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Question Paper Code: 52972

M.E. DEGREE EXAMINATION, DECEMBER 2015

Elective

VLSI Design

15PVL526 – FUZZY LOGIC AND NEURAL NETWORKS

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

(5 x 20 = 100 Marks)

1. (a) (i) Compare fuzzy set theory with probability theory. (8)
(ii) Explain the properties of fuzzy sets with examples. (12)

Or

- (b) Give a detailed account of approximate reasoning in fuzzy logic. (20)
2. (a) Explain in detail about the fuzzy rule base. (20)

Or

- (b) What are the various methods employed for Defuzzification? Compare and evaluate the methods. (20)
3. (a) What are the various types of FKBC? Explain any one method in detail. (20)

Or

- (b) Explain the design and performance evaluation of adaptive fuzzy control. (20)
4. (a) (i) Sketch and explain the structure of a biological neuron. (8)
(ii) Explain the concepts of supervised and unsupervised learning in neural networks. (12)

Or

- (b) Using perception rule, with bipolar binary activation function of a simple network with initial weights vector $w' = [1 \ 0 \ -2 \ 0.5]$, learning constant $c=0.1$, the teachers desired response for X_1, X_2, X_3 are $d_1= 1, d_2= -1, d_3= 1$.

$$X_1 = \begin{bmatrix} 1 \\ 1 \\ 0.5 \\ 0 \end{bmatrix} \quad X_2 = \begin{bmatrix} 0 \\ -2 \\ 0 \\ -1 \end{bmatrix} \quad X_3 = \begin{bmatrix} 1 \\ 1.5 \\ 0 \\ -2 \end{bmatrix}$$

Define how learning progresses. Define the learning using delta rule if the neuron's output is bipolar continuous activation function. (20)

5. (a) (i) Draw the McCulloch Pitts model of a neuron and explain how it is used to perform the NOR, OR and XOR functions. (12)
- (ii) Differentiate between ADALINE and MADALINE learning algorithms. (8)

Or

- (b) (i) Determine the weights of a single layer perceptron for the AND function. Consider the inputs and targets to be bipolar and $\alpha=1$. (10)
- (ii) Describe the MADALINE network to perform the NOR function. (10)
