Artificial Neural Network

Lab: 01 to 10

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Assignment Results

Assignment: 1

QST_1. The code converges in 2 iterations. The converged weight vector is w=[-0.0995 -0.4443 0.7749 -0.4385] when eta is 1.0.

QST_2. The code converges in 1000 iterations. The converged weight vector is w=[-0.0195 -0.5063 0.8323 -0.2248] when eta is 1.0.

QST_3. The code converges in 3 iterations. The converged weight vector is [0.0000 0.7000 0.4000 0.5000] when eta is 0.1.

QST_4. Using perceptron training rule, the code converges in three iterations.The weights obtained are [-0.0141 -0.6190 -0.7853] with eta as 1.0.

With Hebbian rule, the code is not converging

Assignment: 2

QST_1. Using perceptron training rule, the code converges in 2 iterations. The weights obtained are [0.8000 0.1000 -0.6000] with eta as 1.0

QST_2. With eta has 0.5 and lamda 0.5, it converges in 13 iterations. The weight vector obtained is [8.0763 -0.6312 -8.1302].

As the value of eta increases, the number of iterations required also increases.With eta as 1, it never converges.

QST_3. The windrow-Hoff learning rule converges with eta as 0.01 in 23 iterations. The weight vector is [1.0034 0.9944]

Assignment: 3

In the table weight vector includes biased term:

Perceptron Algorithm			
Initial weights – [0 0 0]			
1.	AND	eta-0.1	[- 0.6 0.3 0.4]
2.	OR	eta-0.01	[0.1000 0.1000 0.1000]
3.	AND-NOT	eta-0.1	[0.3000 -0.1000 -0.1000]
4.	XOR	eta-0.01	[-1.3998 0.9097 0.9150]
5.	AND	eta-0.01	[-0.4868 0.4841 0.4813]
Widrow-Hoff Learning Rule			
6.	OR	eta-0.05	[0.3223 -0.1666 -0.1825]
7.	AND-NOT	eta-0.005	[0.1000 -0.3000 -0.3000]
8.	XOR	eta-0.005	[0.2300 -0.3000 -0.211]

Assignment: 4

QST_1. The input is x1=[1,1,0,0]'; and x2=[1,0,1,0] and threshold = 2.

AND(Binary i/p)	Y=[1 0 0 0]
OR(Binary i/p)	Y=[1 1 1 0]
AND NOT (Binary i/p)	Y=[0 1 0 0]

And other Questions of this lab is done in matlab file.

Assignment: 5

a. When six images are stored, they can be recalled correctly.
b. If any image is stored also, upto 6 images can be recalled correctly

Assignment: 6

The data is fed to the network as a matrix.Hopfield network has been implemented and when the distorted image is shown to the network, it got classified as a Tank.

Assignment: 7

In this lab, I made only A and B. For the rest, there is an error.

Assignment: 8

QST_1. When the distorted image is presented, the pattern one corresponding to plane. When the first data X* is presented, the pattern (1,0,0,1) is returned but X** is a limit cycle at a hamming distance of 4,8 from patterns A1 and A2

QST_2.

a) X1=[-1 1 -1 1 -1] and X2=[-1 1 1 1 -1]
b) Hamming distance of X*and X** is $\sum \left| Ai - Bi \right| = 2$

Assignment: 9

QST_1. When the actual pattern was applied at the input, the corresponding paired pattern could be retrieved. When the following noise pattern was given:

1,-1,1,1,-1,-1,-1,-1,-1,1,1,1,1,1,-1,-1	Y3	2
1,1,1,-1,1,1,-1,1,1,1,-1,-1,1,1,-1	Y1	1
-1,-1,-1,-1,-1,-1,-1,-1,-1,-1,-1,-1,-1,-1,-1	Limit cycle	3

Assignment: 10

QST_1. All the data points are classified correctly by the SBAM except the 5^{th} data point. As per the data no of defects are 2 but predicted as 4.