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Training Day-7 Report:

What is Linear Regression?

Linear regression is a type of supervised machine learning algorithm that computes the linear relationship between the dependent variable and one ormore independent features by fitting a linear equation to observed data.

When there is only one independent feature, it is known as Simple Linear Regression, and when there are more than one feature, it is known as MultipleLinear Regression.

Similarly, when there is only one dependent variable, it is considered Univariate Linear Regression, while when there are more than onedependent variables, it is known as Multivariate Regression.

Why Linear Regression is Important?

The interpretability of linear regression is a notable strength. The model's equation provides clear coefficients that elucidate the impact of each independent variable on the dependent variable, facilitating a deeper understanding of the underlying dynamics. Its simplicity is a virtue, as linearregression is transparent, easy to implement, and serves as a foundational concept for more complex algorithms.

Linear regression is not merely a predictive tool; it forms the basis for various advanced models. Techniques like regularization and support vector machines draw inspiration from linear regression, expanding its utility. Additionally, linear regression is a cornerstone in assumption testing, enabling researchers tovalidate key assumptions about the data.

Types of Linear Regression:-

There are two main types of linear regression:

Simple Linear Regression

This is the simplest form of linear regression, and it involves only one independent variable and one dependent variable. The equation for simplelinear regression is:

$y = \beta 0 + \beta 1 X y = \beta 0 + \beta 1 X$

where:

- Y is the dependent variable
- X is the independent variable
- $\beta 0$ is the intercept
- $\beta 1$ is the slope

Multiple Linear Regression

This involves more than one independent variable and one dependent variable.The equation for multiple linear regression is:

$= \beta 0 + \beta 1 X + \beta 2 X + \ldots \ldots \beta n X y = \beta 0 + \beta 1 X + \beta 2 X + \ldots \ldots \beta n X$

where:

- Y is the dependent variable
- X1, X2, …, Xp are the independent variables
- $\beta 0$ is the intercept
- $\beta 1, \beta 2, …, \beta n$ are the slopes

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The goal of the algorithm is to find the best Fit Line equation that can predictthe values based on the independent variables.

In regression set of records are present with X and Y values and these values are used to learn a function so if you want to predict Y from an unknown X this learned function can be used. In regression we have to find the value of Y,So, a function is required that predicts continuous Y in the case of regression given X as independent features.

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