

# Python for Visualization

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# Agenda

- Visualization Quiz
- Visualization - One Variable
- Visualization - Two Variables
- Visualization - Multiple Variables

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**Let's begin the discussion by answering a few questions on visualization.**

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# Visualization Quiz

What are the three statistics presented in box of a boxplot?

A

First Quartile (Q1), Mode, Third Quartile (Q3)

B

Lower whisker, Median, Upper whisker

C

First Quartile (Q1), Median, Third Quartile (Q3)

D

First Quartile (Q1), Mean, Third Quartile (Q3)

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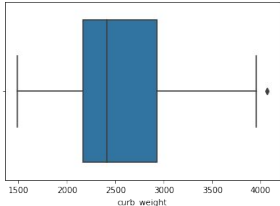
D

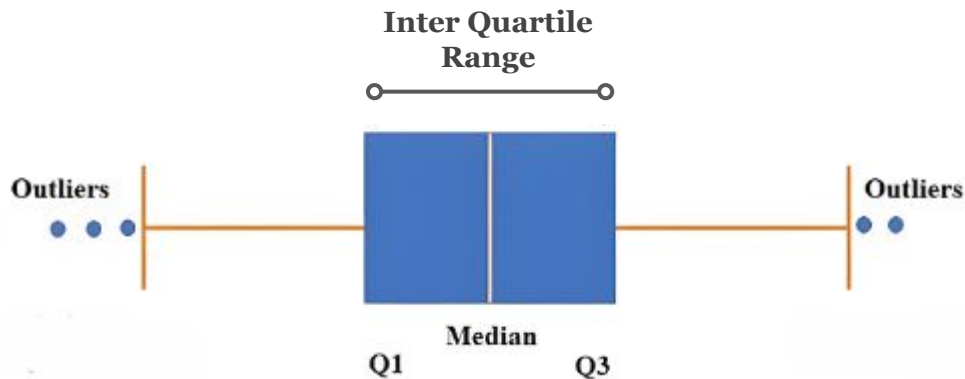
First Quartile (Q1), Mean, Third Quartile (Q3)

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# Visualization - One Variable

Plot	Type of Data	Usage	Example
<b>Boxplot</b>	Numerical	Helps us understand data distribution and skewness by displaying the data in the form of a box divided by quartiles	



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# Visualization Quiz

Which of the following represents the general formula for computing the lower whisker (fence) of a boxplot?

A

$$Q1 - 1.5 * IQR$$

B

$$Q1 - 2 * IQR$$

C

$$Q2 - 1.5 * IQR$$

D

$$Q2 - 2 * IQR$$

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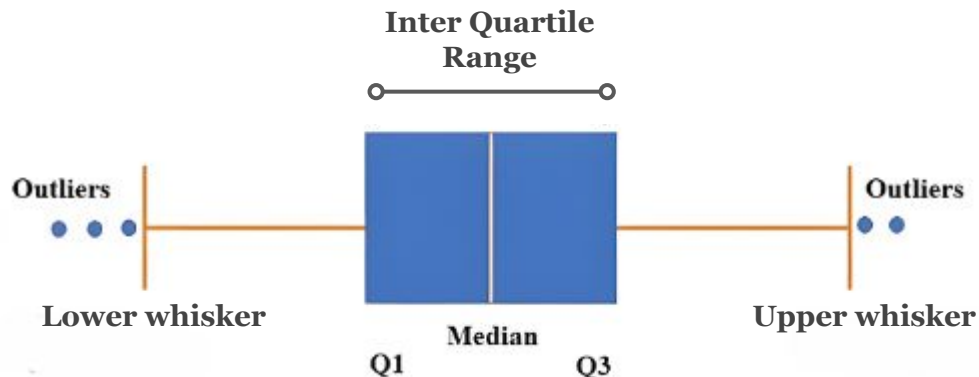
# Visualization - One Variable

The whiskers of a boxplot show the range of the data, excluding outliers.

Upper whisker:  $Q3 + 1.5 * IQR$

Lower whisker:  $Q1 - 1.5 * IQR$

Data points to the left of the lower whisker and to the right of the upper whisker are generally considered to be outliers



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# Visualization Quiz

How does a KDE plot differ from a histogram?

A

A KDE plot displays the frequency of data points, while a histogram shows the probability density.

B

A KDE plot provides a smoother representation of the data distribution compared to a histogram.

C

A KDE plot is suitable for categorical data, while a histogram is designed for numerical data.

D

A KDE plot cannot handle large datasets in general, whereas a histogram can.

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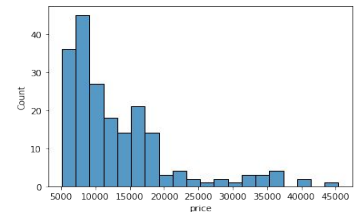
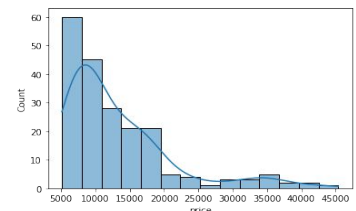
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# Visualization - One Variable

Plot	Type of Data	Usage	Example
<b>Histogram</b>	Numerical	Helps us understand data distribution by dividing it into bins and showing the number of observations in each bin via bars	
<b>Kernel Density Estimation</b>	Numerical	Helps us understand data distribution by displaying a distribution curve on top of the histogram bars	

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# Visualization Quiz

Which statements accurately describe scatterplot?

A

Each point on a scatterplot represents a single observation or data point

B

Primarily visualize the relationship between two continuous variables

C

Explores both positive and negative correlations

D

Scatterplots are only useful for handling categorical variables

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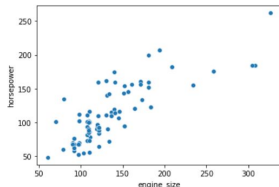
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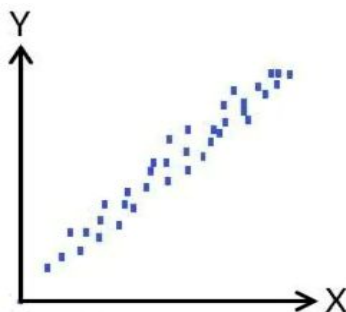
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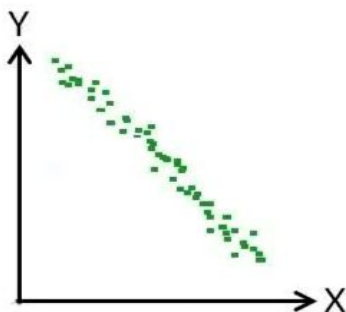
# Visualization - Two Variable

Plot	Type of Data	Usage	Example
Scatterplot	Numerical	Helps us understand potential relationship between two numerical variables	

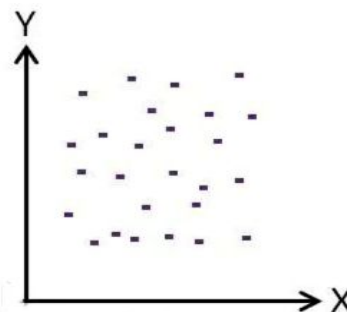
Enables identification of **correlation** and **patterns** between the variables.



**+ve correlation**



**-ve correlation**



**No correlation**

# Visualization Quiz

When should a jointplot be used instead of a scatterplot?

A

When there are more than two variables

B

When we only want to visualize one variable

C

When we want to visualize both the relationship between variables and the distribution of variables

D

When we want to visualize only the relationship between variables and not the distribution of variables

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# Visualization Quiz

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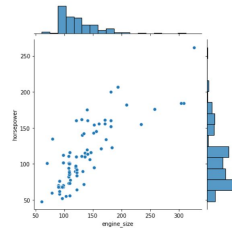
When we want to visualize only the relationship between variables and not the distribution of variables

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# Visualization - Two Variables

Plot	Type of Data	Usage	Example
<b>Jointplot</b>	Numerical	Helps us understand the distribution and relationship between two numerical variables on the same plot.	

Integrates scatterplot with variable-specific histograms for comprehensive visualization

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# Visualization Quiz

Which of the following statements accurately describes a pairplot?

A

It visualizes the relationship between multiple variables

B

It is composed of boxplots and histograms

C

It displays pairwise relationships in a grid format

D

The diagonal line represents histograms of each variable

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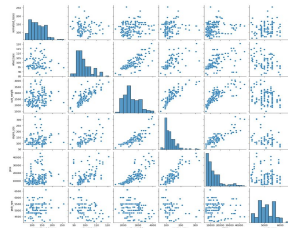
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# Visualization - Multiple Variables

Plot	Type of Data	Usage	Example
<b>Pairplot</b>	Numerical	Helps us understand the relationship between two or more pairs of numerical variables	

Offers simultaneous examination of multiple variables

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# Visualization Quiz

Which of the following statements are TRUE for heatmap?

A

Provide detailed information about outliers

B

Condense information into a single plot for easier pattern identification

C

Exclusively designed for visualizing relationships between categorical variables

D

Represent the relationship between two numerical variables through color gradients

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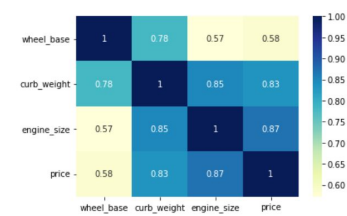
Represent the relationship between two numerical variables through color gradients

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# Visualization - Multiple Variables

Plot	Type of Data	Usage	Example
Heatmap	Numerical	Helps us understand the correlation between pairs of columns in the data by visualizing it as a matrix	

Provide quick insights into patterns

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