

Python - Matplotlib

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Python Grundkurs

einfache Visualisierung

- für einfache Darstellungen von Graphen kann das Modul Matplotlib verwendet werden
- Matplotlib gehört nicht zum Standardumfang von Python
- wir müssen es also nachinstallieren
- Befehl für die Konsole: **`pip3 install matplotlib`**

Matplotlib

```
import numpy as np
import matplotlib.pyplot as plt

x = np.arange(0, 50, 1)
y = x * 3
# Gerade plotten
plt.plot(x, y)
# Label x-Achse
plt.xlabel('x - axis')
# Label y-Achse
plt.ylabel('y - axis')
# Diagramm-Titel
plt.title('Draw a line.')
# Figur anzeigen
plt.show()
```

Matplotlib

```
import matplotlib.pyplot as plt  
x = [1,2,3]  
y = [2,4,1]
```

```
# Kein Abstand nach links, rechts, oben, unten (default = 0.05)  
plt.margins(0.0)  
plt.plot(x, y)
```

```
plt.xlabel('x-Achse')  
plt.ylabel('y-Achse')
```

```
plt.title('Überschrift')
```

```
plt.show()
```

Matplotlib

```
import matplotlib.pyplot as plt
# Linie 1
x1 = [10,20,30]
y1 = [20,40,10]
plt.margins(0)

# Linie 1 plotten und labeln
plt.plot(x1, y1, label = "Linie 1", linestyle = '--')
# Linie 2
x2 = [10,20,30]
y2 = [40,10,30]

# Linie 2 plotten und labeln
plt.plot(x2, y2, 'g--', label = "Linie 2", linewidth = 2)

plt.xlabel("x")
plt.ylabel("y")
```

Fortsetzung nächste Folie →

Matplotlib

Achsen beginnen bei 0

```
plt.xlim(0, 30)
```

```
plt.ylim(0, 40)
```

Titel setzen

```
plt.title("Überschrift")
```

Legende anzeigen, Labels werden verwendet

```
plt.legend()
```

```
plt.show()
```

Matplotlib

Tortendiagramm:

```
import matplotlib.pyplot as plt
```

```
languages = 'Java', 'Python', 'PHP', 'JavaScript', 'C#', 'C++'  
popularity = [22.2, 17.6, 8.8, 8, 7.7, 6.7]  
colors = ["#1f77b4", "#2ca02c", "#ff7f0e", "#d62728", "#9467bd",  
          "#8c564b"]
```

```
# 2. Stück herausschieben
```

```
explode = (0.5, 0.1, 0, 0, 0, 0)
```

```
# Plotten
```

```
plt.pie(popularity, explode=explode, labels=languages, colors=colors,  
shadow=True, startangle=140)
```

```
plt.show()
```

Matplotlib

Balkendiagramm:

```
import matplotlib.pyplot as plt
x = ['Java', 'Python', 'PHP', 'JavaScript', 'C#', 'C++']

popularity = [22.2, 17.6, 8.8, 8, 7.7, 6.7]
color = ["b", "g", "m", "r", "c", "y"]
x_pos = range(0, 6)

plt.bar(x_pos, popularity, color=color, zorder = 100)
plt.xlabel("Languages")
plt.ylabel("Popularity in %")
plt.title("Popularity of Programming Language")
#ersetze 0 , 1, 2 .. durch Java, Python, PHP...
plt.xticks(x_pos, x)
```

Fortsetzung nächste Folie →

Matplotlib

```
# Grid anschalten  
plt.minorticks_on()  
plt.grid(which='major', linestyle='-', linewidth='0.5',  
        color='black')  
  
# Customize the minor grid  
plt.grid(which='minor', linestyle=':', linewidth='0.5',  
        color='black')  
  
plt.show()
```

Matplotlib

Scatter:

```
import matplotlib.pyplot as plt
from pylab import randn
```

```
x1 = randn(200)
y1 = randn(200)
x2 = randn(200)
y2 = randn(200)
```

```
plt.scatter(x1,y1, color='r',s = 100, label="dot1" )
plt.scatter(x2,y2, color='c',s = 10, label="dot2")
```

```
plt.xlabel("x")
plt.ylabel("y")
plt.legend()
plt.show()
```

Matplotlib

Histogramm:

```
import matplotlib.pyplot as plt
```

```
x = [21,22,23,4,5,6,77,8,9,10,31,32,33,34,35,36,37,18,49,50,100]
```

```
num_bins = 5
```

```
n, bins, patches = plt.hist(x, num_bins, facecolor='blue',alpha=0.5)
```

```
plt.show()
```