



Matplotlib

Matplotlib is a plotting library for the Python programming language and its numerical mathematics extension NumPy. It provides an object-oriented API for embedding plots into applications using general-purpose GUI toolkits like Tkinter, wxPython, Qt, or GTK+. There is also a procedural "pylab" interface based on a state machine (like OpenGL), designed to closely resemble that of MATLAB, though its use is discouraged. SciPy makes use of Matplotlib.

Matplotlib was originally written by John D. Hunter, since then it has an active development community, and is distributed under a BSD-style license. Michael Droettboom was nominated as matplotlib's lead developer shortly before John Hunter's death in August 2012, and further joined by Thomas Caswell.

Matplotlib 2.0.x supports Python versions 2.7 through 3.6. Python 3 support started with Matplotlib 1.2. Matplotlib 1.4 is the last version to support Python 2.6. Matplotlib has pledged to not support Python 2 past 2020 by signing the Python 3 Statement.

Comparing with MATLAB - MATPLOTLIB

Pyplot is a Matplotlib module which provides a MATLAB-like interface. Matplotlib is designed to be as usable as MATLAB, with the ability to use Python, and the advantage of being free and open-source.

Matplotlib is an excellent 2D and 3D graphics library for generating scientific figures. Some of the many advantages of this library include:

- Easy to get started
- Support for formatted labels and texts

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- Great control of every element in a figure, including figure size and DPI.
- High-quality output in many formats, including PNG, PDF, SVG, EPS, and PGF.
- GUI for interactively exploring figures and support for headless generation of figure files (useful for batch jobs).

One of the key features of matplotlib that I would like to emphasize, and that I think makes matplotlib highly suitable for generating figures for scientific publications is that all aspects of the figure can be controlled *programmatically*. This is important for reproducibility and convenient when one needs to regenerate the figure with updated data or change its appearance.

Matplotlib Advantages

There are several advantages of using matplotlib to visualize data.

- A multi-platform data visualization tool built on the numpy and siedepy framework. Therefore, it's fast and efficient.
- It possesses the ability to work well with many operating systems and graphic backends.
- It possesses high-quality graphics and plots to print and view for a range of graphs such as histograms, bar charts, pie charts, scatter plots and heat maps.
- With Jupyter notebook integration, the developers have been free to spend their time implementing features rather than struggling with compatibility.
- It has large community support and cross-platform support as it is an open source tool.
- It has full control over graph or plot styles such as line properties, thoughts, and access properties.
- **It uses Python:** Python is a very interesting language for scientific purposes (it's interpreted, high-level, easy to learn, easily extensible, and has a powerful standard library) and is now used by major institutions such as NASA, JPL, Google, DreamWorks, Disney, and many more.
- **It's open source, so no license to pay:** This makes it very appealing for professors and students, who often have a low budget.
- **It's a real programming language:** The MATLAB language (while being Turing-complete) lacks many of the features of a general-purpose language like Python.
- **It's much more complete:** Python has a lot of external modules that will help us perform all the functions we need to. So it's the perfect tool to acquire data, elaborate the data, and then plot the data.
- **It's very customizable and extensible:** Matplotlib can fit every use case because it has a lot of graph types, features, and configuration options.
- **It's integrated with LaTeX markup:** This is really useful when writing scientific papers.
- **It's cross-platform and portable:** Matplotlib can run on Linux, Windows, Mac OS X, and Sun Solaris (and Python can run on almost every architecture available).

Useage

Some people use matplotlib interactively from the python shell and have plotting windows pop up when they type commands. Some people run Jupyter notebooks and draw inline plots for quick data analysis. Others embed matplotlib into graphical user interfaces like wxpython or pygtk to build rich applications.

Matplotlib Vs Seaborn

Matplotlib: Matplotlib is mainly deployed for basic plotting. Visualization using Matplotlib generally consists of bars, pies, lines, scatter plots and so on. Seaborn: Seaborn, on the other hand, provides a variety of visualization patterns. It uses fewer syntax and has easily interesting default themes.

References :-

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Info Table

Aa	Sr.	Types of Graphs	Different Possible Graphs
1		Lines, bars and markers	44
2		Images, contours and fields	43
3		Subplots, axes and figures	32
4		Statistics	20
5		Pie and polar charts	9
6		Text, labels and annotations	40
7		Animation	12
8		3D plotting	36
9		Mnay more types	50+