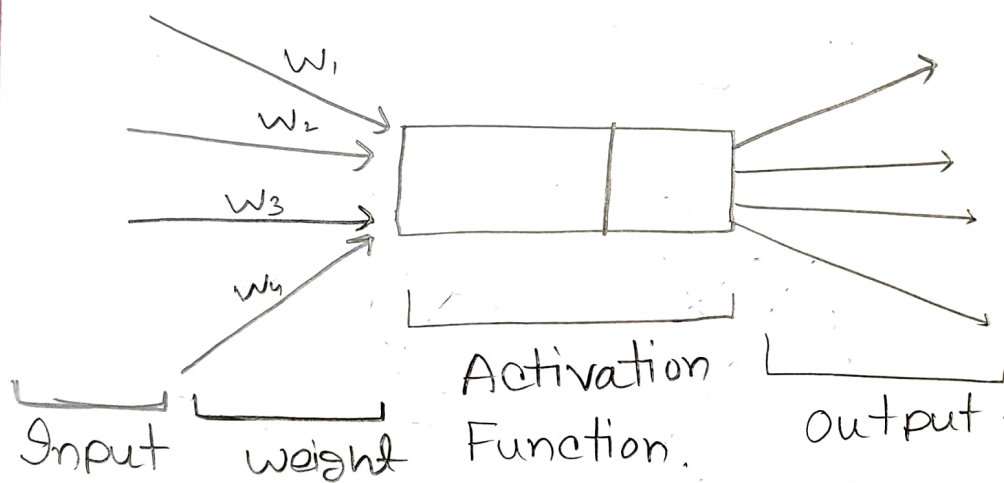# Neural Network.
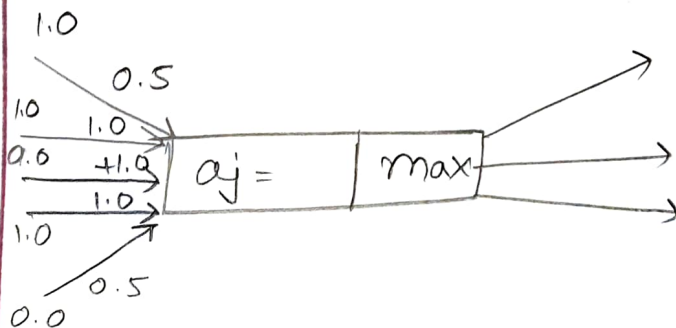
Neural Network works just as a brain works.

When a neuron is fired or activated then it works.

Neural network in a computer model,

Input   weight   Activation Function.   output.

Calculate output

$$\Rightarrow (1.0 \times 0.5) + (1.0 \times 1.0)$$
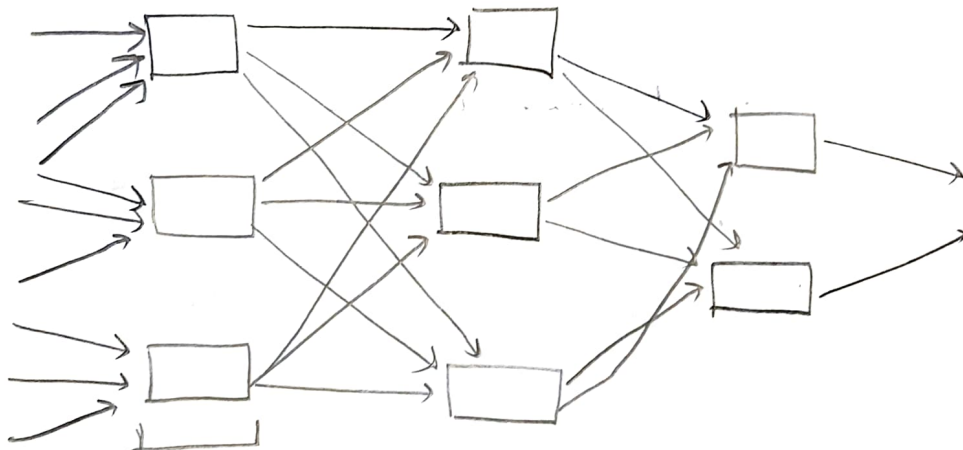$$+ (0 \times 1.0) + (1.0 \times 1.0)$$
$$+ (0 \times 0.5)$$

$$= 0.5.$$

Tensor

Tensor is an N-dimensional array of data.

It's a multi-dimensional vector, the whole NN is based on Tensor.

Network component

*

A Feed Forward network.

Layer

Layer is a collection of neuron.

~~Teg~~ They all have activation Function.

The layers are not interconnected but all the layers are connected.

→ They all have same activation function but with different weight (in a layer)

Deep Neural Neural network
→ Multiple activation Function
→ Combine two non-linear function.

why don't we add two linears?
↳ Because linear + linear = linear.

$$f(x) = y_1 = m_1 x_1 + c_1$$
$$g(x) = y_2 = m_2 x_2 + c_2.$$

$$f(g(x)) = m_1 (m_2 x_2 + c_2 + c_1$$
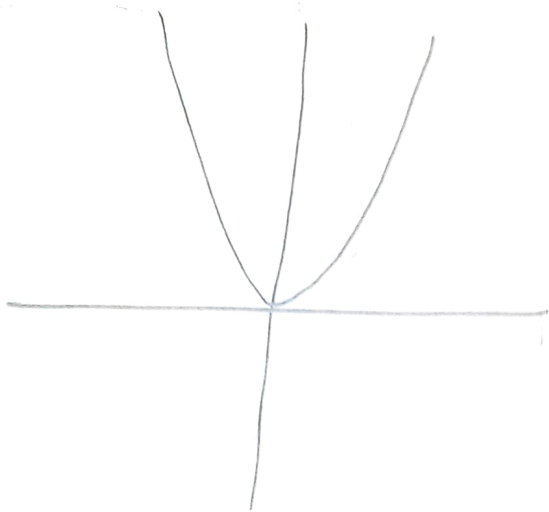$$= m_1 m_2 x_2 + m_1 c_2 + c_1$$
$$= m x_2 + c$$
↳ It's also a linear.
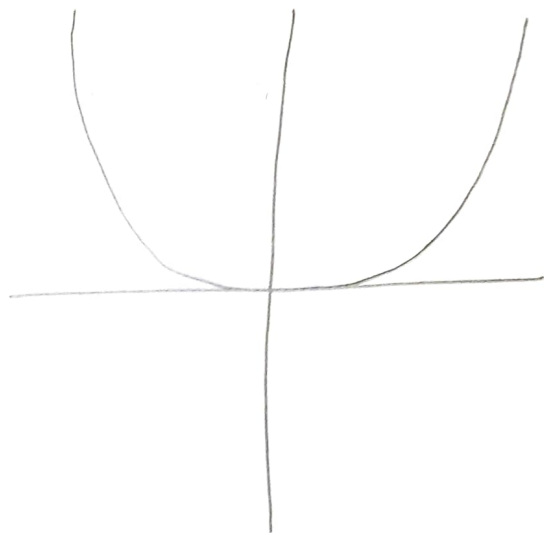
But if we add two non-linear
$$f(x) = y_1 = x^2.$$
$$g(x) = y_2 = x^3.$$ More.
$$f(g(x)) = (x^3)^2 = x^6 \longrightarrow Complex$$

$y = x^2$.

$y = x^6$.

Feed forward neural network

↳ Data only forward propagate ज़ोी learning
  capacity backward.

↳ Loss function updates the weight,
  this is called propagation.

If all neurons are connected
  ↳ Fully connected neural network.

Layers are not connected
  ↳ They have same activation func.
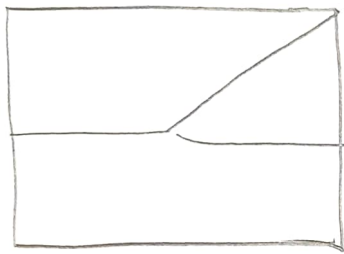 ↳ The abstracts become dependent.

* Features always have to be independent.

What are the activations?

→ It has to be like a gate.

→ It is the gradiant.

ReLU

→ Not differentiable at this point.

↝ Active only when input is positive.

* Somehow if all activation function of a layer is blocked, then no data will pass and the model will stop working.

That's why, we have leaky ReLU.

↳ very slight slope which will always leak some data.

Binary clasification → sigmoid & tanh.

multiclaa "   ─→ softmax.

Sigmoid $f(x) = \dfrac{1}{1+e^{-x}}$.