

MACHINE LEARNING
(Computer Science and Engineering)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A

(25 Marks)

- | | | |
|------|---|-----|
| 1.a) | Define learning. | [2] |
| b) | What is the influence of information theory on machine learning? | [3] |
| c) | What is an active query? | [2] |
| d) | List the characteristics of problems for which decision tree learning is best suited. | [3] |
| e) | State Baye's theorem. | [2] |
| f) | Differentiate between sample error and true error. | [3] |
| g) | What are the disadvantages of instance based methods? | [2] |
| h) | What is the inductive bias of k-nearest neighbor? | [3] |
| i) | What is analytical learning? | [2] |
| j) | List the factors motivated the popularity of genetic algorithms. | [3] |

PART-B

(50 Marks)

2. What is meant by machine learning? What is its need to today's society? Explain successful applications of machine learning. [10]

OR

- 3.a) Illustrate general-to-specific ordering of hypotheses in concept learning.
b) Explain the key property of FIND-S algorithm for concept learning with necessary example. [5+5]
4. Present the basic ID3 algorithm for learning decision trees and illustrate its operation in detail. [10]

OR

- 5.a) Discuss the representational power of a perceptron.
b) Explain the gradient descent algorithm for training a linear unit. Implement stochastic approximation to this. [5+5]
- 6.a) Describe a general approach for deriving confidence intervals.
b) Explain the features of Bayesian learning methods. [5+5]

OR

- 7.a) With an illustrative example explain brute force MAP learning algorithm.
b) What are the applications of probably approximately correct model? Discuss in detail.

[5+5]

- 8.a) Demonstrate k-nearest neighbor algorithm for classification.
b) Discuss the significance of locally weighted regression.

[5+5]

OR

9. Explain how CADET system employs case based reasoning to assist in the conceptual design of simple mechanical devices.

[10]

10. Consider the two strings as initial population for genetic algorithm and generate all possible off springs using various operators.

String 1: 11101001000

String 2: 00001010101

[10]

OR

- 11.a) What are the main properties of PROLOG-EBG algorithm? Is it deductive or inductive? Justify your answer.

- b) Write KBANN algorithm to explain usage of prior knowledge to reduce complexity.

[5+5]

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