

Code No: 07A7EC37

R07**Set No. 2**

IV B.Tech I Semester Examinations, May 2011

ARTIFICIAL NEURAL NETWORKS

Common to Bio-Medical Engineering, Electronics And Instrumentation
Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. Explain the working of Kohonen's self-organizing map and derive its weight update relations. [16]
2. (a) Describe McCulloch-Pitts (MP) neuron model and explain the assumptions involved in this theory. Also design a network using MP neuron to realize the NAND gate.
(b) With suitable diagrams explain the competitive network. [8+8]
3. Draw the sketch of Boltzmann machine and explain the algorithm step-by-step. [6+10]
4. (a) Explain the biological prototype of neuron. Also explain the characteristics of neuron.
(b) List and explain the various activation functions used in modeling of artificial neuron. Also explain their suitability with respect to applications. [8+8]
5. (a) Explain "Global stability of feedback neural network".
(b) Discuss physical significance of energy function used in Hopfield neural network. [8+8]
6. What are the applications of LVQ, SOM and CPN. Explain clearly. [16]
7. Discuss how ART network can be used for
 - (a) image processing
 - (b) Character recognition. [8+8]
8. (a) Given are a set of input training vectors and initial weight vector. The learning constant is assumed to be 0.1. The desired responses for X_1 , X_2 and X_3 are $d_1=-1$, $d_2=-1$ and $d_3=1$ respectively for a bipolar binary case.
 $X_1 = [1, 2, 0, 1]^T$, $X_2 = [0, 1.5, -0.5, -1.0]^T$ and $X_3 = [-1, 1, 0.5, -1]^T$.
 $W^0 = [1, -1, 0, 0.5]^T$.
 Show how the Perceptron learning progresses and evaluate final weight vector.
 (b) State and prove Perceptron convergence theorem. [8+8]

Code No: 07A7EC37

R07

Set No. 4

IV B.Tech I Semester Examinations, May 2011

ARTIFICIAL NEURAL NETWORKS

Common to Bio-Medical Engineering, Electronics And Instrumentation
Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Explain the differences between neuro-computing and conventional computers computing.
(b) List and explain the various activation functions used in ANN. [8+8]
2. Draw the flow chart and explain Hopfield neural network algorithm. Mention its applications. [16]
3. Explain the architectures of popular self-organizing maps. Derive the training algorithm of Kohonen network. Also explain how SOMs can be used for data compression. [16]
4. (a) Discuss the methods, which have been developed to improve generalization of neural network learning.
(b) Explain the following:
(i) Activation function involved in the computation backpropagation
(ii) Rate of learning in backpropagation algorithm.
5. Draw the flow-chart of Learning Vector Quantizer (LVQ) and write step-by-step Algorithm. [16]
6. (a) Explain characteristic and application of ART network.
(b) With a neat architecture, explain the training algorithm used in ART network. [8+8]
7. Discuss how a particular neural network is selected for a particular problem, viz., optimization problem, pattern recognition problem and classification problem. [16]
8. (a) Explain the concept of Hebbian learning principle and its mathematical modeling.
(b) Given are a set of input training vectors and initial weight vector. The learning constant is assumed to be 0.1. The desired responses for X_1 , X_2 and X_3 are $d_1=-1$, $d_2=-1$ and $d_3=1$ respectively for a bipolar binary case. $X_1 = [1, 2, 0, 1]^T$, $X_2 = [0, 1.5, -0.5, -1.0]^T$ and $X_3 = [-1, 1, 0.5, -1]^T$. $W^0 = [1, -1, 0, 0.5]^T$. With Widrow-Hoff learning rule evaluate weight vector after completion of one cycle of training. [8+8]

Code No: 07A7EC37

R07**Set No. 1**

IV B.Tech I Semester Examinations, May 2011

ARTIFICIAL NEURAL NETWORKSCommon to Bio-Medical Engineering, Electronics And Instrumentation
Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Give the brief operation of biological neural network.
(b) Explain how biological neural network is superior over a conventional computer system. [8+8]
2. What is travelling salesman problem? Write step-by-step algorithm for traveling sales man problem using Hopfield neural network. [16]
3. (a) Explain the working of a Perceptron. Write the training algorithm of multi category single layer Perceptron networks.
(b) Explain about supervised and unsupervised training methods of artificial neural networks. [8+8]
4. (a) Differentiate between slow learning and fast learning, how it is achieved in ART Network.
(b) Explain how ART network is designed for both stability and plasticity. [8+8]
5. Explain the Widrow-Hoff learning rule for supervised learning in neural networks with help of an example. Why is it sometimes called the LMS learning rule. [16]
6. (a) Discuss Energy function of discrete Hopfield network.
(b) Discuss the advantages and disadvantages of Hopfield neural network. [8+8]
7. Consider a Kohonen net with two cluster units and three input units. The weight vector for the cluster units are (0.9,0.7,0.6) and (0.4,0.3,0.5). Find the winning cluster for the input vector (0.4,0.2,0.1). Use learning rate of 0.2 . Find new weights for the winning unit. [16]
8. (a) With suitable diagram explain the architecture of the MADALINE and its training algorithm.
(b) Explain the different structures of SOM's. [8+8]

Code No: 07A7EC37

R07**Set No. 3**

IV B.Tech I Semester Examinations, May 2011

ARTIFICIAL NEURAL NETWORKS

Common to Bio-Medical Engineering, Electronics And Instrumentation
Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. Explain about training and retrieval of Hopfield algorithm. [16]
2. (a) What are the assumptions made in McCulloch-Pitts theory? Explain.
(b) What are different types of learning schemes used in training of artificial neural networks?. Explain each of them clearly. [6+10]
3. With a neat sketch explain and discuss full counter propagation algorithm. [16]
4. (a) Explain the architecture and training method of self-organizing map network.
(b) Explain the Grossberg layer training algorithm. [8+8]
5. Describe the Boltzmann machine. Explain how a Boltzmann machine used in constrained optimization problem. [6+10]
6. (a) Explain how pattern mode and batch mode of training affect the result of backpropagation learning.
(b) What is the significance of momentum term in the backpropagation learning
(c) Explain the refinements of the backpropagation learning and also the interpretation of the result of the learning [5+5+6]
7. (a) Explain with suitable examples, why neural networks can handle massive amount of input/output data more efficiently than conventional computers.
(b) Compare the conventional computers with the parallel-distributed processing hardware. [8+8]
8. Explain how a feedforward network can be used for character recognition. Use a sample of 7×10 pixel matrix for the recognition of letter "B". [16]
