

Exam.Code:1000
Sub. Code: 7364

1059

M.E. (Computer Science and Engineering)
Second Semester
CS-8205: Machine Learning

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Unit.

x-x-x

- I. Attempt the following:-
- Compare linear and multivariate linear regression,
 - Define machine learning. A company want to predict resale value of a car based on locality of the property of the owner. Justify whether such a problem is suitable for machine learning.
 - Is Logistic regression a supervised machine learning algorithm?
 - Can we use principal component analysis for visualizing the data in lower dimensions?
 - What is the connection between maximum likelihood and maximum posteriori estimation? (5x2)

UNIT - I

- II. a) Differentiate between bias and variance roles in machine learning. Which is preferred over the other?
- b) Write a short note on Handling Skewed Data Using Large Data Sets What are the various metrics for measuring the effectiveness of your model in skewed data? Can accuracy be used for this purpose? (5,5)
- III. a) Write mathematical representation for following:-
- Classification
 - Regression
 - Class probability estimation
- b) How can you overcome Over fitting in machine learning? (6,4)
- IV. a) How does Support Vector Machine work? Why SVMs are known as large margin classifier? Can Support Vector Machine be used for regression?
- b) Define logistic Regression. What activation functions are suitable for logistic regression? Explain how logistic regression can be used to predict probability of an input sample. Is it possible to design a logistic regression algorithm using a Neural Network Algorithm? (5,5)

P.T.O.

(2)

UNIT - II

- V. a) Define i) Binomial distribution ii) Gaussian Distribution iii) Multivariate Gaussian Distribution iv) Multinomial Distribution. Explain their role with relevance to machine learning algorithms.
- b) Explain dimensionality reduction, where it's used, and what are its benefits? (7,3)
- VI. a) Define clustering. Explain different types of clustering algorithm briefly? How we can pick the correct value of number of clusters? Can there be a problem of local minima in clustering?
- b) Write a short note on Anomaly Detection System. (7,3)
- VII. a) What is EM algorithm in machine learning? Demonstrate the convergence of EM algorithm?
- b) Suppose you are given an EM algorithm that finds maximum likelihood estimates for a model with latent variables. You are asked to modify the algorithm so that it finds MAP (Maximum posterior estimates) estimates instead. Which step or steps do you need to modify? Justify your answer. (5,5)

x-x-x