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NOE041

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

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Roll No. | | | | | | | | | | |

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) $A\ B$

(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 algorithems.

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.