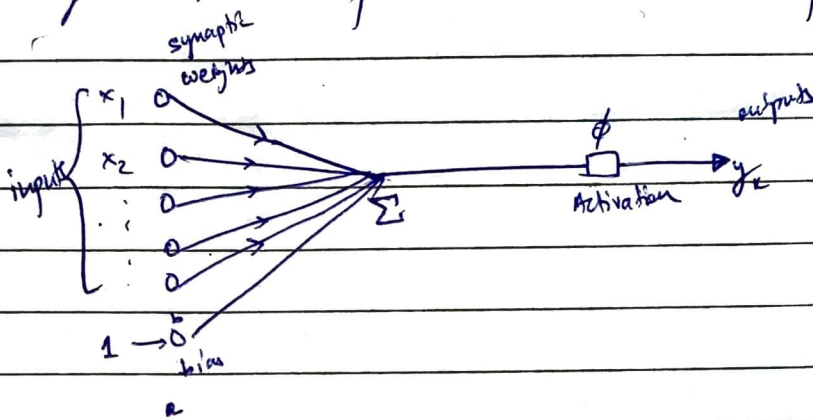


1. A standard artificial neuron has 3 - components; weights, bias and a generic threshold function as the activation function.



Here the activation function is $\phi(v) = \begin{cases} 1 & \text{if } v \geq 0 \\ 0 & \text{if } v < 0 \end{cases}$

In the stochastic model of an artificial neuron, ~~we choose the~~ first two elements are the same but the third differs, since it is chosen to be a sigmoid shaped function with "temperature" parameter.

$$\phi(v) = \frac{1}{1 + \exp(-v/T)}$$

Here we can clearly see that if $T \rightarrow 0$,

$v < 0$ makes $\exp(-v/T) \rightarrow \infty \Rightarrow \phi(v) \rightarrow 0$

$v > 0$ makes $\exp(-v/T) \rightarrow 0 \Rightarrow \phi(v) \rightarrow 1$

Hence $T = 0$ gives us the generic threshold function, which means the ~~for~~ standard artificial neuron w/ a generic threshold function is a special case for the stochastic artificial neuron.