ex15

October 2, 2024

[28]:
```
import math


class SOM:
        def winner(self, weights, sample):

                D0 = 0
                D1 = 0
                for i in range(len(sample)):
                        D0 = D0 + math.pow((sample[i] - weights[0][i]), 2)
                        D1 = D1 + math.pow((sample[i] - weights[1][i]), 2)

                if D0 < D1:
                        return 0
                else:
                        return 1

        def update(self, weights, sample, J, alpha):
                for i in range(len(weights[0])):
                        weights[J][i] = weights[J][i] + alpha * (sample[i] -␣
 ↪weights[J][i])

                return weights

def main():

        T = [[1, 1, 0, 0], [0, 0, 0, 1], [1, 0, 0, 0], [0, 0, 1, 1]]
        m, n = len(T), len(T[0])
        weights = [[0.2, 0.6, 0.5, 0.9], [0.8, 0.4, 0.7, 0.3]]

        ob = SOM()

        epochs = 3
        alpha = 0.5

        for i in range(epochs):
                for j in range(m):
```

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                        sample = T[j]
                        J = ob.winner(weights, sample)
                        weights = ob.update(weights, sample, J, alpha)

        s = [0, 0, 0, 1]
        J = ob.winner(weights, s)

        print("Test Sample s belongs to Cluster : ", J)
        print("Trained weights : ", weights)

if __name__ == "__main__":
        main()
```

```
Test Sample s belongs to Cluster :  0
Trained weights :  [[0.003125, 0.009375, 0.6640625, 0.9984375], [0.996875,
0.334375, 0.0109375, 0.0046875]]
```