

Zainab Rizwan

2019-CE-36

x_1	x_2	y
1	1	1
1	-1	1
-1	1	1
-1	-1	-1

Assuming $w_1 = w_2 = b = 0$

Iteration # 1

$$y_{in} = b + w_1 x_1 + w_2 x_2, \quad t = 1$$

$$= 0 + (0)(1) + (0)(1) = 0$$

Target (1) isn't achieved

Updating weights

$$w_1(\text{new}) = w_1(\text{old}) + \alpha t x_1$$

$$= 0 + (1)(1)(1) = 1$$

$$w_2(\text{new}) = w_2(\text{old}) + \alpha t x_2$$

$$= 0 + (1)(1)(1) = 1$$

$$b(\text{new}) = b(\text{old}) + \alpha t$$

$$= 0 + (1)(1) = 1$$

Updated weights = $w_1 = w_2 = b = 1$

Iteration #2

$$y_{in} = b + w_1 x_1 + w_2 x_2$$

$$= 1 + (1)(1) + (1)(-1)$$

$$= 1 + 1 - 1 = 1$$

$$y_{in} = 1 \Rightarrow y = 1$$

Target achieved

Iteration #3

$$y_{in} = b + w_1 x_1 + w_2 x_2$$

$$= 1 + (1)(-1) + (1)(1)$$

$$= 1$$

$$y_{in} = 1 \Rightarrow y = 1$$

Target achieved

Iteration #4

$$y_{in} = b + w_1 x_1 + w_2 x_2$$

$$= 1 + (-1)(1) + (-1)(1)$$

$$= 1 - 1 - 1$$

$$= -1$$

$$y_{in} = -1 \Rightarrow y = -1$$

Target achieved

Hence final weights and bias are

$$w_1 = w_2 = b = 1$$