Total No. of Questions : 8]

SEAT No. :

PE-2193

[Total No. of Pages : 3

[6584]-92
B.E. (Computer Engineering)
MACHINE LEARNING
(2019 Pattern) (Semester - VII) (410242)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates :

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.***
2) ***Figures to the right side indicate full marks.***
3) ***Draw neat diagram wherever necessary.***
4) ***Assume suitable data, if necessary.***

Q1) a) What is R2 measure of evaluation? **[6]**

b) Explain the concept of a cost function and its role in Gradient Descent. **[6]**

c) What is the primary purpose of the L2 regularization term in the Ridge Regression cost function? **[6]**

OR

Q2) a) Describe the bias-variance trade-off and its relationship to underfitting and overfitting. **[6]**

b)

Month	Amount spent	Sales
Mar-23	13447.45	5750.00
Feb-23	10692.38	44305.00
Jan-23	3067.05	34980.00
Dec-22	200.00	10500.00
Nov-22	12343.18	39154.00
Oct-22	12300.18	23065.00
Sep-22	11960.35	20745.00
Aug-22	9924.53	42000.00
Jul-22	8873.12	5750.00
Jun-22	6383.40	41500.00
May-22	1397.60	13500.00

The table shows advertisement spent and sales figure for 11 months. Predict what would be sales if ad spend is 10800/- using linear regression. **[6]**

c) What are different techniques to reduce overfitting? **[6]**

P.T.O.

Q3) a) Explain the basic principles of a Support Vector Machine (SVM). What are support vectors and how does SVM find the optimal hyper plane for classification? **[5]**

b) What is Multi Class Classification? Explain the variants of Multi Class Classification. **[6]**

c) You have a binary classification model with the following confusion matrix: **[6]**

True Positives (TP): 120

True Negatives (TN): 45

False Positives (FP): 10

False Negatives (FN): 5

Calculate the accuracy, precision, recall, and F1-score of the model.

OR

Q4) a) With suitable diagram, Explain Random forest Algorithm with example. **[5]**

b) What are different distance metrics are used in K-NN? **[6]**

c) Why ensemble learning is used for ML? **[6]**

Q5) a) What is K-means clustering, and how does it work? Explain the basic principles of this unsupervised machine learning algorithm and its applications. **[5]**

b) Why K-medoid is used? Explain K-medoid algorithm. **[6]**

c) Define the terms Core point, Border point, Noise point, Eps (ε), MinPts (min - samples), Reachability, Density-connected used in the Density-Based Spatial Clustering (DBSCAN) algorithm. **[6]**

OR

Q6) a) What is isolation factor model? **[5]**

b) Write short note on following Hierarchical clustering method : **[6]**

i) Agglomerative

ii) Dendogram

c) Explain the intrinsic and extrinsic methods for measuring clustering quality. **[6]**

Q7) a) Describe the architecture of Artificial Neural Network. **[6]**

b) Explain the Recurrent Neural Network (RNN) with suitable example. **[6]**

c) Explain building blocks of RBF networks. **[6]**

OR

Q8) a) What is multilayer perceptron? Describe with diagram. **[6]**

b) Explain the Convolution Neural Network (CNN) with suitable example. **[6]**

c) What is the role of activation functions in neural networks, and why are they necessary for the network's learning process? **[6]**

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