

EIGHTH SEMESTER B. TECH DEGREE EXAMINATION

2013 scheme

13.804.1 SOFT COMPUTING (FR) (Elective III)

Time: 3 Hours

Max Marks: 100

PART –A

Answer all questions. Each question carries 4 marks.

1. Differentiate between supervised and unsupervised learning.
2. What are the features of membership functions?
3. Determine the crisp λ – cut relations for $\lambda = 0.1j$ for $j=0,2,3$ and 10 for the following fuzzy relation matrix, R.

$$R = \begin{bmatrix} 0.2 & 0.7 & 0.4 & 1.0 \\ 1.0 & 0.9 & 0.5 & 0.1 \\ 0.0 & 0.8 & 1.0 & 0.6 \\ 0.2 & 0.5 & 1.0 & 0.3 \end{bmatrix}$$

4. List the application of genetic algorithms.
5. Soft computing techniques give best solution to complex problems. Justify.

(5 X 4 = 20 marks)

PART –B

MODULE –I

6. (a) Construct a Kohonen self-organizing map to cluster the four given vectors, $[0 \ 0 \ 1 \ 1]$, $[1 \ 0 \ 0 \ 0]$, $[0 \ 1 \ 1 \ 0]$ and $[0 \ 0 \ 0 \ 1]$. The number of clusters to be formed is two. Assume an initial learning rate of 0.5. (12 mark)

- (b) With a neat architecture, explain the training algorithm of a hetero associative network.

(8 mark)

OR

7. (a) Using the linear separability concept obtain the response for OR function. Take bipolar inputs and bipolar targets. (10 mark)
 (b) Explain the training and testing algorithm for adaptive linear neuron. (10 mark)

MODULE -II

8. (a) What are the different methods of defuzzification process? (10 mark)
 (b) Explain the architecture of fuzzy logic controller with neat diagram. (10 mark)

OR

9. (a) Design computer software to perform image processing to locate objects within a scene. The two fuzzy sets representing a plane and a train image are given below:

$$plane = \left\{ \frac{0.2}{train} + \frac{0.5}{bike} + \frac{0.3}{boat} + \frac{0.8}{plane} + \frac{0.1}{house} \right\}$$

$$train = \left\{ \frac{1}{train} + \frac{0.2}{bike} + \frac{0.4}{boat} + \frac{0.5}{plane} + \frac{0.2}{house} \right\}$$

Find the union, intersection, complement and set difference. Also verify Demorgan's theorem. (10 mark)

- (b) Explain the various membership value assessment methods. (10 mark)

MODULE III

10. Explain in detail about classification of genetic algorithm. (20 mark)

OR

11. (a) With a neat flowchart, explain how genetic programming is done (10 mark)
 (b) Explain the general genetic algorithm. (10 mark)

MODULE IV

12. (a) How are genetic algorithm utilized for optimizing the weights is neural network architecture? (10 mark)
- (b) Write a note on soft computing based hybrid fuzzy controllers. (10 mark)

OR

13. (a) Describe in detail about any one of the application of soft computing with example. (10 mark)
- (b) Explain genetic fuzzy system with neat block diagram. (10 mark)