**Terna Engineering College**

**Computer Engineering Department**

Program: Sem VII

[**Course: Artificial Intelligence & Soft Computing (AI&SC)**](https://github.com/Amey-Thakur/ARTIFICIAL-INTELLIGENCE-AND-SOFT-COMPUTING-AND-ARTIFICIAL-INTELLIGENCE-AND-SOFT-COMPUTING-LAB)

**Experiment No. 09**

**PART B**

**(PART B: TO BE COMPLETED BY STUDENTS)**

***(Students must submit the soft copy as per the following segments within two hours of the practical. The soft copy must be uploaded on the Blackboard or emailed to the concerned lab in charge faculties at the end of the practical in case there is no Blackboard access available)***

| Roll No. 50 | Name: AMEY THAKUR |
| --- | --- |
| Class: BE-COMPS-50 | Batch: B3 |
| Date of Experiment: 06-10-2021 | Date of Submission: 06-10-2021 |
| Grade : |  |

**Aim:** To Implement Kohonen self-organizing Map– un-supervised learning algorithm.

**B.1 Software Code written by a student:**

clear all;

clc;

disp('Kohonen Self Organizing Feature Maps');

disp('The input patterns are');

x=[1 1 0 0; 0 0 0 1; 1 0 0 0; 0 0 1 1]

%x=[0.2 0.4];

t=1;

alpha(t)=0.6;

%alpha(t)=0.2;

e=1;

disp('Since we have four input pattern and cluster unit to be formed is 2, the weight

matrix is');

w=[0.2 0.8; 0.6 0.4; 0.5 0.7; 0.9 0.3]

disp('The learning rate of this epoch is');

alpha

while(e<=3);

i=1;

j=1;

k=1;

m=1;

disp('Epoch = ');

e

%while(i<=2)

while(i<=4)

for j=1:2

temp=0;

for k=1:4

%temp=temp+((w(k,j)-x(i,k)) 2);

temp=temp+((w(k,j)-x(i,k)));

end

D(j)=temp

end

if(D(1)<D(2))

J=1;

else

J=2;

end

disp('The winning unit is ');

J

disp('Weight updation ');

for m=1:4

w(m,J)=w(m,J)+(alpha(e)\*(x(i,m)-w(m,J)));

end

w

i=i+1;

end

temp=alpha(e);

e=e+1;

alpha(e)=(0.5\*temp);

alpha(e)

End

**B.2 Input and Output:**

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**B.3 Observations and learning:**

After successful completion of this experiment students will have become familiar with neural networks that can learn from available examples and can demonstrate Unsupervised learning algorithms.

**B.4 Conclusion:**

We have successfully implemented Kohonen self-organizing Map– an unsupervised learning algorithm.

**B.5 Question of Curiosity**

1. Construct KSOM to cluster the four given vectors [0 0 1 1],[1 0 0 0],[0 1 1 0],[0 0 0 1] with no clusters into 2 assume that the learning rate is 0.5.

**Ans:**

Initial Weights:



Inference Initial random weights:



Network after 100 iterations:



Network after 1000 iterations:



Network after 10000 iterations:

