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Total Number of Pages: 2

M.TECH  
PPPE102/ PEPE102

1st Semester Regular/Back Examination – 2014  
SOFT COMPUTING

BRANCH(S): POWER ELECTRONICS AND POWER SYSTEMS, POWER ELECTRONICS & DRIVES, POWER ELECTRONICS, POWER ELECTRONICS & ELECTRICAL DRIVES.

Time: 3 Hours

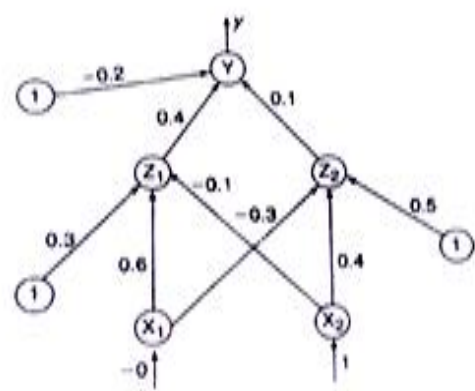
Max Marks: 70

Answer Question No.1 which is compulsory and any five from the rest.  
The figures in the right hand margin indicate marks.

- Q1 Answer the following questions: (2 x 10)
- a) State the importance of genetic algorithm.
  - b) What activation Function is used in continuous BAM?
  - c) What are the factors that improve the convergence of learning in BPN network?
  - d) Derive the generalized Delta learning rule.
  - e) Compare and contrast BAM and Hop field network.
  - f) State generalized modus ponens and generalized modus tollens.
  - g) List the properties of lambda-cut for fuzzy sets.
  - h) What is the difference between crossover and mutation?
  - i) Differentiate between Mamdani FIS and Sugeno FIS.
  - j) Write a short note on fuzzy C-means Clustering.

- Q2 a) Give the comparative specifications of biological neuron and artificial Neuron based on different criteria. Describe the McCulloch-Pitts Neuron characteristics and architecture. (5)
- b) Implement AND function using MADALINE network. (5)

- Q3 Using the back propagation network find the new weights for the net shown in the figure. It is presented with the input pattern [0, 1] and the target output is 1. Using a learning rate  $\alpha = 0.25$  and binary sigmoidal activation function. (10)



- Q4 a)
- | R(x-y) | Unripe | Semiripe | ripe |
|--------|--------|----------|------|
| Green  | 1      | 0.5      | 0    |
| Yellow | 0.3    | 1        | 0.4  |
| Red    | 0      | 0.2      | 1    |
- | S(y-Z)   | Sour | Sweetsour | sweet |
|----------|------|-----------|-------|
| Unripe   | 1    | 0.2       | 0     |
| Semiripe | 0.7  | 1         | 0.3   |
| ripe     | 0    | 0.2       | 1     |

Given two fuzzy relations R (color-ripeness) and S (ripeness-taste). Find the max-min composition  $T = R \circ S$  in matrix form.

- b) Define Defuzzification. State the necessity of Defuzzification Process. Discuss different methods of Defuzzification. (5)
- Q5 a) What is the purpose of LVQ Network? (5)  
How are the initial weights determined for LVQ net? With architecture, describe how LVQ nets are trained. (5)
- b) Write a short note on Particle Swarm Optimization (5)

- Q6 a) What is ANFIS? With a suitable block diagram explain its architecture and working principle. (5)  
b) What is the need for encoding in genetic algorithm? Explain various encoding methods. (5)
- Q7 a) Explain Real-Time recurrent learning (RTRL) algorithm in details. (5)  
b) Using the genetic algorithm process, minimize the function  $f(x) = x^2 + 5x$ . Assume the necessary operator for the process on your own. (5)
- Q8 Write short notes on any two of the following: (5 x 2)  
a) NARX Model  
b) K-means clustering  
c) Support Vector Machine  
d) Simulated Annealing

