



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

PAPER ID :199431

Roll No.

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B. Tech.

(SEM. IV) THEORY EXAMINATION 2014-15
INTRODUCTION TO SOFT COMPUTING (NEURAL NETWORK,
FUZZY LOGIC & GENETIC ALGORITHM)

Time : 3 Hours]

[Total Marks : 100

- 1 Attempt Five Questions. 5x4=20
- 1 Define fuzzification and defuzzification with example.
 - 2 What is ADALINE?
 - 3 What are the Three technology involved in Artificial Intelligence?
 - 4 What are the fundamental building blocks of the biological neural network? Discuss.
 - 5 Define fuzzy if then rules with suitable examples.
 - 6 What is reinforcement learning? Discuss basic difference between learning factors or classifications.

2 Attempt any four. 4x5=20

- 1 Define structure of human brain with the help of neuron structure.
- 2 What are the characteristics of Neural Network?
- 3 How linear separable task is defined for two dimensional spaces and Discuss XOR problem?
- 4 Write note on:-
Partition and covering.
- 5 Verify De Morgan's Law using truth table (For 3 states).
- 6 Discuss the basic fuzzy set operations.

3 Attempt any Two. 10x2=20

- (i) Consider the fuzzy sets A and B defined on the interval $X = [0,5]$ of real numbers by the membership grade functions

$$\mu_A(x) = \frac{x}{x+1}, \mu_B(x) = 2^{-x}$$

Determine the mathematical formulae and graphs of the membership grade functions of each of the following sets

- (a) A^c, B^c
- (b) $A \cup B$
- (c) $A \cap B$
- (d) $(A \cup B)^c$

- (ii) The task is to recognize English alphabetical characters (F, E, X, Y, I, T) in an image processing system.

Define two Fuzzy Sets I and F to represent the identification of characters I and F.

$$I = \{(F,0.4), (E,0.3), (X,0.1), (Y,0.1), (I,0.9), (T,0.8)\}$$

$$F = \{(F,0.99), (E,0.8), (X,0.1), (Y,0.2), (I,0.5), (T,0.5)\}$$

Find the following:

- A) (I) $I \cup F$ (II) $I - F$ (III) $F \cup F^c$
B) Verify De Morgan's Law
 $(I \cup F)^c = I^c \cap F^c$

(iii) Given

- (i) $C \vee D$
(ii) $\sim H \Rightarrow (A \wedge \sim B)$
(iii) $(C \vee d) \Rightarrow \sim H$
(iv) $(A \wedge \sim B) \Rightarrow (R \vee S)$

Can $(R \vee S)$ be inferred from inference rules?

4 Attempt any Two.

10x2=20

- 1 Derive an activation function for thresholding function.
- 2 Give Artificial Neural Network Architecture?
What is Rosenblatt's perceptron model?

- 3 (a) Explain different methods of selection in genetic algorithm in order to select a population for next generation.
- (b) Give the detail of genetic representation (Encoding)

5 Attempt any Two. 10x2=20

- 1 Discuss the different applications of Genetic algorithms.
 - 2 (a) Draw Flow chart and genetics cycle for Genetic Algorithm.
 - (b) Define the basic concept of genetic algorithm.
 - 3 (a) Discuss different genetic operators.
 - (b) Explain Back propagation learning algorithm in detail.
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