MCTA–201

M. E./M. Tech. (Second Semester) EXAMINATION, Nov./Dec., 2009

SOFT COMPUTING

(MCTA – 201)

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Attempt any *one* question from each Unit. All questions carry equal marks. Make suitable assumptions wherever necessary.

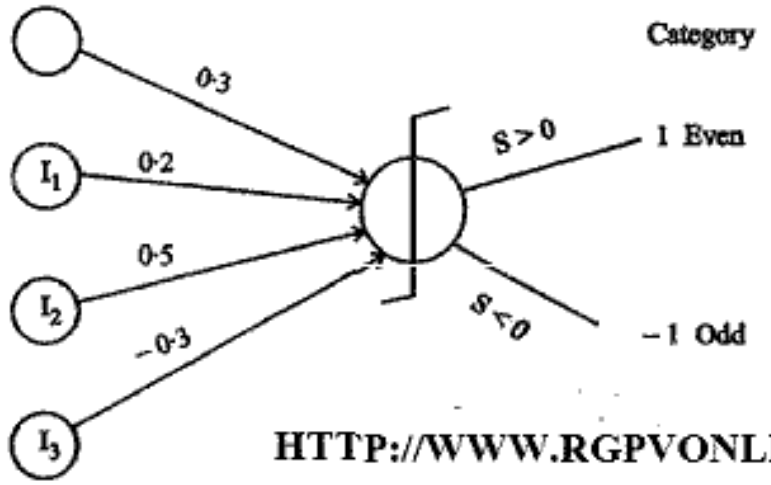
Unit – I

1. (a) Describe briefly about any *five* learning methods in Neural Networks.

   (b) Illustrate the step by step procedure of the back propagation algorithm.

Or

2. A perceptron is being trained for a learning task. The task is to determine when the product of three integers is even and when it is odd. There is an input unit for each integer being multiplied and the input is + 1 if the integer is even, − 1 if the integer is odd. The current state of the perceptron is :



(i) Why are there four inputs units ?

(ii) Would the perceptron predict that the product 2 * 3 * 4 is even or odd ? (Let I_1 be 2, I_2 be 3 and I_3 be 4).

(iii) Using a learning rate of 0·1 and give the input triple (2, 3, 4), recalculate the weights using the perceptron training rule. Draw the perceptron after training. Does the trained perceptron correctly predict whether 2 * 3 * 4 is odd or even ?

Unit – II

(a) Let $A = \{(x_1, 0{\cdot}2), (x_2, 0{\cdot}7), (x_3, 0{\cdot}4)\}$ and $B = \{(y_1, 0{\cdot}5), (y_2, 0{\cdot}6)\}$ be two Fuzzy sets defined on the universe of discourse $X = \{x_1, x_2, x_3\}$ and $Y = \{y_1, y_2, y_3\}$ respectively. Find the Cartesian product of the A and B and fuzzy relation R.

(b) Mention the need for the De-fuzzification. Explain the three types of De-fuzzification with its formulae.

Or

(a) What is called De-fuzzification ? Mention its types.

(b) What are the parameters to be considered for the design of membership function ?

Unit – III

5. (a) Explain how simulated annealing can be used to reduce search complexity and contrast its operation with classic search techniques ?

(b) Explain the different categories into which data clustering algorithms are classified.

Or

6. (a) Explain K-mean and hierarchical clustering algorithms with example.

(b) Describe briefly how a solution to the Travelling Salesman problem might be obtained using simulated annealing, indicating how you would obtain the necessary features for this problem.

Unit – IV

7. (a) Explain various operators and parameters of Genetic Algorithms.

(b) What do you understand by cross-over rate and mutation rate in genetic algorithms ?

Or

8. (a) Explain fitness computations with examples.

(b) Explain how Genetic Programming is a branch of Genetic Algorithms ?

Unit – V

9. (a) How do you creating scripts with the MATLAB Editor/Debugger ?

(b) Represent the following facts as a set of frames :

"The aorta is a particular kind of artery which has a diameter of 2·5 cm. An artery is a kind of blood vessel. An artery always has a muscular wall and generally has a diameter of 0·4 cm. A vein is a kind of blood vessel, but has a fibrous wall. Blood vessels all have tubular form and contain blood."

Or

10. (a) Represent the following facts in the language of predicate logic and semantic nets :

(i) Every apple is either green or yellow.

(ii) No apple is blue.

(iii) If an apple is green then it is tasty.

(iv) Every man likes a tasty apple.

(b) What are basic operations done on vectors in MATLAB ?