

Code No: K0423

R07

Set No. 1

IV B.Tech. II Semester Regular Examinations, April - 2011

ARTIFICIAL NEURAL NETWORKS
(Electronics & Communication Engineering)

Time: 3 Hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Compare the characteristics and performance of Artificial and Biological Neural Network and Biological Network.
(b) Distinguish various types of learning procedures of Artificial Neural Networks. List various ANN Architectures in each of the learning Technique.
(c) Discuss various Activation functions used in Artificial Neural Networks.
2. (a) Discuss least mean Square (LMS) rule to train the perceptron. Define Linear separability. How perceptron does form the straight line for Classification of data?
(b) Discuss Boltzmann learning
3. (a) Derive the weight iteration equation in Multi-layer perceptron using Back propagation algorithm.
(b) Discuss Back propagation algorithm
(c) What are the learning difficulties in Multilayer perceptron? How do you overcome these difficulties?
4. (a) What is Madeline? Discuss two algorithms MRI, MRII
(b) Form a madaline network for XOR function with bipolar input and targets using MRI algorithm and derive the necessary weights.
5. (a) Draw the architecture of Kohonen Network and explain the algorithm for training the weights of the Network.
(b) Draw the architecture of Full counter propagation network and explain its significance and use of the network for Image compression.

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6. (a) Discuss the algorithm for designing the weights of the Hopfield Network.
(b) What is energy function for Hopfield Network? How the data can be stored and retrieved in Hopfield Network?
7. (a) Draw the network architecture of ART network. Explain the algorithm for designing the weights of ART network.
(b) What is vigilance threshold? Explain the significance of vigilance threshold.
8. Write short notes on the following.
 - (a) Applications of Hopfield Network for Travelling sales man problem
 - (b) Bi-directional Associative Memory

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R07**Set No. 2**

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ARTIFICIAL NEURAL NETWORKS
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Time: 3 Hours**Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Distinguish Von Neumann Computer and Biological Neural system. Draw typical Artificial Neural Network architectures.
 (b) Distinguish the following learning procedures
 - (i) Supervised Training
 - (ii) Unsupervised Training
 - (iii) Reinforcement Training
2. (a) Discuss Widrow-Hoff Rule for training the neural network. Derive the weight iteration equation in Delta Rule for Single Output unit.
 (b) Using the Hebb rule, find the weights required to perform the following Classifications: vectors (1 1 1 1) and (-1 1 -1 -1) are members of class (with target value 1); vectors (1 1 1 -1) and (1 -1 -1 1) are not members of class (with target value -1)
3. (a) Draw the architecture of Radial Basis function network. Discuss the training algorithm for Radial Basis function network with fixed centres.
 (b) Differentiate between local minima and global minima. Suggest the changes in weight iteration equation of Back propagation algorithm to avoid the local minima.
4. (a) Draw the Learning Vector Quantization(LVQ) net with and discuss the training algorithm for designing the weights.
 (b) Construct and test LVQ with four vectors assigned to two classes. Assume $\alpha = 0.1$. Perform interaction upto $\alpha = 0.05$

Vector	Class
(1 0 1 0)	1
(0 0 1 1)	2
(1 1 0 0)	1
(1 0 0 1)	2

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5. (a) Draw the Adaline net. Form the AND NOT function with binary data using adaline net.
(b) Form a madaline network for XOR function with bipolar input and targets using MRI algorithm.
6. (a) Draw the Hopfield network and explain the algorithm to train the network.
(b) Design a Hopfield Network for 4 bit bipolar patterns. The training patterns are

I Sample	$S_1 = [1 \ 1 \ -1 \ -1]$
II Sample	$S_2 = [-1 \ 1 \ -1 \ 1]$
III Sample	$S_3 = [-1 \ -1 \ -1 \ 1]$

Find the weight matrix and the energy for the three input samples. Determine the Pattern to which the sample $S = [-1 \ 1 \ -1 \ -1]$ associates.

7. (a) Draw the Bi-directional associative memory. Explain the algorithm to train the weights of Bi-directional Associative Memory.
(b) What is vigilance threshold? Explain the significance of vigilance threshold in ART.
8. Write the short notes on the following
 - (a) Use of Multilayer perceptron for data compression
 - (b) Energy function of Hopfield network and thereby use of the same for solving Travelling salesman problem

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R07**Set No. 3****IV B.Tech. II Semester Regular Examinations, April, 2011****ARTIFICIAL NEURAL NETWORKS****(Electronics & Communication Engineering)****Time: 3 Hours****Max Marks: 80****Answer any FIVE Questions****All Questions carry equal marks**

1. (a) Compare the Biological Neural network and Artificial Neural Network. What are the terminologies associated with Biological neuron and Artificial Neuron.
(b) What are the activation functions used in Artificial Neural Networks? Define each of them.
(c) Write a short note on learning rate.
2. (a) Discuss the following learning rules.
 - (i) Competitive learning rule
 - (ii) Delta learning rule
 - (iii) LMS learning rule
 (b) Generate NAND and NOR function using McCulloch-Pitts neural net.
3. (a) What is linear separability? Propose the Network to solve XOR problem. Draw the architecture of neural network to solve XOR problem.
(b) Discuss the Back propagation algorithm to train the network to solve XOR problem.
(c) What are the merits and demerits of Back Propagation algorithm?
4. (a) Draw and explain the MRI training algorithm.
(b) Construct XOR function using two ANDNOT functions, and train it using the Madaline MRI algorithm.
5. (a) Draw the architecture of Adaptive Resonance Theory and explain the algorithm to train the network.
(b) Consider the ART1 network for four input units and three cluster units. Determine the updating in weights when vectors (1 0 1 0), (1 0 0 1), (0 1 1 1), and (1 1 0 1) are input. Assume the vigilance parameter as 0.3.

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6. (a) Draw the architecture of Hopfield Network and explain the algorithm to train the network weights.
(b) Consider three orthogonal vectors $[1 \ -1 \ 1 \ -1]$, $[-1 \ 1 \ 1 \ -1]$, $[1 \ 1 \ -1 \ -1]$, Find the weight matrix to store all the three orthogonal vectors and test the response of the net for each of the input vectors given.
7. (a) Draw the architecture of Self organizing network. Explain the algorithm to train the network.
(b) What is the significance of Self organizing network in Full counter propagation network. Explain how it can be used in data compression.
8. Write short notes on the following
 - (a) A/D converter using Hopfield network
 - (b) Any two applications of Multilayer perceptron.

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R07**Set No. 4**

IV B.Tech. II Semester Regular Examinations, April, 2011

ARTIFICIAL NEURAL NETWORKS**(Electronics & Communication Engineering)****Time: 3 Hours****Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Define Artificial Neural Network. What are the basic building blocks of an artificial Neural Network?
(b) What are the types of learning? Explain in detail
(c) Discuss various network topologies in Artificial Neural Networks.
2. (a) What do you understand by linear separability? Explain with the help of necessary Mathematical equations.
(b) Using the Hebb rule, find the weights required to perform the following classifications:
vectors $(1 \ 1 \ 1 \ 1)$ and $(-1 \ 1 \ -1 \ -1)$ are members of class (with target value 1);
vectors $(1 \ 1 \ 1 \ -1)$ and $(1 \ -1 \ -1 \ 1)$ are not members of class (with target value -1).
3. (a) Draw the architecture of Radial Basis Function Network, and explain the training algorithm of the network.
(b) Construct a three layered network with two inputs, two hidden units and one output unit. Include a bias unit that projects to units in the hidden and output layers. Train the network, using back propagation to implement XOR Gate truth table.
4. (a) Draw Adaline and Madeline architectures (MRI and MR II). Explain any two algorithms to design the weights.
(b) Form OR function with bipolar input and targets using madaline MR II algorithm.

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5. (a) Explain the Kohonen algorithm to design the weights of self organizing map.
(b) Use Kohonen Self organizing map to cluster the given four vectors (0 1 0 0), (0 0 1 1), (1 1 0 0). Assume own initial weights and learning rate.
6. (a) Explain the Hopfield Network training algorithm to design the weights.
(b) With the help of Energy function of Hopfield network, explain how patterns can be stored and retrieved from Hopfield Network.
(c) What are the problems associated with Hopfield Network? What are remedies suggested?
7. (a) Draw the Bi-directional Associative Memory architecture. Explain how it can be used as Hetero associative memory.
(b) What is importance of vigilance threshold in ART network? Explain ART 1 algorithm
8. Write short notes on the following
 - (a) A/D Converter using Hopfield network
 - (b) Pattern association using Multi-layer Perceptron