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15EC653

Sixth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Artificial Neural Networks

Time: 3 hrs.

Max. Marks: 80

Note: *Answer any FIVE full questions, choosing one full question from each module.*

Module-1

1 a. What is a biological neuron? How biological neuron is realized using artificial neuron models? **(08 Marks)**
   b. Give any four differences between supervised learning and unsupervised learning. **(04 Marks)**
   c. Define convex hull and linear separability, provide their significance in two class data classification problem. **(04 Marks)**

OR

2 a. What is meant by an activation function? Provide any two types of activation functions. With mathematical and graphical representations. **(06 Marks)**
   b. State and prove perceptron convergence theorem. **(10 Marks)**

Module-2

3 a. State and explain the weight update rule in α-least mean square learning. Prove that the error correlation is proportional to the error itself in α-least mean square learning. **(06 Marks)**
   b. What is steepest descent search? Explain and prove that steepest descent search converges to the Weiner solution. **(10 Marks)**

OR

4 a. Define Mean Square Error (MSE). Prove that $\nabla \varepsilon = RV$, where $\nabla \varepsilon$ is MSE gradient, R is input correlation matrix and V is the deviation from Weiner solution. **(10 Marks)**
   b. Explain the application of LMS to noise cancellation. **(06 Marks)**

Module-3

5 a. Explain SVM classification for linearly separable data. **(08 Marks)**
   b. Write a note on Radial Basis Function neural network classification. **(08 Marks)**

OR

6 a. Explain application of SVM for image classification. **(08 Marks)**
   b. What is statistical learning theory? Write a note on empirical risk minimization. **(08 Marks)**

Module-4

7 a. Write a note on associative learning and explain associative memory. **(08 Marks)**
   b. Explain Hopfield auto associative memory architecture. **(08 Marks)**

OR

8 a. Explain Brain-State-in-a-Box Neural network. **(08 Marks)**
   b. Write a note on simulated annealing. **(08 Marks)**

Module-5

9 a. Explain vector quantization. **(08 Marks)**
   b. Write a note on Hebbian learning. **(08 Marks)**

OR

10 a. Explain self organizing feature maps. **(08 Marks)**
    b. Explain applications of self organizing map in pattern classification. **(08 Marks)**

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