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48316

BT-8/D-22

SOFT COMPUTING

Paper-ECO-13A

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *five* questions in all, selecting at least *one* question from each Section.

SECTION-I

1. (a) Classify the various types of soft computing techniques. Define Intelligent System. (5)

   (b) Explain Swarm Intelligent System and its Properties. (5)

   (c) Define Intelligent System. (5)

2. (a) Write the training algorithm and testing algorithm of Adaline Network and with a neat architecture. (7)

   (b) Write short notes on the following :

   (i) Artificial Intelligence.

   (ii) Artificial Neural Network. (8)

SECTION-II

3. (a) Explain the training algorithm of Kohonen self-organizing feature maps and with a neat diagram. (10)

(b) With a neat Architecture, Explain the training algorithm of Back Propagation Network. (5)

4. (a) Construct and test the Hamming network to cluster four vectors. Given the exemplar vectors :

$e(1) = [\ 1\ -1\ -1\ -1\ ]$;

$e(2) = [\ -1\ -1\ -1\ 1]$

The bipolar input vectors are

$x1 = [-1\ -1\ 1\ -1]$

$x2 = [-1\ -1\ 1\ 1]$

$x2 = [-1\ -1\ -1\ 1]$

$x2 = [1\ 1\ -1\ -1]$. (10)

(b) Draw the structure of Hamming network and Explain. (5)

SECTION-III

5. (a) Discuss the methods of aggregation of fuzzy rules.

(b) With suitable block diagram, explain the working principle of fuzzy inference system.

(c) Explain the different types of membership function used in fuzzification process. (5)

6. (a) The discretized membership functions for a transistor and a resistor are given below :

$\mu T = \{0/0 + 0.2/1 + 0.7/2 + 0.8/3 + 0.9/4 + 1/5\}$

$\mu R = \{0/0 + 0.1/1 + 0.3/2 + 0.2/3 + 0.4/4 + 0.5/5\}$

Find the following :

(i) Algebraic sum.

(ii) Algebraic product.

(iii) Bounded sum.

(iv) Bounded difference. (8)

(b) Discuss about the four modes of fuzzy reasoning. (7)

SECTION-IV

7. (a) What do you understand by Fitness function? Mention the importance of Fitness function in genetic algorithm. How can Fitness functions be found for any optimization problem? (7)

(b) Define Mutation and explain various types of Mutation in Genetic algorithm. Describe the Encoding operators in Genetic algorithm. (8)

8. (a) Implement Optimization of Travelling Salesman Problem using Genetic algorithm approach. (8)

(b) Design a fuzzy logic controller to simulate a temperature control system for a room. (7)