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Total No. of Questions : 08

M.Tech.(IT) E2(2015 & Onwards)/(CSE Engg.) (2015 to 2017) (Sem.–2)

SOFT COMPUTING

Subject Code : MTCS-202

Paper ID : [72886]

Time : 3 Hrs. Max. Marks : 100

INSTRUCTION TO CANDIDATES :

1. **Attempt any FIVE questions out of EIGHT questions.**
2. **Each question carries TWENTY marks.**

1. You have decided to use a multi-layer perception to predict the water level of a river. You have data for the amount of rain and water levels, on a day-by-day basis, covering several years. You figure that the water level primarily depends on these two variables from the previous week. Describe how you should do to make a reasonable prediction of the water level of tomorrow with the help of the network. In particular, state what you use as input and output and how you go about training the network. Which learning algorithm do you choose?

2. a) What are rough sets?

   Let Y and R be two fuzzy sets of young and rich people. What is the member grade of person being young and rich if the member grade of a person being young is 0.8 and being rich is 0.7?

   b) Explain Fuzzy Inference System in detail with its block diagram.

3. a) Consider two parent strings :

   Pl= 10010110

   P2= 10111000

   Find the two off spring produced when crossover points i=5 is selected.

   b) Elaborate various applications of Genetic Algorithm.

4. a) A multilayered feed forward net with threshold units cannot be trained using a gradient following method, like *e.g.* back propagation. Why? Other optimization methods, *e.g.* genetic algorithms, can be used instead. Describe how this could be done. In particular, describe what should be used as the fitness function, and what kind of representation should be used in the chromosomes.

b) What is meant by the term overfitting (overtraining) in the context of learning from samples?
Under what conditions is the risk for this phenomenon big? What can be done to detect the problem?

5. a) What is Soft Computing? State the differences between soft computing & hard computing. List out the soft computing characteristics.

b) Differentiate between supervised and unsupervised learning.

6. a) With the help of block diagram explain the concept of bidirectional associative memory.

b) Discuss how neural networks and genetic algorithms techniques could integrate to generate a better overall performance system as an evolutionary neural network. Discuss how the learning rate affects the performance of the population based learning algorithms.

7. a) With a block diagram explain the working of a fuzzy controller. List down the assumptions made in a fuzzy control system design.

b) Give the architecture of hybrid system. Also explain its working.

8. a) How selection of candidates for matting pool will affect the convergence of a Genetic Algorithm? Why the various operators are required in the Genetic Algorithm?

b) Explain the steps in the solution of a general optimization problem, by a Neural Networks and a Genetic Algorithm.