|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Epoch | Inputs  X1 X2 | | Desired output  yd | Initial weights  W1 W2 | | Actual output  Y | Error  e | Final weights  W1 W2 | |
| 1. | 0 | 0 | 0 | -0.1 | 0.4 | 0 | 0 | -0.1 | 0.4 |
|  | 0 | 1 | 1 | -0.1 | 0.4 | 1 | 0 | -0.1 | 0.4 |
|  | 1 | 0 | 1 | -0.1 | 0.4 | 0 | 1 | 0.0 | 0.4 |
|  | 1 | 1 | 1 | 0.0 | 0.4 | 1 | 0 | 0.0 | 0.4 |
| 2. | 0 | 0 | 0 | 0.0 | 0.4 | 0 | 0 | 0.0 | 0.4 |
|  | 0 | 1 | 1 | 0.0 | 0.4 | 1 | 0 | 0.0 | 0.4 |
|  | 1 | 0 | 1 | 0.0 | 0.4 | 0 | 1 | 0.1 | 0.4 |
|  | 1 | 1 | 1 | 0.1 | 0.4 | 1 | 0 | 0.1 | 0.4 |
| 3. | 0 | 0 | 0 | 0.1 | 0.4 | 0 | 0 | 0.1 | 0.4 |
|  | 0 | 1 | 1 | 0.1 | 0.4 | 1 | 0 | 0.1 | 0.4 |
|  | 1 | 0 | 1 | 0.1 | 0.4 | 1 | 0 | 0.1 | 0.4 |
|  | 1 | 1 | 1 | 0.1 | 0.4 | 1 | 0 | 0.1 | 0.4 |

Some explanation:

1. In 1st Epoch, 1st line inputs are X1 and X2 are considered from truth table of logical operators or:

|  |  |  |
| --- | --- | --- |
| X1 | X2 | X1 or X2 |
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 1 |

This X1 or X2 is the desired output (yd).

1. Initial weights W1, W2 are given for initial step 1 which is W1 = -0.1, W2 = 0.4.
2. With that initial weights and the threshold ϴ = 0.1, we can calculate (y) actual output y = ((X1\*W1) + (X2\*W2) - ϴ = ((0\*-0.1)+(0\*0.4))-0.1 = -0.1.
3. Next, we need to calculate error € = (yd) – y = desired output – actual output = 0
4. To calculate final weights W1, W2 we need learning rate α = 0.1

ΔW1 = α \* X1 \* W1 = 0.1 \* 0 \* -0.1 = 0 to get final weight W1 = initial weight W1 + ΔW1 = -0.1.

ΔW2 = α \* X2 \* W2 = 0.1 \* 0 \* 0.4 = 0 to get final weight W2 = initial weight W2 + ΔW2 = 0.4.

1. So, these final weights are the initial weights of next instance. These Epoch are iterative until the desired output and actual output are same, and Error is Zero.