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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 Kernel, 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 AdaBOOST 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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