Perceptrons

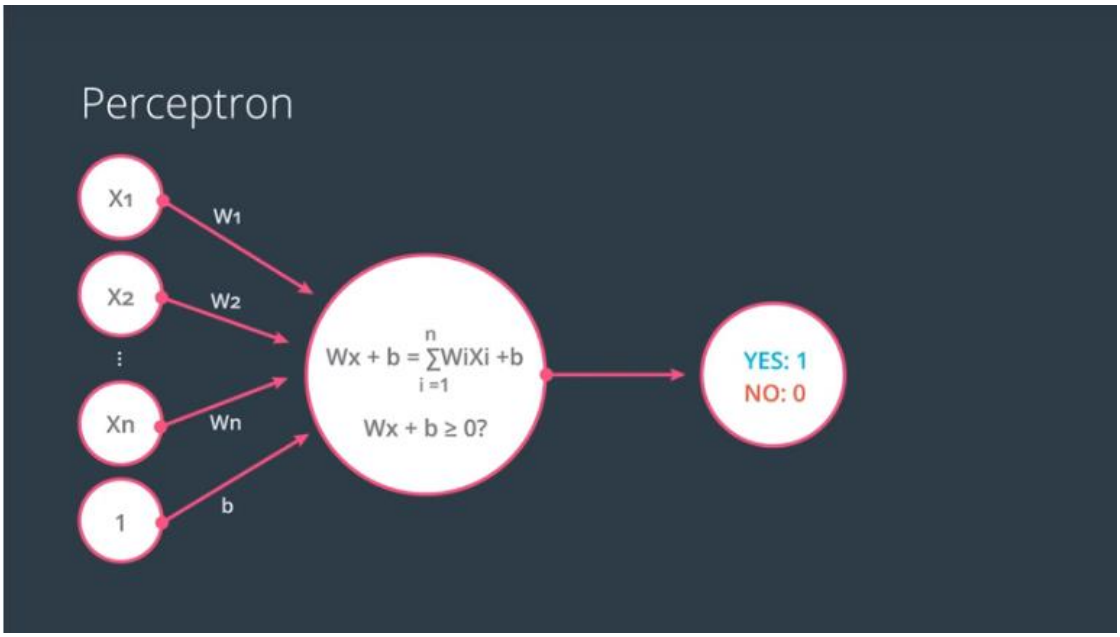
So now we'll introduce the notion of a perceptron, which is the building block of neural networks,

and it's just an encoding of our equation into a small graph.

The way we've build it is the following.

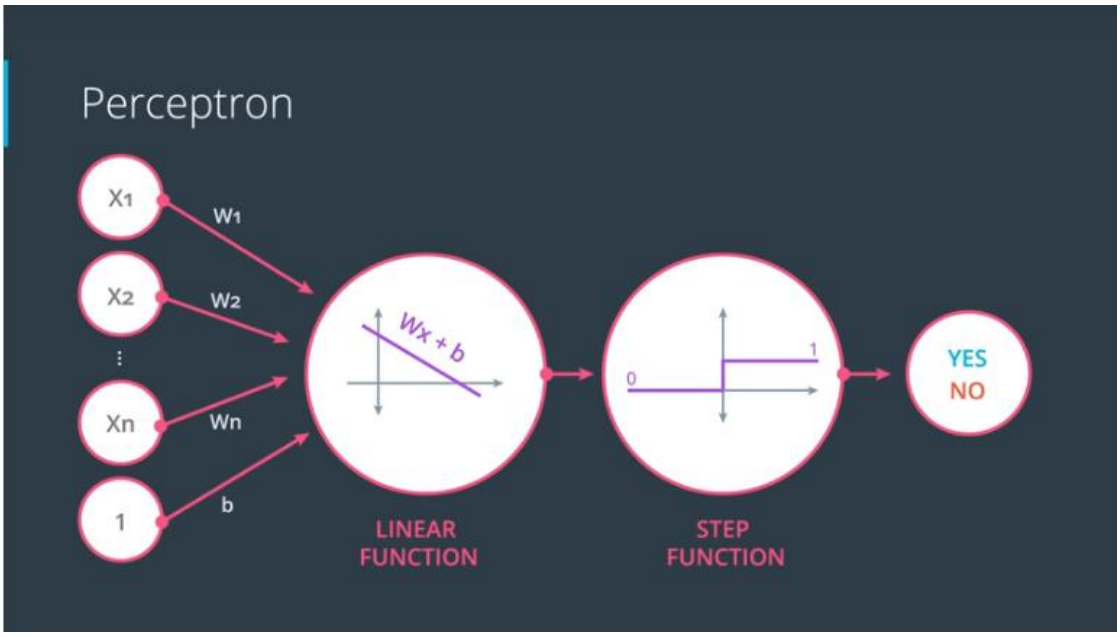
In the general case, this is how the nodes look.

We will have our node over here then end inputs coming in with values X1 up to Xn and one, and edges with weights W1 up to Wn, and B corresponding to the bias unit. And then the node calculates the linear equation Wx plus B, which is a summation from I equals one to n, of WIXI plus B. This node then checks if the value is zero or bigger, and if it is, then the node returns a value of one for yes and if not, then it returns a value of zero for no.



Note that we're using an implicit function, here, which is called a step function. What the step function does is it returns a one if the input is positive or zero, and a zero if the input is negative.

So in reality, these perceptrons can be seen as a combination of nodes, where the first node calculates a linear equation and the inputs on the weights, and the second node applies the step function to the result. These can be graphed as follows:



the summation sign represents a linear function in the first node, and the drawing represents a step function in the second node.