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

2. Which of the following statement is true about outliers in linear regression?
A) Linear regression is sensitive to outliers

3. A line falls from left to right if a slope is _____
B) Negative

4. Which of the following will have symmetric relation between dependent variable and independent variable?
C) Both of them

5. Which of the following is the reason for over fitting condition?
C) Low bias and high variance

6. If output involves label then that model is called as:
B) Predictive modal

7. Lasso and Ridge regression techniques belong to _____?
D) Regularization

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

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

11. Pick the feature extraction from below:
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.
D) It does not make use of dependent variable.

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

13. Explain the term regularization?
Observe that models are usually parameterized by some hyperparameters. Selecting the complexity is usually governed by some such parameters. Thus, we are faced with a model selection problem. A good heuristic for

selecting the model is to choose the value of the hyperparameters that yields the smallest estimated testerror. Remember that this can be done using cross-validation. We may also change the formulation of the objective function to penalize complex models. This is called regularization. Regularization accounts for estimating the value of Ω in our out-of-sample error inequality. In other words, it models the complexity of the technique. This usually becomes implicit in the algorithm but has huge consequences in real applications.

14. Which particular algorithms are used for regularization?

The most common regularization strategies are as follows:

- L2 weight regularization (Ridge): Adding an L2 penalization term to the weights of a weight-controlled model implies looking for solutions with small weight values. Intuitively, adding an L2 penalization term can be seen as a surrogate for the notion of smoothness. In this sense, a low complexity model means a very smooth model.
- L1 weight regularization (Lasso): Adding an L1 regularization term forces sparsity in the weights of the model. In this sense, a low complexity model means a model with few components or few active terms. These terms are added to the objective function. They trade off with the error function in the objective and are governed by a hyperparameter. Thus, we still have to select this parameter by means of model selection. We can use “ensemble techniques”. A third cure for overfitting is to use ensemble techniques. The best known are bagging and boosting.

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

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.

Linear regression most often uses mean-square error (MSE) to calculate the error of the model. MSE is calculated by: measuring the distance of the observed y-values from the predicted y-values at each value of x; squaring each of these distances; calculating the mean of each of the squared distances.