dataset

June 28, 2024

[ ]:
```
# Import necessary libraries
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_squared_error, r2_score
import numpy as np
import matplotlib.pyplot as plt

# Load the dataset
data_bmi = pd.read_csv('/content/drive/MyDrive/Train/car_fuel_efficiency.csv')

# Define independent and dependent variables
X = data_bmi[['Engine_Size', 'Weight']]
y = data_bmi['Fuel_Efficiency']

# Split the data
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2,␣
 ↪random_state=42)

# Train the model
model = LinearRegression()
model.fit(X_train, y_train)

# Evaluate the model
y_pred = model.predict(X_test)
mse = mean_squared_error(y_test, y_pred)
r2 = r2_score(y_test, y_pred)

print(f"Mean Squared Error: {mse}")
print(f"R-squared: {r2}")

# Display coefficients
print(f"Coefficients: {model.coef_}")
print(f"Intercept: {model.intercept_}") # Removed the parenthesis here

# Visualize the results
plt.scatter(y_test, y_pred)
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plt.xlabel("Actual Fuel Efficiency (mpg)")
plt.ylabel("Predicted Fuel Efficiency (mpg)")
plt.title("Actual vs Predicted Fuel Efficiency")
plt.show()

# Predict fuel efficiency for new data
new_data = np.array([[1.6, 2500]])
prediction = model.predict(new_data)

print(f"Predicted Fuel Efficiency for engine size 1.6 liters and weight 2500␣
 ↪lbs: {prediction[0]} mpg")

# Interpret the prediction (arbitrary thresholds for the example)
if prediction < 15:
    print("Extremely Low Efficiency")
elif 15 <= prediction < 20:
    print("Low Efficiency")
elif 20 <= prediction < 25:
    print("Moderate Efficiency")
elif 25 <= prediction < 30:
    print("High Efficiency")
else:
    print("Very High Efficiency")
```
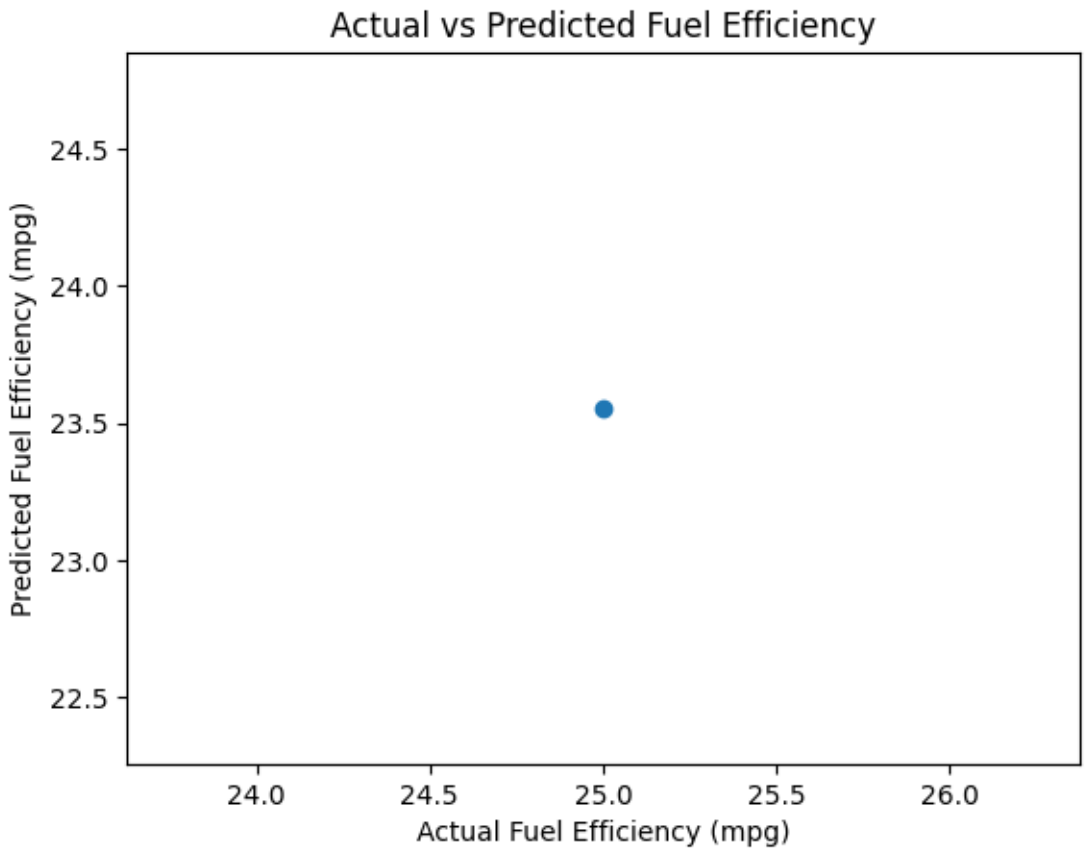

```
/usr/local/lib/python3.10/dist-packages/sklearn/metrics/_regression.py:918:
UndefinedMetricWarning: R^2 score is not well-defined with less than two
samples.
  warnings.warn(msg, UndefinedMetricWarning)
```

```
Mean Squared Error: 2.0917287070555415
R-squared: nan
Coefficients: [ 5.70247934 -0.01586777]
Intercept: 59.7520661157025
```




```
Predicted Fuel Efficiency for engine size 1.6 liters and weight 2500 lbs:
29.20661157024793 mpg
High Efficiency

/usr/local/lib/python3.10/dist-packages/sklearn/base.py:439: UserWarning: X does
not have valid feature names, but LinearRegression was fitted with feature names
  warnings.warn(
```