(52)

B.E. DEGREE END SEMESTER EXAMINATIONS, APR/MAY 2011
COLLEGE OF ENGINEERING, GUINDY.
ELECTRICAL AND ELECTRONICS ENGINEERING BRANCH
VIII SEMESTER

EE 519- NEURAL NETWORK AND FUZZY LOGIC CONTROL

Time : 3 hr Max . Mark: 100

Answer All Questions

Part – A (10 x 2 = 20 Mark)

1. Define bias and threshold in context of ANN.
2. State the Delta learning rule and why it called as Least Mean Squares rule.
3. How perseptron net is is used in the aspect of linear separability.
4. Compare supervised and unsupervised training.
5. What are the operations that can be performed by a fuzzy set?
6. Consider two fuzzy sets one representing a scooter and other van

$$\text{Scooter} = \left\{ \frac{0.6}{\text{van}} + \frac{0.3}{\text{motor cycle}} + \frac{0.8}{\text{boat}} + \frac{0.9}{\text{scooter}} + \frac{0.1}{\text{house}} \right\},$$

$$\text{Van} = \left\{ \frac{1}{\text{van}} + \frac{0.2}{\text{motor cycle}} + \frac{0.5}{\text{boat}} + \frac{0.3}{\text{scooter}} + \frac{0.2}{\text{house}} \right\}$$

Find the following

a) $\text{Scooter} \cup \text{Van}$ b) $\text{Scooter} \cap \overline{\text{Scooter}}$

c) $\overline{\text{Scooter} \cup \text{Scooter}}$ d) $\overline{\text{Scooter} \cap \text{Van}}$

7. List the various shapes available for membership functions in fuzzy logic control tool box.
8. State the conditions for fuzzy equivalence relations.
9. Draw a block diagram representation of a Fuzzy Logic Control.
10. Draw rule table for a car where the input variables are vehicle speed and load torque and the output variable is throttle action. Assume seven fuzzy labels for each variable.

PART B – (5 x 16 = marks)

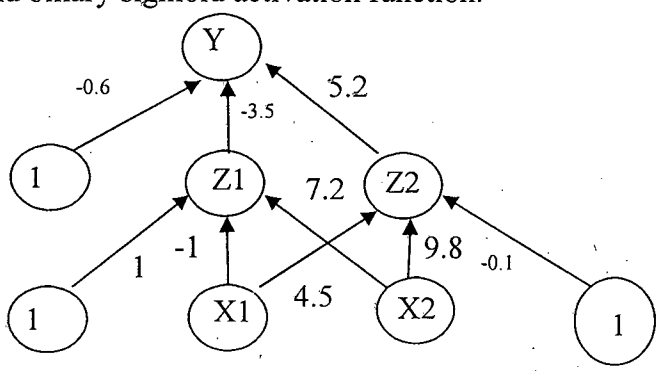
11. Explain in detail any one application of FLC with suitable sketches. (16)

12. (a) Generate AND function with bipolar inputs and targets with the help of Madaline algorithm. Learning rate α=0.5.

$W_{11} = W_{12} = 0.1$, $W_{21} = W_{22} = 0.2$, $b_1 = b_2 = 0.3$, $V_1 = V_2 = b_3 = 0.5$ (4*4)

Or

(b) Use BPN and find the new weights given the input pattern (1,0) and target is 0.5. Use $\alpha = 0.35$ and binary sigmoid activation function.



(16)

13. (a) Draw a flow chart for a simple Genetic Algorithm and explain. (8)
Explain any 3 crossover techniques with an example. (8)

Or

(b) (i) State the algorithm of Hebb net with its architecture. (8)
(ii)Draw the architecture of Adaline net and explain the algorithm (8)

14. (a) $I = \{0.4, 0.7, 1, 0.8, 0.6\}$
$V = \{0.2, 0.8, 1, 0.9, 0.7\}$
$C = \{0.4, 1, 0.5\}$

Find P, using Fuzzy Cartesian Product P = V * I and T = I*C. Using Max-Min and Max-product composition find E = P*T (8+8)

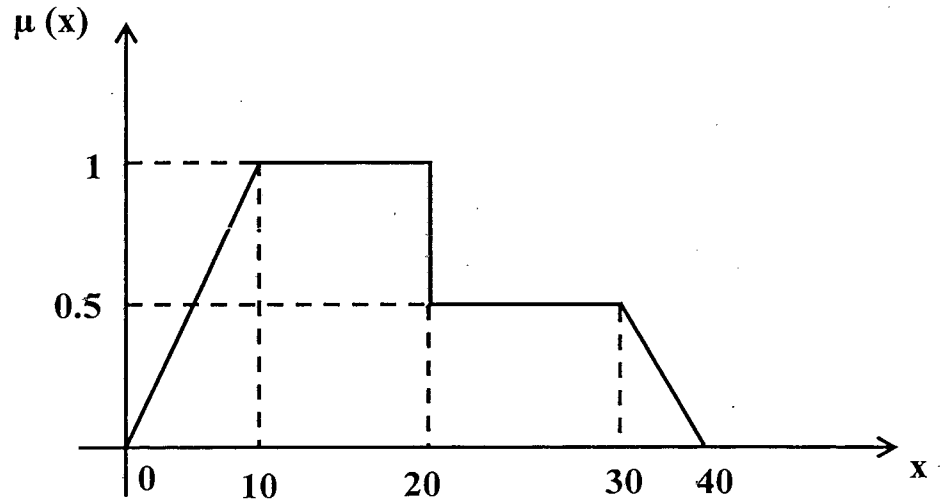
Or

b) Use Cosine amplitude method and Max-min method to find the tolerance relation. (8+8)

$$\begin{bmatrix} 0.3 & 0.4 & 0.2 & 0.1 & 0.7 \\ 0.6 & 0.6 & 0.4 & 0.6 & 0.2 \\ 0.1 & 0.0 & 0.4 & 0.3 & 0.1 \end{bmatrix}$$

15 (a) (i) Discuss in detail about various defuzzification methods. (6)

(ii) Use COG to find the crisp value. (10)



Or

b) (i) Write short notes on knowledge base and decision making logic (8)

(ii) Define the fuzzy set height, weight and age of students in your class. For fuzzy set height choose linguistic variables short, medium and tall. For fuzzy set weight of students choose linguistic variables light, average and heavy. For fuzzy set age choose linguistic variables young, and adult. Apply these to yourself to find

(i) you are young, medium height and average weight.

(ii) you are not short height or heavy weight or not old

(iii) you are very light weight and not tall. (8)

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