MACHINE LEARNING

From 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) Least Square Error

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) Linear regression is sensitive to outliers

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

Answer: b) Negative

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

Answer: b) Correlation

5. Which of the following is the reason for the overfitting 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) Low bias and high variance

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

Answer: b) Predictive model

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

Answer: d) Regularization

8. To overcome with imbalance dataset which technique can be used?
   A) Cross validation B) Regularization
   C) Kernel D) SMOTE

Answer: d) SMOTE

9. The AUC Receiver Operator Characteristic (AUCROC) curve is an evaluation metric for binary classification problems. It uses _____ to make a graph?
   A) TPR and FPR B) Sensitivity and precision
   C) Sensitivity and Specificity D) Recall and precision

Answer: C) Sensitivity and Specificity

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

Answer: B) False

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

Answer: A) Construction bag of words from an email, B) Apply PCA to project high-dimensional data, C) Remove stop words

12. Which of the following is true about the 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 the number of features is very large.
    C) We need to iterate.
    D) It does not make use of a dependent variable.

Answer: A) We don't have to choose the learning rate.
B) It becomes slow when the number of features is very large.
C) We need to iterate.

MACHINE LEARNING

D) Explain the term regularization?

Answer:

It is one of the most important concepts of machine learning.

This technique prevents the model from overfitting by adding **extra information** to it. It is a form of regression that shrinks the coefficient estimates towards zero. In other words, this technique forces us not to learn a more complex or flexible model, to avoid the problem of overfitting.

E) Which particular algorithms are used for regularization?

Answer:

- **Lasso Regularization**: Lasso is a type of regularization that uses L1-norm Regularization. Lasso regularization works by adding a penalty to the absolute value of the magnitude of coefficients. This forces certain coefficients to be equal to zero, which in turn helps to reduce overfitting. It is useful for **feature selection**, as it can help to identify which features are most important for the model. The formula given below is a representation of Lasso regularization for linear regression model. The linear regression model with the below **modified cost function** is also termed **Lasso regression**.

- **Ridge Regularization**: Ridge is a type of regularization that uses L2-norm Regularization. Ridge regularization works by adding a penalty to the square of the magnitude of coefficients. This forces all coefficients to be close to zero but does not allow them to be equal to zero. It is **effective at reducing overfitting**, and can also help to improve the interpretability of the model. The formula below represents the modified cost function of the linear regression model with L2 norm or L2 regularization. The linear regression model with a modified cost function is called the **Ridge regression model**.

F) Explain the term error present in the linear regression equation?

Answer:

Linear regression is a form of analysis that relates to current trends experienced by particular security or index by providing a relationship between dependent and independent variables, such as the price of a security and the passage of time, resulting in a trend line that can be used as a predictive model.

Although the error term and residual are often used synonymously, there is an important formal difference. An error term is generally unobservable and a residual is observable and calculable, making it much easier to quantify and visualize. In effect, while an error term represents the way observed data differs from the actual population, a residual represents the way observed data differs from sample population data.