

Semester VI (B.Tech.)

Er. No...2018308

Academic Year: 2022-23

**Jaypee University of Engineering & Technology, Guna****T-3 (Even Semester 2023)****18B11CI934 - SOFT INTELLIGENCE**

Maximum Duration: 2 Hours

Maximum Marks: 35

Notes:

1. This question paper has 5 questions.
2. Write relevant answers only.
3. Do not write anything on question paper (Except your Er. No.).

**Q1.** Consider the three bipolar patterns A1 , A2, A3 to be stored as an auto-correlator. **Marks [4+3] CO No. CO3**

$$A1 = (-1, 1, -1, 1)$$

$$A2 = (1, 1, 1, -1)$$

$$A3 = (-1, -1, -1, 1)$$

- (a). Show how these patterns are stored.
- (b). Retrieve pattern A2 from the three stored patterns.

**Q2.** Consider 12 numbers of pattern points in Euclidean space. Their coordinates (X , Y) are indicated in the table below. **[07] CO5**

Table Input pattern - coordinates of 12 points

Points	X	Y	Points	X	Y
1	2	3	7	6	4
2	3	3	8	7	4
3	2	6	9	2	4
4	3	6	10	3	4
5	6	3	11	2	7
6	7	3	12	3	7

Determine clusters using the algorithm of vector quantization (VQ), assuming the threshold distance = 2.0.

Q3. Fuzzy relation is a generalization of the definition of fuzzy set from 2-D space to 3-D space. Consider a fuzzy relation [07] CO4

$$R = \{ ((x_1, y_1), 0), ((x_1, y_2), 0.1), ((x_1, y_3), 0.2), ((x_2, y_1), 0.7), ((x_2, y_2), 0.2), ((x_2, y_3), 0.3), ((x_3, y_1), 1), ((x_3, y_2), 0.6), ((x_3, y_3), 0.2) \}$$

Show this relation into matrix form. Assuming  $x_1 = 1, x_2 = 2, x_3 = 3$  and  $y_1 = 1, y_2 = 2, y_3 = 3$ . Show the graphically representation of  $(X, Y, \mu)$  by points in 3-D space.

Q4. Show and explain the taxonomy of search optimization techniques. [07] CO2

Q5. Consider a Back Propagation Network configuration  $\ell - m - n$  where  $\ell = 2$  is input,  $m = 2$  is hidden and  $n = 2$  is output neuron. Determine the weights of this network by using the concept of Genetic algorithms. [07] CO5