USN ☐☐☐☐☐☐☐☐☐☐ 21AI63

Sixth Semester B.E. Degree Examination, June/July 2024
Machine Learning

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Illustrate the basic design issues and approaches to machine learning. **(08 Marks)**
 b. What is machine learning? Explain with an example why to use machine learning. **(04 Marks)**
 c. Explain the main challenges of machine learning that can arise when selecting a learning algorithm and training it on data. **(08 Marks)**

OR

2 a. Discuss the broad categories of machine learning system. **(10 Marks)**
 b. Write Find-S algorithm and apply the same for the given instance.

Location	Price	Size	Condition	Buy_House
Urban	Expensive	Large	New	Yes
Sub urban	Moderate	Medium	Old	No
Urban	Moderate	Small	New	Yes
Urban	Moderate	Large	Old	Yes

(10 Marks)

Module-2

3 a. Illustrate various methods to prepare the data for machine learning algorithms. **(10 Marks)**
 b. Explain multilabel classification and multi output classification with code snippet. **(10 Marks)**

OR

4 a. Explain the various performance measure to evaluate a classifier with an example:
   (i) Measuring accuracy using cross-validation.
   (ii) Confusion matrix
   (iii) Precision
   (iv) Recall
   (v) The ROC curve. **(10 Marks)**
 b. Explain how do you frame the problem and choose an appropriate performance measures for a dataset in a machine learning project. **(06 Marks)**
 c. Explain Grid search method to fine-tune the model. **(04 Marks)**

Module-3

5 a. What is gradient descent. Explain various types of gradient descent with necessary diagrams. **(10 Marks)**
 b. Show that how SVM make predictions using Quadratic programming and Kernelized SVM. **(10 Marks)**

OR

6 a. Explain the following with respect to logistic regression :
   (i)   Estimating probabilities.
   (ii) Training and cost functions. **(10 Marks)**
   b. Discuss non-linear SVM classification. How can you use Polynomial Kernal, Gaussian and RBF Kernel? **(10 Marks)**

Module-4

7 a. Explain how decision trees are trained, visualized and used in making predictions. **(10 Marks)**
   b. Explain Bagging and Pasting with an example. **(10 Marks)**

OR

8 a. Explain CART algorithm. Discuss regularization hyper parameters in Decision trees. **(10 Marks)**
   b. What is Boosting? Explain AdaBOOSE and gradient Boosting. **(10 Marks)**

Module-5

9 a. What is Bayes theorem. Describe Brute-force Map learning algorithm. **(08 Marks)**
   b. Discuss the minimum description length algorithm. **(08 Marks)**
   c. Explain the steps of Gibbs algorithm. **(04 Marks)**

OR

10 a. Write EM algorithm and explain in details. **(10 Marks)**
   b. Explain Naïve Bayes classifier with an example. **(10 Marks)**

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