Training Day 22 Report

Date: 21 July 2025
Topic: Visualizing Linear Regression Results

Overview

Today's session extended the concept of Linear Regression by adding **visualization** to evaluate model performance. Graphs help compare **actual data points** with the **predicted regression line**, making it easier to interpret results.

Key Concepts

1. Why Visualization?

- Helps in understanding how well the regression line fits the data.

- Makes it easier to spot errors or patterns.

2. Steps Performed

- Generated synthetic dataset using make_regression().

- Trained a **Linear Regression** model with scaling.

- Plotted scatter points for **actual data**.

- Drew regression line for **predictions**.

### 3. Code for Visualization

```
import matplotlib.pyplot as plt

# Predictions
y_pred = pipeline.predict(X)

# Scatter plot of actual data
plt.scatter(X, y, color="blue", label="Actual Data")

# Regression line
plt.plot(X, y_pred, color="red", linewidth=2, label="Regression Line")

plt.xlabel("Feature (X)")
```

plt.ylabel("Target (y)")
plt.title("Linear Regression: Actual Data vs Regression Line")
plt.legend()
plt.show()
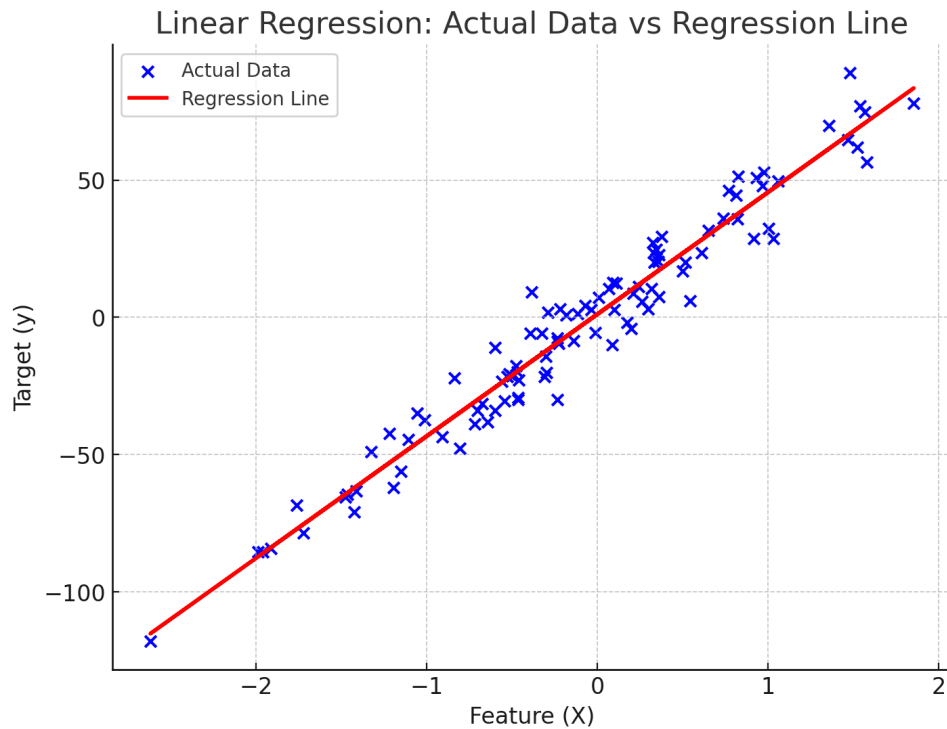
Visualization: Actual vs Predicted

- **Blue dots** → Actual data points

- **Red line** → Predicted regression line

When the red line passes close to most blue dots, it indicates a good fit.

Learning Outcome

- Learned how to **visualize regression results**.

- Understood the importance of **comparing actual vs predicted values graphically**.

- Gained confidence in evaluating model performance through plots.