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M.Tech I Semester Regular & Supplementary Examinations February 2016

NEURAL NETWORKS & APPLICATIONS

(Common to DSCE & ECE)

(For students admitted in 2011, 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) Draw structure and explain in detail the functions of a biological neuron. Compare and contrast the biological neuron and artificial neuron.

(b) Explain different ways of evaluating the performance of neural networks.

2 (a) Explain McCulloch Pitts neuron model and state its limitations.

(b) Distinguish between:

(i) Supervised & unsupervised learning.

(ii) Linear separability & linearly non-separability.

(c) Give the details on the development of ADALINE. Explain its training algorithm.

3 (a) What is a back propagation network? Derive the expression for weight updation in a multilayer feed forward neural network using standard back propagation learning.

(b) What is MADALINE? Explain its training algorithm.

4 (a) A Maxnet consists of three inhibitory weights as 0.25. The net is initially activated by the input signals [0.1 0.3 0.9]. The activation function of the neuron is $F(x) = \begin{cases} X & X > 0 \\ 0 & otherwise \end{cases}$. Find the final winning neutron.

(b) Give the architecture and explain the training algorithm of counter propagation networks.

5 (a) What is adaptive resonance theory (ART)? Explain how it overcomes stability plasticity dilemma in neural networks and give the significance of vigilance parameter.

(b) Give the architecture and explain the algorithm of Kohonen self-organizing maps.

6 (a) What are the limitations of Hopfield network? Suggest method that may overcome these limitations.

(b) Construct a BAM to establish the following associations between four dimensional and two dimensional patterns:

(+1, +1, -1, -1) – (+1, +1)

(+1, +1, +1, +1) – (+1, -1)

(-1, -1, -1, -1) – (-1, +1)

7 (a) What is simulated annealing? Explain in detail the method used in simulated annealing.

(b) Explain how neural network can be used to solve simultaneous linear equations.

8 (a) Discuss the applications of neural networks in the field of image processing.

(b) Discuss the use of feedback neural network to convert English text to speech.

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