Seaborn visualization

Mr. R. M. Huddar

Dept. of Computer Studies,

CSIBER, Kolhapur

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INTRODUCTION

Seaborn is a Python data visualization library based on matplotlib. It provides a high-level interface for drawing attractive and informative statistical graphics.

Seaborn helps you explore and understand your data. Its plotting functions operate on dataframes and arrays containing whole datasets and internally perform the necessary semantic mapping and statistical aggregation to produce informative plots.

There is no universally best way to visualize data. Different questions are best answered by different plots. Seaborn makes it easy to switch between different visual representations by using a consistent dataset-oriented API.

Step 1: Installing Seaborn

pip install seaborn

conda install seaborn

Step 2: Importing required packages

```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

Step 3: reading dataset

```
tips = sns.load_dataset("tips")
tips
```

Relational Plots

Statistical analysis is a process of understanding how variables in a dataset relate to each other and how those relationships depend on other variables. Visualization can be a core component of this process because, when data are visualized properly, the human visual system can see trends and patterns that indicate a relationship.

Relational plots

- relplot
- scatterplot
- lineplot

relplot

This is a figure-level function for visualizing statistical relationships using two common approaches: scatter plots and line plots.

`relplot()` combines a `FacetGrid` with one of two axes-level functions:

a) Scatterplot with kind="scatter"
b) Lineplot with kind="line"

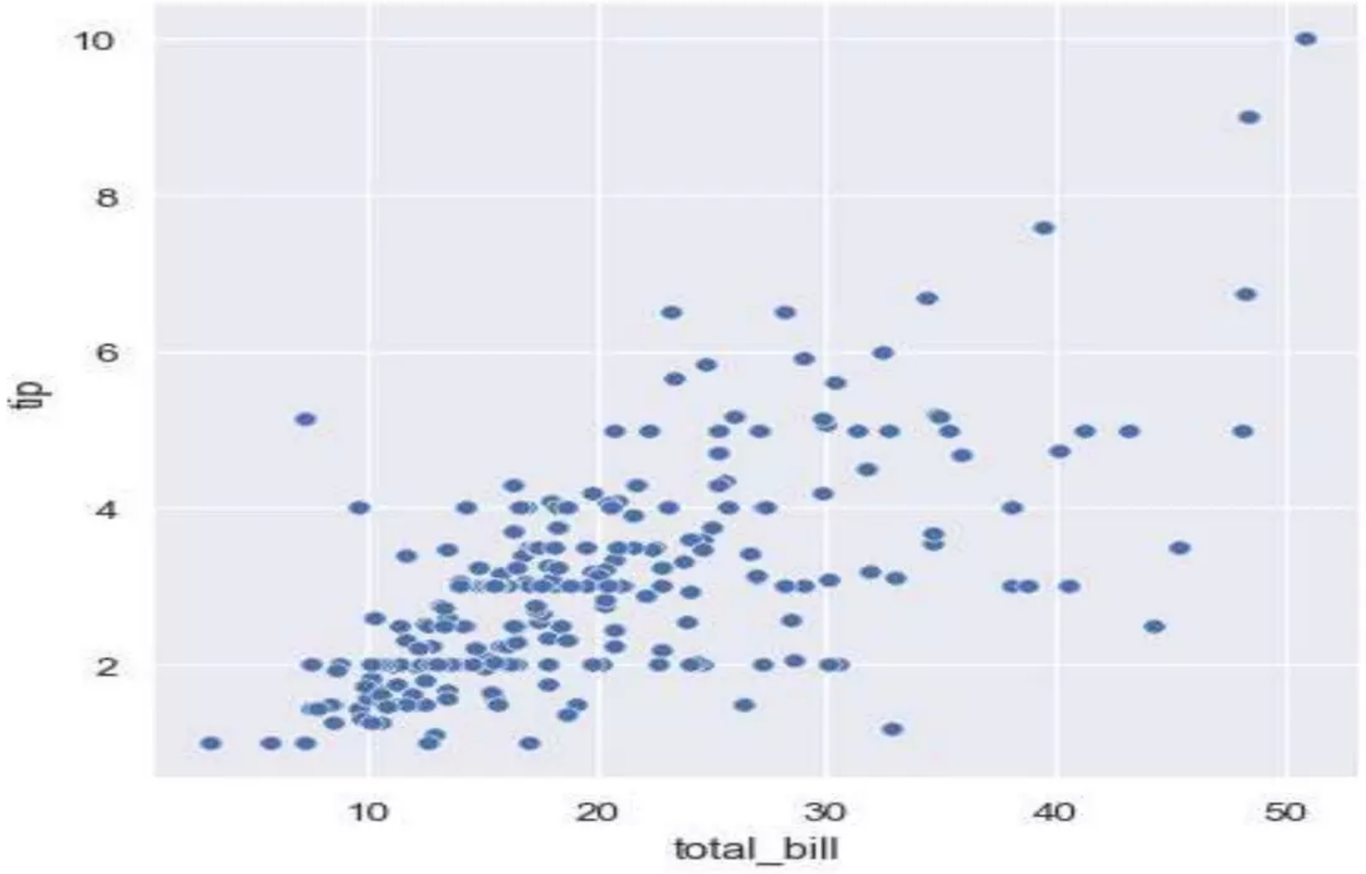
```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns


tips = sns.load_dataset("tips")
tips
```

	total_bill	tip	sex	smoker	day	time	size
0	16.99	1.01	Female	No	Sun	Dinner	2
1	10.34	1.66	Male	No	Sun	Dinner	3
2	21.01	3.50	Male	No	Sun	Dinner	3
3	23.68	3.31	Male	No	Sun	Dinner	2
4	24.59	3.61	Female	No	Sun	Dinner	4
...	...	...	...	...	...	...	...
239	29.03	5.92	Male	No	Sat	Dinner	3
240	27.18	2.00	Female	Yes	Sat	Dinner	2

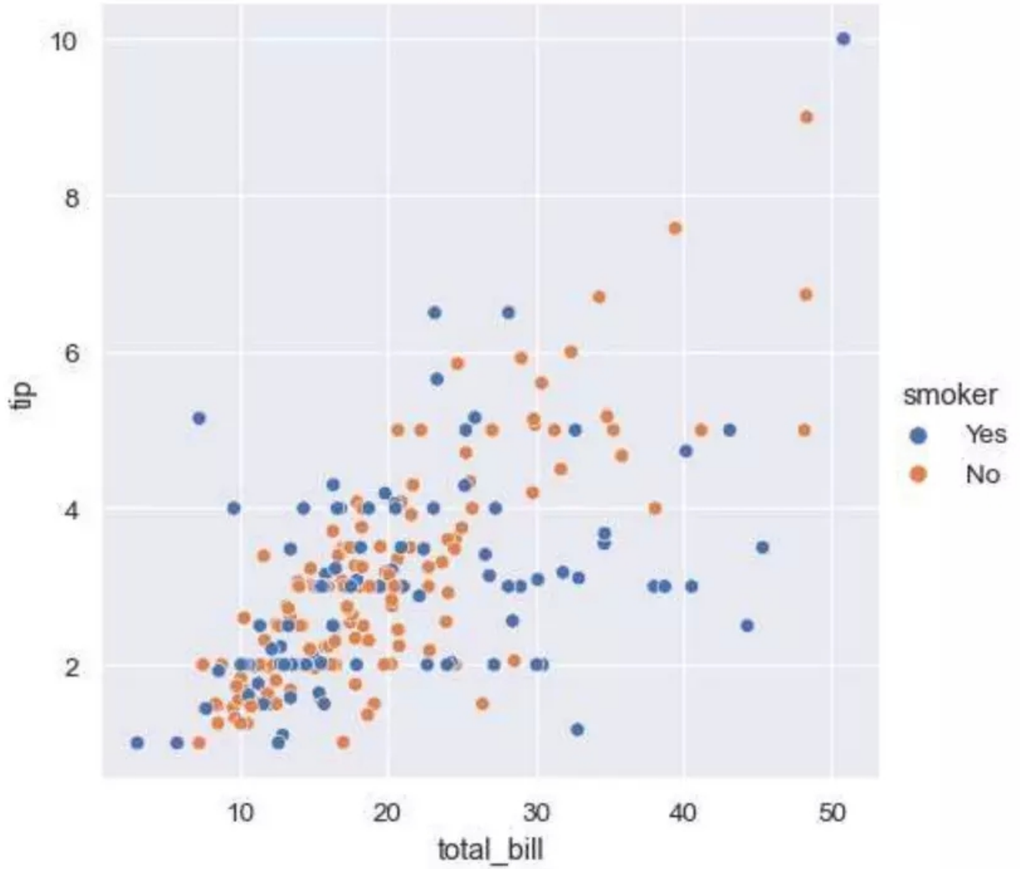
seaborn.relplot(x=None, y=None, hue=None, size=None, style=None, data=None, row=None, col=None, palette=None,markers=None, kind='scatter')

sns.relplot(x="total_bill", y="tip",data=tips);



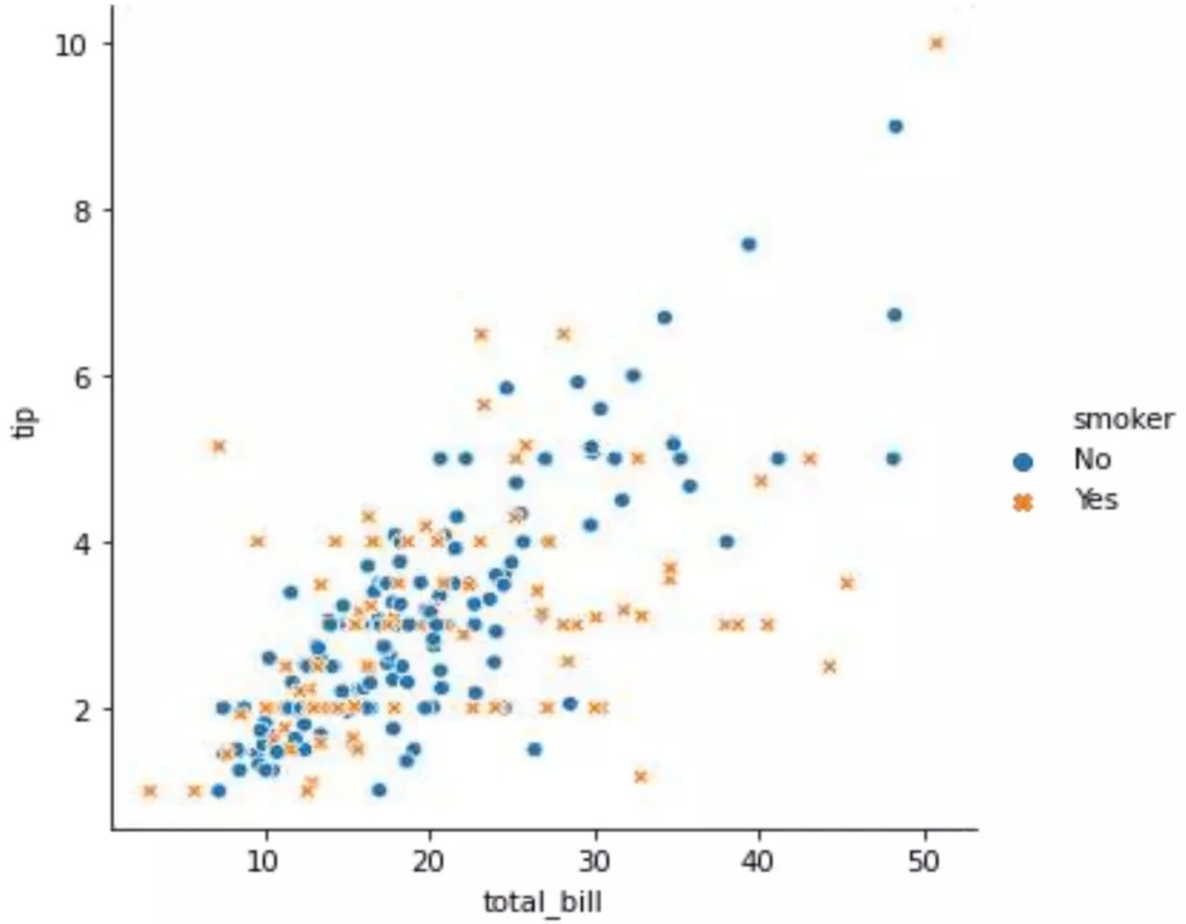
While the points are plotted in two dimensions, another dimension can be added to the plot by coloring the points according to a third variable. In seaborn, this is referred to as using a “**hue** semantic”

```
sns.relplot(x="total_bill", y="tip", hue="smoker", data=tips);
```



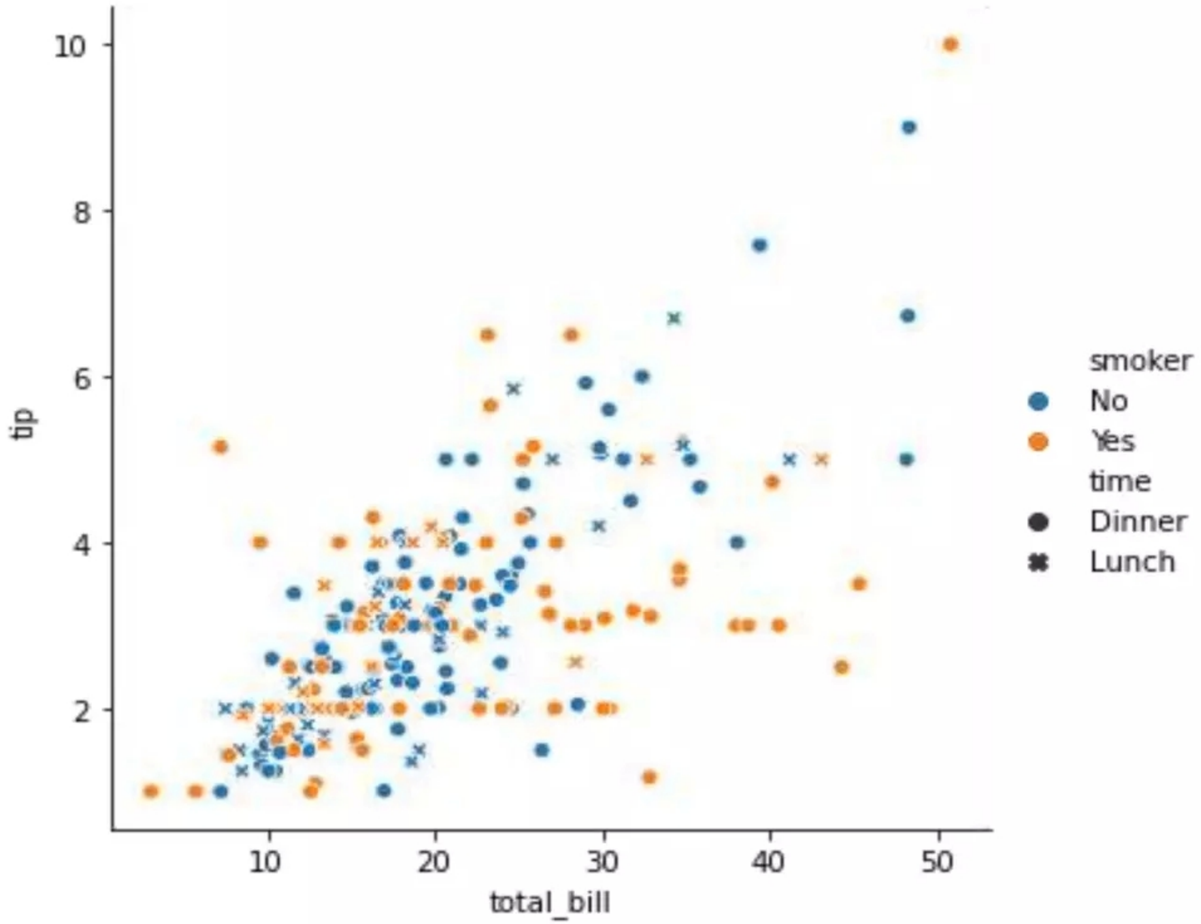
To emphasize the difference between the classes, and to improve accessibility, you can use a different marker style for each class:

```
sns.relplot(x="total_bill", y="tip", hue="smoker", style="smoker",data=tips);
```



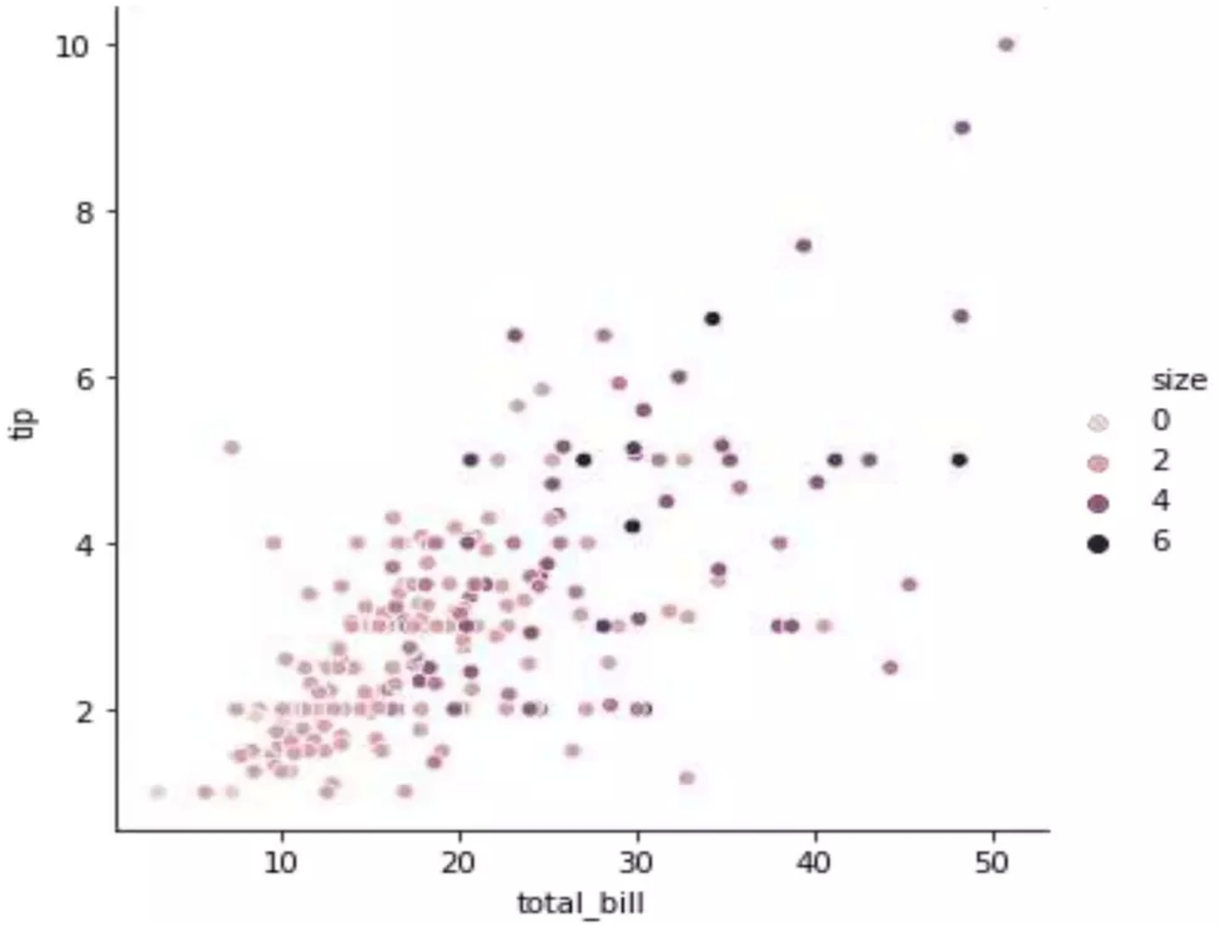
It’s also possible to represent four variables by changing the hue and style of each point independently.

```
sns.relplot(x="total_bill", y="tip", hue="smoker", style="time", data=tips);
```



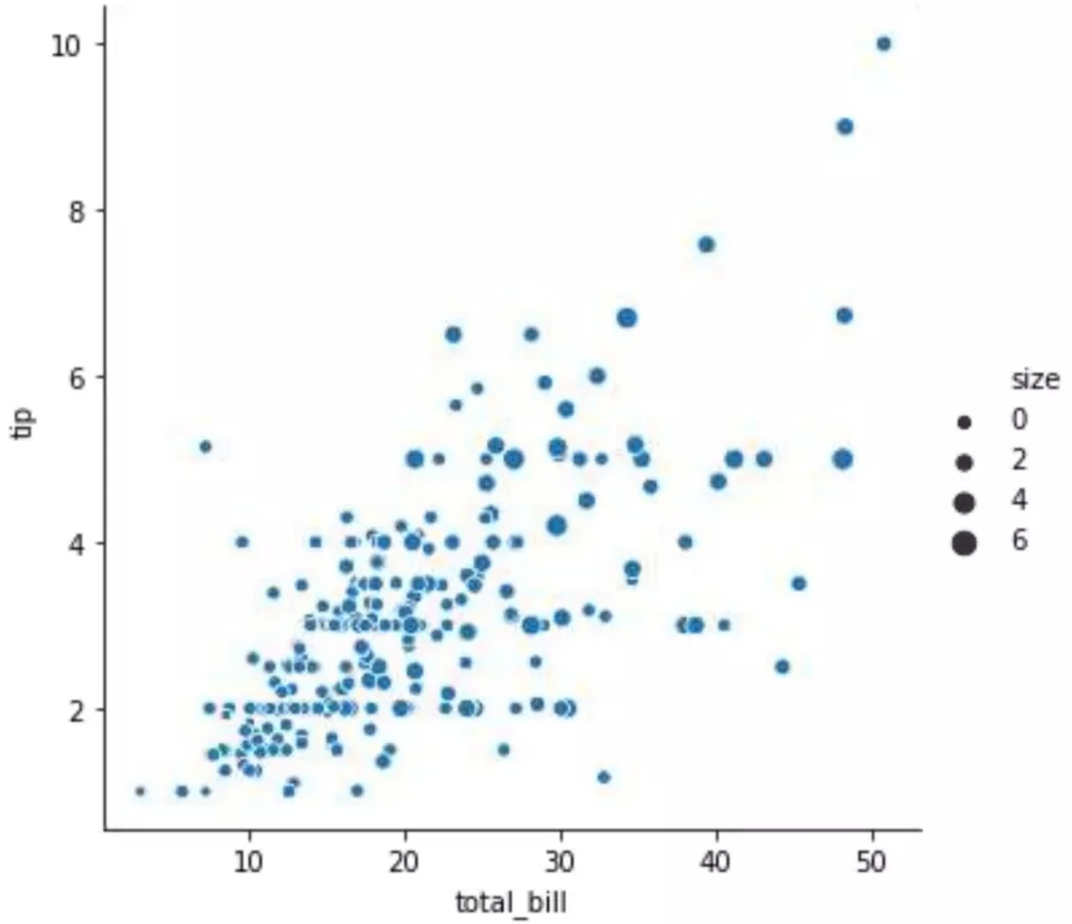
If the hue semantic is numeric the default colouring switches to a sequential palette:

```
sns.relplot(x="total_bill", y="tip", hue="size", data=tips);
```

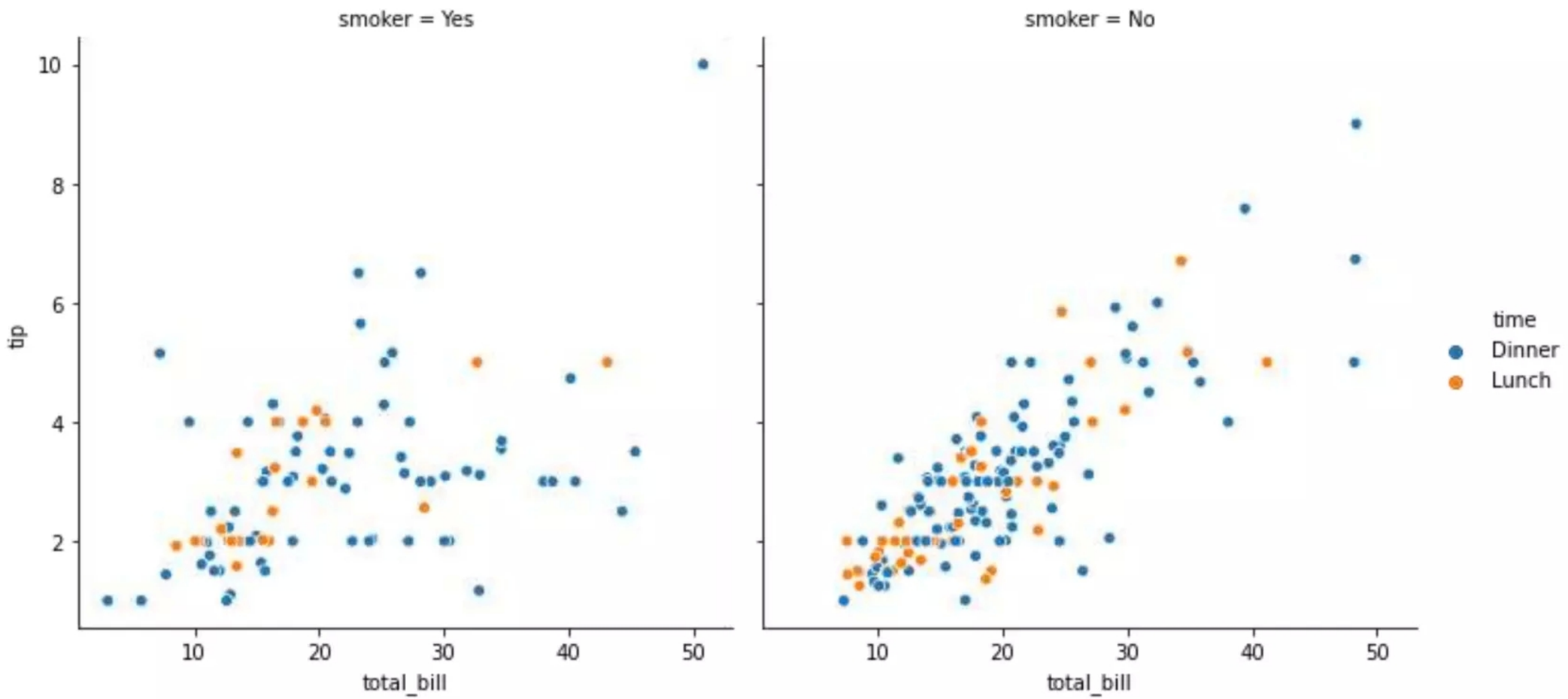


The third kind of semantic variable changes the size of each point:

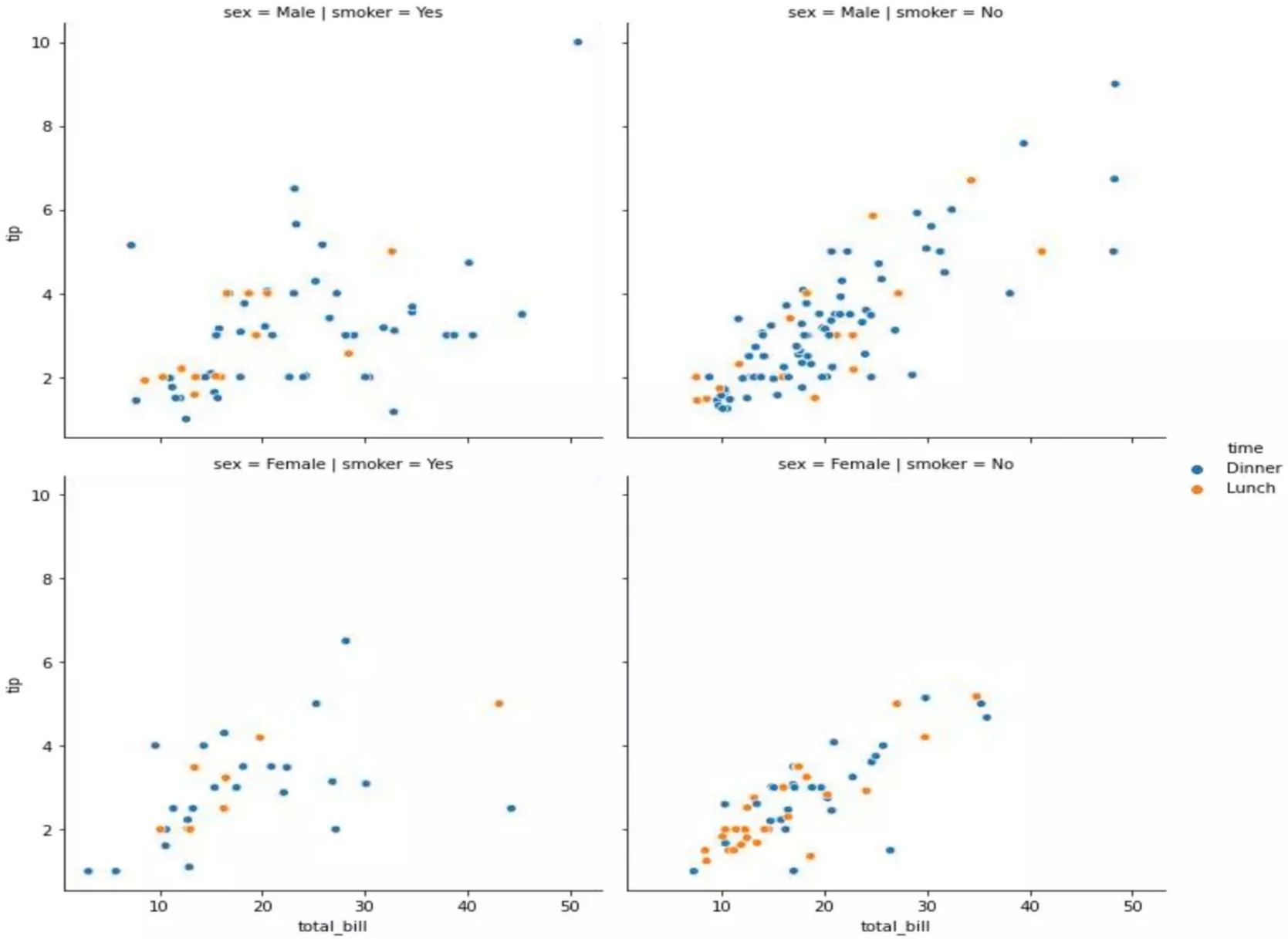
```
sns.relplot(x="total_bill", y="tip", size="size", data=tips);
```



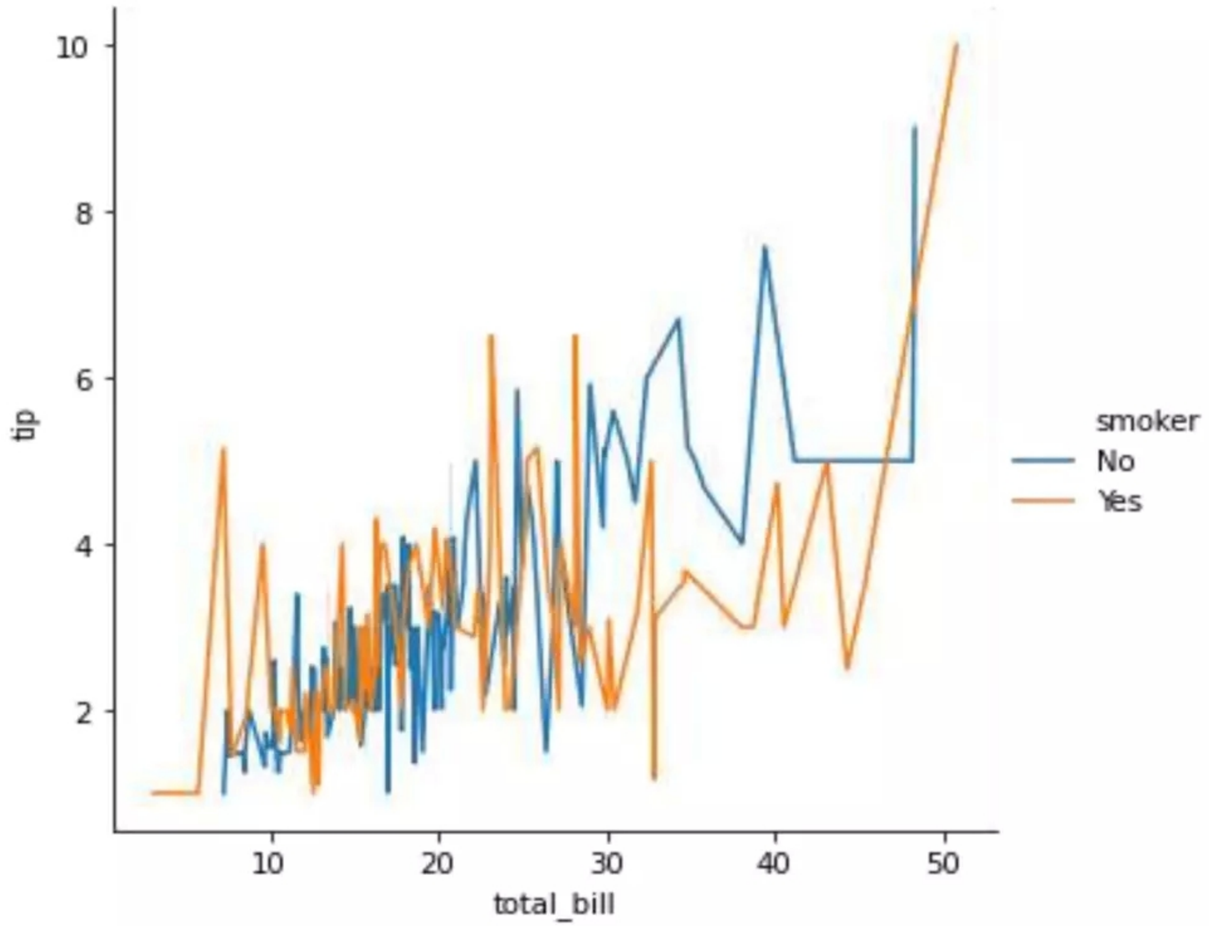
```
sns.relplot(x="total_bill", y="tip",col="smoker",hue="time",data=tips);
```



```
sns.relplot(x="total_bill", y="tip",col="smoker",row="sex",hue="time",data=tips);
```



sns.relplot(x="total_bill", y="tip", hue="smoker",kind="line",data=tips);

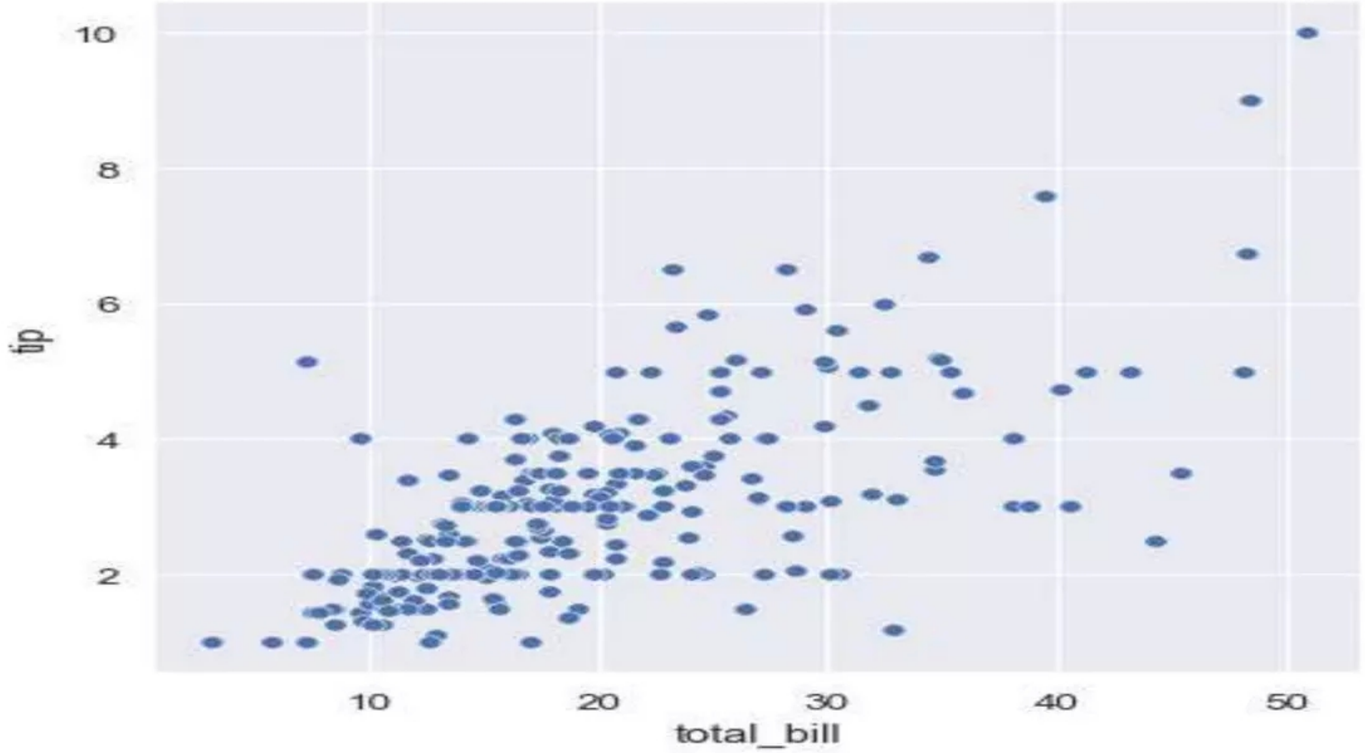


Scatterplot

Scatterplot depicts the joint distribution of two variables using a cloud of points, where each point represents an observation in the dataset. This depiction allows the eye to infer a substantial amount of information about whether there is any meaningful relationship between them.

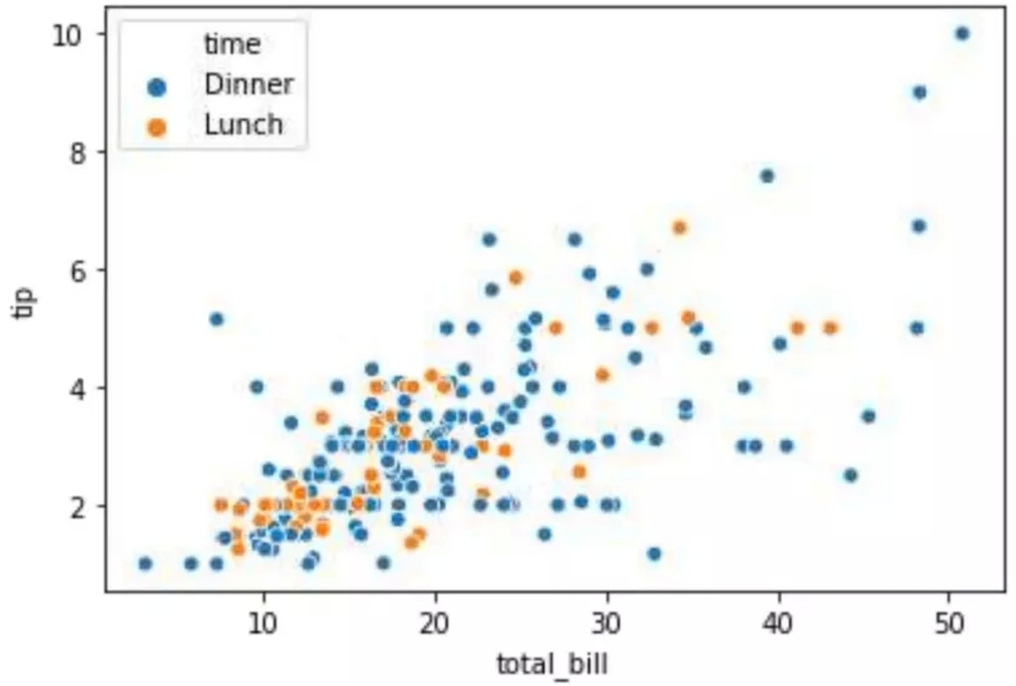
The relationship between `x` and `y` can be shown for different subsets of the data using the `hue`, `size`, and `style` parameters.

```
sns.scatterplot(data=tips, x="total_bill", y="tip")
```



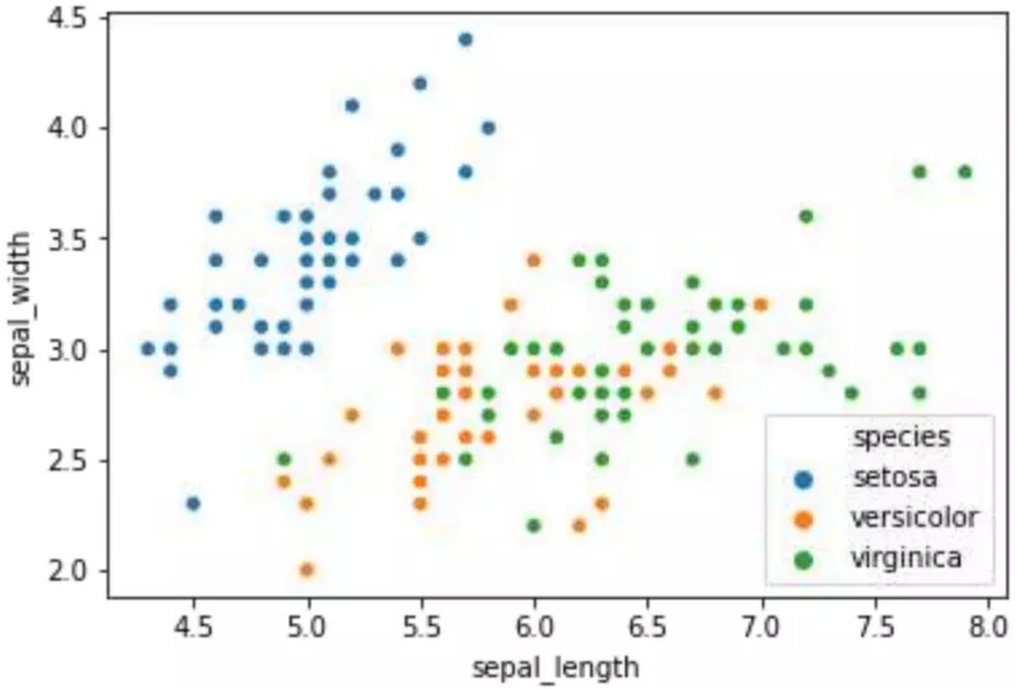
Assigning a variable to hue will map its levels to the color of the points:

```
sns.scatterplot(data=tips, x="total_bill", y="tip", hue="time")
```



```
iris = sns.load_dataset("iris")
iris.head
```

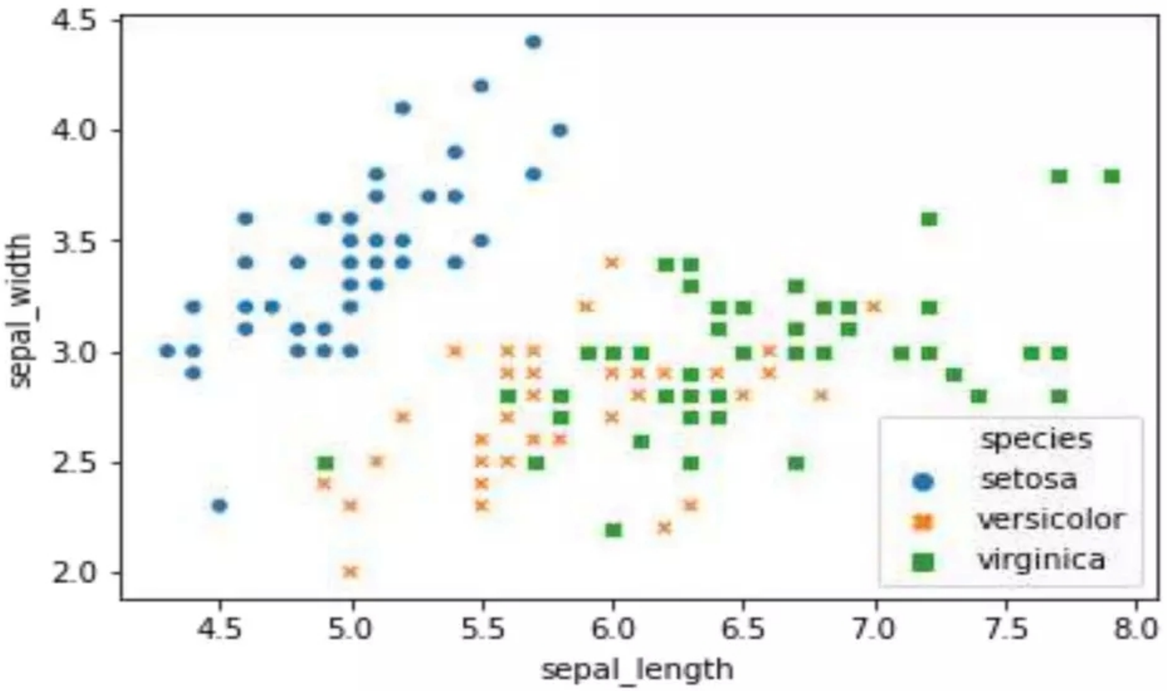
```
sns.scatterplot(x = iris.sepal_length, y = iris.sepal_width,hue = iris.species)
```



Assigning the same variable to `style` will also vary the markers and create a more accessible plot:

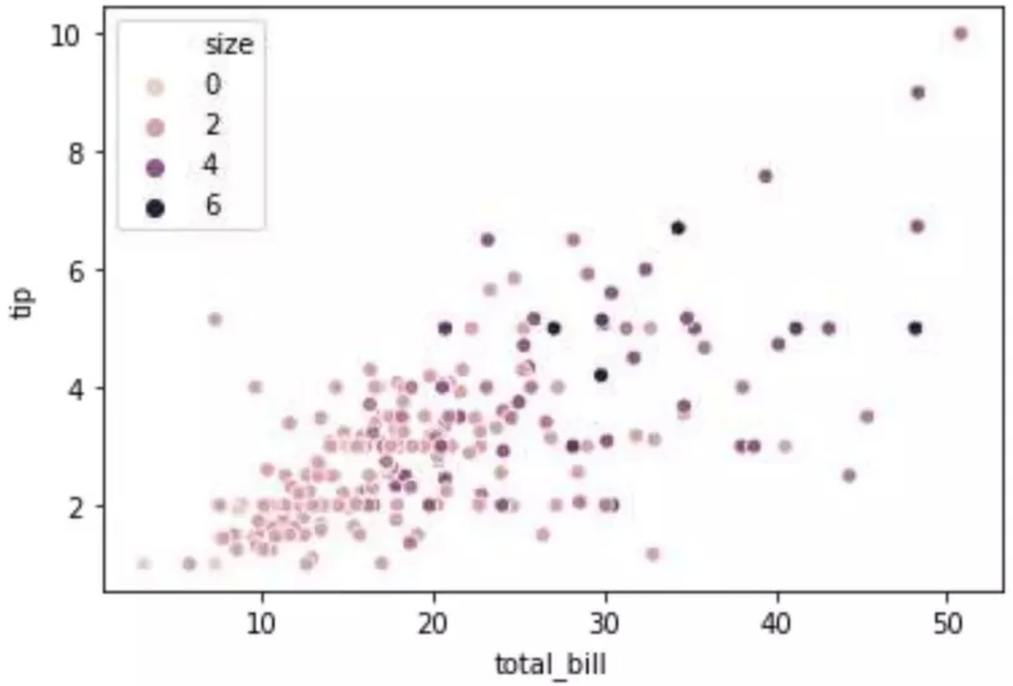
```
sns.scatterplot(data=tips, x="total_bill", y="tip", hue="time", style="time")
```

sns.scatterplot(x = iris.sepal_length, y = iris.sepal_width,hue = iris.species,style=iris.species)



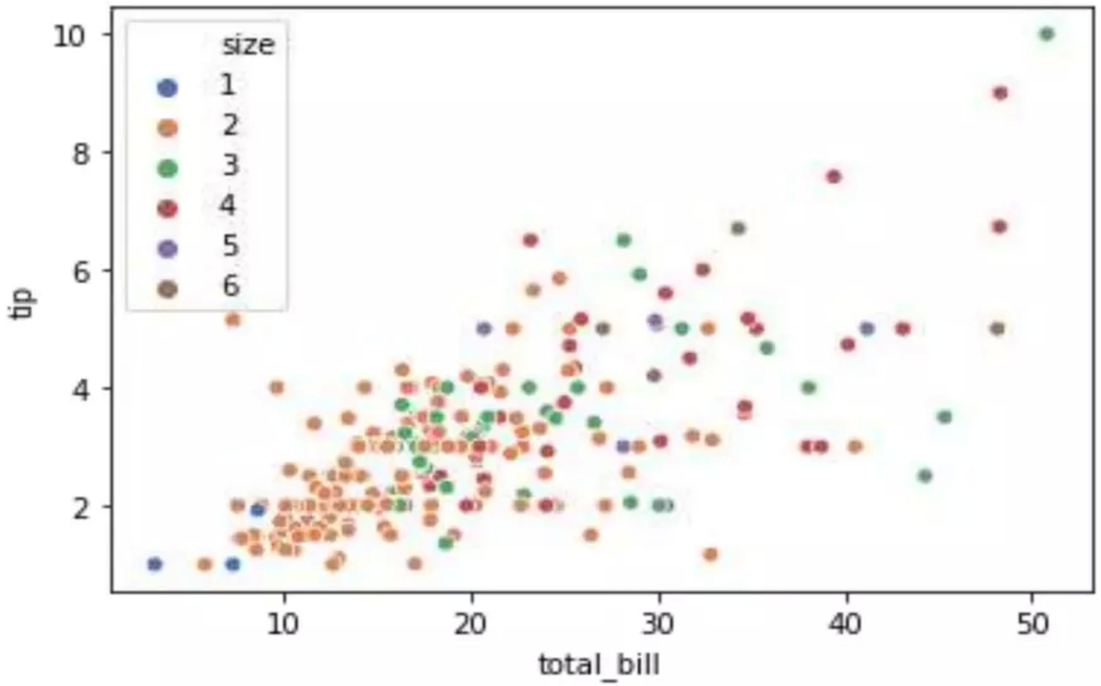
If the variable assigned to hue is numeric, the semantic mapping will be quantitative and use a different default palette:

```
sns.scatterplot(data=tips, x="total_bill", y="tip", hue="size")
```



Pass the name of a categorical palette or explicit colors to force categorical mapping of the `hue` variable:

```
sns.scatterplot(data=tips, x="total_bill", y="tip", hue="size", palette="deep")
```



Lineplot

Draw a line plot with possibility of several semantic groupings.

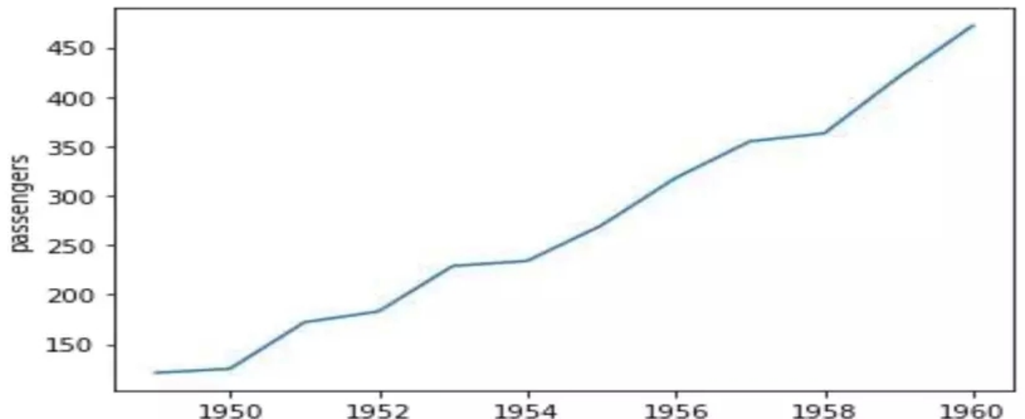
The relationship between `x` and `y` can be shown for different subsets of the data using the `hue`, `size`, and `style` parameters. These parameters control what visual semantics are used to identify the different subsets.

Import the `flights` dataset that has 10 years of monthly airline passenger data:

```
flights = sns.load_dataset("flights")
flights.head()
```

To draw a line plot using long-form data, assign the `x` and `y` variables:

```
may_flights = flights.query("month == 'May'")
sns.lineplot(data=may_flights, x="year", y="passengers")
```



Pivot the dataframe to a wide-form representation:

The pivot() function is used to reshape a given DataFrame organized by given index / column values.

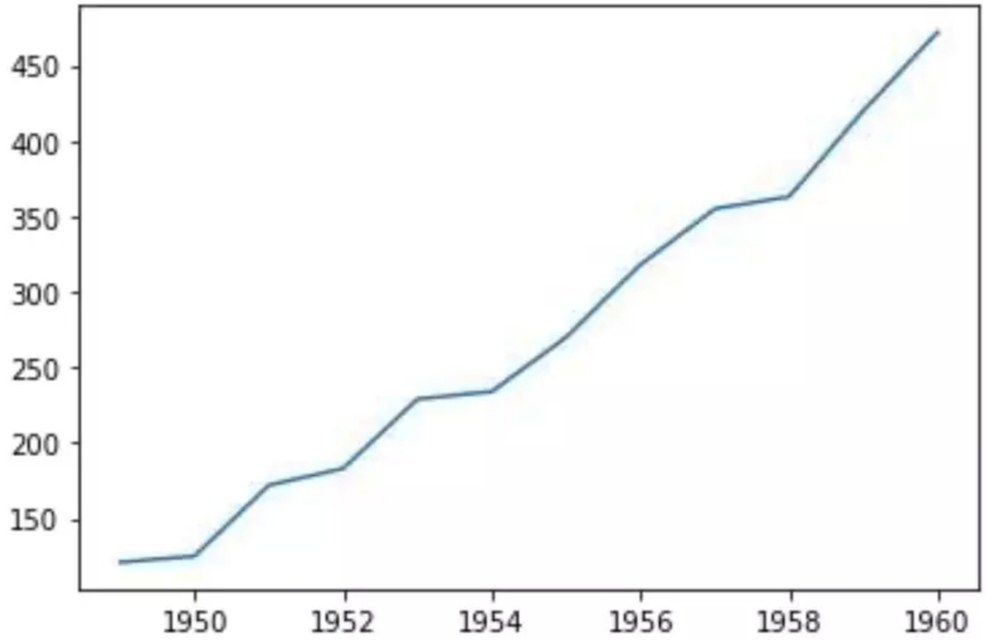
```
DataFrame.pivot(index=None, columns=None, values=None)
```

```
flights_wide = flights.pivot("year", "month", "passengers")

flights_wide.head()
```

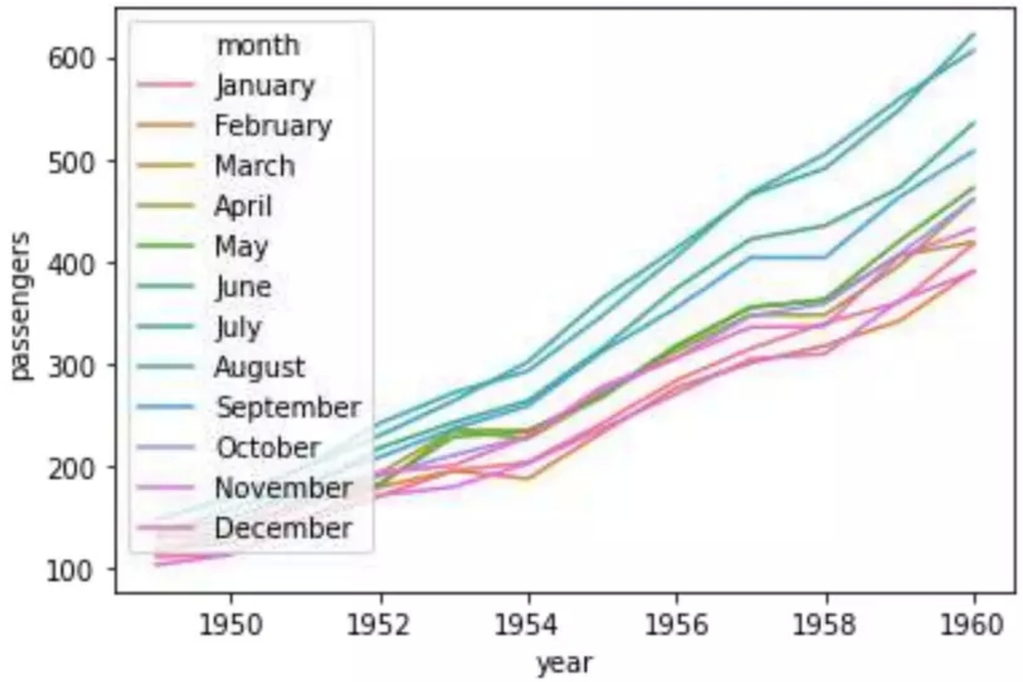
To plot a single vector, pass it to `data`. If the vector is a **`pandas.Series`**, it will be plotted against its index:

```
sns.lineplot(data=flights_wide["May"])
```



Assign a grouping semantic (`hue`, `size`, or `style`) to plot separate lines

```
sns.lineplot(data=flights, x="year", y="passengers", hue="month")
```



The same column can be assigned to multiple semantic variables, which can increase the accessibility of the plot:

```
sns.lineplot(data=tips, x="total_bill", y="tip", hue="smoker", style="smoker")
```