Code No: N0221

R07

Set No. 1

IV B.Tech. I Semester Regular Examinations, November, 2012
NEURAL NETWORKS AND FUZZY LOGIC
(Electrical & Electronics Engineering And Aeronautical Engineering)

Time: 3 Hours   **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks
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1. a) Describe in detail about integrate and Five neuron model.
   b) Give the brief operation of biological neural network.   [8+8]

2. a) Clearly discuss different architectures of artificial neural networks?
   b) Describe the activation dynamics of neural network?   [8+8]

3. a) State and prove the perceptron convergence theorem?
   b) Compare the similarities and differences between single layer and multi layer perceptrons?   [8+8]

4. Discuss briefly the generalized delta rule. Derive the weight update relations?   [16]

5. a) Write about the BAM energy function.
   b) State and Proof the BAM stability theorem.   [8+8]

6. a) Write the classical sets properties, operations and relations?
   b) The task is to recognize English alphabetical characters (F,E,X,Y,I,T) in an image processing system. Define two fuzzy sets $\tilde{I}$ and $\tilde{F}$ to represent the identification of character I and F
      i. $\tilde{I}$={(F,0.4),(E,0.3),(X,0.1), (Y,0.1), (I,0.9), (T,0.8)}
      ii. $\tilde{F}$={(F,0.99),(E,0.8),(X,0.1),(Y,0.2),(I,0.5),(T,0.5)}
   Find the following
   a) $\tilde{I}U\tilde{F}$ b) $(\tilde{I} - \tilde{F})$ c) Verify the De Morgan's Law, $(\tilde{I}U\tilde{F})^c = \tilde{I}^c \cap \tilde{F}^c$
                                                                               [8+8]

7. a) List the main components of fuzzy logic controller. Explain each of them in detail.
   b) Explain the defuzzification methods.   [10+6]

8. Explain how can you diagnosis the fault in power system by using fuzzy logic control?
                                                                               [16]

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Set No. 2

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Time: 3 Hours   **Max Marks: 80**

Answer any FIVE Questions
****

1. a) What are the three models of artificial neuron. Explain them in detail.
    b) Compare and contrast artificial neural networks with conventional computer system.

    [8+8]

2. a) Give the brief operation of Artificial Neuron?
    b) Discuss briefly the synaptic dynamics of neural networks?   [8+8]

3. a) Write about the limitations of the perceptron model and its applications?
    b) Justify clearly that single layer continuous perceptron networks are linearly separable?

    [8+8]

4. a) Describe the learning difficulties and improvements of Back propagation?
    b) Explain about the credit assignment problem?   [8+8]

5. a) Describe in detail about Associative matrix, matrix memories and content Addressable memory.
    b) Explain the architecture of bidirectional associative memory.   [8+8]

6. a) Write about the crisp and fuzzy relations?
    b) $X=\{x_1,x_2,x_3\}$ $Y=\{y_1,y_2\}$ $Z=\{z_1,z_2,z_3\}$ Let $\tilde{R}$ be a fuzzy relation

    $$\begin{bmatrix} 0.5 & 0.1 \\ 0.2 & 0.9 \\ 0.8 & 0.6 \end{bmatrix}$$

    $\tilde{S}$ be a fuzzy relation $\begin{bmatrix} 0.6 & 0.4 & 0.7 \\ 0.5 & 0.8 & 0.9 \end{bmatrix}$ Find the max min composition RoS?   [8+8]

7. Write a short note on the following
    a) Defuzzification to crisp sets
    b) Membership value assignment   [8+8]

8. Define the problem of process identification. What are the possible neural network configurations for plant identification? Explain each of them.   [16]

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Set No. 3

IV B.Tech. I Semester Regular Examinations, November, 2012
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Time: 3 Hours   **Max Marks: 80**

Answer any FIVE Questions
****

1. a) List out the characteristics of artificial neural network?
    b) Discuss the historical development of artificial neural network?   [8+8]

2. a) Explain the types of neuron activation function?
    b) Describe clearly with a neat sketch of Learning Strategy?   [8+8]

3.   Describe the multi category single layer perceptron networks and its algorithm?   [16]

4. a) Write the summary of back propagation algorithm?
    b) State and prove the Kolmogorov Theorem?   [8+8]

5.   a) Explain the Hopfield network algorithm and its limitations.
     b) Explain the Energy analysis of discrete Hopfield Network.   [8+8]

6.   Let X = {1, 2, 3, . . . , 10}. Determine the cardinalities and relative cardinalities of the
     following fuzzy sets.
     a) $\tilde{A}$ = {(3, 10), (4, 0.2), (5, 0.3), (6, 0.4), (7, 0.6), (8, 0.8), (10, 1), (12, 0.8), (14, 0.6)}
     b) $\tilde{B}$ = {(2, 0.4), (3, 0.6), (4, 0.8), (5, 1.0), (6, 0.8), (7, 0.6), (8, 0.4)}
     c) $\tilde{C}$ = {(2, 0.4), (4, 0.8), (5, 1.0), (7, 0.6)}   [16]

7. Write short notes on the following
    a) Development of rule base in fuzzy logic control system.
    b) Decision making logic in fuzzy logic control system.   [8+8]

8. a) Explain clearly applications of neural network in load forecasting?
    b) Briefly discuss about applications of fuzzy logic in classification.   [8+8]

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IV B.Tech. I Semester Regular Examinations, November, 2012
NEURAL NETWORKS AND FUZZY LOGIC
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Time: 3 Hours   **Max Marks: 80**

Answer any FIVE Questions
****

1. a) State the potential applications of ANN?
   b) Describe the McCulloch-Pitts Model of ANN?   [8+8]

2. a) Explain about the classification taxonomy of artificial neural network?
   b) Write about the Learning Rules of artificial neural network?   [8+8]

3. Explain the training and classification using discrete perceptron algorithm?   [16]

4. a) Draw the Block diagram of error back propagation training, Explain?
   b) Explain the back propagation algorithm and derive the expressions for weight
   update relations?   [6+10]

5. What are the modes of operation of a Hopfield network?. Explain the algorithm for
   storage of information in a Hopfield network. Similarly explain the recall algorithm.
        [16]

6. a) Write the fuzzy sets properties, operations and relations?
   b) Determine the intersections and unions of the following fuzzy sets:
   i. $\tilde{A} = \{(3, 10, (4, 0.2), (5, 0.3), (6, 0.4), (7, 0.6), (8, 0.8), (10, 1), (12, 0.8), (14, 0.6)\}$.
   ii. $\tilde{B} = \{(2, 0.4), (3, 0.6), (4, 0.8), (5, 1.0), (6, 0.8), (7, 0.6), (8, 0.4)\}$
   iii. $\tilde{C} = \{(2, 0.4), (4, 0.8), (5, 1.0), (7, 0.6)\}$ [6+10]

7. a) Explain about membership assegnment.
   b) Describe in detail about fizzy logic system components   [8+8]

8. Explain clearly applications of fuzzy logic control in load forecasting?   [16]