MACHINE LEARNING assignment by Mohsin Hilal Qadri

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

My 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

My 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

My 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

My 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

My 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

My answer= B) Predictive model

7. Lasso and Ridge regression techniques belong to _____?

A) Cross validation B) Removing outliers

C) SMOTE D) Regularization

My answer= D) Regularization

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

A) Cross validation B) Regularization

C) Kernel D) SMOTE

My 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

My 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

My 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

My answer= A) Construction bag of words from an email

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

My answer= both A) and B)

13. Explain the term regularization?

My answer=

Regularization is a method to prevent complex models from fitting too closely to the training data, which can lead to poor performance on new, unseen data. It works by adding a penalty to the model that discourages overly complex patterns. This penalty encourages the model to be simpler and more generalized, improving its ability to make accurate predictions on new data. Regularization techniques like Ridge and Lasso are common in regression models and help manage the trade-off between fitting the training data well and avoiding overfitting.

14. Which particular algorithms are used for regularization?

My answer=

Regularization techniques are generally applied to regression algorithms to prevent overfitting. Some of the commonly used algorithms that incorporate regularization are:

01. **Ridge Regression**: This adds a penalty equivalent to the square of the magnitude of coefficients to the loss function. It's also known as L2 regularization.
02. **Lasso Regression**: This adds a penalty equivalent to the absolute value of the magnitude of coefficients to the loss function. It's also known as L1 regularization.
03. **ElasticNet**: This combines both L1 and L2 penalties, allowing for both variable selection (like Lasso) and handling of multicollinearity (like Ridge).
04. **Logistic Regression (with regularization)**: Similar to linear regression, logistic regression can also be regularized using L1 or L2 penalties to prevent overfitting.
05. **Support Vector Machines (SVM)**: SVMs can be regularized by adjusting the hyperparameter C, which controls the penalty for misclassification and helps in controlling the margin width.
06. **Neural Networks**: Techniques like weight decay (applying an L2 penalty to the weights) or dropout regularization are used in neural networks to prevent overfitting.

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

My answer=

In linear regression, "error" refers to how much the actual data points differ from the predictions made by the regression line. It's the gap between what the model predicts and what is actually observed in the data. The goal of linear regression is to minimize these errors, ensuring the line fits the data as closely as possible.

.