# ML Assignment on Regression Technique Name: Dhananjay Siddhanath Jagtap Roll No: 282057 Batch: B3

# Problem Statement

This dataset consists of average monthly temperatures across various locations in India. The temperature values are recorded in Celsius.

## Tasks

a) Apply Linear Regression using a suitable library to predict month-wise temperatures.

b) Evaluate the model performance using MSE, MAE, and R-Squared metrics.

c) Visualize the results using a simple regression model.

## Objective

This assignment aims to help students understand the application of Linear Regression for prediction tasks.

## Software and Hardware Requirements

Operating System: Linux (Ubuntu) / Windows

Software: Jupyter Notebook

## Theory

### Linear Regression

Linear Regression is a statistical method used for predictive analysis. It estimates the relationship between a dependent variable (target) and one or more independent variables (features).

### Types of Linear Regression

• Simple Linear Regression: Uses one independent variable to predict the dependent variable.

• Multiple Linear Regression: Uses multiple independent variables to predict the dependent variable.

### Assumptions of Linear Regression

• Homoscedasticity: Constant variance of errors.

• Independence of Observations: No hidden relationships among observations.

• Normality: The residuals should follow a normal distribution.

• Linearity: There must be a linear relationship between independent and dependent variables.

### Applications of Simple Linear Regression

1. Predicting student marks based on study hours.

2. Estimating crop yield from rainfall levels.

3. Forecasting salary based on years of experience.

### Limitations of Simple Linear Regression

Linear Regression assumes causality where there may be only correlation. Even a well-fitting model does not confirm that one variable causes changes in another. Further analysis is required to establish causation.

## Conclusion

Simple Linear Regression helps identify and quantify relationships between variables. It is a foundational tool in predictive modeling that provides insights using a straight-line approximation.







