

K. J. Somaiya Institute of Engineering and Information Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

End Semester Exam August 23

(B.Tech) Program: B.Tech

Examination: Supplementary Exam TY Semester: VI

Course Code: EXC602 and Course Name: Machine Learning

Date: 9th August 23

Duration: 2.5 Hours

Max. Marks: 60

Instructions:

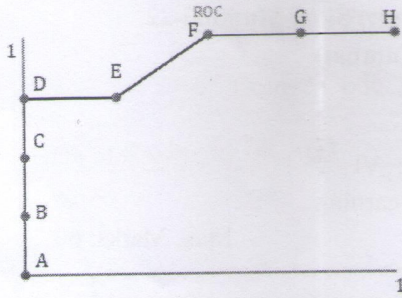
- (1) All questions are compulsory.
- (2) Draw neat diagrams wherever applicable.
- (3) Assume suitable data, if necessary.

		Max Marks	CO	BT level
Q.1	Solve any six questions out of eight:	12		
i)	How machine learning is different from rule based programming?	2	1	R
ii)	Write expression for hypothesis, cost function and for parameter using gradient descent for univariate linear regression.	2	2	R
iii)	What is SVM kernel?	2	3	R
iv)	Define over fitting and under fitting of a ML model	2	4	R
v)	Differentiate between Supervised Learning and Unsupervised Learning	2	5	U
vi)	What is an anomaly?	2	6	U
vii)	What is reinforcement learning?	2	1	U
viii)	Define accuracy of a ML model used for classification.	2	4	U
Q.2	Solve any four questions out of six.	16		
i)	List at least four applications of machine learning. Elaborate in brief.	4	1	U
ii)	What is feature scaling? Write significance of feature scaling in machine learning.	4	2	U
iii)		4	3	A

Height	163	163	160	165	168	170	165
Weight	60	61	60	65	62	64	61
T shirt size	M	M	M	L	L	L	L

The above dataset shows the data related to height and weight of few men and their T-shirt sizes. Predict the size of T-shirt for a man with height 164 cm and weight 58 kg using KNN, considering K=3.

iv)



4 4 U

Which of the point on the above ROC curve gives the best threshold for a machine learning model that predicts whether or not to send a social media advertisement to a person? Why?

v)

Explain the types of Unsupervised Learning with example.

4 5 U

vi)

Explain recommender system in brief.

4 6 U

Q.3 Solve any two questions out of three.

16

i)

What are different types of machine learning algorithms? Explain each in brief with an example.

8 1 U

ii)

x1	2.1	1.4	2.6	1.8	0.9	1.4
x2	3.4	4.6	2.8	2.9	1.7	2.1
y	3.81	3.75	4.05	3.1	3.6	3.76

8 2 A

For the above dataset, find out value of parameters after applying gradient descent once. $\theta_0 = 1.9, \theta_1 = 0.39, \theta_2 = 0.31$ and $\alpha = 0.1$.

iii)

Use the k-means algorithm and Euclidean distance to cluster the following 8 examples into 3 clusters:
 $A_1=(2,10), A_2=(2,5), A_3=(8,4), A_4=(5,8), A_5=(7,5), A_6=(6,4), A_7=(1,2), A_8=(4,9)$.

8 5 A

Q.4 Solve any two questions out of three.

16

i)

The above data shows the database of an automobile company whether a person with the given age and salary has bought a car or not. For $\theta_0 = -10, \theta_1 = 0.2$ and $\theta_2 = 0.2$. Predict whether a woman of age 25 and salary 67000 will buy a car or not. Find the new parameters after applying gradient descent once.

8 3 A

Age	20	32	18	29	47	45	46	48	45
Salary (Thousand)	86	18	82	80	25	26	28	29	22
Purchased	1	1	1	1	0	0	0	0	0

ii)

A machine learning model used for classification could predict 720 not-obese and 30 obese children correctly. But it incorrectly predicted 35 non-obese children as obese and 15 obese children as non-obese. Draw confusion matrix considering the obese class to be positive class. Also define and calculate precision, recall and F1 score.

8 4 A

iii)

Write short note on :

8 6 U

- a) Online learning b) Data parallelism