Training Day 12 Report

Date: 8 July 2025

Topic: Data Visualization with Matplotlib

Overview

On Day 12, you learned about **Matplotlib**, one of the most widely used Python libraries for data visualization.
You practiced creating different types of plots:

- Line Plot
- Bar Chart
- Histogram
- Scatter Plot
- Pie Chart

Key Concepts Covered

1. Installing and Importing Matplotlib

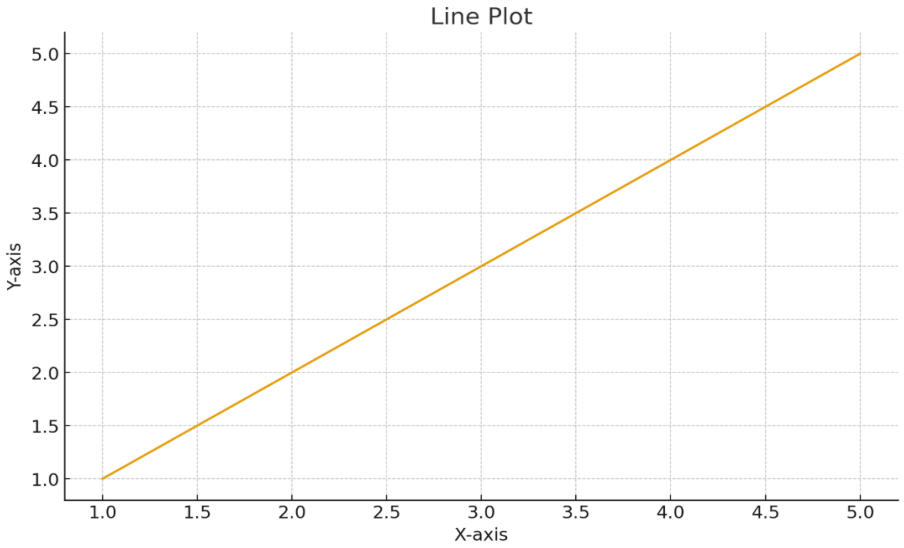
```
!pip install matplotlib
import matplotlib.pyplot as plt
```

- Installed the Matplotlib package.
- Imported it as plt (standard convention).

2. Line Plot

```
x = [1, 2, 3, 4, 5]
y = [1, 2, 3, 4, 5]
plt.plot(x, y)
plt.title("Line Plot")
plt.xlabel("X-axis")
plt.ylabel("Y-axis")
plt.show()
```

- Simple line connecting data points (x, y).
- Useful for **showing trends over time or sequence**.

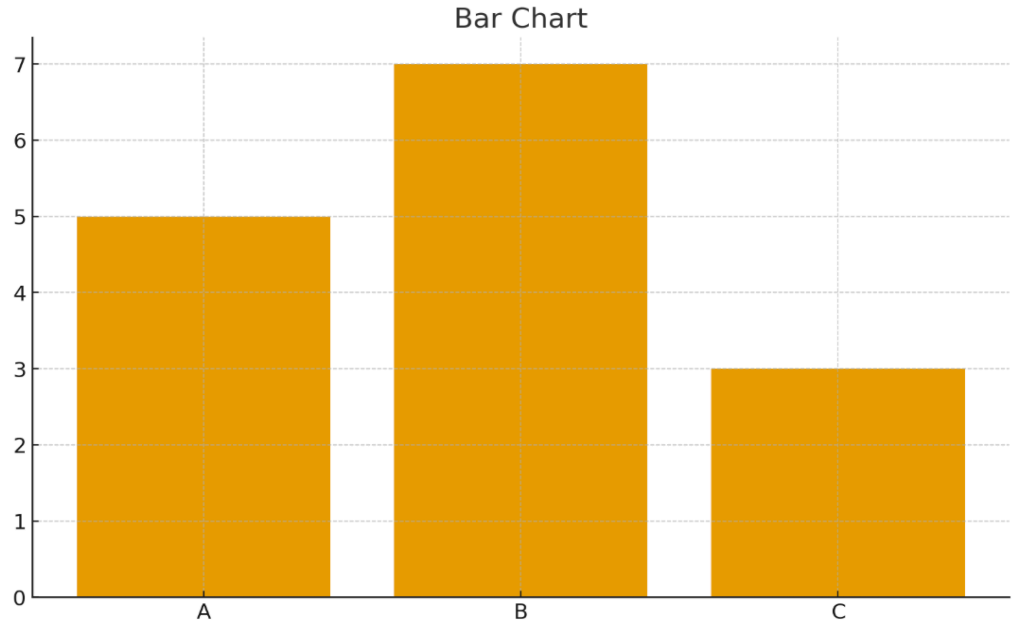


3. Bar Chart

x = ['A', 'B', 'C']
y = [5, 7, 3]

plt.bar(x, y)
plt.title("Bar Chart")
plt.show()

- Plots categorical data.
- Shows **comparisons** between groups (A, B, C).

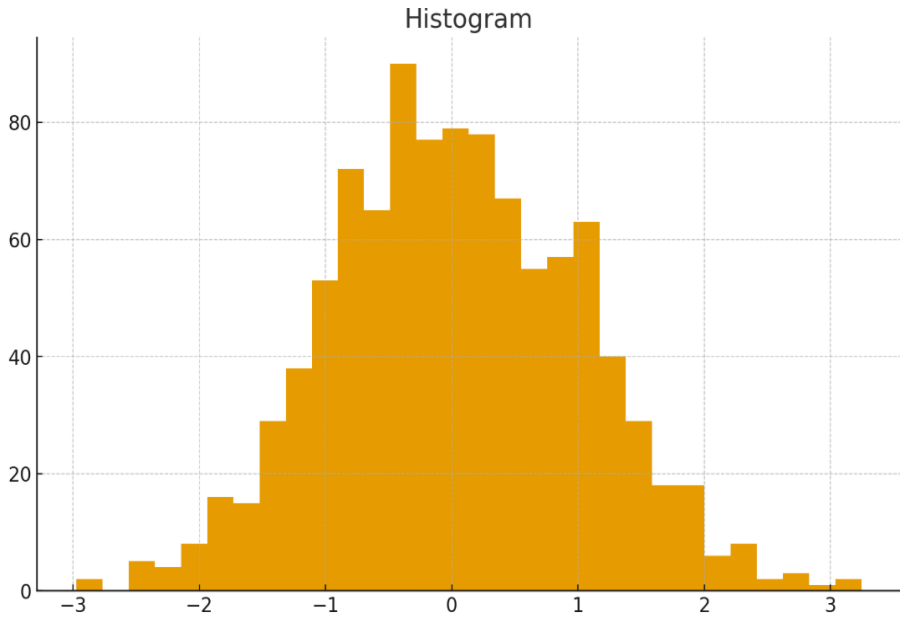


4. Histogram

```
import numpy as np
data = np.random.randn(1000)  # 1000 random values

plt.hist(data, bins=30)
plt.title("Histogram")
plt.show()
```

- Histogram shows **distribution of continuous data**.
- Here, 1000 random values (normally distributed) were plotted.
- Helps to analyze **frequency distribution**.



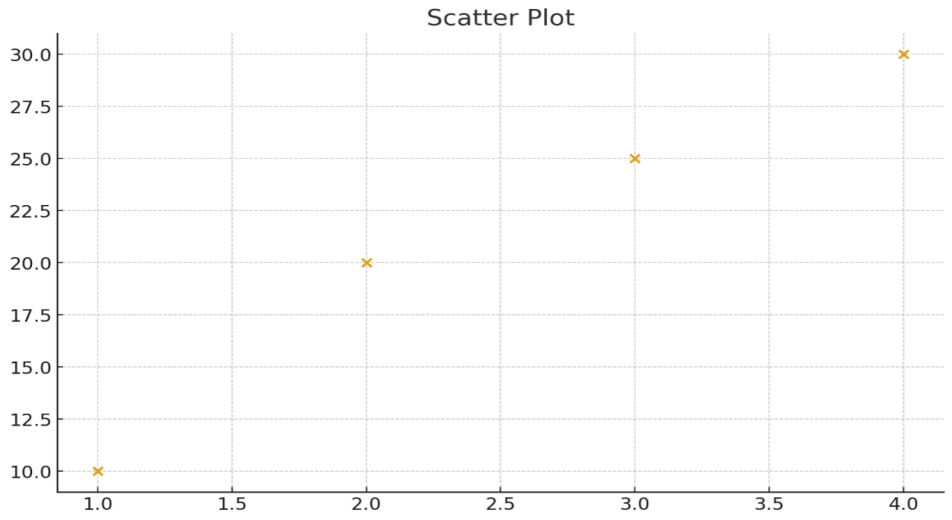
5. Scatter Plot

```
x = [1, 2, 3, 4]
y = [10, 20, 25, 30]

plt.scatter(x, y)
plt.title("Scatter Plot")
plt.show()
```

- Each point represents a pair (x, y).

- Useful for showing **correlation between variables**.

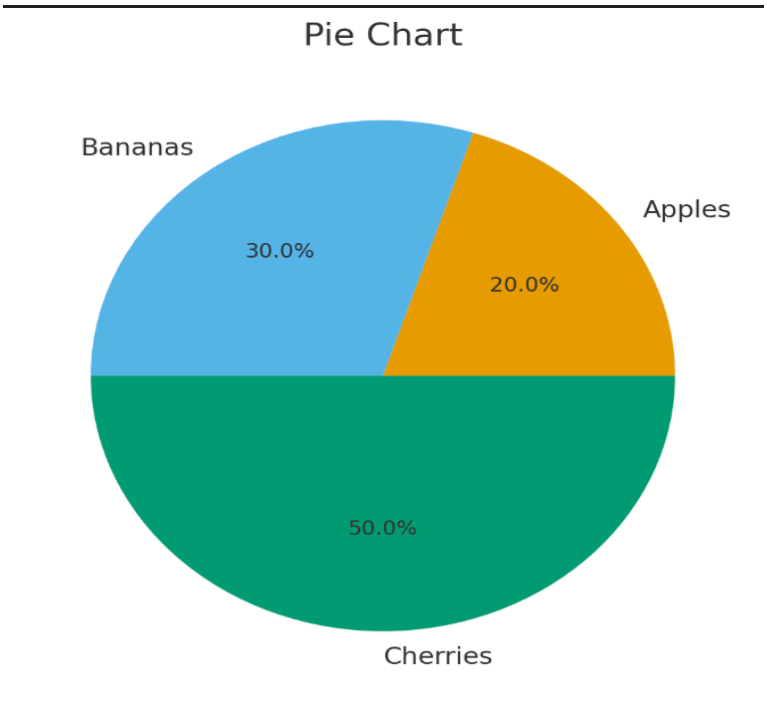


6. Pie Chart

```
sizes = [20, 30, 50]
labels = ['Apples', 'Bananas', 'Cherries']

plt.pie(sizes, labels=labels, autopct='%1.1f%%')
plt.title("Pie Chart")
plt.show()
```

- Displays data as percentages of a whole.
- Here, Cherries = 50%, Bananas = 30%, Apples = 20%.



Summary of Learning

✔ Installed and used **Matplotlib**.
✔ Learned to plot **Line, Bar, Histogram, Scatter, Pie Charts**.
✔ Understood which type of chart is suitable for different types of data.
✔ Learned labeling, titling, and customizing charts.

Learning Outcomes

✅ Ability to **visualize datasets** using Matplotlib.
✅ Can create **basic plots for data analysis**.
✅ Understood **distribution, comparison, correlation, and proportions** through visualizations.