Regression Analysis

Topics

1. What is Regression ?
2. Application of Regression.
3. Different types of Regression.
4. How is Regression different from Classification.
5. Regression Algorithms in ML

What is Regression?

- Regression is the analysis of the relation between a **dependent variable** and one or more **independent variable**.
- The dependent variable is a variable whose value depends upon other variables.
- The independent variables are variables which decide the value of other variables.
- If $Y = X1 + X2 + X3$,

  Then Y = dependent variable & X's= independent variable

Application of Regression

1. **Business -**

   Regression can be used to find the relation between the money spent on advertisement wrt revenue generated.

1. **Medical field -**

   Regression can be used to find the relation between the drug dosage and blood pressure of the patient.

Types of Regression:

1. Simple Linear Regression : Y share linear relation with a single X

   $$y = \beta_1 X$$

1. Multiple Linear Regression: Y shares linear relation with multiple X's

   $$y = \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3$$

1. Non Linear Regression: X & Y do not share a linear relationship

   $$y = \beta_1 X^2$$

Regression Vs. Classification

- In Regression, the output variable must be continuous in nature i.e. a real valued number

  In Classification, the output variable must be a discrete value.

- In Regression, we try to find the best fit line, which can predict the output more accurately.

  In Classification, we try to find the decision boundary, which can divide the dataset into different classes.

Regression Algorithms in ML:

- Linear Regression
- Ridge Regression
- Lasso Regression
- Decision Tree Regression
- Random Forest
- KNN Model
- Support Vector Machines (SVM)
- Neural Network Regression

To be covered:

- Linear Regression
- Ridge Regression
- Lasso Regression
- Decision Tree Regression