Printed Pages : 3

NOE-031

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

PAPER ID : 199323

Roll No. ☐☐☐☐☐☐☐☐☐☐

# B. Tech.

(SEM. III) (ODD SEM.) THEORY
EXAMINATION, 2014-15

**INTRODUCTION TO SOFTCOMPUTING**

Time : 3 Hours]                           [Total Marks : 100

1   Attempt any FOUR parts :                    4×5=20

   (a)   Define softcomputing. What are the different learning paradigms ?

   (b)   What is an activation function ? Explain its characteristics in neural network.

   (c)   Discuss in detail operations and properties of fuzzy sets.

   (d)   What are the operators involved in a simple genetic algorithm ? Explain each with example.

   (e)   What is neural network architecture ? Explain logistic sigmoid function with example.

2   Attempt any FOUR parts of the following :     4×5=20

   (a)   What is the classification of training ? Explain supervised training.

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   (b)   What are the different attributes of predicate logic ? Using inference in predicate logic and prove following statement :
   (i)   All man are mortal.
   (ii)  Socrates is a man.
   Prove : Socrates is mortal.

   (c)   Let X = {a, b, c, d}
        Y = {1, 2, 3, 4}
        And   $\tilde{A}$ = {(a, 0) (b, 0.8) (c, 0.6) (d, 1)}
              $\tilde{B}$ = {(1, 0.2) (2, 1) (3, 0.8) (4, 0)}
              $\tilde{C}$ = {(1, 0) (2, 0.4) (3, 1) (4, 0.8)}
        Determine the implication relation if X is $\tilde{A}$ then Y is $\tilde{B}$.

   (d)   Consider X = {2, 4, 6, 8, 10}. Find its power set, cardinality and cardinality of power set.

   (e)   Define delta rule. Explain significance of delta rule in defining the weights.

3   Attempt any TWO parts :                      10×2=20

   (a)   What is meant by genetic algorithm ? Compare and contrast traditional algorithm and genetic algorithm.

   (b)   A neuron j receivers inputs from other neurons whose activity levels are 10, –20, 4 and –2. The respective synaptic weights of the neurons are 0.8, 0.2, –1.0 and 0.9. Calculate the output of neuron j for the following situation
   (1)   The neuron is linear.
   (2)   The neuron is represented by McCulloch-Pits model, defined as follows :

   $Y_k = \begin{cases} 1, & \text{if } V_k \geq 0 \\ 1, & \text{if } V_k < 0 \end{cases}$  where $V_k$ is the induced local field.

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(c) State the drawbacks of single layer perceptron. Name a problem which cannot be solved by the above neural model.

**4** Attempt any TWO parts :                          10×2=20

(a) What is meant by genetic algorithm ? Compare and contrast traditional algorithm and genetic algorithm.

(b) Is it possible for a GA to generate an individual with maximum fitness without using mutation, but only single point crossover ? If so, give an example.

(c) Explain the effect of selection, crossover and mutation in evolutionary computation.

**5** Attempt any TWO parts :                          10×2=20

(a) Short notes :
   (1) Perceptron model.
   (2) Unsupervised and Supervised learning.
   (3) Associative memory.

(b) Discuss crossover operation in Genetic algorithm and its type.

(c) Explain Fuzz inference system (FIS).

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