

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

PAPER ID :

Roll No.

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B.TECH.

Theory Examination (Semester-VI) 2015-16

NEURAL NETWORK & FUZZY SYSTEM

Time : 3 Hours

Max. Marks : 100

SECTION-A

Q.1 Attempt all parts. Write answer of each part in short. (2 x 10=20)

- How the artificial neural network is related with biological network?
- What are the various learning methods?
- List the advantages of back propagation algorithm.
- Define recurrent networks.
- Define Crisp sets.
- What are fuzzy relations?
- What do you mean by Fuzzification?
- State how elements of a fuzzy set are mapped to a universe of membership values?
- What are the assumptions made in the design of fuzzy system?
- List-out the advantages of Neuro-Fuzzy networks.

SECTION-B

Q.2 Attempt any 5 questions from this section.

(10 x 5=50)

- Elaborate the statement "Perceptron cannot handle tasks which are not linearly separable" with the help of suitable example.
 - Distinguish between the feed forward and feedback neural networks. What are the significance of number of neurons in the input and output layers of feed forward network?
 - Write the algorithm for back propagation training and explain about the updation of weight.
- Q.5 Approximate the given function shown in figure 1 using a single input single output one hidden layer two hidden unit network. The output unit is a linear one. A nonlinear activation function shown in figure 2 is used for hidden units. Draw the network and find all the weights.

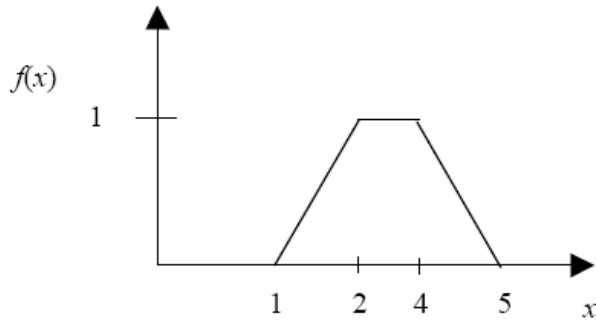


Figure 1

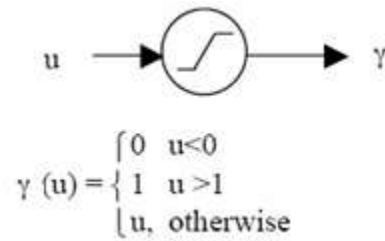


Figure 2

d. Explain optimization of membership function using neural network.

e. Use max-mm composition and max-product composition to find the relation $R(X,Z)$ given.

$$R(X,Y) = \begin{bmatrix} 0.6 & 0.4 & 1 \\ 0 & 0 & 1 \\ 0.4 & 0 & 0.9 \end{bmatrix} \quad R(Y,Z) = \begin{bmatrix} 0.8 & 0.5 \\ 0 & 1 \\ 0 & 0.8 \end{bmatrix}$$

f. Explain how the fuzzy inference is helpful in performing nonlinear mapping between the input vectors and crisp outputs.

g. Discuss about LR type fuzzy numbers, also explain how it is useful for fuzzy back propagation learning.

SECTION-C

Note: Attempt any 2 questions from this section.

(15 x 2=30)

Q.3 (a) What is the need of an activation in an ANN? Discuss on the activation functions used in ANN.

(b) Discuss Winner-Take-All learning rule.

Q.4 Discuss the different methods of defuzzification with an example.

Q.5 Discuss the application of Fuzzy logic control for Image Processing.