

2072
M.E. Computer Science and Engineering (Cyber Security)
Second Semester
CSN-8202: Soft Computing

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 (Section-A) which is compulsory and selecting two questions each from Section B-C.

X-X-X

Section-A																																					
Q1.	a) List out the steps in perceptron learning algorithm for single output class. b) Differentiate between hard computing and Soft Computing. c) Write learning factors of Back Propagation Network. What does back propagation algorithm update while training a neural network. d) Differentiate between Mamdani FIS and Sugeno FIS. e) Discuss briefly various stopping conditions for genetic algorithm flow.	10																																			
Section-B																																					
Q2.	a) Design and implement OR function with bipolar inputs and targets using Adaline network? Find total mean square error of 3 epochs? b) What are the main differences among the three models of ANN namely McCulloch-Pitts, perceptron, and Adaline. Illustrate the working of any one of it.	5 5																																			
Q3.	a) Explain limitations of backpropagation learning. Also explain the scope to overcome these limitations. b) Explain the architectures of popular self-organizing maps. Derive the training algorithm of Kohonen network. Also explain how SOMs can be used for data compression.	3 7																																			
Q4.	a) Discuss storage capacity and energy function of the Hopfield network. b) Design a suitable multilayer, feed forward network for identifying whether an image of size 16*16 contains a dog or a cat. Make suitable assumptions.	4 6																																			
Section-C																																					
Q5.	a) What is the goal of restricted Boltzmann machine? How many layers does Boltzmann machine have? b) What is RBF activation function? What is radial basis function neural network used for? c) Can neuro-fuzzy systems lead to more powerful neural network? Justify with the help of suitable example. Also explain how neural networks and fuzzy logic can be combined.	3 3 4																																			
Q6.	a) Using inference approach, obtain the membership values for the triangular shapes: isosceles(I), right angled (R), other triangle (T) with angles 40 degree, 60 degrees, 80 degree. b) Distinguish between fuzzy logic and probability with example. c) Explain different defuzzification methods.	4 3 3																																			
Q7.	Table 1 shows a population of strings. Assuming that the string represents a binary encoding of a number n, and that the fitness function is given by:- $F_i = 100 / n$ Fill in rest of the table using a suitable procedure such as the roulette wheel algorithm to generate a mating pool. Complete Table 2 by randomly selecting mates and single crossover sites to generate a new population. Calculate F_i for each member of the new population. Is this an improvement?	10																																			
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