



Bokeh 是一款交互式可视化库，可以通过 Python，快速便捷地为大型流数据集提供优雅简洁的高性能交互式图表，在浏览器中呈现。

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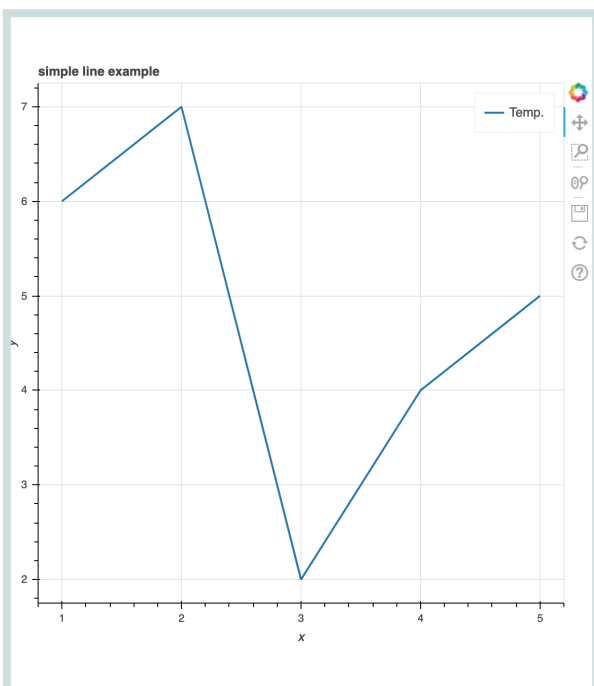
参考 | datacamp cheatsheet

## bokeh.plotting 界面绘图基本步骤与示例

Step 1 准备数据 (Python 列表、Numpy 数组、Pandas 数据框或其它序列值) Step 2 创建图形

Step 3 为数据添加渲染器，自定义可视化图 Step 4 指定生成的输出类型 Step 5 显示视图或保存结果

```
> from bokeh.plotting import figure
  from bokeh.io import output_file, show
  x = [1, 2, 3, 4, 5]
  y = [6, 7, 2, 4, 5]
  p = figure(title="simple line example", x_axis_label='x', y_axis_label='y') #Step 2
  p.line(x, y, legend_label="Temp.", line_width=2) #Step 3
  output_file("lines.html") #Step 4
  show(p) #Step 5
```



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## 1. 数据准备

通常，Bokeh 在后台把数据转换为列数据源，不过也可手动转换：

```
> import numpy as np
  import pandas as pd
  df = pd.DataFrame(np.array([[33.9,4,65, 'US'],[32.4,4,66, 'Asia'], [21.4,4,109, 'Europe']] ),
                    columns=['mpg', 'cyl', 'hp', 'origin'],
                    index=['Toyota', 'Fiat', 'Volvo'])
  from bokeh.models import ColumnDataSource
  cds_df = ColumnDataSource(df)
```

## 2. 绘图

figure 函数

```
> from bokeh.plotting import figure
> p1 = figure(plot_width=300, tools='pan,box_zoom')
> p2 = figure(plot_width=300, plot_height=300, x_range=(0, 8), y_range=(0, 8))
> p3 = figure()
```

## 3. 渲染器与自定义可视化

### 图符号

散点标记

```
> p1.circle(np.array([1,2,3]), np.array([3,2,1]), fill_color='white')
> p2.square(np.array([1.5,3.5,5.5]), [1,4,3], color='blue', size=1)
```

线型图符号

```
> p1.line([1,2,3,4], [3,4,5,6], line_width=2)
> p2.multi_line(pd.DataFrame([[1,2,3],[5,6,7]]), pd.DataFrame([[3,4,5],[3,2,1]]), color="blue")
```

### 自定义图符号

图符号选择与反选

```
> p = figure(tools='box_select')
> p.circle('mpg', 'cyl', source=cds_df, selection_color='red', nonselection_alpha=0.1)
```

绘图区内部

```
> from bokeh.models import CategoricalColorMapper
> color_mapper = CategoricalColorMapper(factors=['US', 'Asia', 'Europe'], palette=['blue', 'red', 'green'])
> p3.circle('mpg', 'cyl', source=cds_df, color=dict(field='origin', transform=color_mapper), legend_label='Origin')
```

### 3. 渲染器与自定义可视化

#### 图例位置

##### 绘图区内部

```
> p.legend.location = 'bottom_left'
```

##### 绘图区外部

```
> from bokeh.models import Legend  
  
> r1 = p2.asterisk(np.array([1,2,3]), np.array([3,2,1]))  
> r2 = p2.line([1,2,3,4], [3,4,5,6])  
  
> legend = Legend(items=[("One", [r1]), ("Two", [r2])], location=(0, -30))  
> p.add_layout(legend, 'right')
```

#### 图例方向

```
> p.legend.orientation = "horizontal"  
> p.legend.orientation = "vertical"
```

#### 图例背景与边框

```
> p.legend.border_line_color = "navy"  
> p.legend.background_fill_color = "white"
```

#### 栅格布局

```
> from bokeh.layouts import gridplot  
> row1 = [p1,p2]  
> row2 = [p3]  
> layout = gridplot([[p1,p2],[p3]])
```

```
> from bokeh.models.widgets import Panel, Tabs  
> tab1 = Panel(child=p1, title="tab1")  
> tab2 = Panel(child=p2, title="tab2")  
> layout = Tabs(tabs=[tab1, tab2])
```

#### 标签布局

##### 链接坐标轴

```
> p2.x_range = p1.x_range  
> p2.y_range = p1.y_range
```

##### 链接刷

```
> p4 = figure(plot_width = 100, tools='box_select,lasso_select')  
> p4.circle('mpg', 'cyl', source=cds_df)  
> p5 = figure(plot_width = 200, tools='box_select,lasso_select')  
> p5.circle('mpg', 'hp', source=cds_df)  
> layout = row(p4,p5)
```

#### 链接图

#### 行列布局

##### 行

```
> from bokeh.layouts import row  
> layout = row(p1,p2,p3)
```

##### 列

```
> from bokeh.layouts import column  
> layout = column(p1,p2,p3)
```

##### 行列嵌套

```
> layout = row(column(p1,p2), p3)
```

### 4. 输出与导出

#### Notebook

```
> from bokeh.io import output_notebook, show  
output_notebook()
```

#### HTML

##### 本地 HTML

```
> from bokeh.embed import file_html  
from bokeh.resources import CDN  
html = file_html(p, CDN, "my_plot")  
  
> from bokeh.io import output_file, show  
output_file('my_bar_chart.html', mode='cdn')
```

##### 组件

```
> from bokeh.embed import components  
script, div = components(p)
```

##### PNG

```
> from bokeh.io import export_png  
export_png(p, filename="plot.png")
```

##### SVG

```
> from bokeh.io import export_svgs  
p.output_backend = "svg"  
export_svgs(p, filename="plot.svg")
```

### 5. 显示或保存图形

#### show 与 save 函数

```
> show(p1)  
> save(p1)  
  
> show(layout)  
> save(layout)
```



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