

MID2-ML-2020-21-SEM2-3CSE-A,B & C-18CS601-14-06-21-

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1

REGISTRATION NUMBER *

Y18ACS503

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STUDENT NAME *

VENKATA PRABHANJAN KUMAR MATHI

3

section *

☐ A

☒ B


☐ C

4

SUBJECT NAME *

MACHINE LEARNING

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Department of Computer Science and Engineering

BAPATLA ENGINEERING COLLEGE, BAPATLA

(AUTONOMOUS)

Second Term Examination (6th Semester)

A.Y: 2020-21

Class: III/IV B.Tech(CSE) Sec - 'A', 'B' & 'C'

Subject: MACHINE LEARNING / 18CS601

Max.Marks: 25M.

Time: 90Mins.

Date: 14-06-21

Answer question-1 compulsorily, Answer 1 question from each unit

1. Answer all the following questions. 5 X 1 = 5 M

a. Define version space $V_{S_{H,D}}$.

b. Define weighted Euclidean distance between two attribute vectors $(X_1, X_2, \dots, X_d), (Z_1, Z_2, \dots, Z_d)$.

c. What is the maximum probability that a version space $V_{S_{H,D}}$ is not ϵ -exhausted with m training samples?

d. Write the expressions for probability distributions of 2-class logistic regression model.

e. Explain how conditional independence reduces the learning complexity in Bayes classification.

Unit-3

2. Model a complete Bayes classifier and classify the attribute vector in the last row. 10 M

Age	Income	Student	CR	Buys
Young	High	No	Fair	No
Young	High	No	Good	No
Middle	High	No	Fair	Yes
Elder	Medium	No	Fair	Yes
Elder	Low	Yes	Fair	Yes
Elder	Low	Yes	Good	No
Middle	Low	Yes	Good	Yes
Young	Medium	No	Fair	No
Young	Low	Yes	Fair	Yes
Elder	Medium	Yes	Fair	Yes
Young	Medium	Yes	Good	Yes
Middle	Medium	No	Good	Yes
Middle	High	Yes	Fair	Yes
Elder	Medium	No	Good	No
Middle	Low	No	Fair	?

(OR)

3.

a. Explain Logistic regression and derive the weight update rule. 5M

b. Apply Logistic regression for the following dataset and perform weight updates for 2 epochs. Assume initial weights are $[0.0, 0.0, 0.0]$ and $\alpha = 0.2$ 5M

SL	7.2	6.1	7.4	6.3
SW	3	2.8	2.8	2.5
CLASS	0	1	0	1

Enter your answer

6

- 4.
- a. Derive an expression for the sample complexity of PAC-learnability for finite hypotheses space. 3 M
- b. Write the K-NN classification algorithm. 2 M
- c. Classify the test sample $Z = (5.8, 3.9, 4.1, 2)$ using the K-NN classifier and the following dataset. 5M

Sepal Length	Sepal Width	Petal Length	Petal width	Iris Class
5.5	4.2	1.4	0.2	Iris-setosa
4.9	3.1	1.5	0.1	Iris-setosa
6.7	2.5	5.8	1.8	Iris-virginica
5.8	2.7	3.9	1.2	Iris-versicolor
6	2.7	5.1	1.6	Iris-versicolor
5.9	3.2	4.8	1.8	Iris-versicolor
5	3.6	1.4	0.2	Iris-setosa
4.8	3.4	1.9	0.2	Iris-setosa
4.9	2.5	4.5	1.7	Iris-virginica
6.8	3.2	5.9	2.3	Iris-virginica

(OR)

- 5.
- a. Write the k-means clustering algorithm. 3 M
- b. Apply Clustering algorithm for the following dataset and perform two iterations. Take the initial centroids $\mu_1 = (3, 0.25), \mu_2 = (2.5, 1.5), \mu_3 = (3, 2.5)$. 7M

Length	Width
4.2	0.2
3.1	0.1
2.5	1.8
2.7	1.2
2.7	1.6
3.2	1.8
3.6	0.2
3.4	0.2
2.5	1.7
3.2	2.3
3	1.5
3.3	2.5
2.8	1.5
2.7	1.4
4.1	0.1
3.1	0.1
2.6	2.3
3.4	2.3
3.7	0.2
2.9	1.8

Enter your answer

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