Plotly Merkblatt

Plotly Grundlagen

Plotly ist ein Python-Framework zum erzeugen von interaktiven, hochqualitativen Graphen. Die Graphen werden dabei eingebettet in HTML angezeigt.

Installation

sudo pip3 install plotly

Imports

Häufig werden NumyPy und Pandas zur Datenaufbereitung vor dem Plotting eingesetzt.

import numpy as np

import pandas as pd

import plotly.offline as pyo

import plotly.graph_objs as go

import plotly.figure_factory as ff

Datenvorbereitung

x = np.linspace(0, 5, 50)

y = np.cos(x)

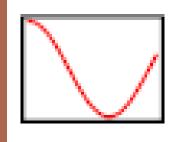
z = np.sin(x)

df = pd.DataFrame(np.random.randn(100,4),
 columns='A B C D'.split())

Beispielplot

pyo.plot([{'x': df.index, 'y': df[col],
 'name': col} for col in df.columns])

Plot mit Layout und Figures



layout = go.Layout(
 title='Liniendiagramm')
trace = go.Scatter(x=x, y=y,
 mode='lines', name='Linie')
fig = go.Figure(data=[trace],
 layout=layout)

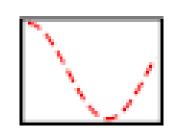
Plot anzeigen

pyo.plot(fig, filename='plot.html')

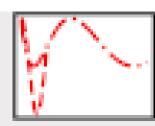
Linientyp



trace = go.Scatter(x=x, y=y,
 mode='lines',
line=dict(color='green', width=25))



trace = go.Scatter(x=x, y=y, mode='lines', line=dict(dash='dot'))



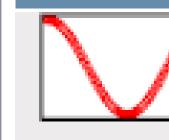
trace = go.Scatter(x=x, y=y,
 mode='lines',
 line=dict(dash='dashdot'))

Annotierung

layout = go.Layout(showlegend=False,
 annotations=[dict(x=0.5, y=1, ax=0, ay=-40,
 showarrow=True, arrowhead=1, text='Info')])
trace = go.Scatter(x=[0, 1], y=[1, 1],
 mode='lines+text', text=['Text A', 'Text B'],
 textposition='top center')

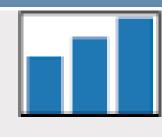
Plotly Plotting

Scatterplot



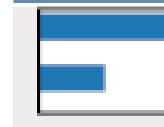
trace = go.Scatter(x=x, y=y,
 mode='markers', name='Markers')

Vertikale Balken



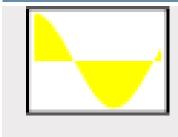
trace = go.Bar(y=[5,6,8],
 orientation='v')

Horizontale Balken



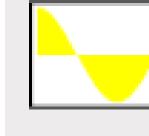
trace = go.Bar(y=[5,6,8],
 orientation='h')

Fülle zu x



trace = go.Scatter(x=x, y=y,
fill='tozeroy')

Fülle zu x



trace = go.Scatter(x=x, y=y,
fill='tozeroy')

Horizontale Linie



trace = go.Scatter(x=list(range(
 len(x))), y=[0.35]*len(x),
 mode='lines')

Vertikale Linie



trace = go.Scatter(y=list(range(
 len(y))), x=[0.69]*len(y),
 mode='lines')

Histogramm



trace = go.Histogram(x=y,
 xbins=go.XBins(start=-1, end=1,)
 size=0.2)

Pfeilplot

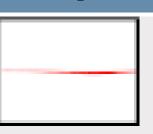
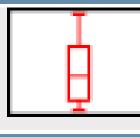


fig = ff.create_quiver(x, y, y, z)

Boxplot



trace = go.Box(y=y)

Violinplot

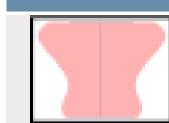


fig = ff.create_violin(z)

Weitere Plots

Kuchendiagramm

```
labels = ['A','B','C','D']
values = [4500, 2500, 1053, 500]
```

fig = go.Figure(

data=[go.Pie(labels=labels, values=values)])

Heatmap

fig = go.Figure(data=go.Heatmap(z=[[1, 20, 30], [20, 1, 60], [30, 60, 1]]))

Zeitfolgen

from datetime import datetime as dt

x = [dt(year=2013, month=10, day=4),
 dt(year=2013, month=11, day=5),
 dt(year=2013, month=12, day=6)]

fig = go.Figure(
 data=[go.Scatter(x=x, y=[1, 3, 6])])
fig.update_layout(xaxis_range=

[dt(2013, 10, 17),dt(2013, 11, 20)])

Gantt-Diagramm

```
df = [dict(Task="A", Start='2009-01-01',
    Finish='2009-02-28'),
    dict(Task="B", Start='2009-03-05',
    Finish='2009-04-15'),
    dict(Task="C", Start='2009-02-20',
    Finish='2009-05-30')]
fig = ff.create gantt(df)
```

Tabellen

fig = go.Figure(data=[go.Table(header=dict(values=['A', 'B']), cells=dict(values=[[100, 90, 80, 90], [95, 85, 75, 95]]))])

Sankey-Diagramm

```
fig = go.Figure(data=[go.Sankey(node=dict(
label = ["A1", "A2", "B1", "B2", "C1", "C2"],),
link = dict(source = [0, 1, 0, 2, 3, 3],
target = [2, 3, 3, 4, 4, 5],
value = [8, 4, 2, 8, 4, 2]))])
```

Konturplot

```
fig = go.Figure(data=go.Contour(z=[[10, 10.625, 12.5, 15.625, 20], [5.625, 6.25, 8.125, 11.25, 15.625], [2.5, 3.125, 5., 8.125, 12.5], [0.625, 1.25, 3.125, 6.25, 10.625], [0, 0.625, 2.5, 5.625, 10]]))
```

Dendrogramm

```
X = np.random.rand(15, 12)
fig = ff.create_dendrogram(X)
```

Logarithmische Achsen

```
fig.add_trace(go.Scatter(x=[0, 1, 2, 3, 4, 5, 6, 7],
    y=[8, 7, 6, 5, 4, 3, 2, 1]))
fig.add_trace(go.Scatter(x=[0, 1, 2, 3, 4, 5, 6, 7],
    y=[0, 1, 2, 3, 4, 5, 6, 7]))
fig.update_layout(
    xaxis_type="log", yaxis_type="log")
```

Dash

Dash ist ein Python-Framework für Webapplikationen und zusammen mit Plotly hervorragend für die Entwicklung webbasierte Anwendungen zur Datenanalyse geeignet.

Installation

```
sudo pip install dash==0.21.1 \
  dash-renderer==0.13.0
  dash-html-components==0.11.0
  dash-core-components==0.23.0
```

Imports

import dash import dash_core_components as dcc import dash_html_components as html

App-Aufbau

Zuerst wird eine Instanz der Basisklasse **Dash** erstellt. Anschliessend werden dieser HTML-Elemente und Graphen hinzugefügt. Zuletzt wird die Applikation ausgeführt.

```
app = dash.Dash()
html.Div(children='Dash Beispielanwendung'),
dcc.Graph(figure={'data': [{'x': [1, 2, 3],
    'y': [6, 4, 1], 'type': 'bar', 'name': 'EUR'},
    {'x': [1, 2, 3], 'y': [2, 3, 3], 'type': 'bar',
    'name': 'USD'}]})])
if __name__ == '__main__':
    app.run_server(debug=True)
```

CSS

CSS-Styles können als Parameter übergeben werden. html.H1(children='Hallo', style={ 'textAlign': 'center', 'color': '#999999'}),

Scatterplot

dcc.Graph(figure={'data': [go.Scatter(x=x, y=y,
 mode='markers')]})

Linienplot

Ändere den Parameter **mode** von **markers** zu **lines**, um einen Linienplot anstelle eines Scatterplots darzustellen.

Marker- und Linienstil

Füge der data-Liste des obigen Graphen folgenden Parameter hinzu, um den Marker- und Linienstil zu ändern: marker={'size': 15, 'line': {'width': 5, 'color': 'green'}}

Layout

Füge dem **figure**-Dictionary des obigen Graphen einen Parameter **layout** hinzu, um das Layout des Graphen anzupassen:

```
'layout': go.Layout(hovermode='closest', xaxis={'type': 'log', 'title': 'Log'}, yaxis={'title': 'Cosinus'}, margin={'l': 40, 'b': 40, 't': 10, 'r': 10})
```

