Work Sheet 1

Q 1 : Ans : A) Least Square Error

Q 2 : Ans : A) Linear regression is sensitive to outliers

Q 3 : Ans : B) Negative

Q 4 : Ans : B) Correlation

Q 5 : Ans : C) Low bias and high variance

Q 6 : Ans : B) Predictive modal

Q 7 : Ans : D) Regularization

Q 8 : Ans : D) SMOTE

Q 9 : Ans : A) TPR and FPR

Q 10 : Ans : B) False

Q 11 : Ans : B) Apply PCA to project high dimensional data

Q 12 : Ans : A) We don't have to choose the learning rate.

B) It becomes slow when number of features is very large.

Q 13 : Ans : Regularization :

Regularization refers to techniques that are used to calibrate machine learning models in order to minimize the adjusted loss function and prevent overfitting or underfitting.

Using Regularization, we can fit our machine learning model appropriately on a given test set and hence reduce the errors in it.

Q 14 : Ans : Particular algorithms are used for regularization :

1. Ridge (L2) Regularization :

Also known as Ridge Regression, it modifies the over-fitted or under fitted models by adding the penalty equivalent to the sum of the squares of the magnitude of coefficients.

This means that the mathematical function representing our machine learning model is minimized and coefficients are calculated. The magnitude of coefficients is squared and added. Ridge Regression performs regularization by shrinking the coefficients present. The function depicted below shows the cost function of ridge regression :

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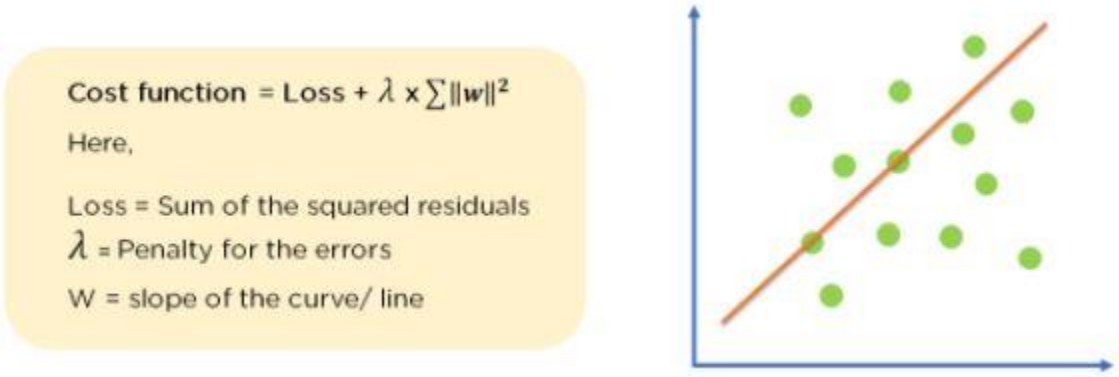

Fig : Cost Function of Ridge Regression

In the cost function, the penalty term is represented by Lambda λ. By changing the values of the penalty function, we are controlling the penalty term. The higher the penalty, it reduces the magnitude of coefficients. It shrinks the parameters. Therefore, it is used to prevent multicollinearity, and it reduces the model complexity by coefficient shrinkage.

2. Lasso (L1) Regression

It modifies the over-fitted or under-fitted models by adding the penalty equivalent to the sum of the absolute values of coefficients.

Lasso regression also performs coefficient minimization, but instead of squaring the magnitudes of the coefficients, it takes the true values of coefficients. This means that the coefficient sum can also be 0, because of the presence of negative coefficients. Consider the cost function for Lasso regression :

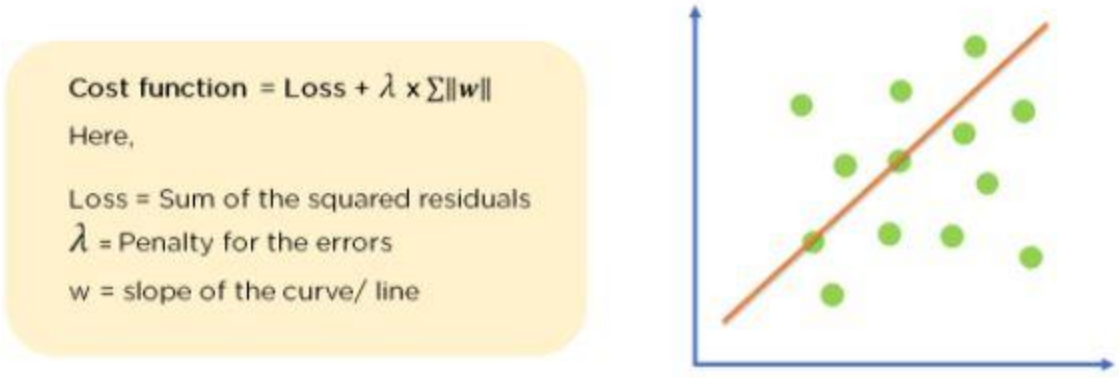

Fig : Cost function for Lasso Regression

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Q 15 : Ans : The error term of a regression equation represents all of the variation in the dependent variable not explained by the weighted independent variables.

A regression equation is the formula for a straight line — in this case, the best-fit line through a scatterplot of data. If there were no error, all the data points would be located on the regression line; to the extent they are not represents error; this is what the error term summarizes.