

Lesson 17: Matplotlib Basics

Data Science with Python – BSc Course

45 Minutes

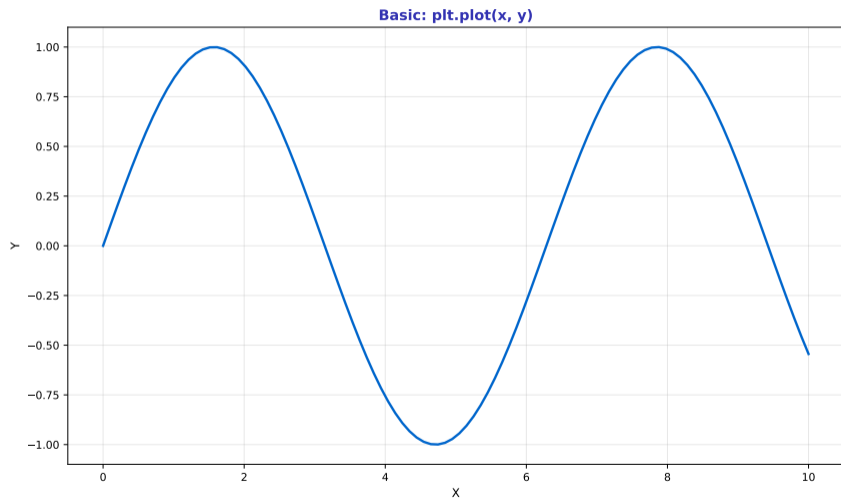
Learning Objectives

After this lesson, you will be able to:

- Create line, bar, and scatter plots
- Customize colors, labels, legends
- Build multi-panel figures
- Add annotations and formatting

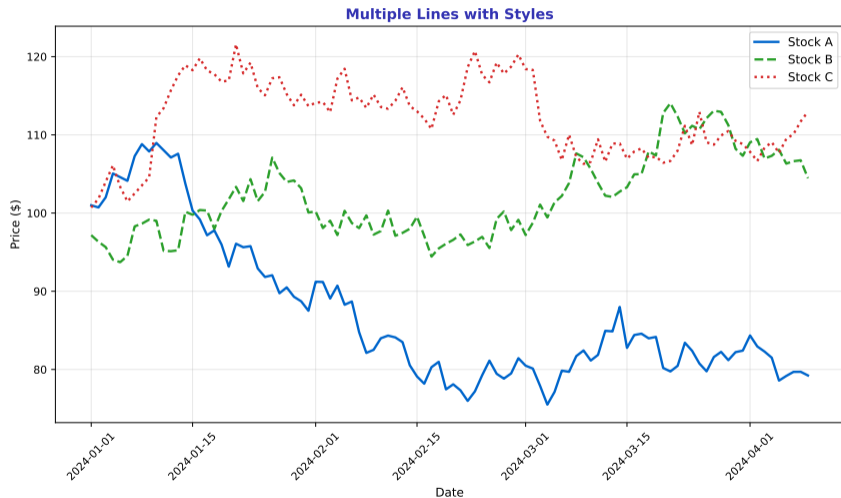
Finance application: Statistical analysis of market data

Basic Line Plot



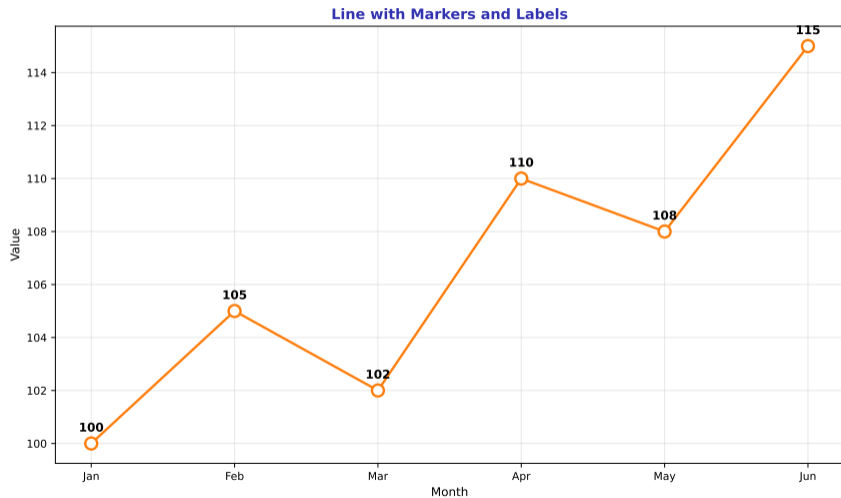
`plt.plot(x, y)` for simple line charts

Multiple Lines

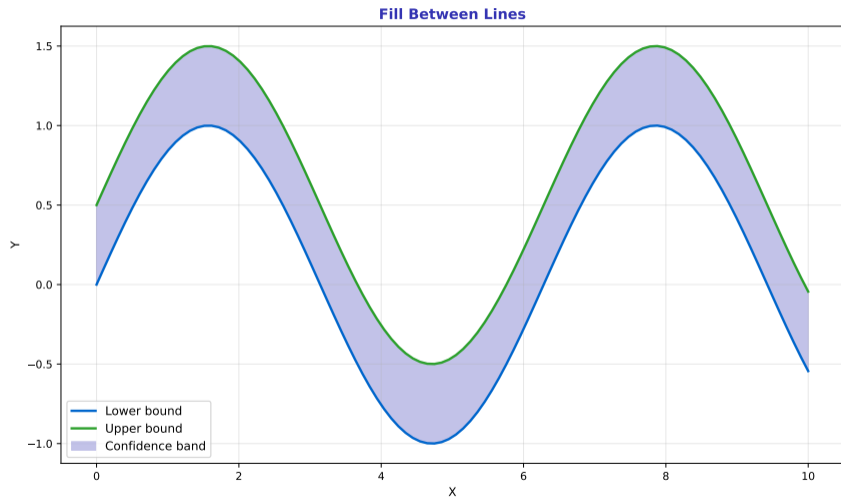


Comparing multiple time series

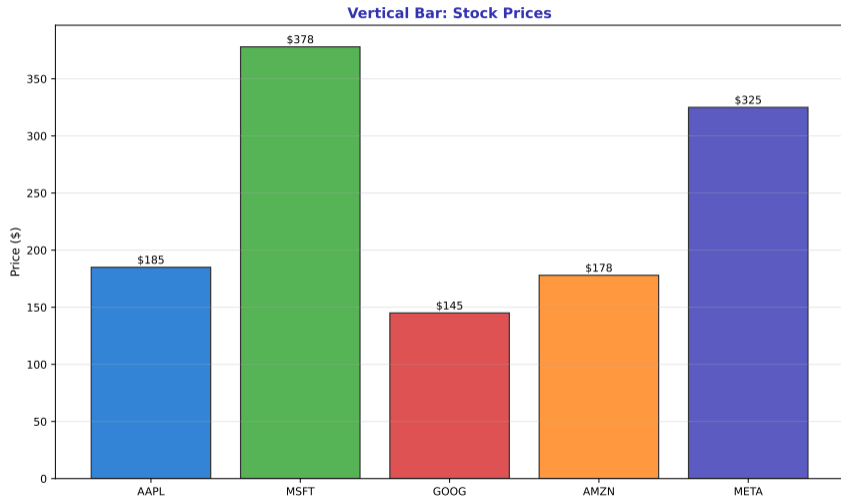
Line with Markers



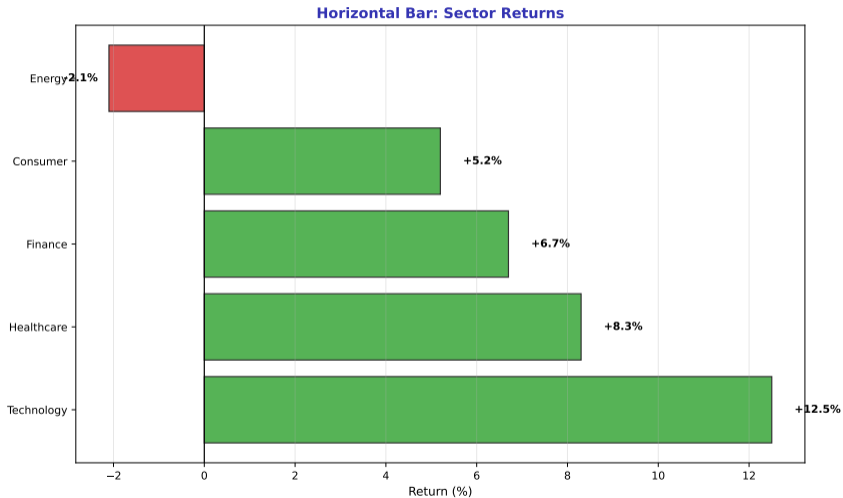
Adding data point markers



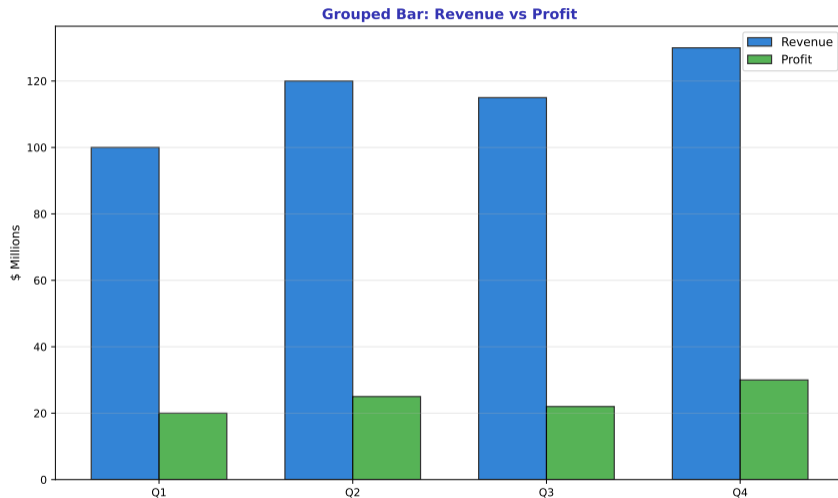
Shading area between lines



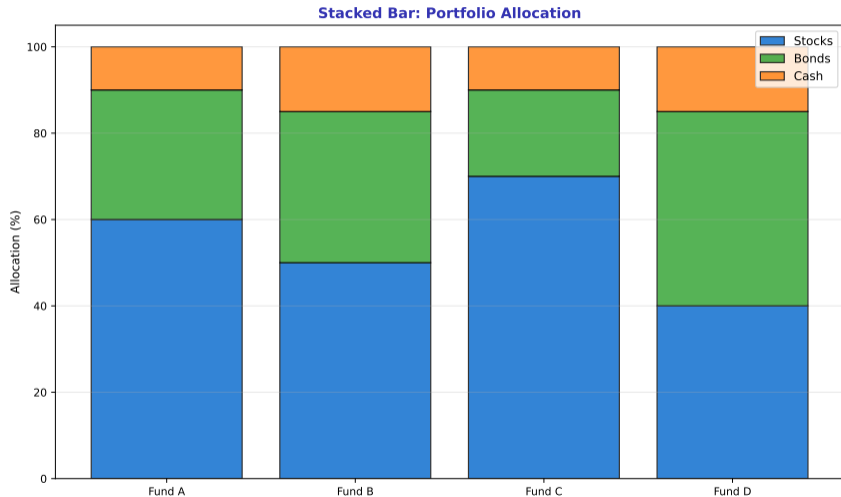
Comparing categorical values



Better for long category names

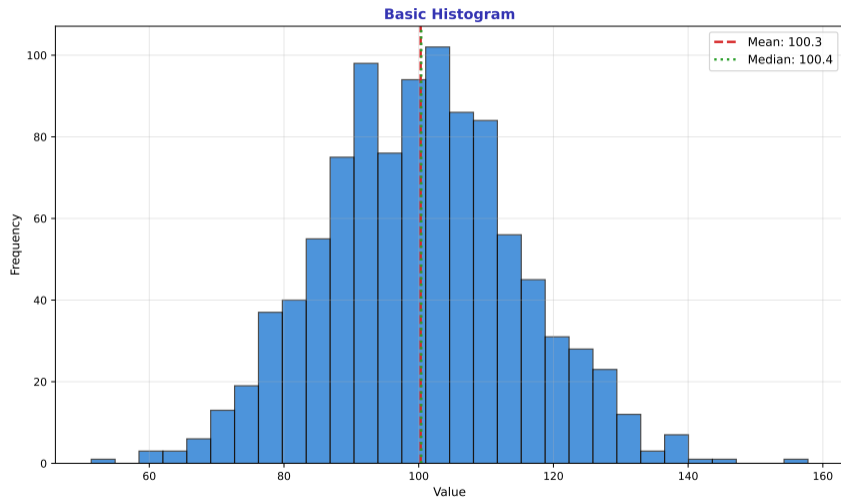


Comparing multiple series by category



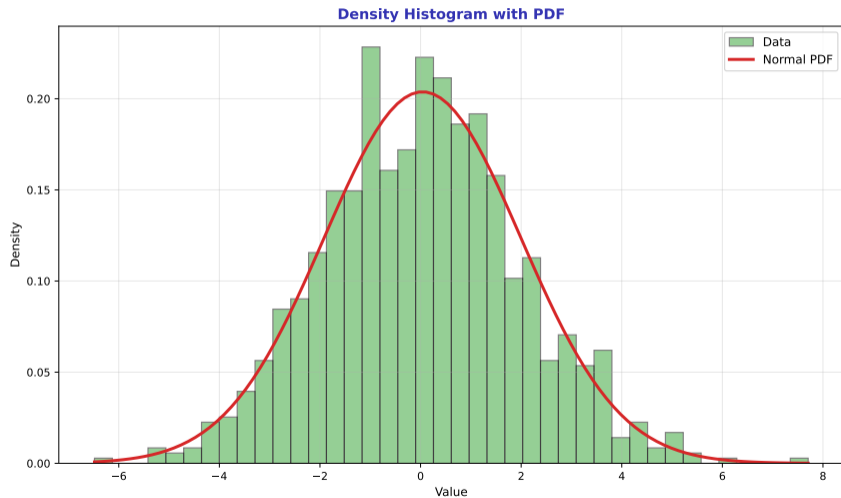
Showing composition of totals

Basic Histogram



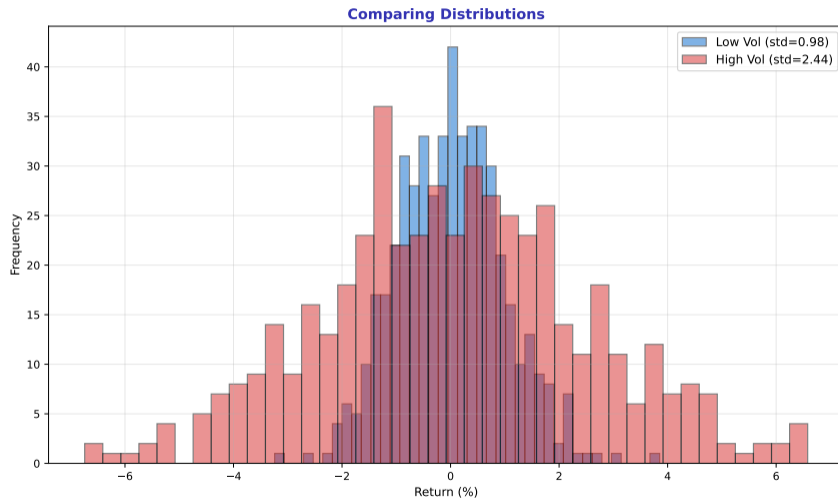
Distribution with mean and median

Density Histogram



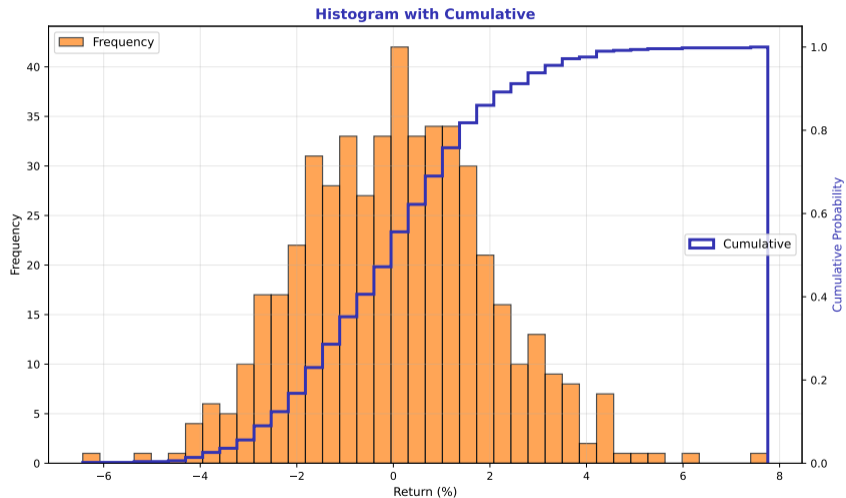
Normalized with PDF overlay

Comparing Distributions

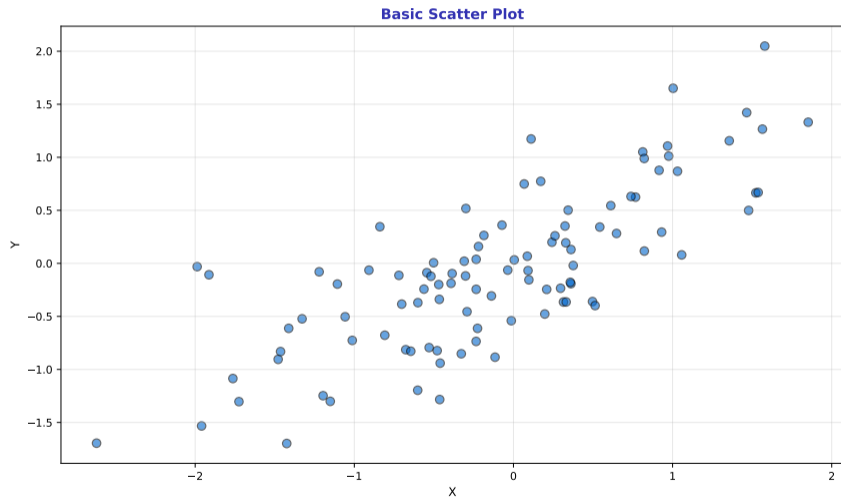


Multiple overlapping histograms

Cumulative Histogram

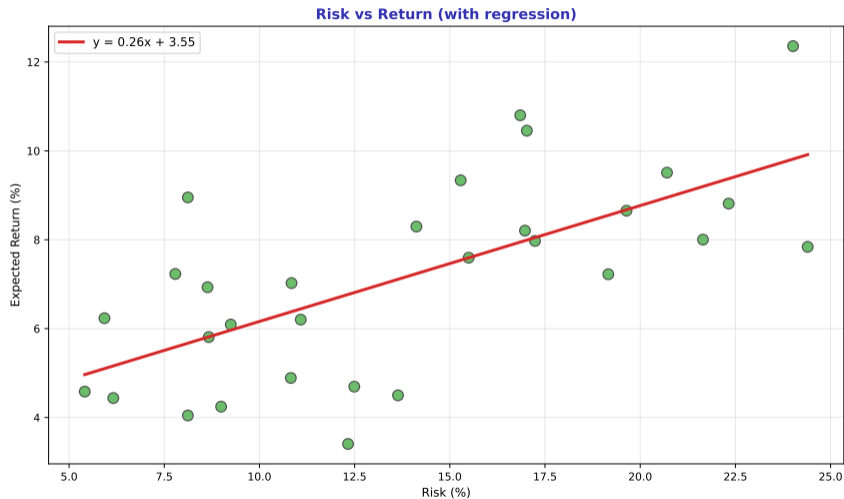


Frequency with CDF



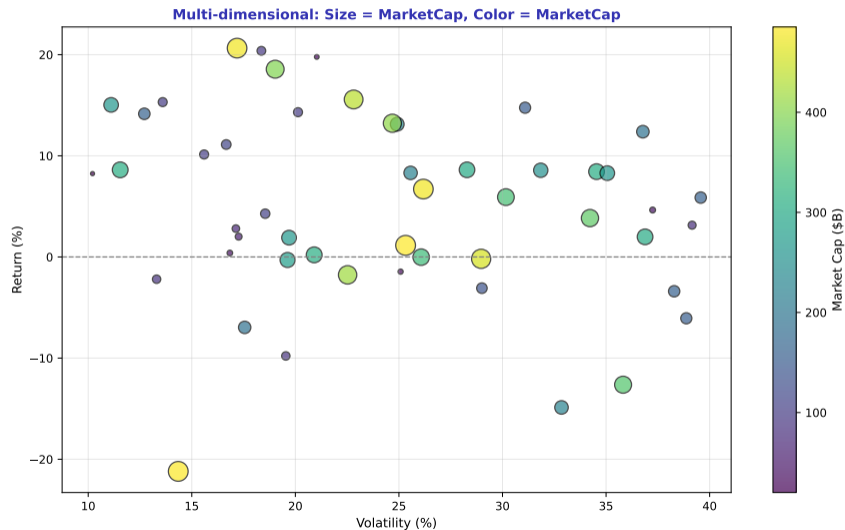
Simple X vs Y relationship

Scatter with Regression

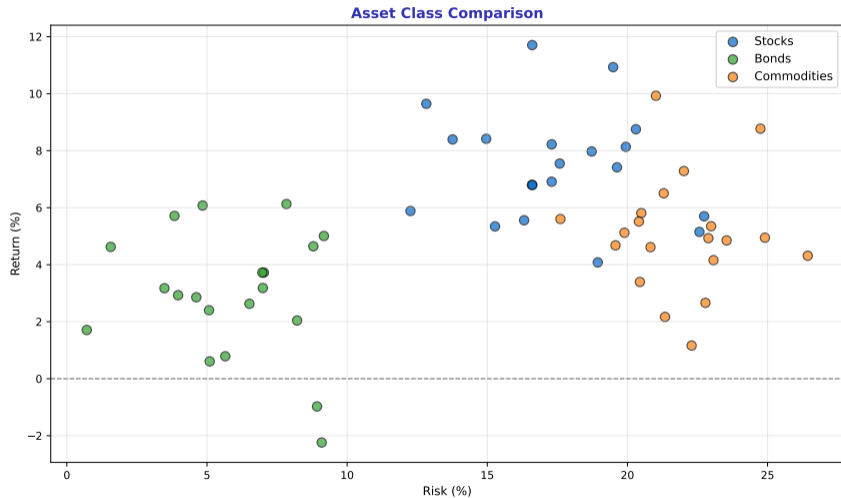


Adding trend line

Multidimensional Scatter



Grouped Scatter



Comparing categories

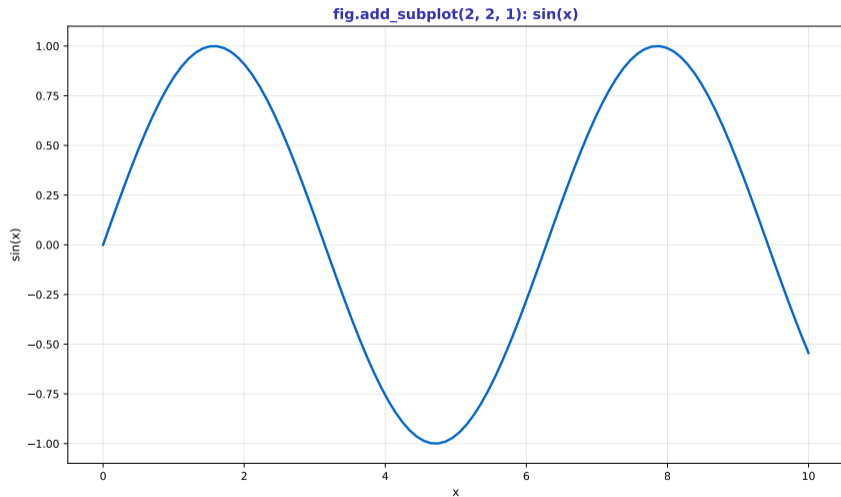
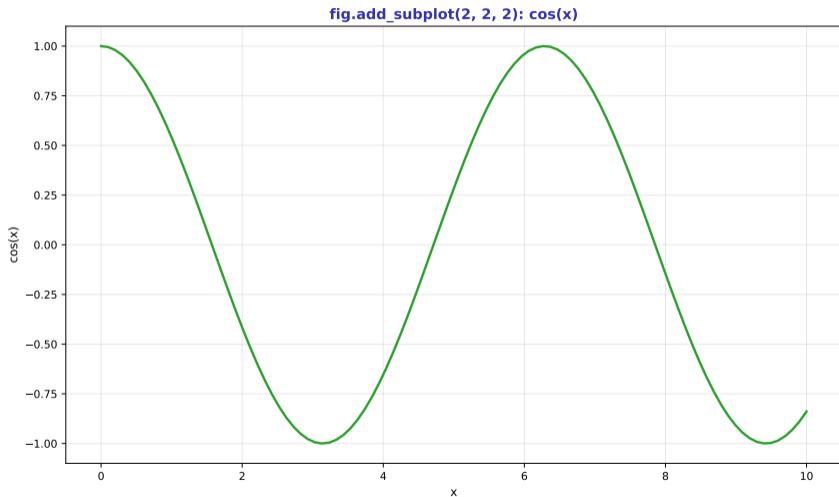
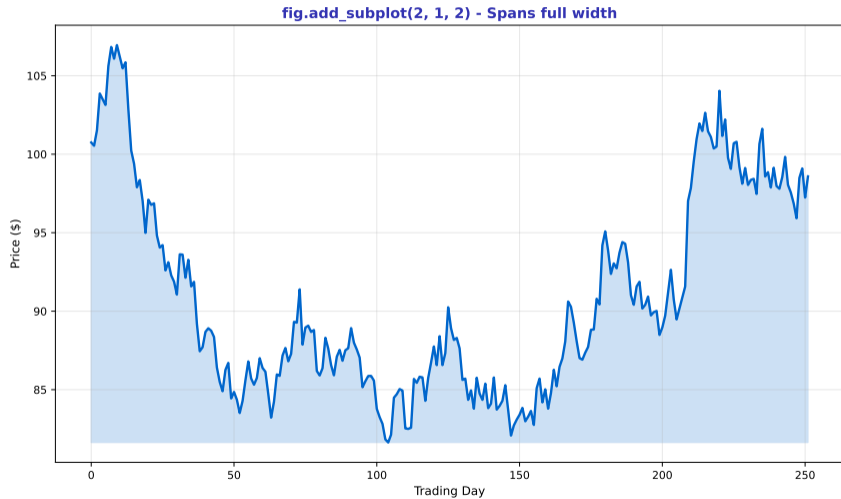


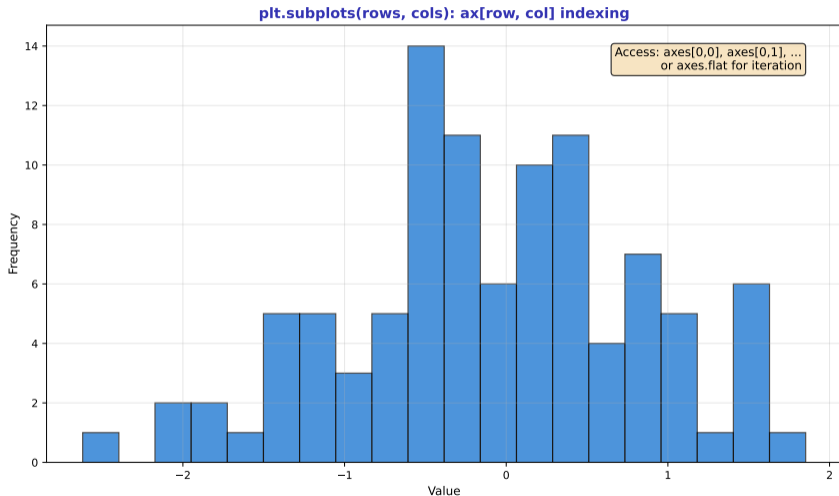
fig.add_subplot(rows, cols, index)

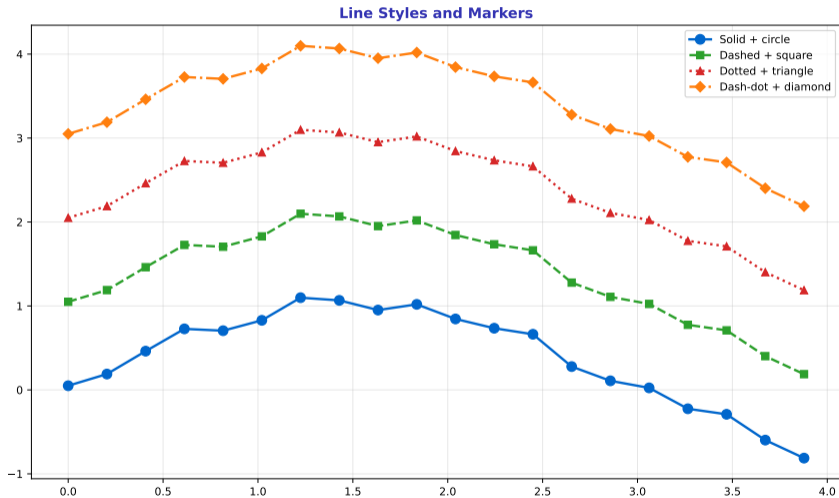


Spanning Subplot

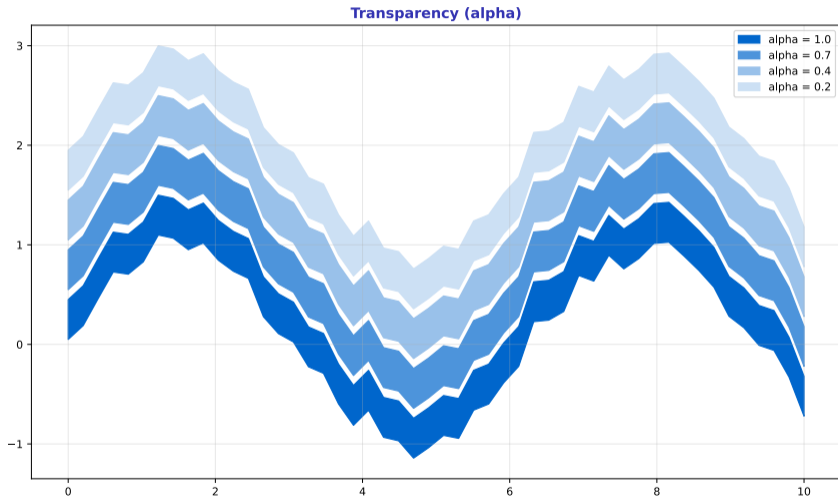


Subplot spanning multiple positions

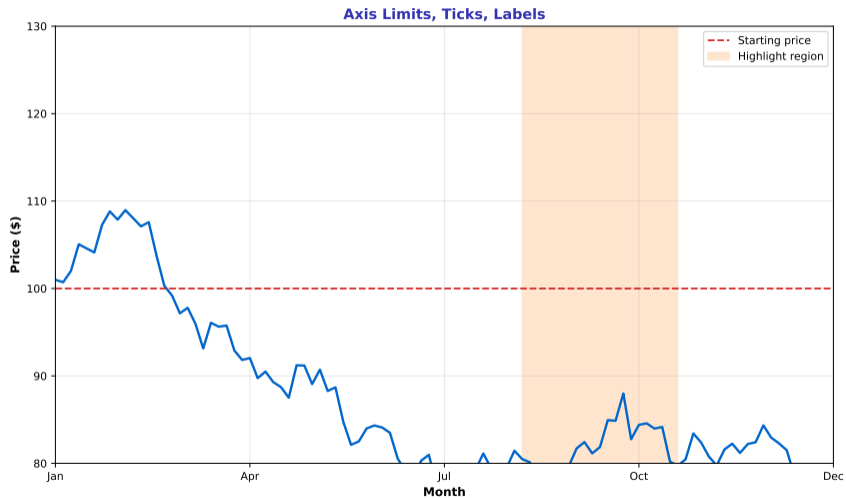


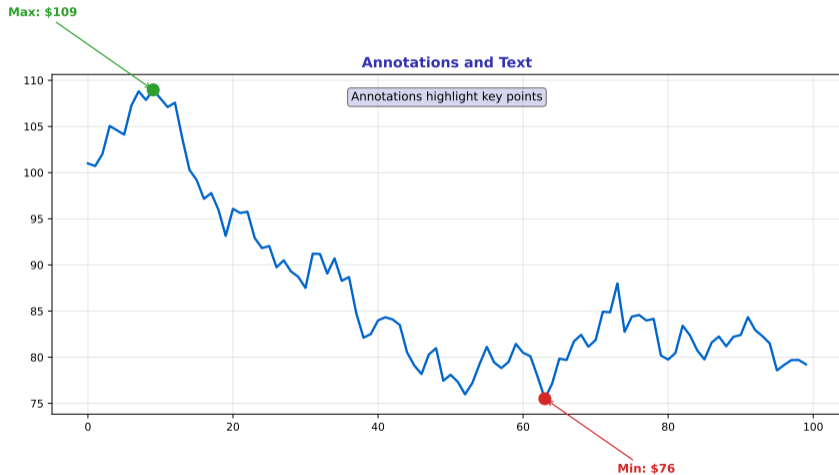


Solid, dashed, dotted, markers

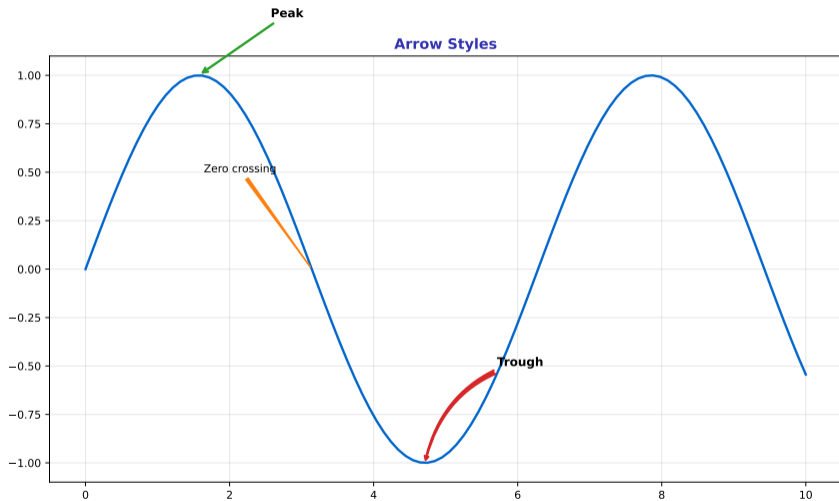


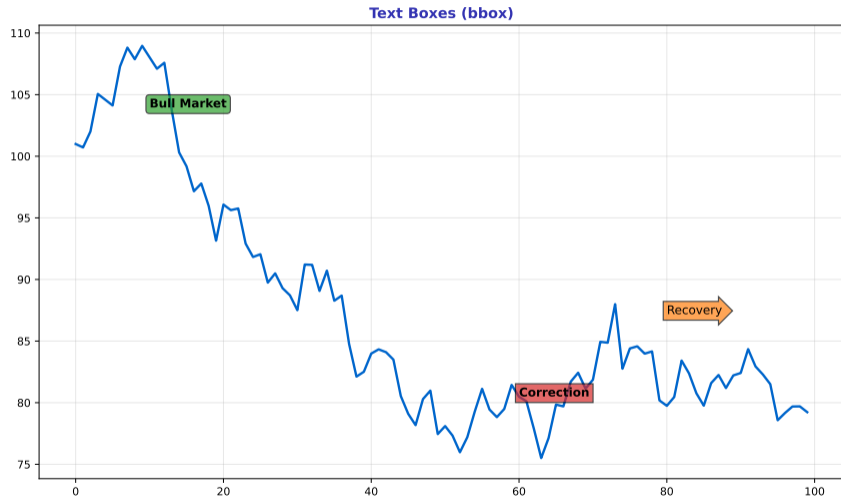
Using alpha for layering



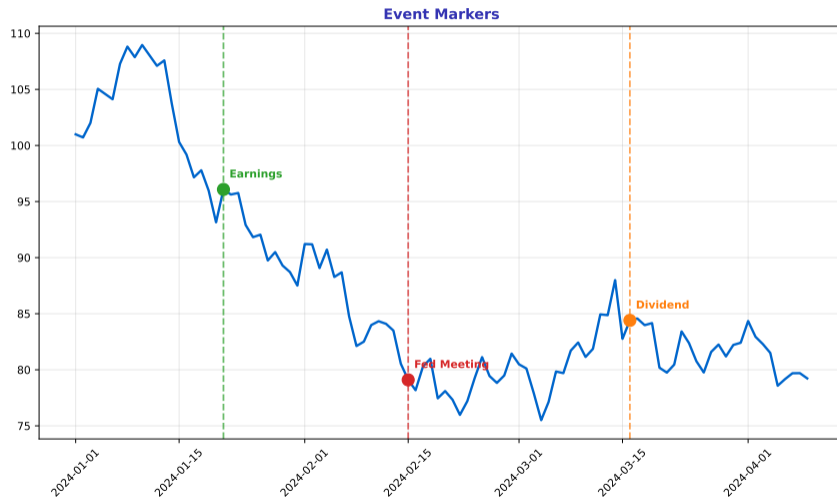


Highlighting key points

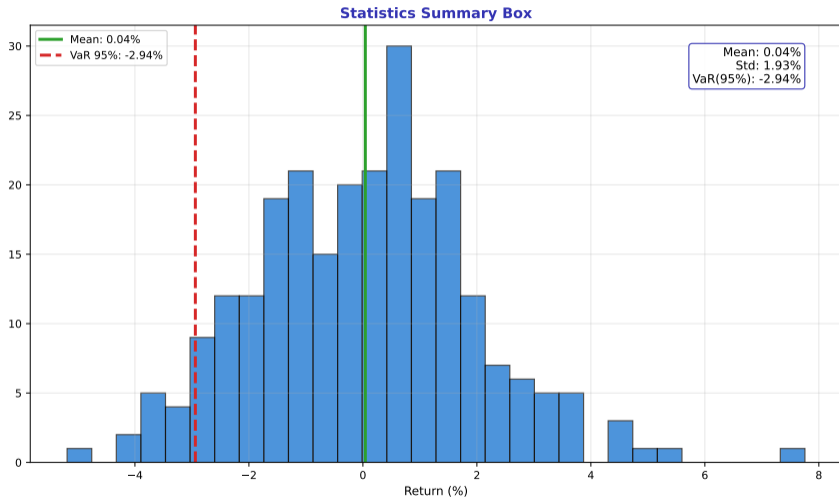




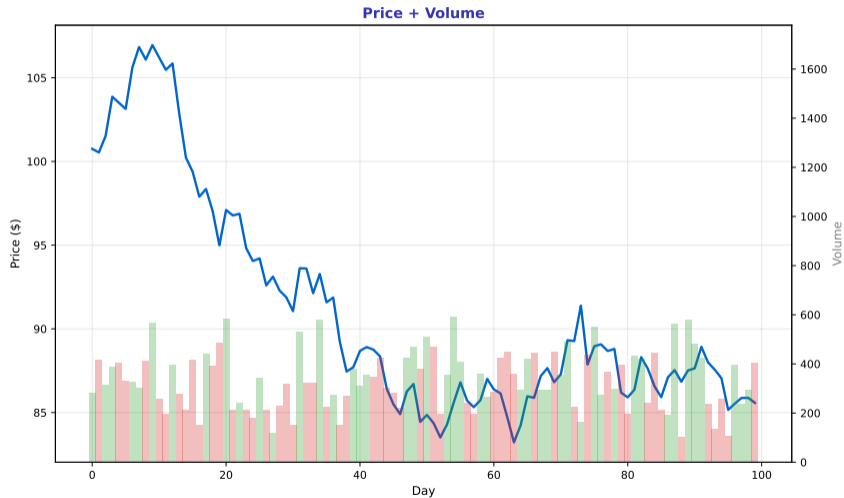
bbox styles for annotations

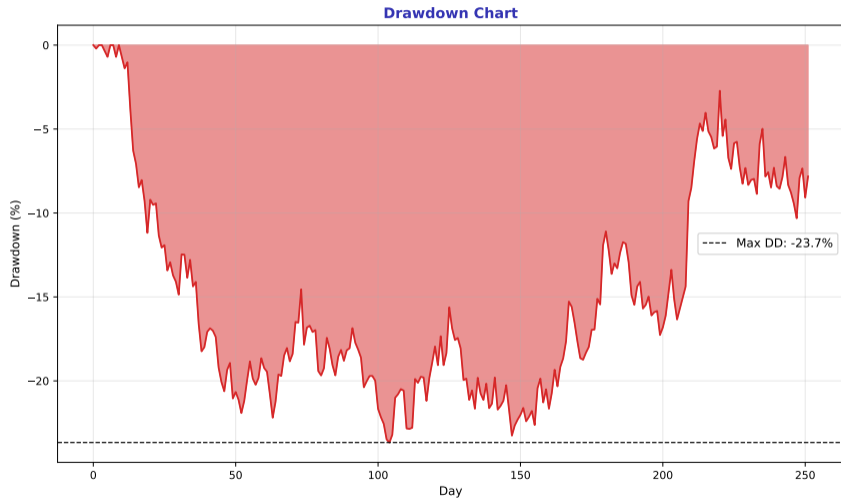


Highlighting specific dates



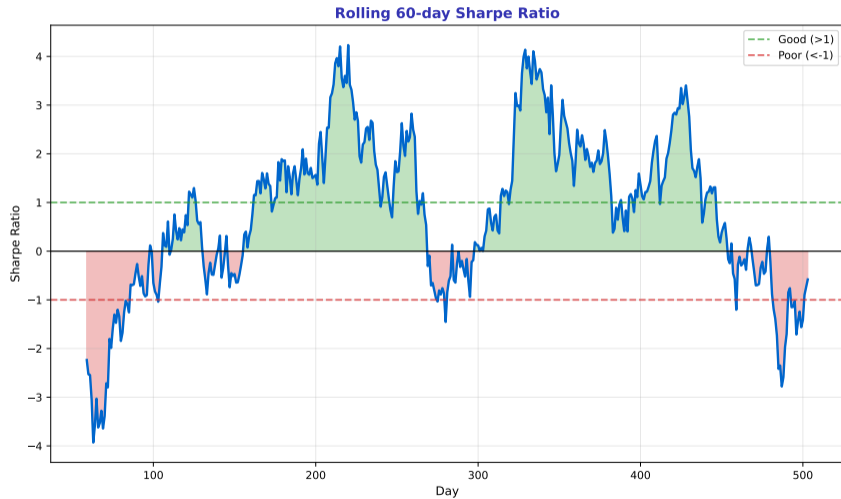
Key metrics annotation





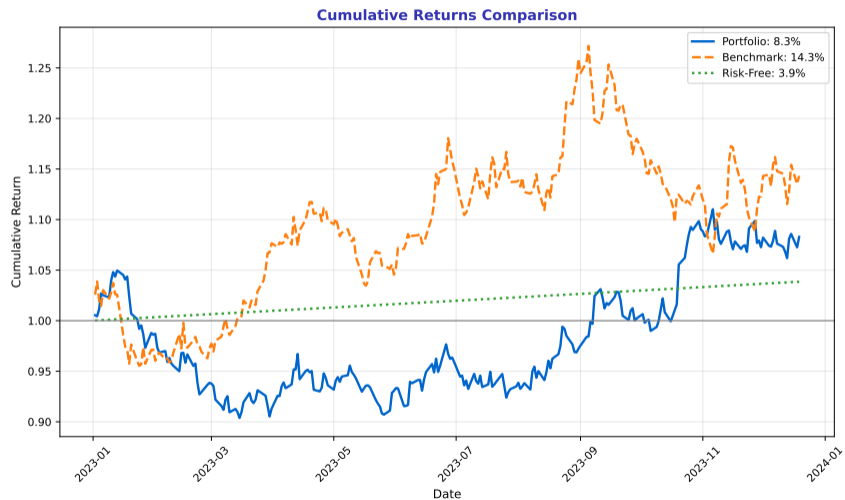
Visualizing losses from peak

Rolling Sharpe



Performance over time

Cumulative Returns



Strategy comparison

Key Takeaways:

- Line plots for time series, bar charts for categories
- Histograms show distributions, scatter plots show relationships
- Subplots combine multiple views
- Customization: colors, styles, annotations, text boxes
- Finance applications: price/volume, drawdown, Sharpe, returns

Statistics + Visualization = Data Science foundation