

29-5-19 (E)

Exam.Code:0932  
Sub. Code: 6937

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1059

B.E. (Electronics and Communication Engineering)  
Eighth Semester  
Elective - II & III

EC-810: Neural Networks and Fuzzy Logic

Max. Marks: 50

Time allowed: 3 Hours

NOTE: Attempt five questions in all, including Question No. I (Part-A) which is compulsory and selecting two questions each from Part B-C. Assume and specify any missing data.

x-x-x

Part- A

- I
- a) Explain in brief the structure of biological neuron. 5x2
  - b) Differentiate between local minima and global minima.
  - c) How competition is performed using neural networks?
  - d) What are the three states of art network?
  - e) Euclidean distance method is more used than the dot product method. Justify.

Part- B

- II (a) Explain the term artificial intelligence. Give comparison between hard and soft computing. (5)
- (b) Discuss the different learning rules in neural networks. (5)
- III Find the new weights, using backpropagation algorithm for the network shown in Fig1. The network is presented with input pattern [0.4, 0.8] and the target output is 0.7. Use a learning rate of 0.5 and bipolar sigmoidal activation function. (10)

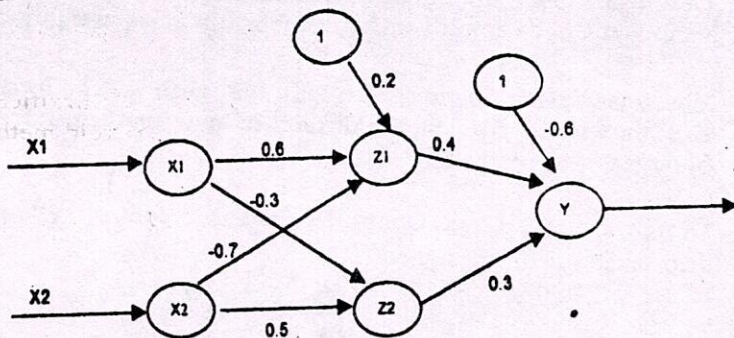


Fig.1

P.T.O.

(2)

- IV (a) How does a Hopfield network work? Explain the algorithm for storage of information in Hopfield network. Similarly explain the recall algorithm. (5)
- (b) Given the following data: (5)

Original Vector	Associated Vector
$x_1(1,0,0)$	$y_1(0,0,1)$
$x_2(0,1,0)$	$y_2(0,1,0)$
$x_3(0,0,1)$	$y_3(1,0,0)$

Prove that applying an input vector to A through W produces its associated output vector at B and this in turn when applied to  $W^T$  again produces A.

### Part- C

- V (a) Consider a Kohonen net with two cluster and three input units. The weight vectors for the cluster units are (0.9, 0.7, 0.6) and (0.4, 0.5, 0.3). Find the winning cluster unit for the input vector (0.4, 0.2, 0.3). Use Learning rate of 0.5 and also find new weights. (5)
- (b) Explain the terms: stability, plasticity, bottom up weights, vigilance parameter, and noise suppression parameter of artificial neural network. (5)
- VI (a) Describe the architecture of ART1 network and discuss its training algorithm. (5)
- (b) Define and give importance of membership function in fuzzy logic. List the various methods employed for membership value assignment. (5)
- VII (a) What is defuzzification? Explain the need of defuzzification process. Explain with illustration, the difference between centroid method and center of largest area method. (5)
- (b) Design a Fuzzy Logic Controller for speed control system and explain the steps used for FIS designed. (5)

x-x-x