PVP 14

Code: CS5T4

III B.Tech-I Semester–Regular / Supplementary Examinations
March 2021

SOFT COMPUTING
(COMPUTER SCIENCE AND ENGINEERING)

Duration: 3 hours Max. Marks: 70

PART – A

Answer ***all*** the questions. All questions carry equal marks

11x 2 = 22 M

1.

a) How would you compare and contrast fuzzy logic and crisp logic?
b) What is meant by universe of discourse in crisp set and give an example.
c) How would you classify the connectives in the propositions?
d) Which fuzzy inference system is used more widely and why?
e) What is the main idea of synaptic gap?
f) List out the differences between artificial and biological neural network.
g) Sketch a 3-4-5-2 neural network.
h) What can you say about the deletion of pattern pairs in BAM?

i) What facts would you select to show the ART1 architecture is best when comparing to ART2 architecture?

j) Differentiate between mutation and crossover operator.

k) Why would you choose genetic algorithm over traditional algorithms.

PART – B

Answer any ***THREE*** questions. All questions carry equal marks.

3 x 16 = 48 M

2. a) Consider a set $P = \{P_1, P_2, P_3, P_4\}$ of four variety of paddy plants, set $D = \{D_1, D_2, D_3, D_4\}$ the various diseases affecting the plants and $S = \{S_1, S_2, S_3, S_4\}$ be the common symptoms of diseases. Let $\bar{R}$ be a relation on P X D and $\bar{S}$ be a relation on D X S and gives as

$$\bar{R} = \begin{array}{c} \\ P_1 \\ P_2 \\ P_3 \\ P_4 \end{array} \begin{array}{c} \begin{array}{cccc} D_1 & D_2 & D_3 & D_4 \end{array} \\ \begin{bmatrix} 0.6 & 0.6 & 0.9 & 0.8 \\ 0.1 & 0.2 & 0.9 & 0.8 \\ 0.9 & 0.3 & 0.4 & 0.8 \\ 0.9 & 0.8 & 0.1 & 0.2 \end{bmatrix} \end{array} \quad \text{and} \quad \bar{S} = \begin{array}{c} \\ D_1 \\ D_2 \\ D_3 \\ D_4 \end{array} \begin{array}{c} \begin{array}{cccc} S_1 & S_2 & S_3 & S_4 \end{array} \\ \begin{bmatrix} 0.1 & 0.2 & 0.7 & 0.9 \\ 1 & 1 & 0.4 & 0.6 \\ 0 & 0 & 0.5 & 0.9 \\ 0.9 & 1 & 0.8 & 0.2 \end{bmatrix} \end{array}$$

Obtain the association of the plants with the different symptoms of disease using max-min composition.

8 M

b) What is meant by membership function? Explain in detail various membership functions of fuzzy logic systems. 8 M

3. a) Define defuzzification. With an example explain in detail the following defuzzification methods i) Centre of sums and ii) Centroid of Area. 8 M

b) Write short notes on air conditioner control using fuzzy logic. 8 M

4. a) Using the linear separability concept, obtain the response for 8 M

i) OR function

ii) AND function

b) Distinguish between Feed forward and Recurrent networks with their relative merits and demerits. 8 M

5. a) Explain in detail about Wang et al's multiple training encoding strategy. 8 M

b) Discuss the application character recognition using ART1. 8 M

6. Suppose a genetic algorithm uses chromosomes of the form x = abcdefgh with a fixed length of eight genes. Each gene can be any digit between 0 and 9. Let the fitness of individual x be calculated as:
f(x) = (a + b) − (c+ d) + (e + f) − (g + h) and let the initial population consist of four individuals with the following

chromosomes:

x1 = 6 5 4 1 3 5 3 2

x2 = 8 7 1 2 6 6 0 1

x3 = 2 3 9 2 1 2 8 5

x4 = 4 1 8 5 2 0 9 4

Evaluate the fitness of each individual, showing all your workings, and arrange them in order with the fittest first and the least fit last. 16 M