

Exam. Code: 0925
Sub. Code: 6547

2063
B.E. (Information Technology)
Seventh Semester
IT-702: Machine Learning

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Part.

x-x-x

1	(a) How machine learning is different from deep learning? (b) What is the residual sum of square method? (c) How value of parameter/weight affects the prediction? (d) What will be the value of sigmoid function if score is infinity? (e) What is the difference between PCA and ICA?	(10)																												
Part A																														
2	(a) Derive equation for theta/parameter/weights matrix with regularization using Normal equation method (using matrices). (b) What is the model complexity? How it can lead to underfitting or overfitting? What will be variance or bias values for underfitting and overfitting?	(5) (5)																												
3.	(a) Calculate precision, recall, accuracy and F1 score. If, out of 700 positive reviews 530 are classified correctly and remaining 170 are classified as negative. Out of 300 negative reviews, 255 are actually classified as negative. Whereas remaining 45 are classified as positive. (b) What is the importance of theta/weight/parameter in linear classification? Explain with the help of a numerical example including some dummy score and corresponding sigmoid (score) values. Let threshold be 0.5.	(5) (5)																												
4.	Solve decision tree using entropy method <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Examples</th> <th>X1</th> <th>X2</th> <th>Y</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>TRUE</td> <td>TRUE</td> <td>YES</td> </tr> <tr> <td>2</td> <td>TRUE</td> <td>TRUE</td> <td>YES</td> </tr> <tr> <td>3</td> <td>TRUE</td> <td>FALSE</td> <td>NO</td> </tr> <tr> <td>4</td> <td>FALSE</td> <td>FALSE</td> <td>YES</td> </tr> <tr> <td>5</td> <td>FALSE</td> <td>TRUE</td> <td>NO</td> </tr> <tr> <td>6</td> <td>FALSE</td> <td>TRUE</td> <td>NO</td> </tr> </tbody> </table>	Examples	X1	X2	Y	1	TRUE	TRUE	YES	2	TRUE	TRUE	YES	3	TRUE	FALSE	NO	4	FALSE	FALSE	YES	5	FALSE	TRUE	NO	6	FALSE	TRUE	NO	(10)
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Part B																														
5.	Find out and draw negative plane, positive plane and hyper plane for the following data.. Separate the classes using $X2 = X1 * X1$ transformation. <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Class</th> <th>Positive</th> <th>Negative</th> <th>Negative</th> <th>Positive</th> </tr> </thead> <tbody> <tr> <td>Data (X1)</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> </tr> </tbody> </table>	Class	Positive	Negative	Negative	Positive	Data (X1)	0	1	2	3	(10)																		
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6.	(a) Let, Initial mean = 28 and variance =2. Find best mean using maximum likelihood method if data point is $X = 30$. (b) Compare K means clustering and Gaussian mixture model.	(5) (5)																												
7	Find within the class and between the class separability of two classes for following data points. $X1 = \{(1,1), (1,2)\}$ $X2 = \{(2,2), (3,3)\}$	(10)																												

x-x-x

Question No. 1: ...

(1)	What is the difference between R^2 and F ?
(2)	How do you interpret the coefficient of a variable in a regression equation?
(3)	What is the purpose of the F-test in a regression model?
(4)	What is the purpose of the t-test in a regression model?
(5)	What is the purpose of the Durbin-Watson test?
(6)	What is the purpose of the Breusch-Pagan test?
(7)	What is the purpose of the White test?
(8)	What is the purpose of the Ramsey RESET test?
(9)	What is the purpose of the Goldfeld-Quandt test?
(10)	What is the purpose of the Levene test?