

Exam.Code:0924
Sub. Code: 6857

1058

B.E. (Information Technology)
Sixth Semester
Departmental Elective Course - I
ITE-643/648: Neural Network and Fuzzy Logic

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Section.

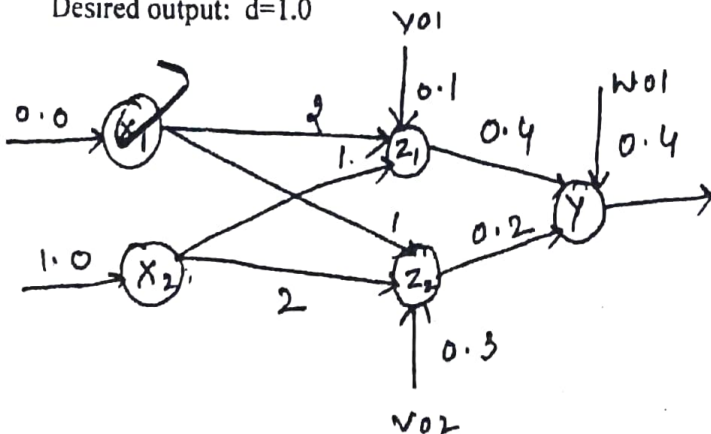
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- Q 1 a) Distinguish between supervised and unsupervised learning. (2*5=10)
- b) Define fuzzy propositions.
- c) Explain with suitable example linearly separable pattern classification.
- d) What is Fuzzification?
- e) Justify the statement: "Partial membership is allowed in fuzzy sets."

SECTION-A

- Q2) What is self organizing feature map? Draw and explain the architecture of Kohonen self organizing feature map. (10)
- Q 3) Apply back propagation algorithm to find the final weights for the following net. (10)

Desired output: $d=1.0$



Q 4 a) Explain the following terms with respect to membership functions: (5)

- (i) The Core
- (ii) The support
- (iii) Crossover Point
- (iv) Convex Fuzzy Set
- (v) Height of a fuzzy Set

b) Differentiate between Mamdani and Sugeno fuzzy inference system with suitable explanation. (5)

SECTION-B

Q5 a) Let A and B be two fuzzy numbers whose membership functions are given by

$$A(x) = \begin{cases} (x+2)/2 & \text{for } -2 < x \leq 0 \\ (2-x)/2 & \text{for } 0 < x < 2 \\ 0 & \text{otherwise,} \end{cases}$$

$$B(x) = \begin{cases} (x-2)/2 & \text{for } 2 < x \leq 4 \\ (6-x)/2 & \text{for } 0 < x \leq 6 \\ 0 & \text{otherwise.} \end{cases}$$

Calculate the fuzzy numbers MIN (A, B) and MAX (A, B). (5)

b) Using your own intuition, develop fuzzy membership functions on the real line for the fuzzy number "approximately 2 or approximately 8" using the following function shapes: (5)

- (i) Symmetric triangles
- (ii) Gaussian functions

Q6 a) What are different linguistic hedges and how the linguistic hedges have the effect of modifying the membership function basic atomic term? (5)

b) What is non-specificity of a fuzzy set and why we need it in fuzzy set theory? (5)

Q7) Discuss the architectures of various neuro-fuzzy hybrid systems in detail. (10)