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M.Tech I Semester Supplementary Examinations August 2016

NEURAL NETWORKS & APPLICATIONS

(Common to DSCE & ECE)

(For students admitted in 2012, 2013, 2014 & 2015 only)

Time: 3 hours Max. Marks: 60

Answer any FIVE questions

All questions carry equal marks

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1 (a) Explain about the important architectures of neural network.
(b) Discuss about various linear and non linear activation functions. Give their merits and demerits.

2 (a) Explain delta learning rule.
(b) State and prove perceptron convergence theorem.

3 (a) How the parameters are set for back propagation algorithm? Explain the significance of learning rate and momentum term.
(b) Write short note on radial basis function networks. Compare with multilayer perceptrons.

4 (a) Discuss how the "Winner-Take-All" in the Kohonen's layer is implemented and explain the architecture, also explain the training algorithm.
(b) What is Learning Vector Quantizer (LVQ) and explain the training algorithm with the help of an example.

5 (a) Give the architecture of adaptive resonance theory (ART) network and explain the training algorithm. Give expressions to modify weights.
(b) Describe hamming net.
(c) What is self-organizing network?

6 (a) What is pattern association? Describe and construct energy function for a discrete Hopfield network and show that the energy function decreases every time as the neuron output changes.
(b) A Hopfield network made up of 5 neurons, which is required to store the following three fundamental memories.

$$X_1 = \{+1, +1, +1, +1, +1\}^T$$
$$X_2 = \{+1, -1, -1, +1, -1\}^T$$
$$X_3 = \{-1, +1, -1, +1, +1\}^T$$

(i) Evaluate the synaptic weight matrix.
(ii) Specify the network structure.
(iii) Specify the connection weight.

7 (a) Write short note on Boltzmann machines.
(b) Show how the traveling salesman problem can be solved using the Hopfield model.

8 (a) What are the important applications in speech area? Discuss about any one application.
(b) What is the difference between pattern recognition and classification? How is artificial neural network applied in both?

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