DATA VISUALISATION

A Guide to Visualisation Libraries in Python and R

OVERVIEW

There are many different visualisation packages that can be used to improve your projects, and in the long-term, improve your presentations in your day-to-day work. Below you will find a list of resources that give overviews of visualisation practices and choosing the appropriate visualisations based on your data. In addition, there are two tables - one for Python, and one for R - describing various libraries available, their uses, and where to find more information about them.

GENERAL RESOURCES

- Fusion Charts: the best Python visualisation libraries (Python)
- Seaborn vs. Matplotlib (Python)
- Python Graph Gallery (Python)
- 11 Visualisation libraries (general use, for Python and R)
- Data Viz Project: online tool for choosing visualisations
- Data Viz Catalogue: online resource about visualisation types
- Data to Viz: Choosing the right graph (general use, R example codes)
- Show Me Shiny: A collection of Shiny Dashboards (R)
- Top premade colour palettes and packages (R)

PYTHON LIBRARIES

Python	About the Library	Resources
Matplotlib	• Basic Python library • General, all-purpose • Variety of visuals	• Machine Learning Plus: Top 50 Visualisations • Matplotlib Article: quick and easy visuals
Seaborn	• Built on Matplotlib • Visually appealing defaults • Easier code for heat maps, violin plots, time series	• Seaborn website • Seaborn tutorial • Seaborn on Github
ggplot	• Based on “Grammar of Graphics” • Python version of the R library ggplot2 • Compared to Matplotlib, can layer components to make a full plot	• ggplot website • ggplot on Github
Bokeh	• Based on “Grammar of Graphics” • Supports streaming and real-time data • Create interactive, web-ready plots (output: JSON, HTML, or web apps) • 3 levels of interfaces for varying degrees of control	• Bokeh website • Getting started with Bokeh, part 1 (article) • Bokeh on Github
Plotly	• Interactive, publication-quality graphs • Offers charts not found in most libraries (e.g., contour plots, candlestick charts) • Also has an online platform for data visualisation • Save the graphics via hosting on Plot.ly or offline as an html file (see this article) • Dash - create dashboard apps using Python and R models	• Plotly website (Python) • Plotly online dashboard • Plotly Article (with links to example codes) • Dash by Plotly

Plotly Express	• A quicker method for data exploration compared to Plotly • Syntax is easier to use than Plotly, but more limited scope	• Plotly Express • Information guide
Pygal	• Interactive plots that can be embedded in a web browser • Distinct in that outputs charts as SVGs (note: can be slow and have rendering issues with large datasets • Can create graphs with little code • Appealing built-in styles	• Pygal website
Altair	• Simple, friendly visualization library based on Vega-lite (JSON) • Declarative - only need to mention links between data columns (e.g., x-axis, y-axis, color) and the plotting details are handled automatically • Easy to make and design beautiful visualizations with minimal code	• Altair website
Geoplotlib	• Plot geographical data, map creation • Many map types, (e.g., dot density plots, choropleths, heatmaps, • Requires installation of Pyglet • Providing a set of in-built tools for common tasks (e.g., spatial graphs, shape files, density visualization) • Good alternative as most Python libraries don't offer maps	• Geoplotlib installation • Geoplotlib on Github
Gleam	• Inspired by R's Shiny package • Can create interactive web apps	• Gleam installation • Gleam on Github

	• Works with any Python data visualisation library • Create a plot, then build fields on top of the plot to filter and sort data	
Missingno	• Gauge completeness of a dataset • Can filter and sort data based on completion, or spot correlations with a heat map or a dendrogram	• Missingno installation • Missingno on Github

R LIBRARIES

R	About the Library	Resources
ggplot2	• Easily create multi-layered, customised static graphs • Based on The Grammar of Graphics • Can be slow to learn at first the syntax • Use the patchwork library to combine multiple ggplot2 charts into one graphic • Use ggiraph to make graphs interactive	• Top 50 ggplot2 visualisations • ggiraph: make ggplot2 plots interactive
gganimate	• Animated charts built upon ggplot2 • Allows you to add extra code into ggplot2 graphics to customise how they look	• gganimate website • gganimate article
Plotly	• Interactive, publication-quality graphs • Offers charts not found in most libraries (e.g., contour plots, candlestick charts) • Also has an online platform for data visualisation	• Plotly website (R)
bbplot	• Publication-ready graphics in BBC style	• BBC-style graphics

	• Based on ggplot2 library • Makes it easier to make new R graphics • Not available on CRAN, so you have to download it (instructions here)	
echarts4r	• Build interactive 2D and 3D visualisations for a variety of chart and graph types • Has the ability to link interactive visuals together, and has zoom abilities • Can be used with the Shiny package • Can download complimentary packages for graphing data onto globes and maps	• Echarts4r website
wordcloud2	• Library for additional word clouds • Use additional shapes and letters/words as the 'clouds' • Ability to rotate and/or resize the text within clouds and the clouds themselves • Can be used with the Shiny package	• Wordcloud2 website
Shiny	• For building interactive web apps in R • Standalone hosting or embed them in R markdown • Has a steep learning curve, can be difficult to learn the code at first	• Shiny website • Extensions for Shiny • Deploying a Shiny app to a remote server • Video tutorials
Flexdashboard	• A newer package for making dashboards with multiple windows • Can be used in conjunction with Shiny • Easily make your own dashboard layouts • Much more user-friendly than Shiny	• Flexdashboard website • Flexdashboard example (with code)
dygraphs	• Built on Dygraphs JavaScript packages	• Dygraphs github website

	• Great for charting interactive time-series data in R • Can be used in Shiny	
googleVis	• Package to provide an interface between R and Google's chart tools • Create locally-displayed web pages with interactive charts using R data frames. • Requires modern browser with internet connection • Some charts require a Flash player	• googleVis for R
Highcharter	• Package for the Highcharts.js library • Interactive graphics • Potential for highly advanced plot customisation if you know javascript	• Highcharter website (with example code) • DataCamp: Highcharter in R (with example code)
RColorBrewer	• A package of pre-made colour palettes • Some categories are semi-customisable to accommodate graphics with many data points	• RColorBrewer documentation • RColorBrewer article
colorspace	• Package for premade color templates and themes to use in R	• Colorspace website