(Following Paper ID and Roll No. to be filled in your Answer Books)

Paper ID : 199407 Roll No. | | | | | | | | | | |

B.TECH.

Theory Examination (Semester-IV) 2015-16

INTRODUCTION TO SOFT COMPUTING (NEURAL NETWORK, FUZZY LOGIC & GENETIC ALGORITHM)

Time : 3 Hours *Max. Marks : 100*

Section-A

Q.1. Attempt all parts. All parts carry equal marks. Write answer of each part in short. (2×10=20)

(a) Give the difference between supervised and unsupervised learning in artificial neural network.

(b) What is soft computing?

(c) Write benefits of genetic algorithm.

(d) List the various types of soft computing techniques and Mention some application areas for neural network.

(e) Draw a biological NN and explain the parts.

(f) Consider an auto associative net with the bipolar step function as the activation function and weights set by Hebb rule (outer diagonal) where the main diagonal of the weight matrix is set to zero. Find the weight matrix to store the vector v1= (1 1 1 1 −1 −1).

(g) What is FLC?

(h) Define mutation.

(i) Use the Hebb rule to store the vector (1 1 −1 −1) in an auto associative neural net. Find the weight matrix.

(j) Draw an artificial neural network.

Section-B

Q.2. Attempt any five questions from this section. **(10×5=50)**

(a) (i) Let R be a crisp relation among the two sets X={dollar, pound, franc, mark} and Y={United States, France, Canada, Britain, Germany}, which associates a country with a currency. Represent it as a fuzzy relation using 2-dimensional membership array.

(ii) Explain delta rule for pattern association.

(b) What is Simulated Annealing? What is the structure of a Simulated Annealing Algorithm?

(c) How fuzzy logic differs from crisp logic? How rules are defined in fuzzy rule base system?

(d) Which neural network architecture is used for on line spell checking? Explain that architecture.

(e) Which is the most common radial basis function? Explain that function.

(f) Write fuzzy logic control system models.

(g) State the different selection methods in GA.

(h) For the given input vectors $S=(S_1,S_2,S_3,S_4)$ and output vectors $t=(t_1, t_2)$, find the weight matrix using heteroassociative training algorithm.

	$S = (S_1,$	$S_2,$	$S_3,$	$S_4)$	$t = (t_1, t_2)$
I	(1	0	1	0)	(1, 0)
II	(1	1	0	0)	(1, 0)
III	(1	1	1	0)	(0, 1)
IV	(1	0	0	0)	(0, 1)

Section-C

Note: Attempt any two questions from this section. (15×2=30)

Q3. (a) Consider four travel packages offered by Thomas Cook, Club Mahindra, World around, and Himalaya Travels.

We want to choose one. Their costs are INR 100,000, INR 200,000 . INR 150,000 and I NR 175,000. Their travel time in hours is 1 I 50, 200, 100, and 125 respectively. They are viewed as interesting with degrees 0.4. 0.3, 0.6, 0.5. Define your own fuzzy set of acceptable travel times. Then determine the fuzzy set of interesting travel packages whose cost and travel times are acceptable and use this set to choose one of your own packages.

(b) Explain McCulloch-Pitts Neuron model and write disadvantage of it.

(c) What is the difference between crisp set and fuzzy set?

Q4. (a) Write the expression for bipolar continuous and bipolar binary activation function.

(b) What is learning rate? What is its function?

(c) Explain Hebbian learning.

Q5. (a) Draw a network for solving Exclusive OR problem.

(b) Write various steps of the back propagation algorithm.

(c) Draw and Explain the multiple perceptron with its learning algorithm.