Analysis of XOR function

Truth Table of XOR

|  |  |  |
| --- | --- | --- |
| Input X | Input Y | output |
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 0 |

Perceptron Equation for XOR

Consider x and y as two inputs to the XOR perceptron , t is the threshold , w1 is the weight of input x and w2 is the weight of input y. Assuming that the perceptron will fire only if the output is equal to or greater than the threshold so the threshold of XOR gate is 1

* 0.w1+0.w2=0 < t the perceptron will not fire
* 1.w1+1.w2=0 < t the perceptron will not fire
* 0.w1+1.w2=1>=t the perceptron will fire as w2>t
* 1.w1+0.w2=1>=t the perceptron will fire as w1>t

Conclusion

* All 4 inequalities contradict
* We are not able to draw a straight line from all four points
* XOR is not a liner function