**ASSIGNMENT -1**

1ans: By fitting a linear equation, the statistical technique of linear regression is used to represent the relationship between one or more independent variables (commonly denoted as "X") and a dependent variable (often denoted as "Y"). In two dimensions, this equation is represented by a straight line, and in higher dimensions, by a hyperplane. Finding the line that minimizes the difference between the observed values of the dependent variable and the predicted values by the model is the best course of action.

For a number of reasons, linear regression is frequently employed in data analysis and predictive analysis. First of all, it offers a clear and understandable manner to comprehend how variables relate to one another. The model aids in quantifying the relationship between variations in the independent factors and the dependent variable.

Second, a strong technique for prediction is linear regression. Using fresh values for the independent variables, the model can be used to predict future results once the link has been established using historical data. This capacity for prediction is extremely significant in a variety of industries, including marketing, healthcare, and economics.

Additionally, linear regression is a fundamental statistical and machine learning tool. In order to comprehend fundamental ideas like overfitting, bias-variance tradeoff, and feature importance, it builds the foundation for more complicated models.

In addition, hypothesis testing using linear regression makes it possible to assess the importance of the link between variables. Understanding the model's validity and dependability requires conducting the statistical testing mentioned before.

In conclusion, linear regression is an essential and flexible technique for data analysis and forecasting. It facilitates forecasts based on past trends, aids in the unraveling of links between variables, and offers insights crucial for decision-making across several sectors.

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