Lab 5
Supervised Learning – Regression

Dataset:

housing = fetch_california_housing(as_frame=True)
df = housing.frame

Objectives

- Understand various regression algorithms and their applications.
- Evaluate model performance using MSE, MAE, RMSE, and R^2.

Theory to Be Read Before Lab
- Regression types: Simple, Multiple, Polynomial
- Evaluation Metrics: MAE, MSE, RMSE, R^2
- Train-test split rationale

Exercises

Apply the following regression models to predict charges:
- Simple Linear Regression (using MedInc only)
- Multiple Linear Regression (all features)
- Polynomial Regression (degree 2 and 3, using both single and multiple features)
- Ridge Regression (with tuning alpha)
- Lasso Regression (with tuning alpha)
- Decision Tree Regressor

For each model:
- Train the model
- Predict on test data
- Evaluate and record:
    - MAE
    - MSE
    - RMSE
    - R^2 Score
- Create scatter plot of actual vs predicted values