Complete Matplotlib Guide

Data Visualization with Python

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Matplotlib

🎨 What is Matplotlib?

- **Matplotlib** is a popular Python library for **data visualisation**.
- It helps you create different types of **charts, plots, and graphs** to understand data better.
- Module used:

```
import matplotlib.pyplot as plt
```

⚡ Features of Matplotlib

- Wide variety of plots (line, bar, scatter, histogram, etc.)
- Highly customizable (colors, labels, styles, etc.)
- Works well with **NumPy and Pandas**
- Can export to images (PNG, JPG) and PDFs
- Interactive plots with **Jupyter Notebook**

📝 Basic Example

```
import matplotlib.pyplot as plt
x = [1, 2, 3, 4, 5]
y = [10, 20, 25, 30, 40]
plt.plot(x, y) # line plot
plt.xlabel("X-axis")
plt.ylabel("Y-axis")
plt.title("Simple Line Chart")
plt.show()
```

📊 Types of Charts in Matplotlib

Below is a **list of important charts/graphs,** their definition, and when to use them:

1) Line Chart

```
plt.plot(x, y)
```

Definition: Shows data as points connected by straight lines.
Use Case: Best for showing trends over time (e.g., stock price, sales growth).

2) Bar Chart

```
plt.bar(x, y)
```

Definition: Uses rectangular bars to compare values.
Use Case: Comparing categories (e.g., sales in different regions).

3) Horizontal Bar Chart

```
plt.barh(x, y)
```

Definition: Similar to bar chart but horizontal.
Use Case: When category names are long, or comparison looks better horizontally.