SNS COLLEGE OF TECHNOLOGY

Kurumbapalayam (Po), Coimbatore – 641 035

An Autonomous Institution

Accredited by NAAC – UGC with 'A++' Grade

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

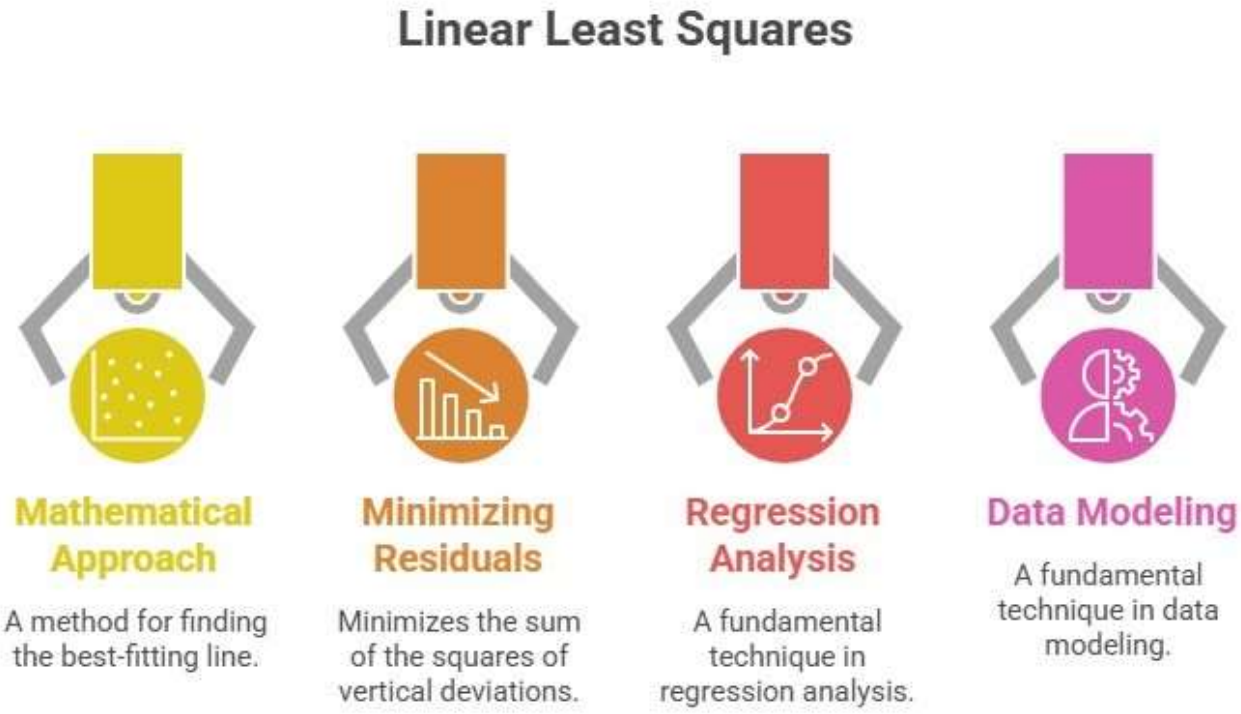
COURSE NAME: 23ADO201- DATA SCIENCE FUNDAMENTALS (OPEN ELECTIVE)

III YEAR / VI SEMESTER

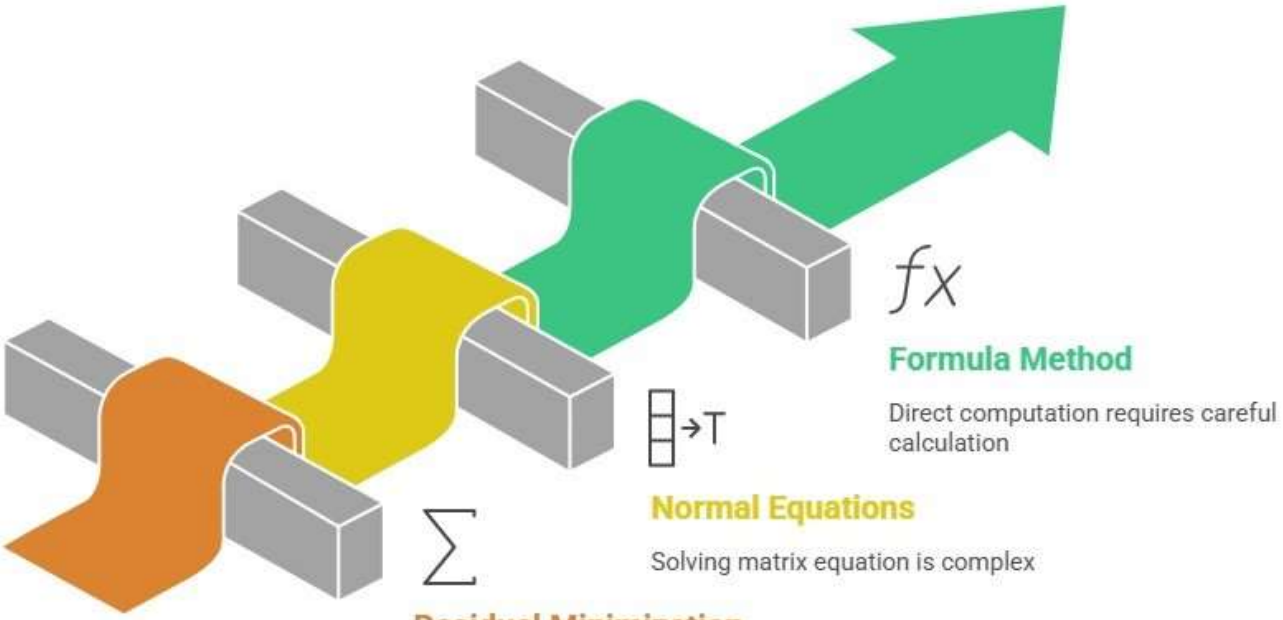
Unit 5 - PREDICTIVE ANALYTICS

Topic : LINEAR LEAST SQUARES

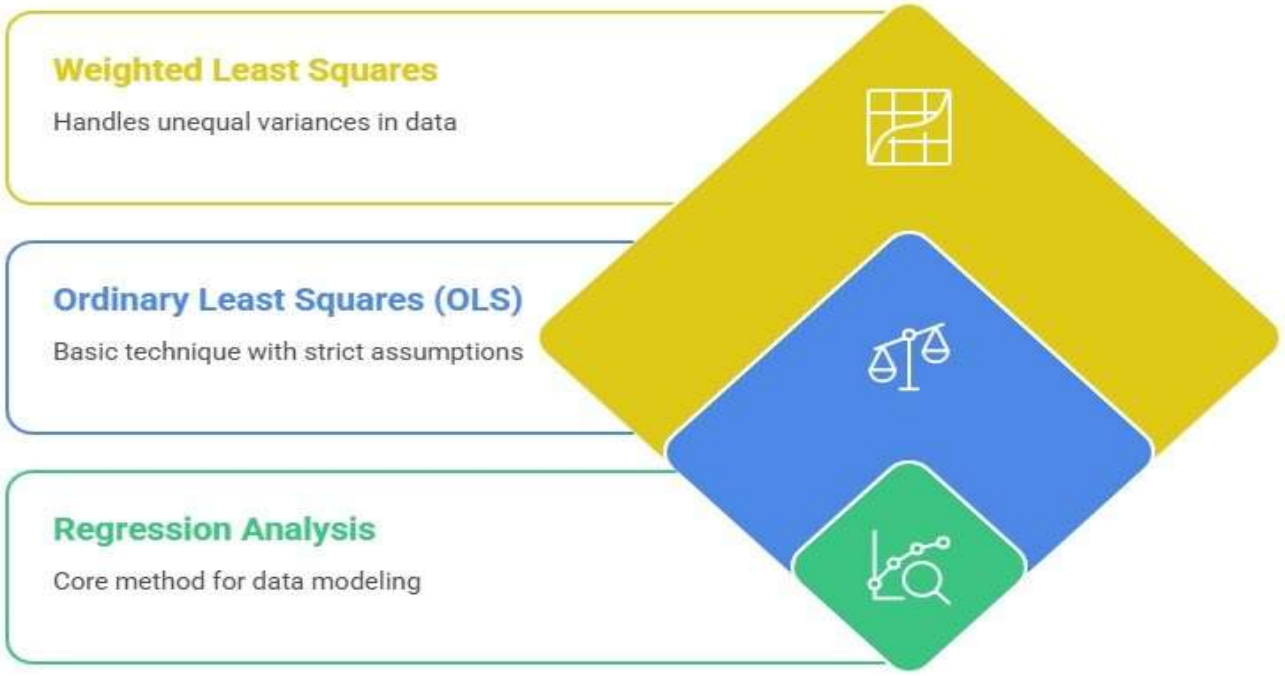
Empathy


Linear Least Squares
Mathematical Approach
A method for finding the best-fitting line.
Minimizing Residuals
Minimizes the sum of the squares of vertical deviations.
Regression Analysis
A fundamental technique in regression analysis.
Data Modeling
A fundamental technique in data modeling.

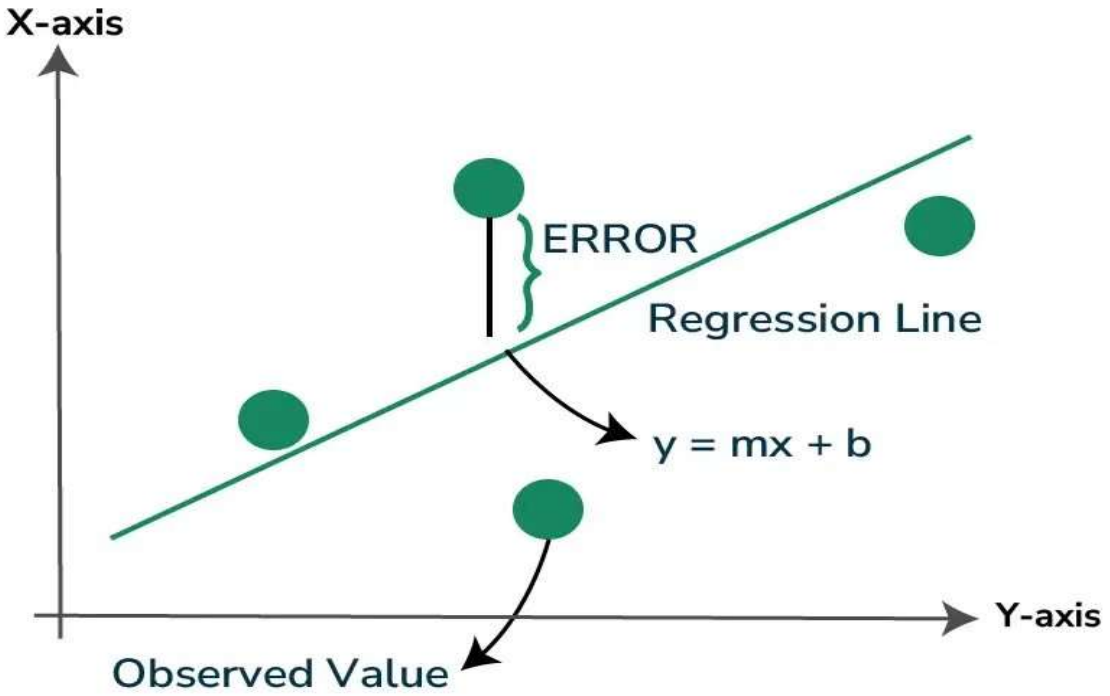
Linear Least Squares Challenges



Regression Analysis Techniques



Least Square Method



Least Square Method Formula

The Least Square Method formula finds the best-fitting line through a set of data points. For a simple linear regression, which is a line of the form

$y = mx+c,$

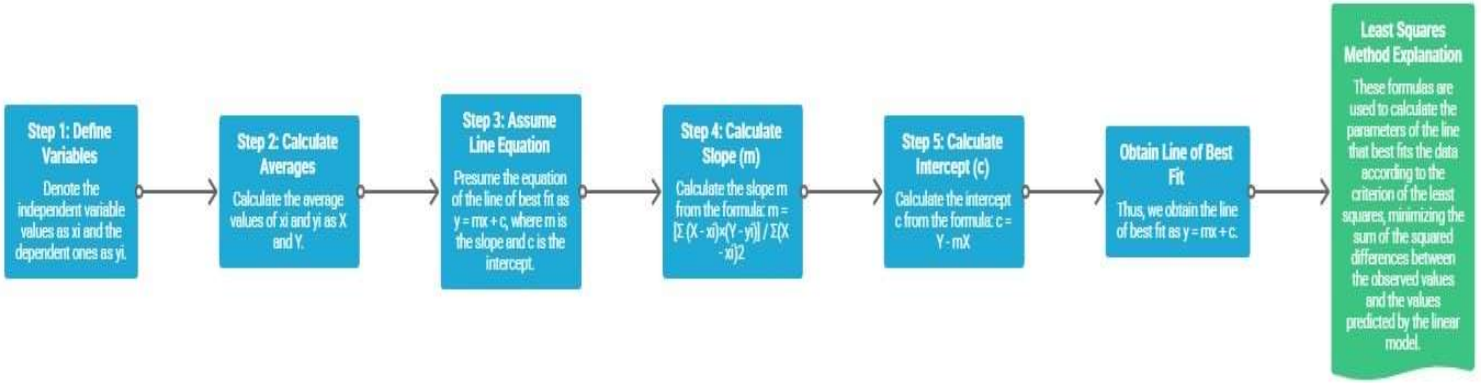
where y is the dependent variable, x is the independent variable, m is the slope of the line, and c is the y-intercept, the formulas to calculate the slope (m) and intercept (c) of the line are derived from the following equations:

- ***Slope (m) Formula:*** $m = \frac{n\sum xy-(\sum x)(\sum y)}{n\sum x^2-(\sum x)^2}$
- ***Intercept (c) Formula:*** $c = \frac{\sum y-m\sum x}{n}$

Where:

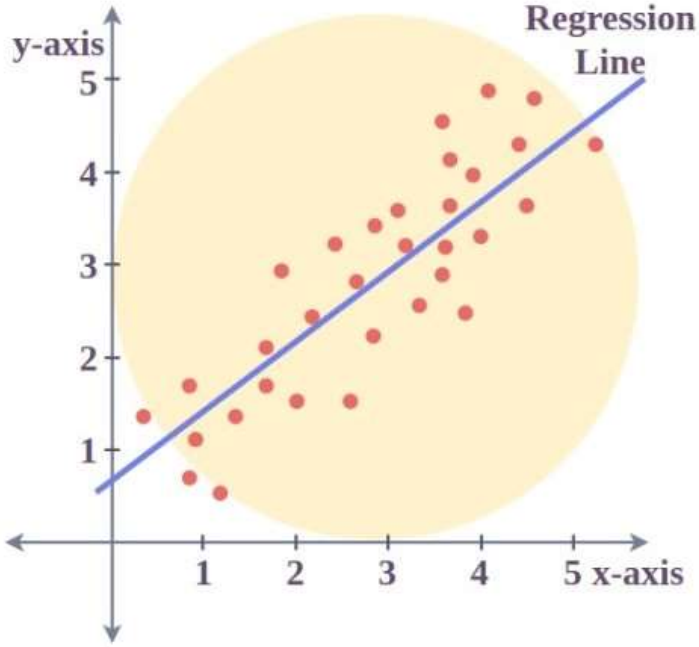
- n is the number of data points,
- $\sum xy$ is the sum of the product of each pair of x and y values,
- $\sum x$ is the sum of all x values,
- $\sum y$ is the sum of all y values,
- $\sum x^2$ is the sum of the squares of the x values.

Steps to Find the Line of Best Fit using Least Squares Method



Least Square Method Graph

Let us have a look at how the data points and the line of best fit obtained from the Least Square method look when plotted on a graph.



Activity

Activity Title: Linear Least Squares (Best Fit Line)

🎯 **Objective**

To find the **best-fit straight line** for a given set of data points using the **least squares method**.

📊 **Given Data (Example)**

x	y
1	2
2	3
3	5
4	4
5	6

🧰 **Materials Required**

•Graph sheet
•Pencil, ruler
•Calculator / Excel (optional)

Linear Least Squares – MCQs

1. The method of least squares is used to:

A) Maximize errors

B) Minimize the sum of squared errors

C) Find random values

D) Eliminate all errors

✅ **Answer:** B

Linear Least Squares – MCQs

1. What is the main objective of the least squares method?

A) Maximize error

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B) Minimize the sum of squared errors

C) Minimize the number of data points

D) Maximize slope

✅ **Answer:** B

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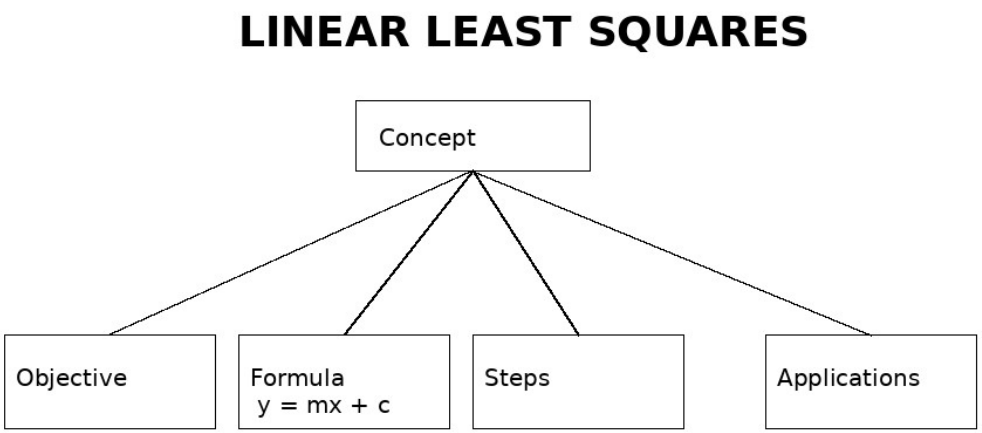
LINEAR LEAST SQUARES
Concept
Objective
Formula
y = mx + c
Steps
Applications

TEXT BOOKS	
1.	Srinivasan Desikan and Gopalaswamy Ramesh, ―Software Testing – Principles and Practices, Pearson Education, 2006.
REFERENCES	
1.	Ilene Burnstein, ―Practical Software Testing, Springer International Edition, 2003
2.	Edward Kit, Software Testing in the Real World – Improving the Process‖, Pearson Education, 1995
3.	Boris Beizer, Software Testing Techniques – 2nd Edition, Van Nostrand Reinhold, New York, 1990.
4.	Aditya P. Mathur, ―Foundations of Software Testing _ Fundamental Algorithms and Techniques, Dorling Kindersley (India) Pvt. Ltd., Pearson Education, 2008.

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THANK YOU!

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