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Reg. No. .....

B.E (Full Time) DEGREE END SEMESTER EXAMINATION, NOC/DEC 2011

ELECTRONICS AND COMMUNICATION ENGINEERING

VII SEMESTER

EC504 NEURAL NETWORK AND FUZZY LOGIC

(REGULATION – 2004)

Time: 3 hours Max. Marks:100

PART – A [10 x 2 = 20 Marks]

Answer all the Questions

1. What are the basic building blocks of an artificial neural network?
2. What are the types of learning?
3. Draw the architecture of full CPN.
4. What are the two types of learning in ART net?
5. What are fuzzy If-then rules?
6. What is discrete flopfiled net?
7. How is madaline net formed from adaline net?
8. What are the variations of an LVQ net.
9. What is the activation function used in BPN.
10. What is defuzzification, what are different methods used for defuzzification?

PART – B [5 x 16 = 80 Marks]

11.i. Using the Hebb rule, find the weights required to perform the following classifications: Vectors (1111) and (-1,1,-1,-1) are members of class (with target value 1); vectors (1111 -1) and (1 -1 -1 1) are not member of class (with target value -1). (8)

ii. Apply the Hebb net to the training patterns that defines XOR function with bipolar input and targets. (8)

12a. Develop a perceptron for the AND function with binary inputs and bipolar targets without bias upto 2 epochs. (Take first with (0,0) and next without (0,0)) (16)

(Or)

b. A hetero associative network is given find the weight matrix and test the network with the training input vectors.

s_1=(1 1 0 0)	t_1=(1 0)
s_2=(0 1 0 0)	t_2=(1 0)
s_3=(0 0 1 1)	t_3=(0 1)
s_4=(0 0 1 0)	t_4=(0 1)

13a.i. Consider a stored vector [111-1], test it using a recurrent auto associative net with mistakes in the first and second components of stored vector. (8)

ii. Explain the application algorithm for the bi-directional memory net in detail. (8)

(Or)

b. Explain in detail about the training algorithm used in full CPN net. (16)

14a. Explain the steps involved in training algorithm of back propagation algorithm. (16)

(Or)

b. Consider a Kohonen net with two cluster units and three inputs units. The weight vector for the cluster unit are (0.9, 0.7, 0.6) and (0.4, 0.3, 0.5) find the winning cluster unit for the input vector (0.4, 0.2, 0.1). Use learning rate of 0.2. Find the new weights for the winning unit.

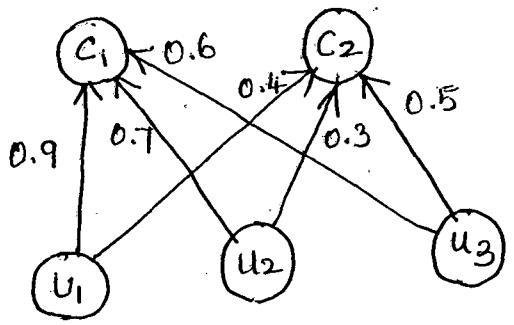

Fig : 1

15a. Three fuzzy set A, B, C are defined as follows:

$$A = \frac{0.2}{x_1} + \frac{0.6}{x_2} + \frac{0.7}{x_3} + \frac{0.9}{x_4} + \frac{0}{x_5}$$

$$B = \frac{0.3}{x_1} + \frac{0.5}{x_2} + \frac{0.2}{x_3} + \frac{0.8}{x_4} + \frac{0.1}{x_5}$$

$$C = \frac{0.5}{x_1} + \frac{0.8}{x_2} + \frac{0.7}{x_3} + \frac{1.0}{x_4} + \frac{0.5}{x_5}$$

Find the following

(i) Level set of A, level set of B
(ii) Fuzzy cardinality of A, B and C
(iii) Scalar cardinality of A, B, and C
(iv) (AnB)U(AnB^C)
(v) (A^{C}nB^C)UC (16)

(Or)

b. The fuzzy relation 'R' is defined by three sets $X_1\{a,b,c\}$ $X_2\{s,t\}$ $X_3=\{x,y\}$

$$R(X_1, X_2, X_3) = \frac{0.4}{b,t,y} + \frac{0.6}{a\,s,x} + \frac{0.9}{b,s,y} + \frac{0.8}{a,t,y} + \frac{0.1}{c,s,y} + \frac{0.3}{b,t,y}$$

Compute
(i) $R_{1,2}$
(ii) R_3
(iii) $R_{1,3}$
(iv) $(R_{12} \uparrow (x_3))$