

Roll No.

Total Pages : 04

BT-8/M-14

8801

NEURAL NETWORKS & FUZZY LOGIC

CSE-402

Time : Three Hours]

[Maximum Marks : 100

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. (a) Discuss analogy between biological and artificial neural network with a diagram. 6
(b) Define activation function. Describe the various activation functions used. 6
(c) Differentiate between supervised and unsupervised training and give some applications of both. 8
2. (a) Differentiate between linear and non-linear separability. Explain how you solve the linear separable problems. Explain the X-OR problem in perceptrons. 12

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- (b) To solve an engineering problem how many layers are normally required and which layer contains highest nodes and why ? 8

Unit II

3. Write Back Propagation training algorithm and its limitations. How can these limitations be overcome ? 20
4. (a) Explain the architecture of counter propagation network and explain its normal mode of operation. 10
(b) Write a short note on Kohonen networks. 4
(c) A neuron j receives input from other neurons whose activity levels are 10, -20, 4 and -2. The respective synaptic weights of the neurons are 0.8, 0.2, -1.0 and -0.9. Calculate the output of neuron j for the following situations :
(i) The neuron is linear

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- (ii) The neuron is represented by McCulloch-pitts model defined as

$$\text{follows } Y_k = \begin{cases} +1 & \text{if } V_k \geq 0 \\ -1 & \text{if } V_k < 0 \end{cases}$$

where V_k is the induced local field. 6

Unit III

5. (a) Draw the architecture of a bi-directional associative memory and give a problem that can be solved with the help of the network. 10
- (b) Explain how weights are computed in a bi-directional associative memory and also show how associations are stored and retrieved. 10
6. Discuss basic architecture and operation of ART network and also explain the three states of an ART network. 20

Unit IV

7. (a) Explain the various methods of selection of chromosome for reproduction. 10
- (b) Explain the structure and training of cognitrons. 10
8. Write notes on any *two* of the following :
- (a) Vector-Matrix Multiplications
- (b) Holographic
- (c) Volume Holograms.