

SCHOOL OF INFORMATION TECHNOLOGY AND ENGINEERING

CONTINUOUS ASSESSMENT TEST II WINTER SEMESTER 2019-2020

Programme Name & Branch: H. Loch

Class Number (a): VI 2019205004447/VI 2019265664439

Course Name Code:

11E1015

Course Name: Soft Computing

Faculty Name(s): Prof.Balakrushna Tripathy & Prof.Senthil Kumar P

Exam Mode: Closed book

Exam Duration: 90 mins

Maximum Marks: 50

Answer ALL Questions (5 x 10=50)

Consider the BAM network (with bipolar vector) to map two sample letters (given by 5 x 3 1. patterns) to the following target codes:

pattern E pattern H

(-1,1)

(1,1)

- a. Find the weight matrix with input pattern E and H.
- b. Obtain the response of the net with E and H as input.
- Construct a Kohenen self-organizing map to cluster the four given vectors, [1100], [0001], 2. [1000], [0011]. The maximum number of cluster to be formed is two. Suppose the learning rate (geometric decrease) is 0.6. Perform one epochs of training.

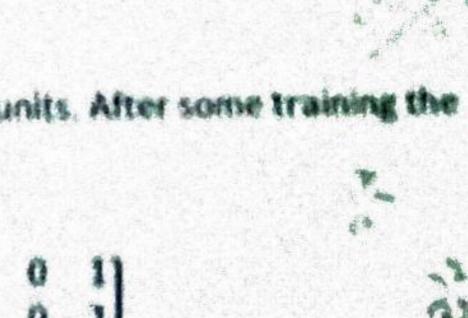
Note: Intial weight vector
$$\begin{bmatrix} 0.2 & 0.8 \\ 0.6 & 0.4 \\ 0.5 & 0.7 \\ 0.9 & 0.3 \end{bmatrix}$$
, R=0

Consider an ART1 neural net with four F1 units and three F2 units. After some training the 3. weights are as follows:

$$b_{ij} = \begin{bmatrix} 0.57 & 0 & 0.2 \\ 0 & 0 & 0.2 \\ 0 & 0.37 & 0.2 \end{bmatrix} t_{ij} = \begin{bmatrix} 0 & 0 & 0 & 1 \\ 1 & 0 & 0 & 1 \\ 1 & 1 & 1 & 1 \end{bmatrix}$$

Determine the new weight matrices after the vector [0, 0, 1, 1] is presented if a = 2

- (a) The vigilance parameter is 0.4
- (b) The vigilance parameter is 0.8



4. An athletic race was conducted in VIT university. The following membership functions are defined based on the speed of the athletes

$$Low = \left\{ \frac{0.1}{100} + \frac{0.2}{200} + \frac{0.3}{300} \right\}$$

$$Medium = \left\{ \frac{0.5}{100} + \frac{0.6}{200} + \frac{0.7}{300} \right\}$$

$$High = \left\{ \frac{0.8}{100} + \frac{0.9}{200} + \frac{1.0}{300} \right\}$$

Find the following

- a. Find R= Low X medium
- b. Find S= Medium X High
- c. Find T= R oS using max-min composition.
- d. Find T= R S using max-product composition
- a. Discuss in detail centroid and centre of sum defuzzification methods used for the converting fuzzy values to crisp values with suitable example. [6 Marks]
 b. Consider A be a fuzzy set that tells about a student performance as shown in the figure and the elements with corresponding maximum membership values are also given.
 A = {(P, 0.6), (F, 0.4), (G, 0.2), (VG, 0.2), (E, 0)}. The linguistic variable P represents a Pass student, F stands for a Fair student, G represents a Good student, VG represents a Very Good student and E for an Excellent student. Find the defuzzified value and represents for the fuzzy set A with weighted average method. [4 Marks]

