INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)
Dundigal-500043, Hyderabad

B.Tech VII SEMESTER END EXAMINATIONS (REGULAR) - DECEMBER 2023
Regulation: UG-20
MACHINE LEARNING

Time: 3 Hours   (COMMON TO CSE | CSE(CS))   Max Marks: **70**

Answer ALL questions in Module I and II
Answer ONE out of two questions in Modules III, IV and V
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

MODULE – I

1. (a) Why is machine learning important? List the areas of influence for machine learning.
   [BL: Understand| CO: 1|Marks: 7]

   (b) Differentiate between overfitting and underfitting in machine learning. Describe the decision tree learning method.   [BL: Understand| CO: 1|Marks: 7]

MODULE – II

2. (a) Explain multilayer neural network with back propagation in detail with gradient descent optimization.   [BL: Understand| CO: 2|Marks: 7]

   (b) List the steps that make up the backpropagation algorithm. Explain genetic learning in detail with a suitable example.   [BL: Understand| CO: 2|Marks: 7]

MODULE – III

3. (a) Design a straightforward concept learning algorithm to output the maximum a posteriori hypothesis, based on Bayes theorem.   [BL: Understand| CO: 3|Marks: 7]

   (b) Implement naïve Bayesian classifier model to classify a set of documents and measure the accuracy, precision, and recall.   [BL: Understand| CO: 3|Marks: 7]

4. (a) How to determine the number hidden neurons in single hidden layer feed-forward neural network? Explain with an example.   [BL: Understand| CO: 4|Marks: 7]

   (b) How the Bayes optimal classifier is a more optimal method than the Gibbs algorithm? Analyze.
   [BL: Understand| CO: 4|Marks: 7]

MODULE – IV

5. (a) Write short note on radial basis functions. How to construct an explicit approximation to function (f) over a local region surrounding x_q.   [BL: Understand| CO: 5|Marks: 7]

   (b) Outline the following terms:
   i) Crossover
   ii) Flipbit mutation
   iii) Gaussian mutation
   iv) Exchange/swap mutation   [BL: Understand| CO: 5|Marks: 7]

6. (a) Explain in detail five major preparatory steps in genetic programming. List the advantages of radial basis function network. [BL: Understand| CO: 5|Marks: 7]

   (b) Summarize the following common operators for genetic algorithm
   i) Single point crossover
   ii) Two point crossover
   iii) Uniform crossover
   iv) Point mutation [BL: Understand| CO: 5|Marks: 7]

MODULE – V

7. (a) Summarize the following terms used in reinforcement learning:
   i) Reward()
   ii) Policy()
   iii) Value()
   iv) Q-Value() [BL: Understand| CO: 6|Marks: 7]

   (b) Explain the goal, justification, advantages and pitfalls of pure inductive learning and pure analytical learning. [BL: Understand| CO: 6|Marks: 7]

8. (a) Illustrate to initialize the hypothesis to perfectly fit the domain theory using prior knowledge.
   [BL: Understand| CO: 6|Marks: 7]

   (b) Estimate the adjacent state using Q learning algorithm learns by iteratively reducing the discrepancy between Q value. [BL: Understand| CO: 6|Marks: 7]

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