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Total No. of Pages : 02

Total No. of Questions : 08

M.Tech.(Electronics & Communication Engg.) (2018 Batch) (Sem.-1)

FUZZY LOGIC AND SYSTEMS

Subject Code : MTEC-PE2Y-18-4

M.Code : 75180

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWELVE marks.

1. Given two fuzzy sets

$$B_1 = \left\{ \frac{1}{1.0} + \frac{0.75}{1.5} + \frac{0.3}{2.0} + \frac{0.15}{2.5} + \frac{0}{3.0} \right\}$$

$$B_2 = \left\{ \frac{1}{1.0} + \frac{0.6}{1.5} + \frac{0.2}{2.0} + \frac{0.1}{2.5} + \frac{0}{3.0} \right\}$$

Find the following :

- a) $B_1 \cup B_2$
- b) $B_1 \cap B_2$
- c) $\overline{B_1}$
- d) $\overline{B_2}$
- e) $B_1 | B_2$
- f) $\overline{B_1 \cup B_2}$
- g) $\overline{B_1 \cap B_2}$
- h) $B_1 \cap \overline{B_1}$
- i) $B_1 \cup \overline{B_1}$
- j) $B_2 \cap \overline{B_2}$
- k) $B_2 \cup \overline{B_2}$

2. a) How back propagation algorithm is different from delta learning rule.
b) Write down the algorithmic steps to use back propagation algorithm.
3. a) State Hebb's postulate and write down mathematical equations used to update network parameters.
b) Given the input prototypes orange and apple as $(1,-1,-1)$ and $(1,1,-1)$ and corresponding targets as -1 and 1 respectively. Let the initial random weights of perceptron classifier to be used for classification are given as $(0,1,0)$. Use Hebbian learning to train the network.
4. a) State the principle of Genetic algorithm. What are its applications?
b) Explain the role of Genetic algorithm operators in solution search process with suitable examples.
5. What are the classifications of neuro-fuzzy hybrid systems? Explain in detail any one of the neuro-fuzzy hybrid systems.
6. For the given membership function as shown in Figure 1 below, determine the defuzzified output by weighted average, mean-max, center of sums method.

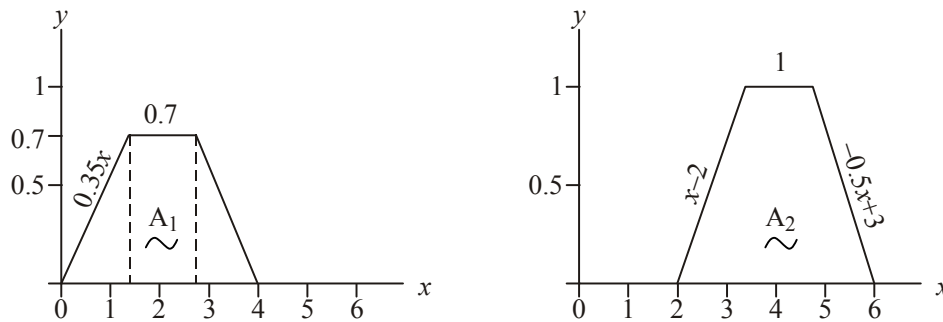


FIG. 1 Membership Function

7. What are various types of crossover and mutation techniques?
8. How are genetic algorithms utilized for optimizing the weights in neural network architecture?

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.