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Paper Code : PCCAIML603 Soft Computing

UPID : 006918

Time Allotted : 3 Hours *Full Marks :70*

The Figures in the margin indicate full marks.
Candidate are required to give their answers in their own words as far as practicable

Group-A (Very Short Answer Type Question)

1. Answer *any ten* of the following : [1 x 10 = 10]

(I) To generate the final output, the sum is passed on to a non-linear filter ϕ called _____.

(II) If the associated pattern pairs (x,y) are different and if the model recalls a y given an x or vice versa, then it is termed as _____.

(III) The structural constitute of a human brain is known as _____.

(IV) _____ is a Systematic method for training multilayer artificial neural network.

(V) _____ is the analogues version of ART.

(VI) _____ is never assured of finding global minimum as in the simple layer delta rule case.

(VII) What is Tabu Search?

(VIII) _____ function is a continuous function that varies gradually between the asymptotic values 0 and 1 or -1 and +1.

(IX) Write the applications of Back Propagation.

(X) BAM stands for _____.

(XI) _____ of the network means that a pattern should not oscillate among different cluster units at different stages of training.

(XII) What is Ant Colony Optimization (ACO)?

Group-B (Short Answer Type Question)

Answer *any three* of the following : [5 x 3 = 15]

2. Explain the between hard and soft computing. [5]
3. Explain Mamdani Fuzzy Models. [5]
4. Explain Hebbian learning with suitable example. [5]
5. Explain crossover and mutation with suitable example. [5]
6. Explain Simulated Annealing in brief. [5]

Group-C (Long Answer Type Question)

Answer *any three* of the following : [15 x 3 = 45]

7. (a) Explain the single layer Neural Network architecture using Perceptron model with suitable activation function. [10]

   (b) Explain perceptron convergence theorem. [5]

8. Using Mamdani fuzzy mode, Design a fuzzy logic controller to determine the wash time of domestic washing machine. Assume that the inputs are dirt and grease on cloths. Use 3 descriptors for each input variables and five descriptors for output variables. Derive necessary membership function and required fuzzy rules for the application. [15]
9. Explain the Hopfield Networks. With the help of an example explain Supervised, Unsupervised, Reinforcement learning. What is ADALINE? Why it is trained using least mean square rule? [15]
10. Explain the Roulette wheel technique for traditional GA selection. Describe the various stopping conditions for genetic algorithm flow. Compare and contrast traditional algorithm and genetic algorithm. [15]
11. Using inference approach, find the membership values for each of the triangular shapes (I, R, IR, E, T) for a triangle with angles 120°, 50°, 10° . Represent the standard fuzzy set operations using Venn diagram. Examine the various aspects of sigmoidal activation function. List the drawbacks. [15]

*** END OF PAPER ***

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