

INSTITUTE OF AERONAUTICAL ENGINEERING

(AUTONOMOUS)

Code No: BCS208

MODEL QUESTION PAPER - II

M. Tech II Semester Regular Examinations, August 2017

SOFT COMPUTING

(Computer Science and Engineering)

Time: 3 hours

Max. Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

UNIT-I

1. (a) Consider a multilayer feed forward network, all the neurons of which operate in their linear regions. Justify the statement that such a network is equivalent to a single-layer feed forward network. [7M]
(b) Define hebb's rule and delta rule. List the features that distinguish two rules from each other. [7M]
2. (a) List out various applications of neural networks. Explain how neural networks can be implemented in handwritten digit recognition application. [9M]
(b) Consider the simple example of a network involving a single weight, for which the cost function is
$$\mu(w) = k_1(w - w_0)^2 + k_2$$
Where w_0 , k_1 and k_2 are constants. A back-propagation algorithm with momentum is used to minimize $\mu(w)$.
Explore the way in which the inclusion of the momentum constant α influences the learning process with particular reference to the number of epochs required for convergence versus α . [5M]

UNIT-II

3. (a) Explain the architecture of counter propagation networks and their training algorithms. [6M]
(b) State how the Hop-field network may be used to maximize an objective function by recasting the objective as one to be minimized. [5M]
(c) Discuss energy function of continuous Hopfield network. [3M]
4. (a) Using suitable diagrams and equations explain the basic bidirectional associative memory configuration. Also describe its energy function. [7M]
(b) Draw and explain the architecture of popular self-organizing maps. Derive the training algorithm of kohonen network. Also explain how SOMs can be used for data compression. [7M]

UNIT-III

5. (a) Develop a reasonable membership function for a square, based on the geometric properties of a rectangle, for this problem use L as length of the longer side and l is the length of the smaller side. [8M]
(b) Explain the following with example
i. Fuzzy union
ii. Fuzzy intersection
iii. Fuzzy complement. [6M]
6. (a) What do you mean by defuzzification? Explain the following methods of [8M]

- defuzzification.
- i. Centroid method
 - ii. Weighted average method
- (b) Compare and contrast between crisp variables and fuzzy variables. Give examples. [6M]

UNIT-IV

7. (a) What are the four major steps in fuzzy rule-based model? Explain them. [4M]
 (b) How multivalued logic and fuzzy logic are related? Give brief description of the following
 i. unconditional and unqualified fuzzy proposition
 ii. Conditional and unqualified fuzzy proposition. [6M]
- (b) Define and explain fuzzy inference systems with examples. [4M]
8. (a) With an example discuss fuzzy individual decision making and also explain the direct methods of fuzzy construction. [7M]
 (b) What is fuzzy compliment? What are the axioms to be satisfied so that a function can be used as fuzzy compliment? Check whether the function $x+y-x.y$ can be used as a fuzzy union or not. [7M]

UNIT-V

9. (a) Differentiate between genetic algorithm and genetic programming. Write short notes on tree based genetic programming. [7M]
 (b) Discuss the characteristics of genetic programming. With a computer program, explain the approach of genetic programming to scheduling algorithms. [7M]
10. (a) Mention some of the areas where genetic algorithms can be applied. How is fuzzy optimization performed? Illustrate with an example. [6M]
 (b) How genetic algorithms are related to internet? Discuss about selection of the degree of crossover and generation of the output set with an example. [8M]