Code: 9A10805

R09

B.Tech IV Year II Semester (R09) Advanced Supplementary Examinations August 2014

ARTIFICIAL NEURAL NETWORKS

(Common to E.Con.E and EIE)

Time: 3 hours Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 (a) Compare biological networks and artificial neural networks.
(b) What is meant by activation function? Discuss in detail about various activation functions of ANN.

2 (a) Explain the basic architecture and response of McCulloch-Pitts neuron model.
(b) Realize NAND and NOR functions using McCulloch-Pitts neuron model.

3 (a) What are the merits and demerits of back propagation algorithm? Discuss.
(b) Explain in detail various applications of back propagation algorithm.

4 Develop an ADALINE network for OR function with bipolar inputs and bipolar targets.

5 Discuss in detail the concepts of:
(a) Kohonen self organizing network.
(b) Grossberg layer network.

6 What is meant by energy function? Discuss in detail about discrete Hopfield network energy function.

7 Explain in detail about the basic architecture and algorithm of ART1.

8 What is the use of ANN in image processing? Explain.

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Code: 9A10805

R09

B.Tech IV Year II Semester (R09) Advanced Supplementary Examinations June/July 2016

ARTIFICIAL NEURAL NETWORKS

(Common to E.Con.E & EIE)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 (a) What are artificial neural networks? What are their characteristics?
(b) Explain about the important architectures of neural network.
(c) Compare and contrast the biological neuron and artificial neuron.

2 (a) Describe perceptron learning rule and delta learning rule.
(b) How is "Winner takes all" process executed by competitive learning?

3 (a) State and explain the Ex-OR problem. Also explain how to overcome it.
(b) Give the architecture and explain back propagation training algorithm. Derive the expressions for weight modification.
(c) Explain the significance of learning rate and momentum term in back propagation algorithm.

4 (a) Explain minimum disturbance principle.
(b) Explain ADALINE and MADALINE. List some applications.
(c) Draw the ADALINE implementation for AND and OR functions.

5 (a) Draw the architecture and explain the training algorithm of Full counter propagation networks.
(b) Write short notes on learning vector quantization.

6 (a) What is gradient type Hopfield network? Differentiate between discrete time Hopfield network and gradient type Hopfield network.
(b) What are the limitations of Hopfield network? Suggest methods to overcome these limitations.

7 (a) 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)

(b) What is adaptive resonance theory? Explain stability plasticity dilemma in neural networks.
(c) Write short note on Boltzmann machines.

8 (a) Explain how a neural network can be trained for a pattern recognition task.
(b) Describe how Hopfield network can be used as analog to digital converter.

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Code: 9A10805 **R09**

B.Tech IV Year II Semester (R09) Regular & Supplementary Examinations April 2015

ARTIFICIAL NEURAL NETWORKS

(Common to E.Con.E & EIE)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks

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1 (a) Discuss in detail about various ANN architectures.
(b) How can you set the weights for an ANN? Explain.

2 Define 'Learning'. Explain in detail about perception and delta learning rules.

3 Obtain output equations and weight update equations for a multilayer feed forward neural network using Back propagation algorithm.

4 Form a MADALINE network for XOR function with bipolar input and targets using MRI algorithm.

5 Explain in detail the basic architecture and training algorithm of forward only counter propagation network.

6 Explain in detail the storage and retrieval algorithms of Hopfield networks.

7 (a) Explain in detail the application algorithm of Boltzmann machine.
(b) Write short notes on:
(i) Input processing. (ii) Cluster units. (iii) Reset mechanism.

8 How ANN is useful in Pattern recognition process? Explain.

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R09

Code: 9A10805

B.Tech IV Year II Semester (R09) Regular & Supplementary Examinations May/June 2014

ARTIFICIAL NEURAL NETWORKS

(Common to E.Con.E & EIE)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 (a) With neat sketch explain the organization and functionality of biological neuron.
(b) What are the basic differences between human brain and computer? Explain.

2 What is meant by 'unsupervised learning'? Explain in detail about various unsupervised learning strategies.

3 (a) Discuss in detail about the basic architecture and algorithm of single layer perceptron.
(b) State and prove perceptron convergence theorem.

4 Explain in detail the basic architecture and MRII algorithm of MADALINE model.

5 Explain in detail the basic architecture and training phases of full counter propagation network.

6 With neat diagram explain the basic architecture of discrete Hopfield network and also explain its training algorithm.

7 (a) State and prove BAM stability theorem.
(b) With neat diagram explain the architecture of Boltzmann machine.

8 What is meant by travelling salesman problem? How Hopfield network is useful to solve it?

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Code: 13A02605 **R13**

B.Tech IV Year I Semester (R13) Supplementary Examinations June 2017

NEURAL NETWORK & FUZZY LOGIC

(Electronics & Communication Engineering)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

(a) What are the advantages of neural networks over conventional computers?
(b) Distinguish between Mccullochpitts, perceptron and ADALINE neural models.
(c) Distinguish between supervised and unsupervised learning, linear separability & non-separability.
(d) What is a spatio temporal pattern?
(e) Distinguish between a feed forward network and a recurrent network.
(f) List the applications of neural networks.
(g) Compare and contrast operations of classical set theory and fuzzy set theory.
(h) Show that a multilayer network with linear discriminate function is equivalent to single layer network.
(i) Define fuzzification.
(j) Explain Fuzzy Logic.

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2 (a) Draw the structure of biological neuron and explain its function in detail.
(b) Explain about Correlation Learning and winner takes all learning with examples.

OR

3 (a) Explain about neuron modeling for artificial neuron systems and common activation functions in detail.
(b) What is neural learning? Explain in detail about delta learning rule.

UNIT – II

4 (a) What is Ex-OR problem? How is it solved?
(b) What is Hopfield model? Describe energy function for Hopfield network and explain how it can be minimized.

OR

5 (a) Draw the architecture of multilayer perceptron and explain the training algorithm along with expressions.
(b) Differentiate between local minima and global minima? What is the significance of momentum term in back propagation learning?

UNIT – III

6 (a) Explain in detail recurrent associative memory.
(b) Construct a BAM with 4 nodes in the first layer and 2 nodes in the second layer and symmetric weights. Establish the following three associations.
(+1, +1, -1, -1) -> (+1, +1)
(+1, +1, +1, +1) -> (+1, -1)
(-1, -1, +1, +1) -> (-1, +1)

OR

7 (a) Explain about Bidirectional Associate Memory (BAM) and its mathematical model.
(b) Explain about improved coding of memories.

Contd. in page 2

UNIT – IV

8 (a) Explain relations between fuzzy and crisp sets and also its conversion.

(b) Consider two fuzzy subsets of the set X, X = {a, b, c, d, e} referred to as A and B.

A = {1/a, 0.3/b, 0.2/c 0.8/d, 0/e) and B = {0.6/a, 0.9/b, 0.1/c, 0.3/d, 0.2/e}

Find: (i) Support. (ii) Core. (iii) Cardinality. (iv) Complement. (v) Union. (vi) Intersection. (vii) a-cut for each set where a = 0.5 and a = 0.3

OR

9 (a) Explain the basic concept of fuzzy sets and properties of fuzzy sets.

(b) Explain about classical set theory and its operation with properties in detail.

UNIT – V

10 (a) For the given fuzzy set:

$$\tilde{A} = \left\{\frac{1}{1.0} + \frac{0.65}{1.5} + \frac{0.4}{2.0} + \frac{0.35}{2.5} + \frac{0}{3.0}\right\},$$

$$\tilde{B} = \left\{\frac{0}{1.0} + \frac{0.25}{1.5} + \frac{0.6}{2.0} + \frac{0.25}{2.5} + \frac{1}{3.0}\right\}$$

$$\tilde{C} = \left\{\frac{0.5}{1.0} + \frac{0.25}{1.5} + \frac{0}{2.0} + \frac{0.25}{2.5} + \frac{0.5}{3.0}\right\}$$

Solve the following: (i) $\tilde{A} \cap \tilde{B}$. (ii) $\tilde{A} \cup \tilde{B}$. (iii) $\tilde{A}^c$. (iv) $\tilde{B}^c$. (iv) $\tilde{A}^c \cup \tilde{B}^c$.

(b) Explain in detail about fuzzy membership functions and features.

OR

11 (a) Explain the processes of fuzzification and defuzzification in detail.

(b) Two fuzzy sets A and B both defined on X are as follows:

$\mu(X_i)$	x_1	x_2	x_3	x_4	x_5	x_6
$\tilde{A}$	0.1	0.7	0.8	1.0	0.9	0.1
$\tilde{B}$	1.0	0.9	0.5	0.2	0.1	0

Express the following cut set using Zadeh notation:

(i) $(\tilde{A})_{0.7}$ (ii) $(\tilde{B})_{0.5}$ (iii) $(\tilde{A} \cup \tilde{B})_{0.8}$ (iv) $(\tilde{A} \cap \tilde{B})_{0.9}$

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Code: 13A04607 **R13**

B.Tech III Year II Semester (R13) Regular & Supplementary Examinations May/June 2017

ARTIFICIAL NEURAL NETWORKS & FUZZY SYSTEMS

(Electronics & Communication Engineering)

Time: 3 hours Max. Marks: 70

PART - A

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

(a) List the applications of neural network.
(b) State the properties of classical set.
(c) Define fuzzy Cartesian product.
(d) Write four advantages of GA.
(e) Name the different types of defuzzification techniques.
(f) State core, support and boundary in membership function.
(g) Define membership function.
(h) What is supervised and unsupervised learning?
(i) Define Lambda – cuts for fuzzy set.
(j) Define power set.

PART - B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT - I

2 Explain the properties of commutativity, associativity, distributivity, idempotence and identity with respect to crisp sets.

OR

3 (a) Write in detail about error-detection learning.
(b) Write in detail about memory brief learning.

UNIT - II

4 What are the characteristics of feed forward neural networks? What is the significance of number of neurons in i/p & o/p layers?

OR

5 Explain the following terms: (a) Resting potential. (b) Nernst equation. (c) Action potential.

UNIT - III

6 Write short notes on: (a) Error correction learning. (b) Reinforcement learning.

OR

7 Give three sets A, B and C. Prove Demorgan's law using Venn diagrams.

UNIT - IV

8 Define recurrent network, give some examples and explain them.

OR

9 Draw the flow chart of producing solution of optimization problems using feed forward.

UNIT - V

10 Describe the design of fuzzy logic control with an air conditioner controller as an example.

OR

11 Write short notes on the following: (a) Adaptive fuzzy systems. (b) Fuzzy neural networks.

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