Data Visualization

Plotly

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Visualization libraries

Frontend

Python is abundant with visualization libraries. Here are some:

- matplotlib – the default choice, based on MatLab plots, low level
- seaborn – for statisticians, based on matplotlib, more user friendly
- ggplot – for Rusers,
- bokeh – for interactivity and interfaces
- plotly – default choice for interactive plotting, available also in R

Plotly

Plotting

Plotly has several options for plotting:

- Online
  - Inside Jupyter Notebook (**from plotly.plotly import iplot**)
  - Not in Jupyter Notebook (**from plotly.plotly import plot**)
- **Offline**
  - **Inside Jupyter Notebook** (**from plotly.offline import iplot**)
  - Not in Jupyter Notebook (**from plotly.offline import plot**)

In case of plotting inside the Notebook (using iplot), the following line of code must be executed, to show the plot inline:

- **from plotly.offline import init_notebook_mode**
- **init_notebook_mode(connected=True)**

Objects

Most of the graphing functions (such as Scatter, Histogram etc) in Plotly are stored in **Graph objects**, which is usually imported as **go**:

- **import plotly.graph_objs as go**

Yet, there are still some in other locations, such as **distribution plot**, which is located in **figure factory**:

- **import plotly.figure_factory as ff**

Basic plots

Structure

Key notes:

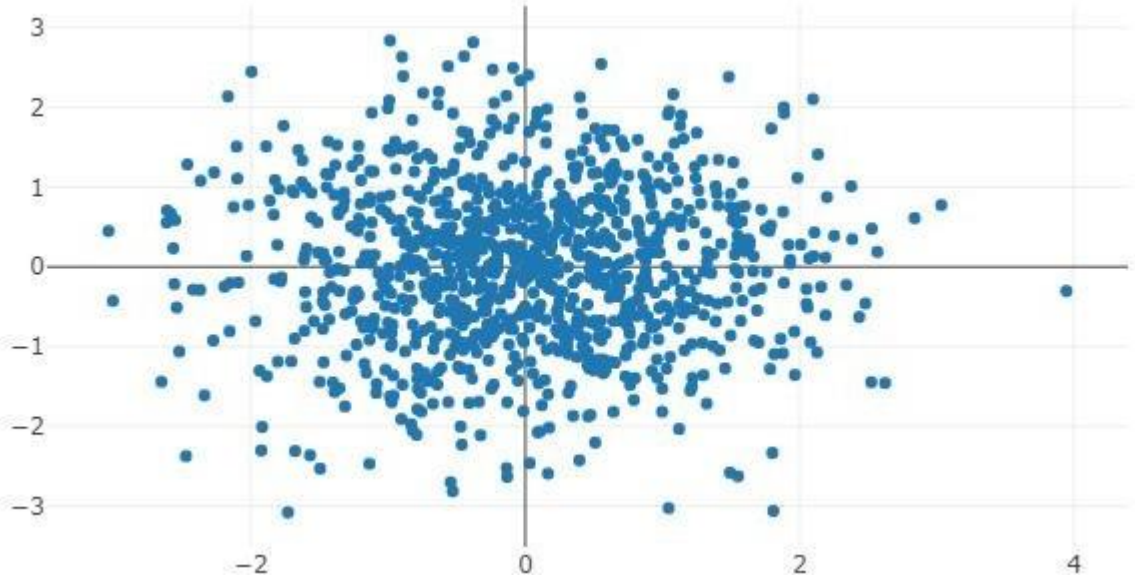
- Everything is a pair of keys and values (i.e. a dictionary)
- Each figure consists of two components (two keys): data and layout
- Data is a list of all traces in the plot (e.g. if you have a scatter plot and a fitted line, you will have two traces)

Pseudostructure:

1. trace_1 = go.Scatter(…….)
2. trace_2 = go.Scatter(…….)
3. data = [trace_1, trace_2]
4. layout = dict(title="My first plot")
5. figure = dict(data=data, layout=layout)
6. plot(figure)

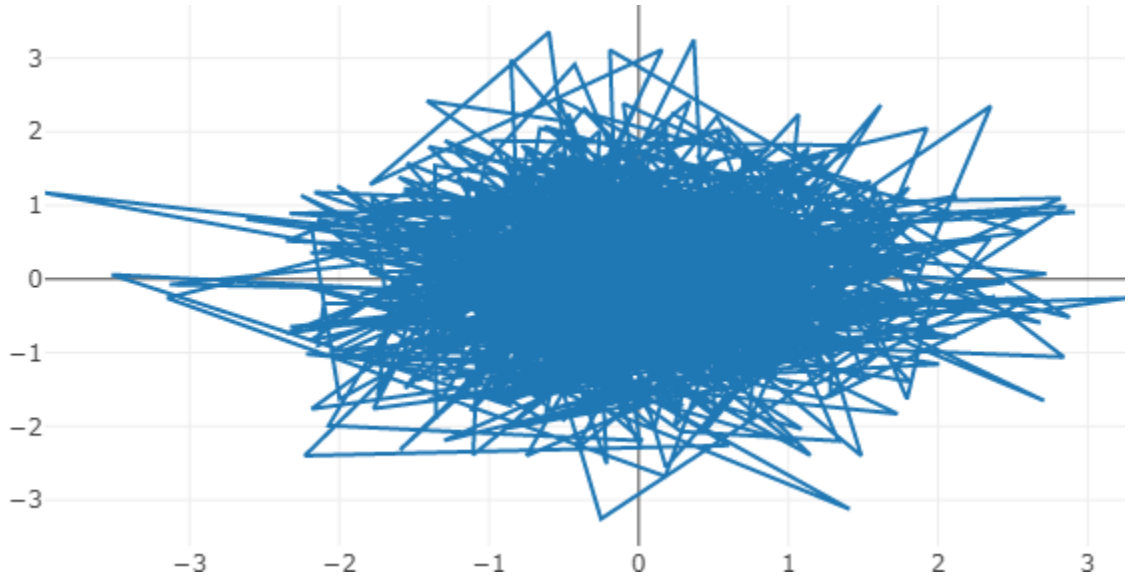
Scatterplot

```
1  from plotly.offline import plot, iplot
2  import plotly.graph_objs as go
3
4  import numpy as np
5
6  N = 1000
7  random_x = np.random.randn(N)
8  random_y = np.random.randn(N)
9
10 trace = go.Scatter(
11     x = random_x,
12     y = random_y,
13     mode = 'markers',
14     name = 'markers'
15 )
16
17 data = [trace]
18 iplot(data)
```



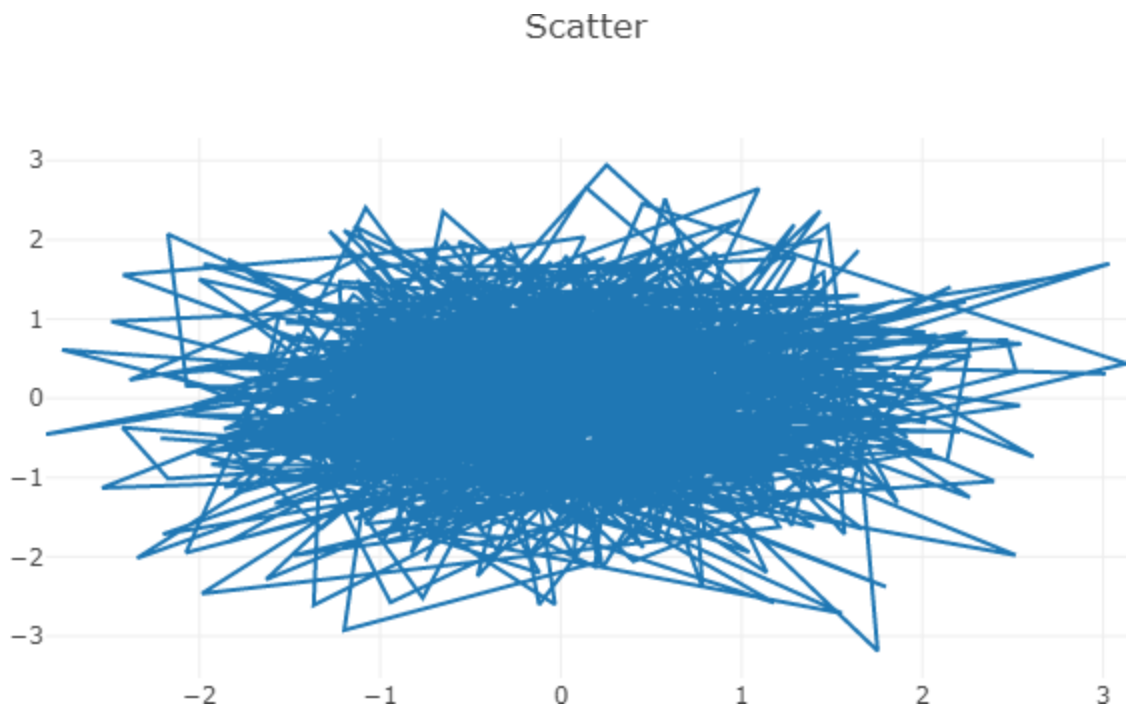
Line plot

```
1  from plotly.offline import plot, iplot
2  import plotly.graph_objs as go
3
4  import numpy as np
5
6  N = 1000
7  random_x = np.random.randn(N)
8  random_y = np.random.randn(N)
9
10 trace = go.Scatter(
11     x = random_x,
12     y = random_y,
13     mode = 'lines',
14     name = 'lines'
15 )
16
17 data = [trace]
18 iplot(data)
```



Layout

```
1  from plotly.offline import plot, iplot
2  import plotly.graph_objs as go
3
4  import numpy as np
5
6  N = 1000
7  random_x = np.random.randn(N)
8  random_y = np.random.randn(N)
9
10 trace = go.Scatter(
11     x = random_x,
12     y = random_y,
13     mode = 'lines',
14     name = 'lines'
15 )
16
17 data = [trace]
18
19 layout  = dict(title = "Scatter",
20                xaxis = dict(zeroline=False),
21                yaxis = dict(zeroline=False)
22               )
23 figure = dict(data=data,layout=layout)
24
25 iplot(figure)
```



Thank You

continue to Jupyter Notebook