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) 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 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 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) Low bias and high variance

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) Predictive modal

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 graph?

A) TPR and FPR B) Sensitivity and precision

C) Sensitivity and Specificity D) Recall and precision

Answer: A) TPR and FPR

10. In AUC Receiver Operator Characteristic (AUCROC) curve for 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 a email

B) Apply PCA to project high dimensional data

C) Removing stop words

D) Forward selection

Answer: B) Apply PCA to project high dimensional data

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.

Answer: A, B and C

FLIP ROBO

ASSIGNMENT – 39

MACHINE LEARNING

Q13 and Q15 are subjective answer type questions, Answer them briefly.

13. **Explain the term regularization?**

Answer: One of the most crucial ideas in machine learning is regularization. It is a method for preventing the model from overfitting by providing it with more data. The machine learning model may occasionally perform well with training data but poorly with test data. When dealing with unseen data by introducing noise in the output, it means the model is unable to anticipate the result and is therefore referred to as being overfitted. The use of a regularization approach can solve this issue.

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

Answer: The three main regularization methods are as follows:

- **LASSO Regularization -** Lasso Regularization: The regression model known as LASSO (Least Absolute Shrinkage and Selection Operator) regression employs the L1 Regularization approach. The "absolute value of magnitude" of the coefficient is added as a penalty term by the Lasso Regression to the loss function (L). By punishing the weights to almost equal 0 if a feature serves no purpose in the model, lasso regression also aids in feature selection.

- **Ridge Regularization -** L2 Regularization: Ridge regression is a type of L2 regularization-based regression model. The "squared magnitude" of the coefficient is added as a penalty term to the loss function (L) in ridge regression.

- **Elastic Nets Regularization at the L1 and L2 Levels:** L1 and L2 regularization are both used in this model. That indicates that we must also add the weights' absolute norm and their squared measure. with the use of a further hyperparameter that regulates the proportion of L1 to L2 regularization.

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

Answer: The regression line is used as a point of analysis when trying to determine the correlation between one independent variable and one dependent variable. An error term represents the margin of error within a statistical model; it refers to the sum of the deviations within the regression line, which provides an explanation for the difference between the theoretical value of the model and the actual observed results.

Mean-square error (MSE), which is most frequently used in linear regression, is used to determine the model's error. MSE is determined by:

- At each value of x, the difference between the observed and anticipated y-values is measured, squared, and the mean of these squared distances is calculated.
- By identifying the regression coefficient that produces the smallest MSE, linear regression finds a line that fits the data.