

Roll No.

Exam Code : J-22

Subject Code—1482

M.C.A. (Third Semester) (Batch 2020
Onwards) (Regular)/M.Sc. (Computer
Science) & M.C.A. (Third Semester)
(Batch 2020 Onwards) (Distance)

EXAMINATION

MACHINE LEARNING

MCA-31

Time : 3 Hours

Maximum Marks : 70

Note : There are nine questions in all. Attempt *Five* questions in total. Q. No. 1 is compulsory. Attempt remaining *four* questions, selecting *one* question from each Unit. All questions carry equal marks.

1. (a) Illustrate, how can we achieve classification by discrimination.

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P.T.O.

- (b) What are different types of machine learning ?
- (c) What is information gain ? Does it play any a key role in training process of ID3 ?
- (d) How is a classification and a regression problem related to each other ?
- (e) What is ANN ? Give one supervised and unsupervised learning example using ANN.
- (f) What is a local minima ?
- (g) Differentiate between prior and posterior probability in terms of Bayesian classification.

7×2=14

Unit I

2. What is unsupervised machine learning ? State and explain the k -mean clustering algorithm. Consider the data points as a Set = {2, 3, 4, 10, 11, 12, 20, 25, 30}. Form two clusters based on the k -means clustering algorithm. 14

3. What is dimensional reduction ? Calculate the Principal Components (eigen vectors) for the data set = {2, 3, 4, 5, 6, 7; 1, 5, 3, 6, 7, 8}. Also write the steps of Principal Component Analysis. 14

Unit II

4. What is a decision tree ? What are the characteristics of a decision tree ? Explain ID3 algorithm in detail. 14
5. (a) What is Entropy ? How is it useful in decision tree induction ? 7
- (b) What is linear regression ? 7

Unit III

6. (a) What is neural network ? Explain any application of neural network. 7
- (b) What is a perceptron ? Draw a diagram to explain activation function of a perceptron. 7

7. Realize a two input logical AND function using perceptron (use Hebb rule i.e. $\Delta w_i = x_i \times t$). Assume the initial weights as zero i.e. $w_0 = w_1 = w_2 = 0$ and bias input is permanently set as 1 i.e. $x_0 = 1$. 14

Unit IV

8. Consider the following table showing customer's purchase history for an electronic company. Each column (other than RID) is discrete valued attribute and the last column is class attribute having two distinct classes i.e. 'yes' and 'no'. Use the table as a training dataset for a Naïve Bayes Classifier and determine the class label of a tuple X described as : 14

X = (age = youth, income = medium, student = yes, credit rating = fair).

RID	age	income	student	credit_rating	Class : buys_computer
1.	youth	high	no	fair	no

2.	youth	high	no	excellent	no
3.	middle_aged	high	no	fair	yes
4.	senior	medium	no	fair	yes
5.	senior	low	yes	fair	yes
6.	senior	low	yes	excellent	no
7.	middle_aged	low	yes	excellent	yes
8.	youth	medium	no	fair	no
9.	youth	low	yes	fair	yes
10.	senior	medium	yes	fair	yes
11.	youth	medium	yes	excellent	yes
12.	middle_aged	medium	yes	excellent	yes
13.	middle_aged	high	yes	fair	yes
14.	senior	medium	no	excellent	no

9. Write short notes on the following :

(a) SVM

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(b) Instanced based learning.

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