

(Following Paper ID and Roll No. to be filled in your Answer Book)

Paper ID : 120753

Roll No.

B.Tech.

(SEM. VII) THEORY EXAM. 2015-16

NEURAL NETWORKS AND FUZZY SYSTEM

[Time:3 hours]

[Maximum Marks:100]

Section-A

uptuonline.com

1. Attempt all parts. All parts carry equal marks. Write answer of each part in short. (2x10=20)
 - (a). What do you mean by artificial neural network? Give major applications.
 - (b). What is the significance of recurrent networks?
 - (c). Draw the model of a artificial neuron.
 - (d). Discuss the role of activation functions in neural networks?
 - (e). What is the delta rule of learning the neural networks?
 - (f). Explain the fuzzy composition with example.

- (g) Let A and B are two fuzzy sets given by $A=\{(x_1,0.2), (x_2,0.8), (x_3,0.5)\}$ and $B=\{(x_1,0), (x_2,0.6), (x_3,1)\}$. Find the value of $(A-B)$.
- (h) Explain the terms fuzzifications and defuzzification.
- (i) Draw fuzzy membership function to describe cold, warm and hot water.
- (j) List applications of fuzzy neural networks.

SECTION-B

Attempt any five questions from this section. (10x5=50)

2. Write the characteristics of Neural Networks. Explain single layer and multilayer feed forward networks.
3. What are associative memories and where they are used?

A hetero-associative network is given as:

$$X1=[1,1,0,0] \quad y1=[1,0]$$

$$X2=[0,1,0,0] \quad y2=[1,0]$$

$$X3=[0,0,1,1] \quad y3=[0,1]$$

$$X4=[0,0,1,1] \quad y4=[0,1]$$

Find the correlation matrix.

4. Explain the selection criterion of various parameters in BPN.

5. a) Explain the single layer perceptron networks and discuss its characteristics.

b) Explain MADALINE networks to solve XOR problem.

6. What do you mean by Fuzzy relations? Explain with example. The speed of a motor and voltage applied to it is given by following fuzzy sets:

$$S = \{0.6/0 + 0.3/1 + 1/2 + 0.75/3\}$$

$$V = \{1/0 + 0.75/1 + 0.5/2 + 0.25/3 + 0/5 + 0.2/6\}$$

Find the Cartesian product relation R between S & V.

7. Compare between crisp and fuzzy sets.

if X and Y two fuzzy sets are defined as:

$$X = \{(0.3/a), (0.5/b), (0.8/c), (0.8/d), (0.9/e), (1/f)\}$$

$$Y = \{(0.9/a), (0.6/b), (0.8/c), (0.5/d), (0.2/e), (0.1/f)\},$$

find the following (i) $X \cup Y$ (ii) $X \cup Y^c$

8. What are fuzzy membership functions? Explain different types of membership functions used in fuzzy systems.

9. What are Fuzzy BP networks. Explain learning of fuzzy back propagation networks

SECTION-C

Attempt any two questions from this section : (15x2=30)

10. What are fuzzy implication relations?

Let sets of values of variables X and Y be $X = \{x_1, x_2, x_3\}$ and $Y = \{y_1, y_2\}$, respectively. Assume a proposition "IF X is A THEN Y is B" is given, where $A = \{0.5/x_1 + 1/x_2 + 0.6/x_3\}$ and $B = \{1/y_1 + 0.4/y_2\}$. Then given a fact expressed by proposition "X is A'" where $A' = \{0.6/x_1 + 0.9/x_2 + 0.7/x_3\}$ use the generalized modus ponens to derive the conclusion "Y is B".

11. Explain the architecture of a back propagation network. What is the activation function used for back propagation network. Explain the calculations at each layer of a back propagation network.

12. Write short note on following:

i) Fuzzy Controller and its applications.

ii) Fuzzy Neuron.

—x—

uptuonline.com