

**Code No: 137DV****JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B. Tech IV Year I Semester Examinations, December - 2019****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 as sub questions.

**PART – A****(25 Marks)**

- 1.a) List the basic design issues to machine learning. [2]
- b) State version space representation theorem. [3]
- c) What is the representational power of perceptrons? [2]
- d) How to compute expected value and variance of a random variable? [3]
- e) State Bayes theorem. [2]
- f) Under what conditions is successful learning possible? [3]
- g) How to use entropy as evaluation function? [2]
- h) What factors contribute to the popularity of genetic algorithm? [3]
- i) What is the essential difference between analytical and inductive learning methods? [2]
- j) What are the limitations of explanation based learning? [3]

**PART – B****(50 Marks)**

2. Which disciplines have their influence on machine learning? Explain with examples. [10]

**OR**

- 3.a) Contrast the hypothesis space search in ID3 and candidate elimination algorithm.
- b) Illustrate the impact of overfitting in a typical application of decision tree learning. [5+5]

4. Discuss how a multi layer network learns using a gradient descent algorithm. [10]

**OR**

- 5.a) Distinguish between inductive bias and estimation bias.
- b) Explain the methods for comparing the accuracy of two hypotheses. [4+6]

- 6.a) Explain the features of Bayesian learning methods.
- b) Discuss the relationship between the maximum likelihood hypothesis and the least-squared error hypothesis. [6+4]

**OR**

- 7.a) Prove  $\mathcal{C}$ -exhausting the version space theorem.
- b) With suitable example discuss a radial basis function network. [5+5]

8. Describe the representation of hypotheses and genetic algorithms used in this. [10]  
OR
- 9.a) How rules are post pruned? Explain with an example.  
b) What is Q function? Write an algorithm for learning Q. [5+5]
10. Explain an algorithm for regressing a set of literals through a single horn clause. [10]  
OR
11. Describe the TANGENTPROP algorithm to train a neural network to fit both training values and training derivatives. [10]

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