Total No. of Questions : 10]

SEAT No. :

P1871

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[4859]-1060
B.E. (I.T.)
MACHINE LEARNING
(2012 Course) (414455) (End Semester) (Semester-I)

Time : $2^{1}/_{2}$ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Draw neat diagrams wherever necessary.***
2) ***Assume suitable data, if necessary.***
3) ***Figures to the right indicate full marks.***

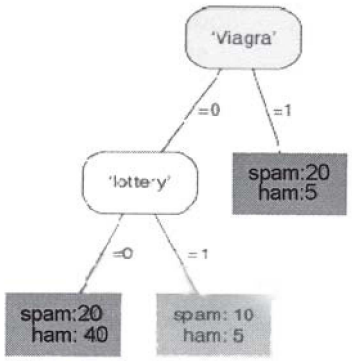
Q1) a) Explain predictive and descriptive tasks. **[5]**

b) Prove with an example **Accuracy = 1-error rate.** **[5]**

OR

Q2) a) Define class probability estimator. State mathematical model of class probability estimator. Is that a predictive or descriptive task? Justify. **[5]**

b) What is majority clcass decision rule? Using following feature tree, write decision rules for majority class. **[5]**



Q3) a) What is a slack variable? Discuss margin errors. **[5]**

b) Explain ridge regression and lasso. **[5]**

OR

Q4) a) Consider the following three-class confusion matrix. **[5]**

P.T.O.

	Predicted		
Actual	15	2	3
	7	15	8
	2	3	45

Calculate precision and recall per class. Also calculate weighted average precision and recall for the classifier.

b) Explain the term bias-variance dilemma. **[5]**

Q5) a) Explain with the help of diagrams and equations Minkowski, Euclidean, Manhattan and Hamming distances. **[8]**

b) What is a feature tree? Write the Grow Tree algorithm to generate feature tree. Explain the role of best split in this algorithm. **[10]**

OR

Q6) a) Explain support and confidence with the help of formulae. Calculate support, and confidence for the following example. **[8]**

Transaction	Items
1	nappies
2	beer, crisps
3	apples, nappies
4	beer, crisps, nappies
5	apples
6	apples, beer, crisps, nappies
7	apples, crisps
8	crisps

b) Write an algorithm for K-means clustering. Describe its working in brief using example. **[10]**

Q7) a) Distinguish between discriminative learning models and generative learning model with suitable examples. **[8]**

b) Define: **[8]**

1) Bernoulli's distribution.

2) Binomial distribution.

3) MAP decision rule.

4) Maximum likelihood function.

OR

Q8) a) Write a note on Naïve Bayes Classification algorithm. **[8]**

b) Explain in brief logistic regression. Compare simple regression and logistic regression. **[8]**

Q9) a) Explain reinforcement learning. **[8]**

b) Explain bagging and boosting as ensemble methods. **[8]**

OR

Q10)a) Explain data stream and online learning. **[8]**

b) Explain multitask learning. **[8]**

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