Model Question Paper

Second Semester M. Tech Degree Examination in

Electronics and Communication Engineering

Stream: Signal processing (2013 Scheme)

TCD 2002: Soft Computing

Time: 3 hours   Max. Marks: 60

Instructions: *Answer any 2 questions from each module (Each carries 10 Marks)*

Module I

1. (a) Briefly explain the LMS algorithm with respect to neural networks.   (6)

   (b) The figure shows a neuron with activation function $\varphi(u) = \dfrac{0.6}{1 + \exp(10.2u)}$ where

   u indicates total synaptic input and output activation of the neuron with x1= 0.6, x2 = 2 and x3 = - 0.4
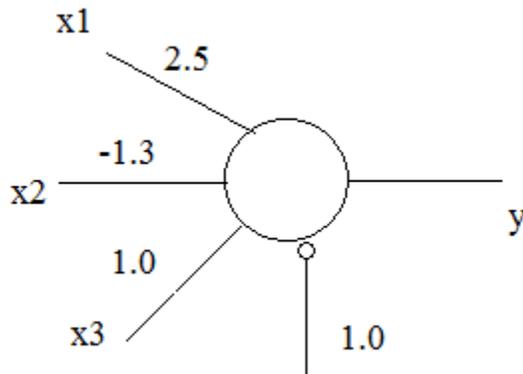
   (4)

2. Let R be a relation from X to Y defined by $R = \begin{bmatrix} 0.5 & 1.0 & 0.2 \\ 0.4 & 0.2 & 0.6 \\ 0.7 & 0.4 & 0.8 \end{bmatrix}$. Find the domain, range,

   inverse, all possible projections and cylindrical extensions of the relation.   (10)

3. a) Let continuous fuzzy sets A and B of [0, 1] have the set functions $A(x) = e^{-x}$, $B(x) = 1/2$ on unit interval domain [0, 1]. Compute the subset hood values S(A, B), scalar and fuzzy cardinalities and E(A,B).   (5)

   b) Distinguish between supervised and unsupervised learning.   (5)

(PTO)

Module II

4. a) What is Boltzmann machine? What is the objective of Boltzmann learning?   (6)

   b) Write short notes on Hebbian learning.   (4)

5. Briefly explain the Neuro fuzzy system with an example.   (10)

6. a) Explain simulated annealing schedule.   (5)

   b) Describe briefly the K- means clustering algorithm.   (5)

Module III

7. (a) With an example explain a fuzzy genetic model.   (6)

   (b) What are semantic networks and frames?   (4)

8. Explain the various gain scheduling approaches for the design of neuro fuzzy controllers.

    (10)

9. (a) Briefly describe Rank space method AI search algorithm   (5)

   (b) Explain the cycle of Genetic algorithm .   (5)