

Common Plot Types in Data Science

1. Histogram

- **Purpose:** Show frequency distribution of a single numeric variable.
- **Use case:** Understand the distribution (normal, skewed, etc.) of continuous data.
- **Library:** `seaborn.histplot()` or `matplotlib.pyplot.hist()`

2. Box Plot (Box-and-Whisker Plot)

- **Purpose:** Summarize the distribution with min, Q1, median, Q3, max, and outliers.
- **Use case:** Compare distributions across categories.
- **Library:** `seaborn.boxplot()`

3. Violin Plot

- **Purpose:** Combines a box plot with a KDE (Kernel Density Estimate) plot.
- **Use case:** See the distribution and probability density of the data.
- **Advantages:** Shows multimodal distributions better than boxplots.
- **Library:** `seaborn.violinplot()`

4. Scatter Plot

- **Purpose:** Visualize the relationship (correlation) between two numerical variables.
- **Use case:** Detect trends, clusters, or outliers.
- **Library:** `seaborn.scatterplot()` or `matplotlib.pyplot.scatter()`

5. Line Plot

- **Purpose:** Show trends over time or sequential data.
- **Use case:** Time series analysis or trend spotting.
- **Library:** `seaborn.lineplot()`

6. Bar Plot

- **Purpose:** Compare quantities across categories.

- **Use case:** Compare categorical features like gender, region, etc.
- **Library:** `seaborn.barplot()` or `matplotlib.pyplot.bar()`

7. Count Plot

- **Purpose:** Show the count of occurrences of each categorical variable.
- **Use case:** Frequency of classes in classification tasks.
- **Library:** `seaborn.countplot()`

8. Heatmap

- **Purpose:** Visualize correlations or matrix-like data with colors.
- **Use case:** Explore feature correlation or confusion matrices.
- **Library:** `seaborn.heatmap()`

9. Pair Plot (Scatterplot Matrix)

- **Purpose:** Visualize pairwise relationships in a dataset.
- **Use case:** Quick EDA (exploratory data analysis) on small datasets.
- **Library:** `seaborn.pairplot()`

10. Swarm Plot

- **Purpose:** Plot categorical data with all points visible (no overlap).
- **Use case:** Use alongside box or violin plots to show all observations.
- **Library:** `seaborn.swarmplot()`

11. Joint Plot

- **Purpose:** Combines scatter + histogram + correlation in one view.
- **Use case:** Analyze relationships and marginal distributions together.
- **Library:** `seaborn.jointplot()`

12. Pie Chart

- **Purpose:** Show proportions of categories.
 - **Use case:** Simple percentage distribution.
 - **Library:** `matplotlib.pyplot.pie()`
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When to Use What?

Task	Recommended Plot
Distribution of one variable	Histogram / KDE / Box / Violin
Compare groups	Bar / Box / Violin / Swarm
Relationships between variables	Scatter / Line / Pair / Joint
Correlations	Heatmap
Frequency of categories	Countplot / Bar