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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

Ans: 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

Ans: 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

Ans: 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

Ans: 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

Ans: 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

Ans: B) Predictive model

7. Lasso and Ridge regression techniques belong to_____?

A) Cross validation B) Removing outliers
C) SMOTE D) Regularization

Ans: D) Regularization

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

A) Cross validation B) Regularization
C) Kernel D) SMOTE

Ans: 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

Ans: D) Recall and precision

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

A) True B) False

Ans: A) True

11. Pick the feature extraction from below:

MACHINE LEARNING

A) Construction bag of words from a email
B) Apply PCA to project high dimensional data
C) Removing stop words
D) Forward selection

Ans: 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.

Ans: A), B) and C)

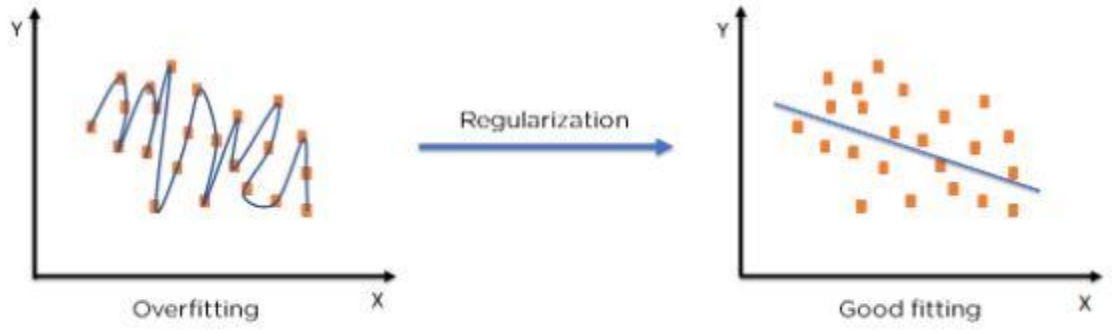
MACHINE LEARNING

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

13. Explain the term regularization?

Ans:

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.

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Regularization Techniques

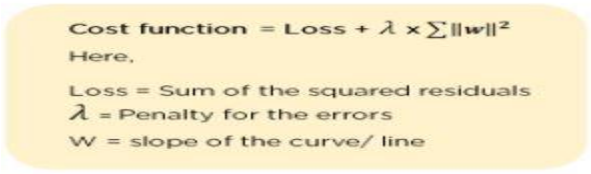
There are two main types of regularization techniques: Ridge Regularization and Lasso Regularization.

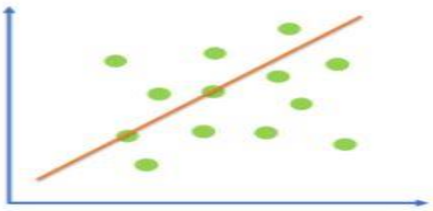
- Ridge Regularization
- Lasso Regularization

Ridge Regularization:

It is 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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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:

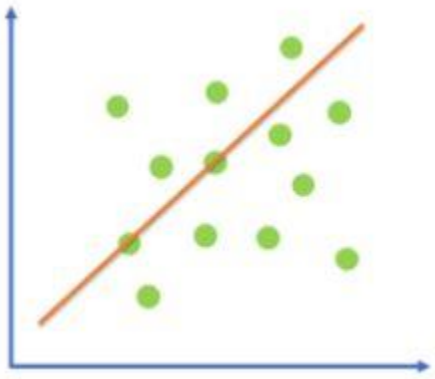
Cost function = Loss + λ x $\sum\|w\|$

Here,

Loss = Sum of the squared residuals

λ = Penalty for the errors

w = slope of the curve/ line



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

Ans:

The distance between each point and the linear graph (shown as black arrows on the above graph) is our **error term.** So we can write our function as $R^B=\beta_0 + \beta_1 E^x + \varepsilon$ where β_0 and β_1 are constants and ε is an (non constant) error term.