Matplotlib

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Matplotlib

- Matplotlib is a plotting library for Python. It is used along with NumPy to provide an environment that is an effective open source alternative for MatLab.
- It can also be used with graphics toolkits like PyQt and wxPython.
- Matplotlib module was first written by John D. Hunter.
- Since 2012, Michael Droettboom is the principal developer.
- Currently, Matplotlib ver. 1.5.1 is the stable version available. The package is available in binary distribution as well as in the source code form on www.matplotlib.org.

How to install?

```
sudo pip install matplotlib
sudo apt install python-matplotlib
```

How to use?

- Conventionally, the package is imported into the Python script by adding the following statement –

```
from matplotlib import pyplot as plt
```

- Here pyplot() is the most important function in matplotlib library, which is used to plot 2D data.

Example:

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

x = np.arange(1,11)
y = 5 * x + 10
plt.title("Matplotlib demonstration")
plt.xlabel("x axis")
plt.ylabel("y axis")
plt.plot(x,y)
plt.show()
```

Markers

- '-'
  - Solid line style
- '--'
  - Dashed line style
- '-.'
  - Dash-dot line style
- ':'
  - Dotted line style
- '.'
  - Point marker
- ','
  - Pixel marker
- 'o'
  - Circle marker

Markers

- 'v'
  - Triangle_down marker
- '^'
  - Triangle_up marker
- '<'
  - Triangle_left marker
- '>'
  - Triangle_right marker
- '1'
  - Tri_down marker
- '2'
  - Tri_up marker
- '3'
  - Tri_left marker

Colors

Character	Color
'b'	Blue
'g'	Green
'r'	Red
'c'	Cyan
'm'	Magenta
'y'	Yellow
'k'	Black
'w'	White

Example:

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

x = np.arange(1,11)
y = 5 * x + 10
plt.title("Matplotlib demonstration")
plt.xlabel("x axis")
plt.ylabel("y axis")
plt.plot(x,y, "o")
plt.show()
```

Sine wave plot

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

# Compute the x and y coordinates for
x = np.arange(0, 3 * np.pi, 0.1)
y = np.sin(x)
plt.title("sine wave form")

# Plot the points using matplotlib
plt.plot(x, y)
plt.show()
```

Subplots

```
import numpy as np
import matplotlib.pyplot as plt
# Compute the x and y coordinates for po
x = np.arange(0, 3 * np.pi, 0.1)
y_sin = np.sin(x)
y_cos = np.cos(x)
# Set up a subplot grid that has height
# and set the first such subplot as act:
plt.subplot(2, 1, 1)
# Make the first plot
plt.plot(x, y_sin)
plt.title('Sine')
# Set the second subplot as active, and
plt.subplot(2, 1, 2)
plt.plot(x, y_cos)
plt.title('Cosine')
# Show the figure.
plt.show()
```

Bar plots

```
from matplotlib import pyplot as plt
x = [5,8,10]
y = [12,16,6]

x2 = [6,9,11]
y2 = [6,15,7]
plt.bar(x, y, align = 'center')
plt.bar(x2, y2, color = 'g', align = 'center')
plt.title('Bar graph')
plt.ylabel('Y axis')
plt.xlabel('X axis')

plt.show()
```

Histogram

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

a = np.array([22,87,5,43,56,73,55,54,11,20,51,5,79,31,27])
plt.hist(a, bins = [0,20,40,60,80,100])
plt.title("histogram")
plt.show()
```

Thank you

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