SCOA

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Sub : Comp - 2
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Q.1) Explain Hebb learning using an example ?

Ans : i) Hebbian learning rule also known as Hebb learning rule was proposed by Donald o Hebb.

ii) It is the one of the first and easiest learning rule in the natural network. It is used for pattern classification.

iii) It is a single layer neural Network ie It has one input layer and one output layer.

iv) The input layer can have many units say n the output layer has only one unit.

v) Hebbian rule works by updating the weights between neurons in neural network for each training sample.

Algorithm

1) Set all weights to zero ~~with~~ $w_i = 0$ for $i=0$ & bios to zero

2) For each input vectors s (input vector) t (target output) repeach step 3.5.

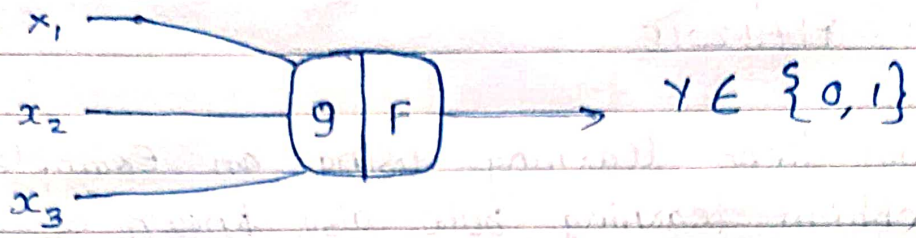
3) Set activations for input units with the input vector $x_i = s_i$ For $i = 1$ to n

4) set the corresponding input values to the output neurons.

5) update weight & bias by applying Hebb rule for $\epsilon_i = 1$ to n.

Q.2) Explain McCulloch - Pitts Neuron in brief by considering AND Gate ~~exp~~ example ?

Ans:



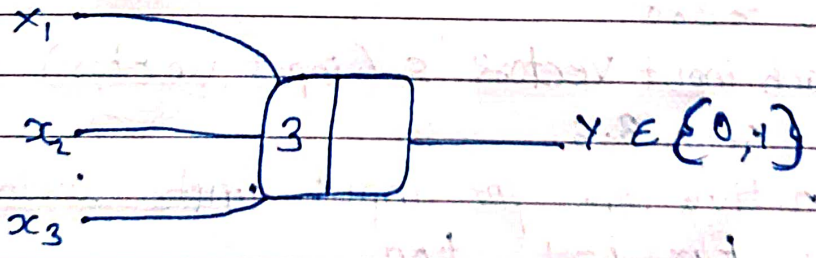

$x_n \in \{0, 1\}$

i) The Mc Culloch - Pitts Neuron may be divided into 2 parts The first part g takes an input performs an aggregation and based on the aggregated value the second part F makes a decision.

ii) Let suppose that I wont to predict my own decision whether to watch a random Football game or not on TV.

iii) The inputs are all boolean i.e (0,1) and my output variable is also boolean { 0 : will watch it won't watch it }

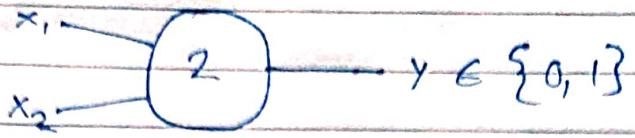
AND Function :-




An AND Function neuron would only fire when all the input are on i.e $g(x) \geq 3$

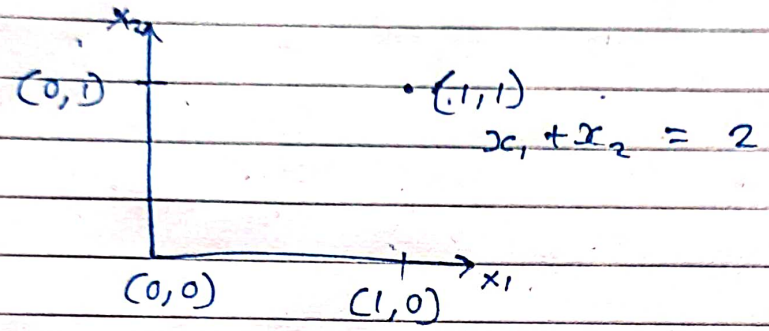
Q.3) Implement AND function using Mc Culloch - Pits neuron

Ans :




AND function

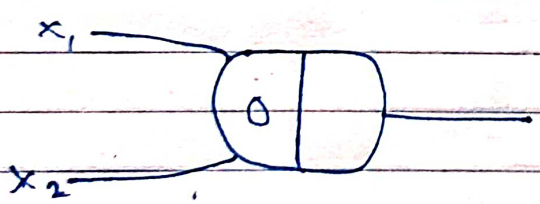
$$x_1 + x_2 = \sum_{i=0}^{2} \quad x_1 \geq 2$$




i) In this case the decision boundry equations is $x = 1$ & $x - 2 = 2$.

ii) Here all the input points that lies ON or above just (1,1) output 1 when passed through the AND Function M-P neutoon. It fits the decision boundary works.

iii) Toutology




It is always ON