or 1, which activation function would you use.

