INTRODUCTION TO DEEP LEARNING

Deep learning is a techniques inspired from human biology that uses layer of artificial neurons to build network's that solve problems.

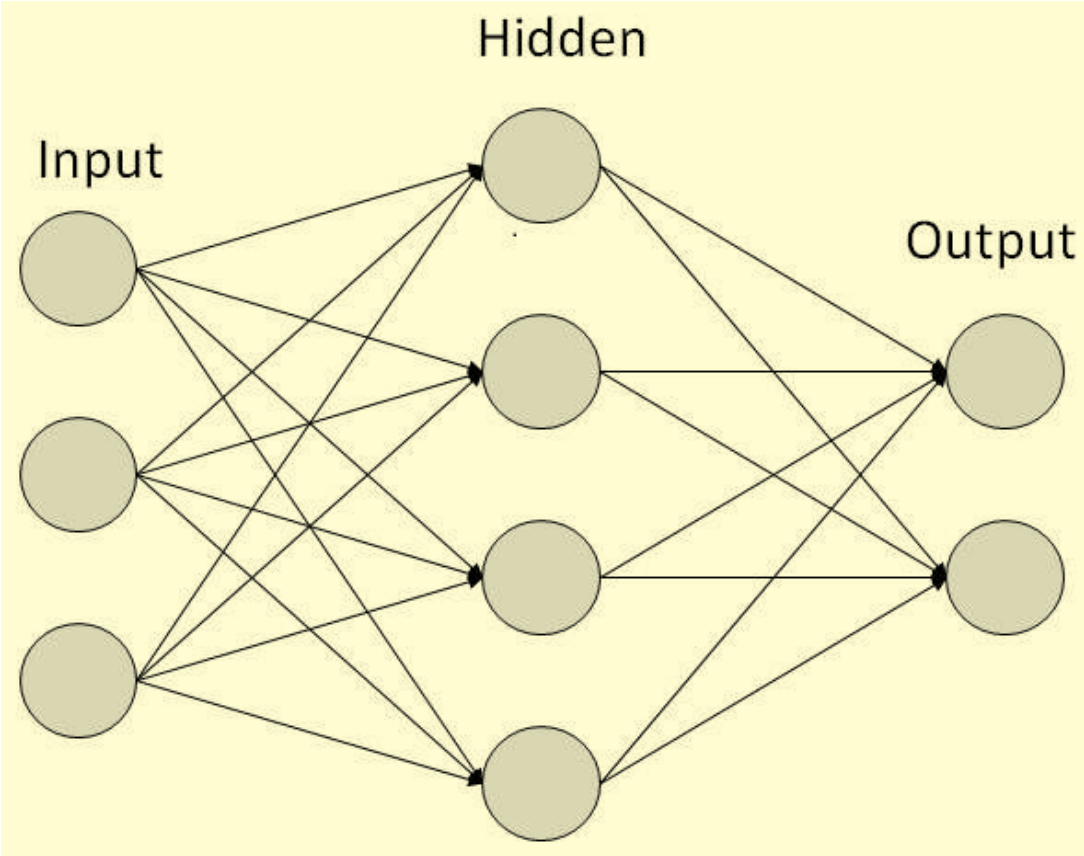
A neural network is composed of layers of these artificial neurons with connections between the layers.

There are 3 typical layers

1. Input
2. Output
3. Hidden layers

- **The output:** of a single neuron connects to the input of all the neurons in the next layer.

- **The Input layer:** is populated from the training data, and the neurons activate throughout the layers until an answer is presented in the output layer, the output is then measured; if the output doesn't meet your threshold the training is repeated.

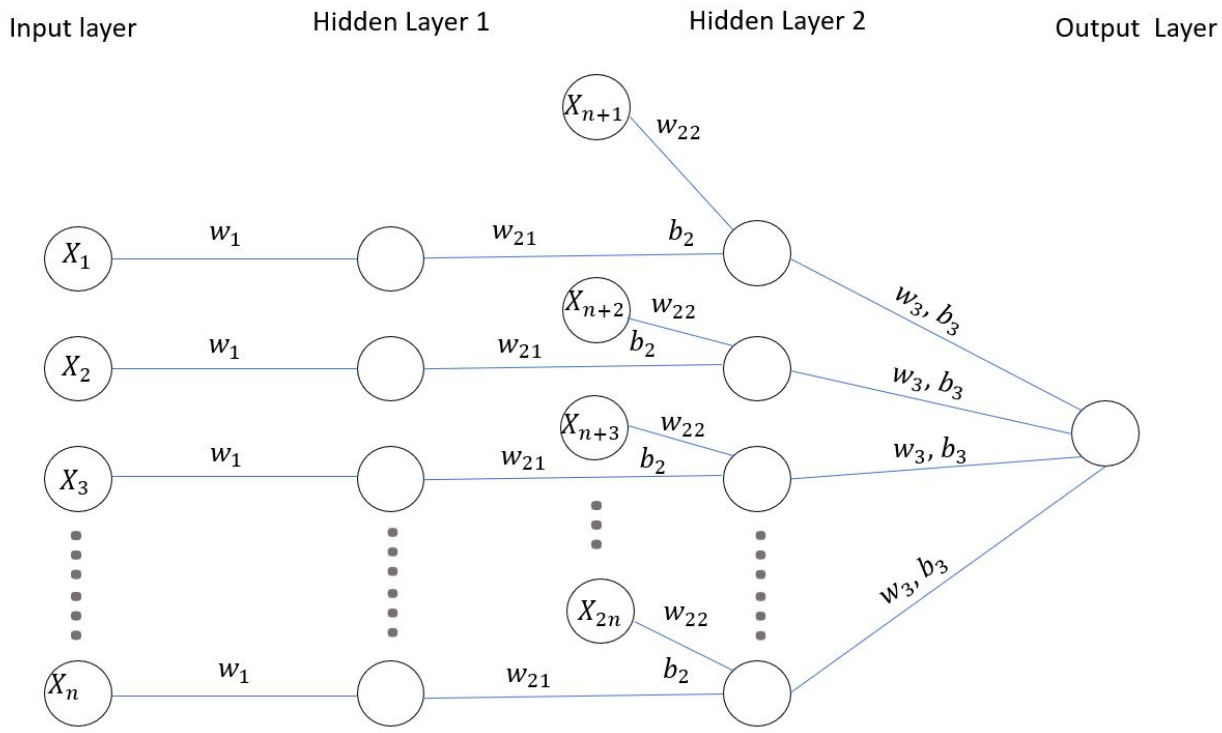


How training works

1. **Weight:** Within a neural network, the weight parameter changes input data within the network's hidden layers. When an input is fed into a node, it is multiplied by a weight value, and the result is either observed or sent on to the next layer of the neural network. The degree of influence a change in the input has on the output is determined by its weight. A low weight value will have little effect on the input, whereas a higher weight value will have a greater impact on the output.

2. **The hidden layers** The weights are applied to the nodes of the hidden layers.

3. **Bias:** The bias of a prediction is the distance between it and its expected value. The disparity between the function's output and the function's intended output is compensated for by biases. A low bias value indicates that the network makes more assumptions about the output form, whereas a high bias value indicates that the network makes fewer assumptions about the output form. The strength of the relationship, on the other hand, can be thought of as weights.



Total of 4 weights and 2 biases (in the whole network) : w_1, w_{21}, w_{22}, w_3, b_1, b_2 are all shared.

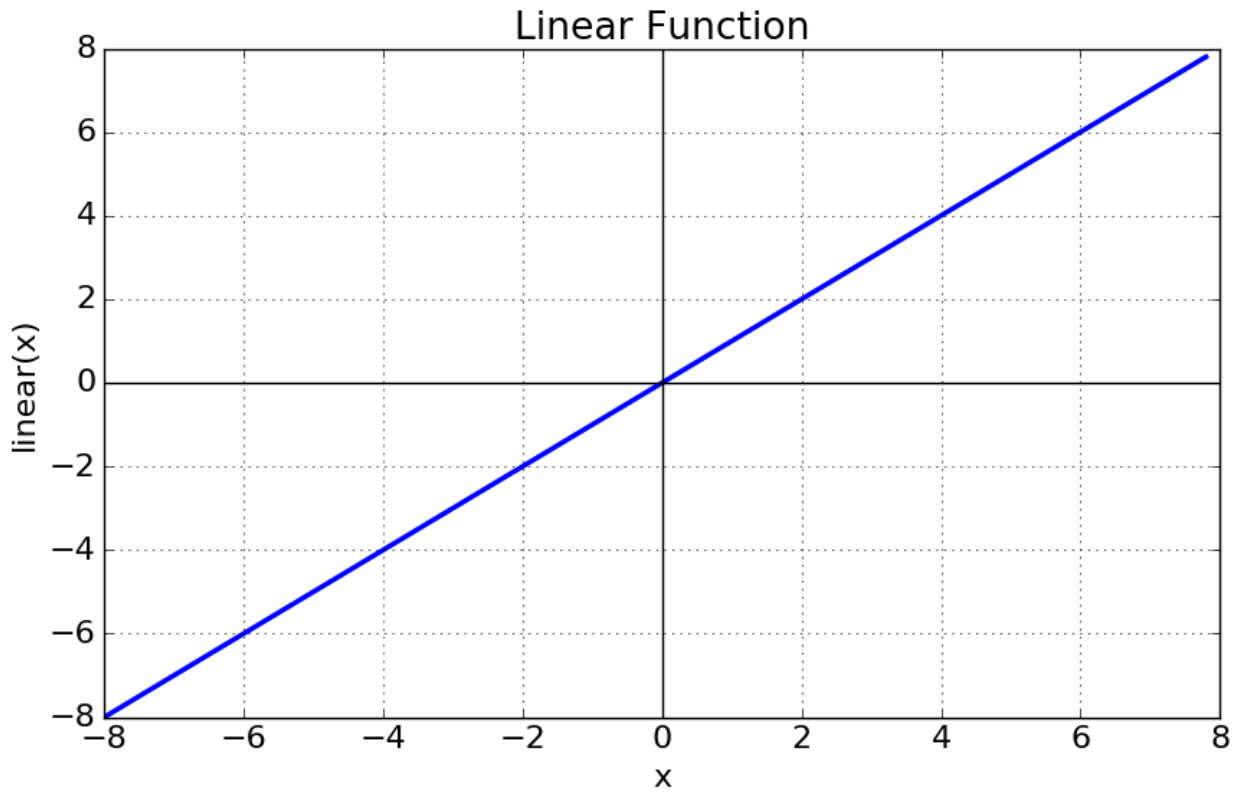
ACTIVATION FUNCTION

- It's merely a simple function that returns the node's output.
- It's used to identify whether a neural network's output is yes or no.
- It converts the values from 0 to 1, -1 to 1, and so on (depending upon the function).

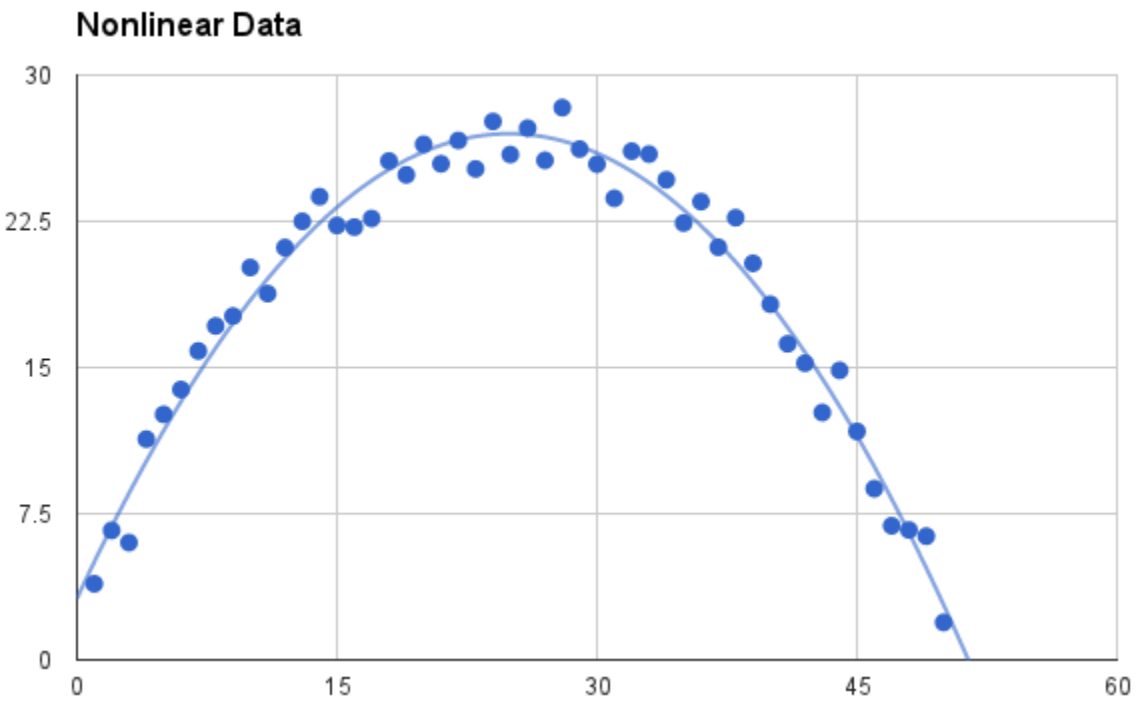
The Activation Functions can be classified into two categories.

- Linear Activation Function
- Non-linear Activation Function

Linear: Gives the output of this type of graph



Non - Linear: Gives the output of this kind of graph



Class sample Notebook:

- https://github.com/opethaiwoh/Data-Analysis-with-Python/blob/main/Neuron_from_Scratch.ipynb

GET DATASET FROM HERE

- https://archive-beta.ics.uci.edu/