



Marginal Distribution Plots in Python

How to add marginal distribution plots.

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Overview

Marginal distribution plots are small subplots above or to the right of a main plot, which show the distribution of data along only one dimension. Marginal distribution plot capabilities are built into various Plotly Express functions such as scatter and histogram. [Plotly Express \(/python/plotly-express/\)](#) is the easy-to-use, high-level interface to Plotly, which [operates on a variety of types of data \(/python/px-arguments/\)](#) and produces [easy-to-style figures \(/python/styling-plotly-express/\)](#).

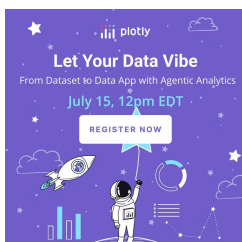
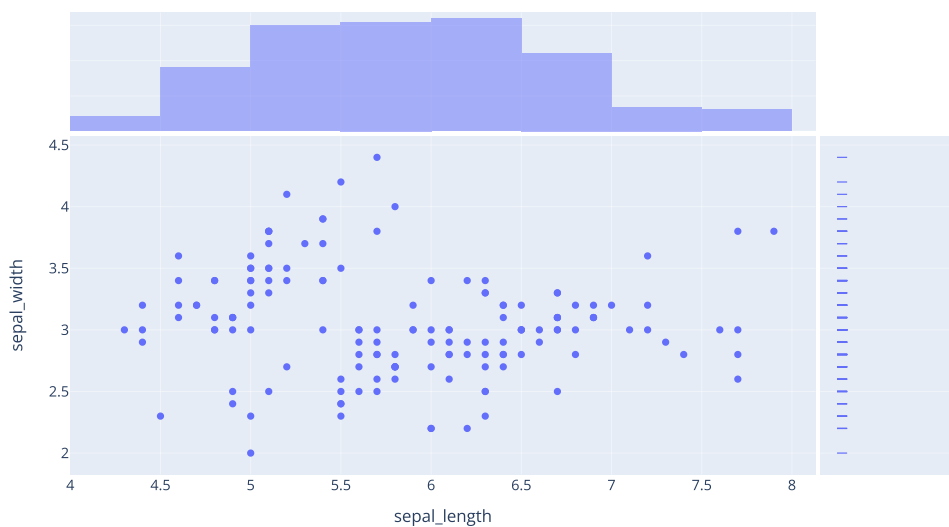
Scatter Plot Marginals

The `marginal_x` and `marginal_y` arguments accept one of "histogram", "rug", "box", or "violin" (see also how to create [histograms \(/python/histograms/\)](#), [box plots \(/python/box-plots/\)](#) and [violin plots \(/python/violin-plots/\)](#) as the main figure).

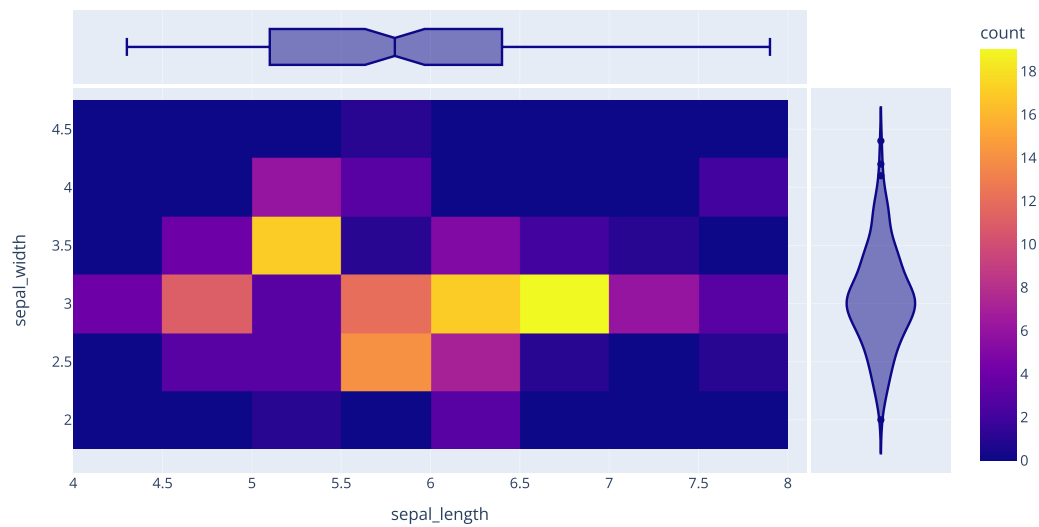
Marginal plots are linked to the main plot: try zooming or panning on the main plot.

Marginal plots also support hover, including per-point hover as with the rug-plot on the right: try hovering over the points on the right marginal plot.

```
import plotly.express as px
df = px.data.iris()
fig = px.scatter(df, x="sepal_length", y="sepal_width", marginal_x="histogram", marginal_y="rug")
fig.show()
```



```
import plotly.express as px
df = px.data.iris()
fig = px.density_heatmap(df, x="sepal_length", y="sepal_width", marginal_x="box", marginal_y="violin")
fig.show()
```

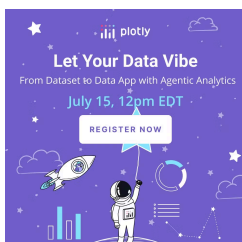
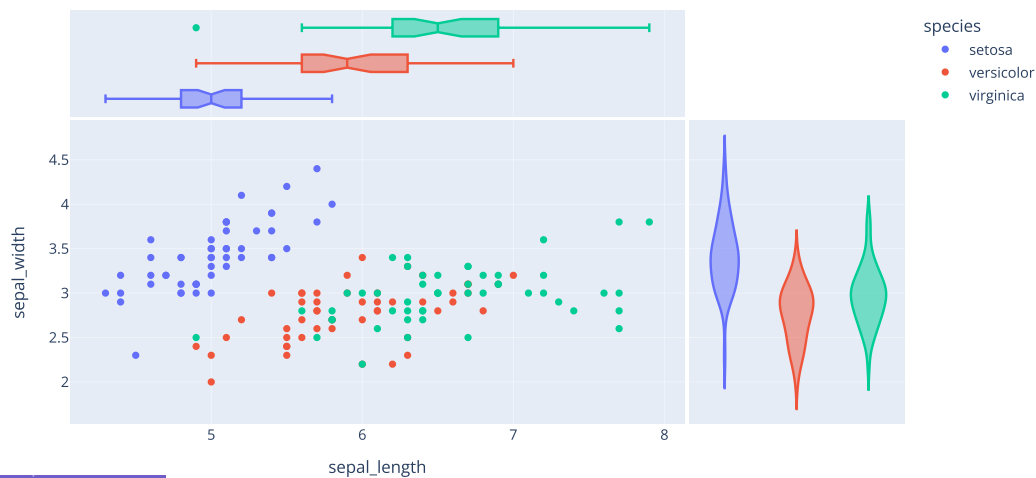


Marginal Plots and Color

Marginal plots respect the color argument as well, and are linked to the respective legend elements. Try clicking on the legend items.

```
import plotly.express as px
df = px.data.iris()
fig = px.scatter(df, x="sepal_length", y="sepal_width", color="species",
                marginal_x="box", marginal_y="violin",
                title="Click on the legend items!")
fig.show()
```

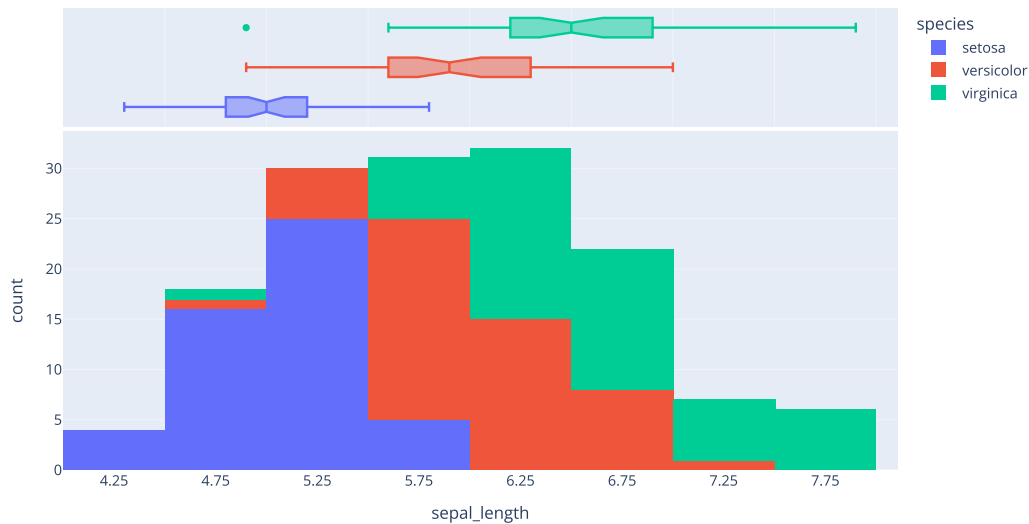
Click on the legend items!



Marginal Plots on Histograms

[Histograms \(/python/histograms/\)](#) are often used to show the distribution of a variable, and they also support marginal plots in Plotly Express, with the `marginal` argument:

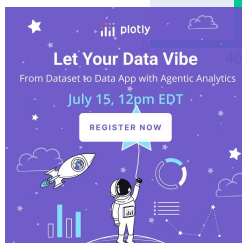
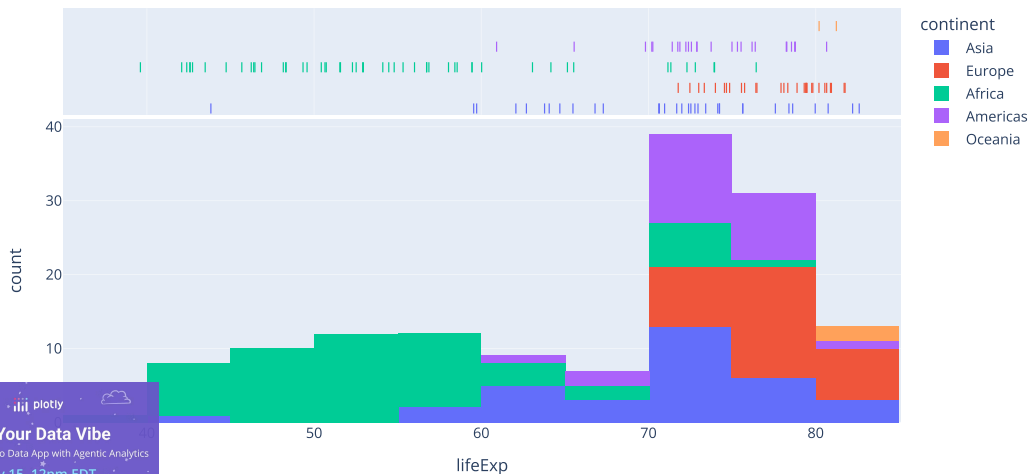
```
import plotly.express as px
df = px.data.iris()
fig = px.histogram(df, x="sepal_length", color="species", marginal="box")
fig.show()
```



Try hovering over the rug plot points to identify individual country values in the histogram below:

```
import plotly.express as px
df = px.data.gapminder().query("year == 2007")
fig = px.histogram(df, x="lifeExp", color="continent", marginal="rug", hover_name="country",
                  title="Hover over the rug plot!")
fig.show()
```

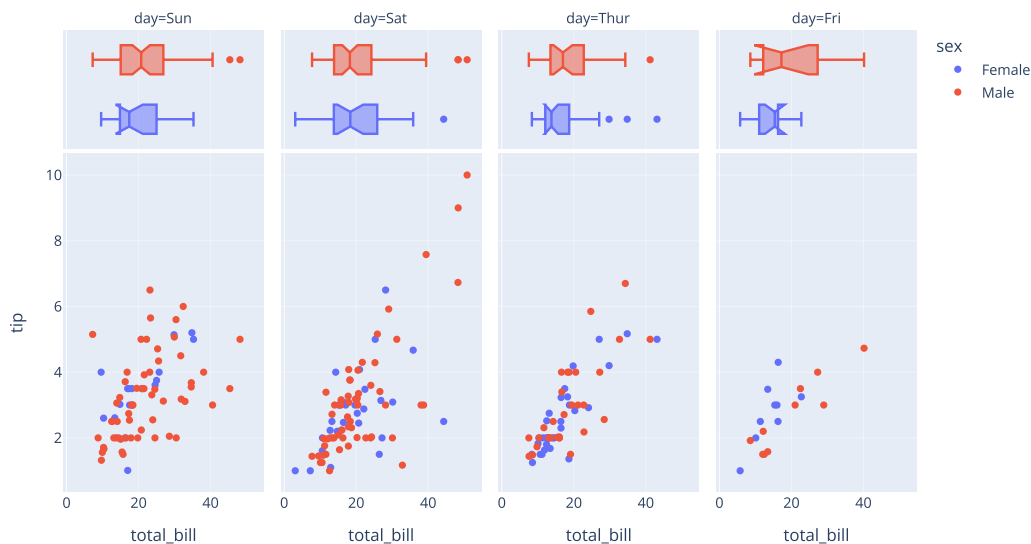
Hover over the rug plot!



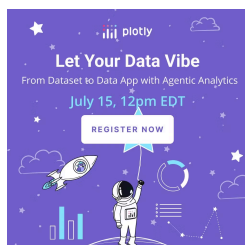
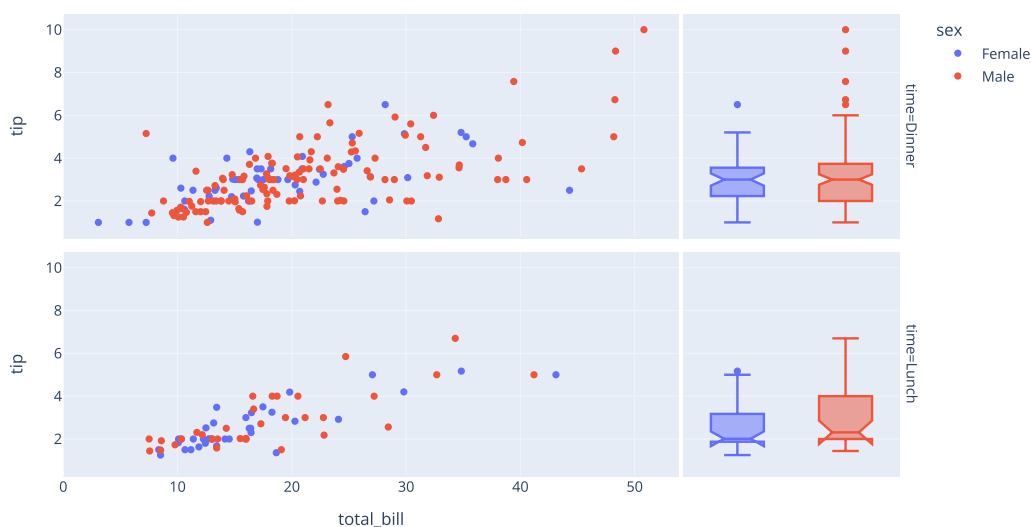
Marginal Plots and Facets

Marginal plots can be used in conjunction with [Plotly Express facets](https://plotly.com/python/facet-plots/) ([python/facet-plots/](https://plotly.com/python/facet-plots/)) so long as they go along different directions:

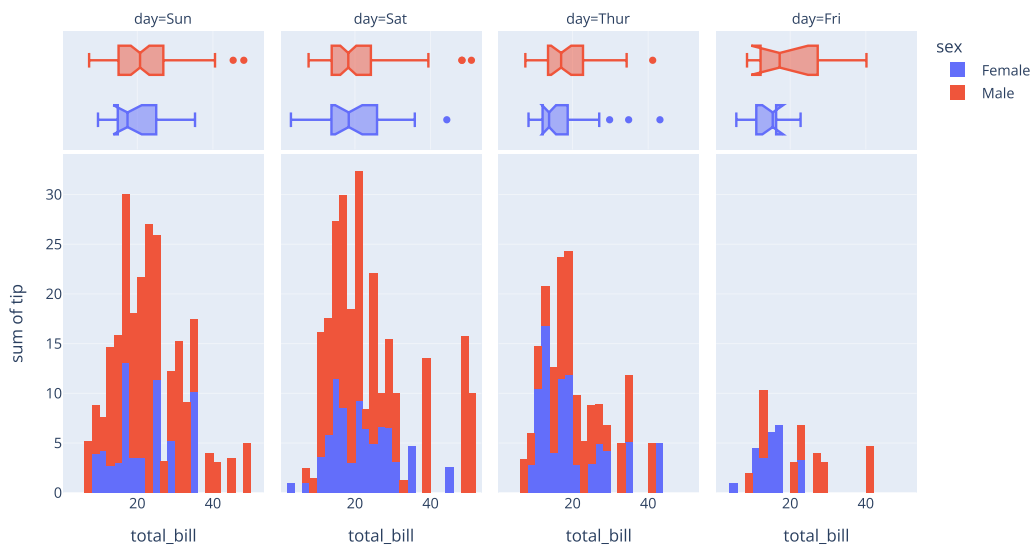
```
import plotly.express as px
df = px.data.tips()
fig = px.scatter(df, x="total_bill", y="tip", color="sex", facet_col="day",
                marginal_x="box")
fig.show()
```



```
import plotly.express as px
df = px.data.tips()
fig = px.scatter(df, x="total_bill", y="tip", color="sex", facet_row="time",
                marginal_y="box")
fig.show()
```



```
import plotly.express as px
df = px.data.tips()
fig = px.histogram(df, x="total_bill", y="tip", color="sex", facet_col="day",
                  marginal="box")
fig.show()
```



What About Dash?

Dash (<https://dash.plot.ly/>) is an open-source framework for building analytical applications, with no Javascript required, and it is tightly integrated with the Plotly graphing library.

Learn about how to install Dash at <https://dash.plot.ly/installation> (<https://dash.plot.ly/installation>).

Everywhere in this page that you see `fig.show()`, you can display the same figure in a Dash application by passing it to the figure argument of the **Graph component** (<https://dash.plot.ly/dash-core-components/graph>) from the built-in `dash_core_components` package like this:

```
import plotly.graph_objects as go # or plotly.express as px
fig = go.Figure() # or any Plotly Express function e.g. px.bar(...)
# fig.add_trace( ... )
# fig.update_layout( ... )

from dash import Dash, dcc, html

app = Dash()
app.layout = html.Div([
    dcc.Graph(figure=fig)
])

app.run(debug=True, use_reloader=False) # Turn off reloader if inside Jupyter
```

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|-------------|-----------|-----------|---------|--------------------|
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| Albania | 3690523 | Europe | 76.423 | 1937.6251259999999 |
| Algeria | 33333216 | Africa | 72.381 | 6223.367465 |
| Angola | 12428676 | Africa | 42.731 | 4707.211267 |
| Argentina | 40081927 | Americas | 75.21 | 12779.37964 |
| Australia | 20414176 | Oceania | 81.235 | 34435.367499999995 |
| Austria | 8109783 | Europe | 79.829 | 50126.4927 |
| Bahrain | 708573 | Asia | 75.635 | 29796.04834 |
| Bangladesh | 158448339 | Asia | 64.062 | 1701.251792 |
| Belgium | 10932226 | Europe | 79.441 | 33092.49506 |
| Benin | 8078914 | Africa | 56.728 | 1441.284873 |
| Bolivia | 9139152 | Americas | 65.354 | 3822.137884 |

<https://plotly.com/python/marginal-plots/>

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