D Y PATIL UNIVERSITY RAMRAO ADIK INSTITUTE OF TECHNOLOGY NAVI MUMBAI

22 NOV 2023

RAMRAO ADIK INSTITUTE OF TECHNOLOGY, NERUL

(D Y Patil Deemed to be University)

Program: Computer Engineering
End Semester Examination: B.Tech. Semester VI
Course Code: CEC601 Course Name: Machine Learning
Time: 2-hour
Max. Marks: 60

Instructions: 1. All three questions are compulsory

Que. No.	Question	Max. Marks	CO	BT
Q1	Solve any **Four**			
i)	Discuss different categories in Machine Learning.	5	CO1	BT2
ii)	Define Regression line, Scatter plot, Residual error and Best fit line with suitable example.	5	CO3	BT3
iii)	List and explain the distance metrics used in clustering	5	CO5	BT2
iv)	Explain the concept of margin and support vector with the help of an example.	5	CO4	BT4
v)	List the benefits of using dimensionality reduction.	5	CO2	BT2
vi)	Discuss the following terms used in reinforcement learning: Agent, Environment and Action	5	CO6	BT2

Que. No.	Question	Max. Marks	CO	BT
Q2 A	Solve any **Two**			
i)	Differentiate between Linear and Logistic Regression	5	CO3	BT4
ii)	Discuss Hierarchical Agglomerative Clustering with example.	5	CO5	BT2
iii)	Discuss Principal Component Analysis.	5	CO2	BT2
iv)	Discuss any one real life application of reinforcement learning.	5	CO6	BT2
Q 2 B	Solve any **One**			
i)	Consider the following dataset:	10	CO4	BT4

Age	Competition	Type	Profit
old	Yes	software	Down
new	No	software	Up
old	No	hardware	Down
new	No	hardware	Up
mid	yes	hardware	Down
mid	No	hardware	Up
mid	No	software	Up
new	yes	software	Up
mid	yes	software	Down
old	No	software	Down

Find the root node to form a decision tree. (Use Information Gain measure)

ii)	Elaborate the steps in developing machine learning applications.	10	CO1	BT2

Que. No.	Question	Max. Marks	CO	BT
Q3	Solve any **Two**			
i)	Use k-means clustering algorithm and Euclidean distance to cluster the following 8 examples into 3 clusters: A1(2,10), A2(2,5), A3(8,4), A4(5,8), A5(7,5), A6(6,4), A7(1,2), A8(4,9). Find the new centroid at every new point entry into the cluster group. Assume initial clutter centers as A1, A4 and A7.	10	CO5	BT5
ii)	Briefly discuss the steps of Random Forest algorithm.	10	CO4	BT2
iii)	Given the following data for the sales of car of an automobile company for six consecutive years. Predict the sales for the next two consecutive years.	10	CO3	BT5

Years (x)	2013	2014	2015	2016	2017	2018
Sales (y)	110	100	250	275	230	300

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Course Outcomes (CO) -Learner will be able to:

CO1: Understand the basic concepts of machine learning.
CO2: Extract different feature vectors from the given data.
CO3: Apply different regression techniques on the input data.
CO4: Apply and analyse the performance of classification algorithms.
CO5: Form clusters using various similarity measures.
CO6: Understand the working of reinforcement learning.

BT1- Remembering, BT2- Understanding, BT3- Applying, BT4- Analyzing, BT5- Evaluating, BT6- Creating