MACHINE LEARNING

In Q1 to Q11, only one option is correct, choose the correct option:

1. Which of the following methods do we use to find the best fit line for data in Linear Regression?
   A) **Least Square Error** B) Maximum Likelihood
   C) Logarithmic Loss D) Both A and B
   Answer: A

2. Which of the following statement is true about outliers in linear regression?
   A) **Linear regression is sensitive to outliers** B) linear regression is not sensitive to outliers
   C) Can't say D) none of these

   Answer: A

3. A line falls from left to right if a slope is__?
   A) Positive **B) Negative**
   C) Zero D) Undefined

   Answer: B

4. Which of the following will have symmetric relation between dependent variable and independent variable?
   A) Regression **B) Correlation**
   C) Both of them D) None of these

   Answer: B

5. Which of the following is the reason for over fitting condition?
   A) High bias and high variance B) Low bias and low variance
   C) Low bias and high variance D) none of these

   Answer: C

6. If output involves label then that model is called as:
   A) Descriptive model B) Predictive modal
   C) Reinforcement learning D) All of the above

   Answer: B

7. Lasso and Ridge regression techniques belong to_?
   A) Cross validation B) Removing outliers
   C) SMOTE **D) Regularization**

   Answer: D

8. To overcome with imbalance dataset which technique can be used?

MACHINE LEARNING

A) Cross validation B) Regularization
C) Kernel **D) SMOTE**

Answer: D

9. The AUC Receiver Operator Characteristic (AUCROC) curve is an evaluation metric for binaryclassification problems. It uses_to make graph?
A) **TPR and FPR** B) Sensitivity and precision
C) Sensitivity and Specificity D) Recall and precision

Answer: A

10. In AUC Receiver Operator Characteristic (AUCROC) curve for the better model area under thecurve should be less.
A) True **B) False**

Answer: B

11. Pick the feature extraction from below:
A) **Construction bag of words from a email**
B) Apply PCA to project high dimensional data
C) Removing stop words
D) Forward selection

Answer: A

In Q12, more than one options are correct, choose all the correct options:

12. Which of the following is true about Normal Equation used to compute the coefficient of the Linear Regression?
A) **We don't have to choose the learning rate**.
B) **It becomes slow when number of features is very large.**
C) We need to iterate.
D) **It does not make use of dependent variable**.

Answers: A, B, D

13. **Explain the term regularization.**

Answer: Regularization is a method in machine learning designed to avert overfitting by incorporating a penalty term into the loss function. This penalty can depend on the size of the coefficients, as seen in Lasso or L1 regularization, or on their squared values, as with Ridge or L2 regularization. By discouraging large coefficients, regularization aims to maintain the coefficients at a smaller scale, thereby simplifying the model and enhancing its ability to generalize to new data.

14. **Which particular algorithms are used for regularization?**

Answer: The most common algorithms that employ regularization includes:

MACHINE LEARNING

- **Lasso Regression (L1 regularization):** Adds a penalty equal to the absolute value of the magnitude of coefficients.
- **Ridge Regression (L2 regularization):** Adds a penalty equal to the square of the magnitude of coefficients.
- **Elastic Net:** Combines L1 and L2 regularization.

15. **Explain the term 'error' present in linear regression equation.**

Answer: The term "error" in linear regression usually refers to the residual error, which is the difference between the observed value and the value predicted by the model. Mathematically, for an observation $(\boldsymbol{x_i}, \boldsymbol{y_i})$, the residual $\boldsymbol{e_i}$ is given by

$$\boldsymbol{e_i = y_i - \hat{y}_i}$$

where $\boldsymbol{\hat{y}_i}$ is the predicted value. The sum of these residuals squared is minimized in ordinary least squares regression to find the best-fitting line. This is known as the sum of squared errors (SSE) or residual sum of squares (RSS).