

A look at



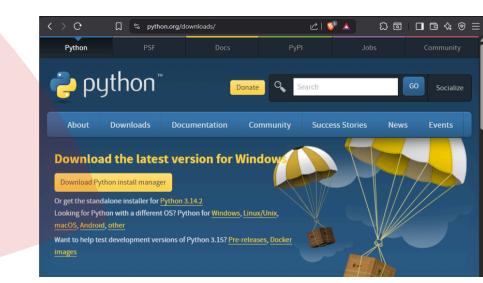
Data Visualization With Python

Best used in **Jupyter Notebook** an interactive coding environment

What is it?

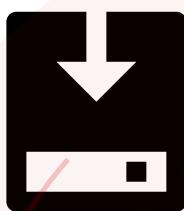
Data visualization in Python is the process of using Python programming tools to turn data into visual formats such as charts, graphs, and plots. It helps people understand patterns, trends, and insights in data more easily than looking at raw numbers. Python libraries like Matplotlib, Seaborn, and Plotly are commonly used to create clear, informative, and sometimes interactive visualizations.

How it works:



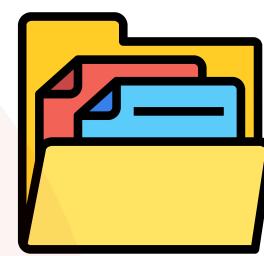
- ✓ Install Python (version 3.8 or higher)

Tip: Use Jupyter Notebook to code interactively! [Jupyter.org](https://jupyter.org)



- Download and install Python python.org from the official website

- ✓ Use pip to install matplotlib/plotly/seaborn



- ✓ Import required libraries

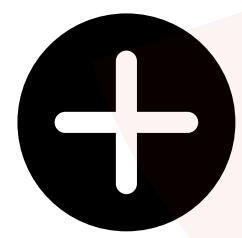


- ✓ Load and inspect data using Pandas

Read datasets into Pandas DataFrames and examine the data structure, columns, and values.



- ✓ Save or export visualizations (PNG, PDF, HTML)



- ✓ Add labels, legends, titles, and annotations



- ✓ Choose the library based on visualization needs

Matplotlib → basic, fully customizable plots
Seaborn → statistical and aesthetic plots
Plotly → interactive and web-based plots

KEY FEATURE SUMMARY

matplotlib

- Core Python plotting library
- Full control over plot elements
- Produces publication-quality static figures
- Highly customizable but more verbose



✓ When to Use

- Academic research and thesis work
- Statistical analysis and data exploration
- Creating reproducible figures
- Working with large datasets
- Need for both static and interactive visuals
- Integration with machine learning or data pipelines

seaborn

- Built on top of Matplotlib
- Simplifies statistical data visualization
- Attractive default themes and color palettes
- Strong support for distributions and correlations

plotly

- Interactive and dynamic visualizations
- Hover tooltips, zooming, and filtering
- Supports dashboards and web embedding
- Outputs interactive HTML files

Common Visualization Types Supported

Line Charts

Matplotlib ✓ Seaborn ✓ Plotly ✓

Bar Charts

Matplotlib ✓ Seaborn ✓ Plotly ✓

Scatter Plots

Matplotlib ✓ Seaborn ✓ Plotly ✓

Histogram

Matplotlib ✓ Seaborn ✓ Plotly ✓

Box Plots

Matplotlib ✓ Seaborn ✓ Plotly ✓

Heatmaps

Matplotlib ✓ Seaborn ✓ Plotly ✓

Violin Plots

Matplotlib ✓ Seaborn ✓ Plotly ✓

Pie Charts

Matplotlib ✓ Seaborn ✓ Plotly ✓

Time Series Plots

Matplotlib ✓ Seaborn ✗ Plotly ✓

✗ When Not to Use

- When drag-and-drop tools are preferred (e.g., Tableau)
- For users without programming background
- Simple one-time charts with tight deadlines
- Complex dashboards without web development knowledge

