

G. H. Raison College of Engineering, Nagpur
(An Autonomous Institution)

Fourth Semester B.Tech. AI/ETRX/ETC/CSE/IT

End Semester Examination Summer - 2021

Machine Learning Algorithms

Time: 2 hrs.]

[Max. Marks: 50

Instructions:

- 1) All questions carry marks as indicated
- 2) Assume suitable data wherever necessary.
- 3) Due credit will be given to neatness and adequate dimensions.
- 4) Illustrate your answer wherever necessary with the help of neat sketches.
- 5) Use of non-programmable calculator is permitted.

Q1 CO1

10 M

- a. Explain with an example
1. clustering
 2. classification
 3. Supervised Learning
 4. Unsupervised Learning
 5. Hypothesis Space

Q2 CO2

- a. Consider the following dataset and solve the KNN algorithms, where $K=3$

5M

P1	P2	Class
7	7	False
7	4	False
3	4	True
1	4	True

Now, let $P1=3$ and $P2=7$, so it will belong to which class?
Explain in details.

- b. How can you differentiate between over-fitting and under-fitting? Elaborate in with an example.

5M

Q3 CO3

- a. How are the Support Vector Machine useful for categories the data?

5M

- b. Madhuri is getting married on Friday at an outdoor ceremony in the Rajasthan.

In recent years, it has rained only 5 days each year. Unfortunately the weatherman is forecasting rain for Friday. When it actually rains, the weatherman has forecast rain 90% of the time. When it doesn't rain, he has forecast rain 10% of the time.

What is the probability it will rain on the Friday of Madhulis' wedding?

5M

Q4 C04

a. Solve the following problem using PCA Algorithm

10 M

x1	x2
1.4000	1.6500
1.6000	1.9750
-1.4000	-1.7750
-2.0000	-2.5250
-3.0000	-3.9500
2.4000	3.0750
1.5000	2.0250
2.3000	2.7500
-3.2000	-4.0500
-4.1000	-4.8500

1. Find the Covariance Matrix
2. Eigen Values
3. Eigen Vectors

Q5 C05

4. How is K –Mean clustering implemented? Explain in detail. **5M**
5. What is a Gaussian Mixture Models (GMMs)? How to apply GMM to a jumble of unlabeled images . **5M**