21AI63

USN

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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