PAPER ID-310466

Roll No: | | | | | | | | | | | | | |

B. TECH.
(SEM VII) THEORY EXAMINATION 2020-21
NEURAL NETWORKS

Time: 3 Hours ***Total Marks: 100***

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

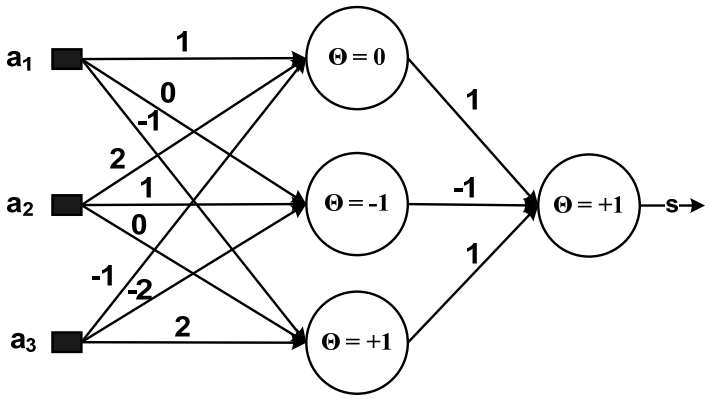
1. Attempt *all* questions in brief. 2 x 10 = 20

a. If the net input to an output neuron is 0.64, calculate its output when the activation function is binary sigmoidal.
b. What is the role of activation functions in a neural network?
c. Distinguish between supervised and unsupervised learning in artificial neural network.
d. Consider an auto-associative network with the bipolar step function as the activation function and weights set by Hebb Rule where the main diagonal of the weight matrix is set to zero. Find the weight matrix to store the vector x= (1 1 1 1-1-1).
e. Why perceptron is not able to handle the tasks, which are not linearly separable. Justify your answer using XOR problem.
f. What do you mean by neurocomputing?
g. Define principal component analysis technique.
h. Use the Hebb rule to store the vector [1 1 1 -1] in an auto-associative neural network.
i. Define RBF Network.
j. What is feature mapping?

SECTION B

2. Attempt any *three* of the following: 10x3=30

a. Evaluate the output of the neural network in figure given for the inputs [1 1 1].



The above diagram is represented as feed-forward artificial neural network.

b. Draw the ADALINE implementation for AND and OR functions.
c. Explain ADALINE and MADALINE. List some applications.
d. What do you understand by Hopfield network? Discuss their significance and usefulness in neural networks.
e. Elaborate different normalization techniques used in data processing.

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SECTION C

3. Attempt any *one* part of the following: 10x1=10

a. What are the factors to be considered while designing a learning rule?
b. what do you understand by the term: Learning, Generalization and Function approximation in context of ANN.

4. Attempt any *one* part of the following: 10x1=10

a. What do you understand by scaling and normalization? Explain.
b. What is feature extraction? Explain any two feature extraction technique in detail.

5. Attempt any *one* part of the following: 10x1=10

a. Discuss Backpropagation algorithm. Explain forward pass and backward pass in conjunction with backpropagation learning. Shall it be called unsupervised learning? Why?
b. Discuss the functionality of recurrent networks. What are the strengths and limitations of such network?

6. Attempt any *one* part of the following: 10x1=10

a. Describe the activation functions commonly used in BP algorithm.
b. Explain how linear separable task is defined for two-dimensional spaces and discuss XOR problem? Draw a network for solving Exclusive-OR problem.

7. Attempt any *one* part of the following: 10x1=10

a. Derive the training algorithm of Kohonen network. Also, explain how SOMs can be used for data compression.
b. What is sum-squared error in neural network training? Write down applications of ANN.