## Project 2: Predictive Modeling with Linear Regression

### Description

This project involves building a linear regression model using the `mtcars` dataset to predict miles per gallon (mpg) based on various car features.

### Dataset

- \*\*mtcars\*\*: Built-in dataset in R containing measurements for various car attributes.

### R Code

1. \*\*Data Preprocessing\*\*: Load and clean the dataset, and split it into training and test sets.

2. \*\*Model Building\*\*: Fit a linear regression model to the training data.

3. \*\*Model Evaluation\*\*: Evaluate the model performance on the test set.

4. \*\*Visualization\*\*: Plot actual vs predicted values.

### How to Run

1. Install and load the required packages.

2. Copy the R code into a Jupyter Notebook cell and run it.

3. View and interpret the model summary and performance metrics.

4. Check the generated plot for model predictions.

**Part 2:**

### R Code

1. \*\*Feature Engineering\*\*: Create interaction terms.

2. \*\*Data Preprocessing\*\*: Standardize the features and split the data.

3. \*\*Model Building\*\*: Fit a linear regression model.

4. \*\*Model Tuning\*\*:

- Ridge Regression (alpha = 0).

- Lasso Regression (alpha = 1).

5. \*\*Evaluation\*\*: Compare model performance using RMSE and other metrics.

6. \*\*Visualization\*\*: Plot actual vs predicted values for Lasso model.

7. \*\*Save Plot\*\*: Save visualization as a PNG file.