Hall Ticket No | | | | | | | | | | | Question Paper Code:ACAC03

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
(Dundigal-500043, Hyderabad)

B.Tech IV SEMESTER END EXAMINATIONS (REGULAR) - JULY 2022
Regulation:UG20
FOUNDATIONS OF MACHINE LEARNING

Time: 3 Hours **(CSE-AI&ML)** **Max Marks: 70**

Answer ALL questions in Module I and II
Answer ONE out of two questions in Modules III, IV and V
(NOTE: Provision is given to answer TWO questions from among one of the Modules III / IV / V
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

MODULE – I

1. (a) List the steps of developing machine learning application. Explain with example importance of machine learning. [BL: Understand| CO: 1|Marks: 7]

   (b) What do you mean by learning problem? Explain with example. [BL: Apply| CO: 1|Marks: 7]

MODULE – II

2. (a) Describe the essential steps of logistic regression. Why it is being used for classification? Elaborate. [BL: Understand| CO: 2|Marks: 7]

   (b) Create the relationship model for the given dataset in Figure 1 to find the relation between height and weight parameters. Predict Y for X=154,161,178 [BL: Apply| CO: 2|Marks: 7]

Sr No.	Height(X)	Weight(y)
1	151	63
2	174	81
3	138	56
4	186	91
5	128	47
6	136	57
7	179	76
8	163	72
9	152	62
10	131	48

Figure 1

MODULE – III

3. (a) How to compute expected value and variance of a random variable? Explain the features of Bayesian learning method. [BL: Understand| CO: 3|Marks: 7]

(b) Given all the previous patient symptoms and diagnoses, predict whether the patient is suffering from Flu or not based upon data given in Table 1 for the new patient by using Naïve Bayes classifier. [BL: Apply| CO: 3|Marks: 7]

Table 1

Chills	Runny Nose	Headache	Fever	Flu?
Y	N	Mild	Y	N
Y	Y	No	N	Y
Y	N	Strong	Y	Y
N	Y	Mild	N	Y
N	N	No	N	N
N	Y	Strong	Y	Y
N	Y	Strong	N	N
Y	Y	Mild	Y	Y

Test data: Chills = Y, Runny Nose = N, Headache = Mild, Fever = Y, Flu = ?

4. (a) Describe in detail about bagging, bootstrapping, boosting, and stacking in machine learning. [BL: Understand| CO: 4|Marks: 7]

(b) "You came to know that your model is suffering from low bias and high variance". Which algorithm should you use to tackle it? Why? [BL: Apply| CO: 4|Marks: 7]

MODULE – IV

5. (a) Discuss in detail about distance based clustering. Write its importance in machine learning. [BL: Understand| CO: 5|Marks: 7]

(b) How to select the features from the given dataset for proper functioning of machine learning algorithm. [BL: Apply| CO: 5|Marks: 7]

6. (a) What is instance based learning? Write about principle component analysis in detail. [BL: Understand| CO: 5|Marks: 7]

(b) Apply K-means clustering for the following dataset for two clusters are given in Table 2 :The initial clusters are C1(185,72) and C2(170,56). [BL: Apply| CO: 5|Marks: 7]

Table 2

Sample No.	X	Y
1	185	72
2	170	56
3	168	60
4	179	68
5	182	72
6	188	77

MODULE – V

7. (a) Discuss in detail about soft margin SVM. Explain how support vector machine can be used for classification of linearly separable data. [BL: Understand| CO: 6|Marks: 7]

   (b) Cluster the following eight points (with (x, y) representing locations) into three clusters by using k-means clustering: A1(2, 10), A2(2, 5), A3(8, 4), A4(5, 8), A5(7, 5), A6(6, 4), A7(1, 2), A8(4, 9) Initial cluster centers are: A1(2, 10), A4(5, 8) and A7(1, 2). [BL: Apply| CO: 6|Marks: 7]

8. (a) Describe nearest-neighbor classification in detail. Interpret the role of radial basis function in separating nonlinear patterns [BL: Understand| CO: 6|Marks: 7]

   (b) Find the optimal hyperplane by using SVM for the data points: (1,1)(2,1)(1,-1)(2,-1)(4,0)(5,1) (5,-1) (6,0). [BL: Apply| CO: 6|Marks: 7]

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