

Market Solutions

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1 Introduction

The following are short summaries of each important solution on the market that helped inform the project's market research.

2 Gnu Plot

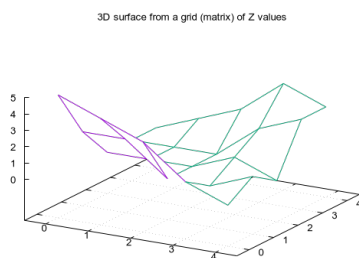


Figure 1: "3D surface from a grid (matrix) of Z values" [8]

Gnu Plot is a free to use command line program for generating graphs on multiple platforms and as a plotting engine for other programs. It has been actively developed since 1986 and is the oldest of the tools mentioned here. It is highly customizable and includes a huge number of different plots and styles of visualization. It also can be run on many platforms and export visuals to different formats. Although being a command line tool, it requires specialist knowledge to use and it is expected that the user would read documentation to learn how to use each of the many options available. Having a lot of customizability in graph options similar to gnu plot would be useful to expand the kind of data that could be displayed. [9] [8]

3 Wolfram

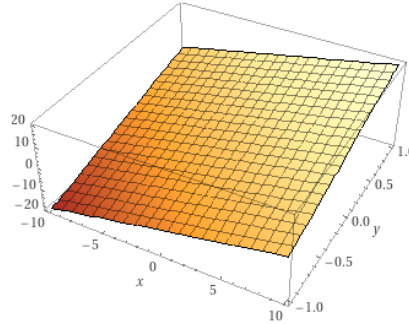


Figure 2: The plot $x+10y$ made with wolfram alpha [13]

Wolfram is a language and set of tools used for the computation of data. One feature of the language itself though is it's integrated ability to display 3D plots of data out of array like data points. Further effects can also be applied to create other visuals. This also requires programming knowledge. A scriptable design for visualisations options might be a good way to structure the code where multiple combinations are possible. [6]

4 Python



Figure 3: Python Logo [14]

A general purpose language [3] would usually be too vague to identify as an option, but an exception is made here mainly for two reasons. First- Python is arguably one of the leading languages for Data Science and Analysis applications with a wide range of supporting libraries. The Stack Overflow 2021 Developer Survey ranks Python as the 3rd most used language [12]- with multiple data libraries on the most used libraries and frameworks list [12]. As such, it wouldn't be representative of the market at hand to omit it. The second reason is that there are too many python libraries that could be listed here, Some focusing on the visualisation itself while others supporting the function of the former in

some way- but all of them can be broken down into the same takeaways as if we consider the whole platform. Those are the following:

- Python is a programming language- As such, there is a high difficulty curve to use it and requires programming knowledge. Although with the large option of libraries it is certainly easier than writing the application you need from scratch.
- The large number of libraries means most tasks can be done through minimal code- this naturally includes visualisation of data too through a library such as matplotlib or one of many others.
- If something is not implemented by a library then it is straightforward (but not necessarily easy) to make it yourself. You cannot say the same for an option that offer's less control to the user.

5 Tableau

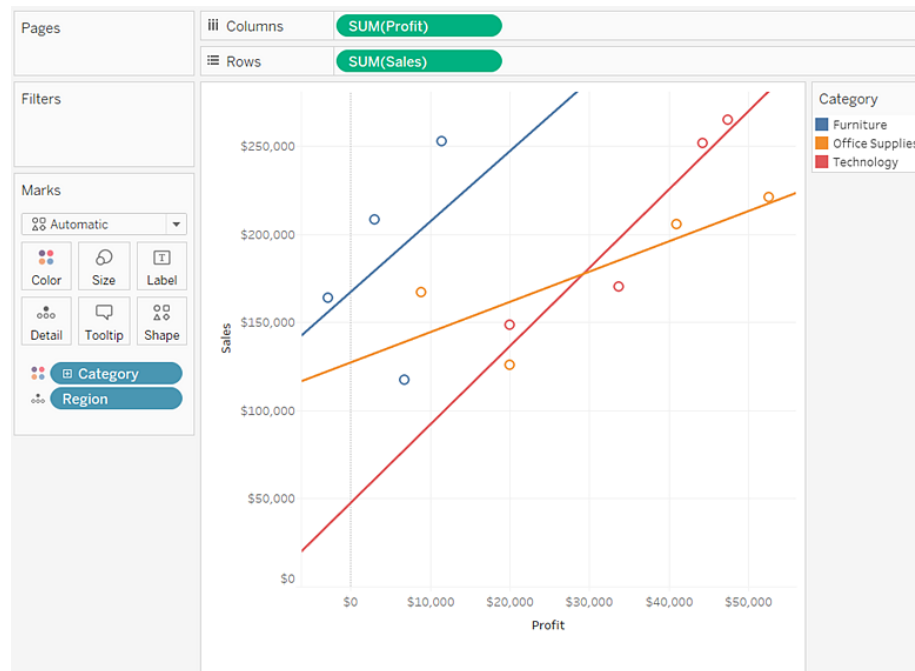


Figure 4: 2D Scatter plot and UI interface [5]

Tableau is a visual analytics platform that was founded in 2003 with the goal of improving the flow of analysis and making data more accessible. To that end, they have a number of products to help drive business decision making.

Some products of particular interest are Tableau Public, which is a platform to share nicely formatted data charts and a no code creation tool. There's also Tableau desktop which gives a drag and drop interface to analyze and plot data from a connected data source. This is the first entry on this list that does not require at least some programming experience- but it is much more limited than the other options, and is not free with a licence required. The easy to use interface of these products provides a great example of what's possible for a data visualisation application. [4]

6 MATLAB

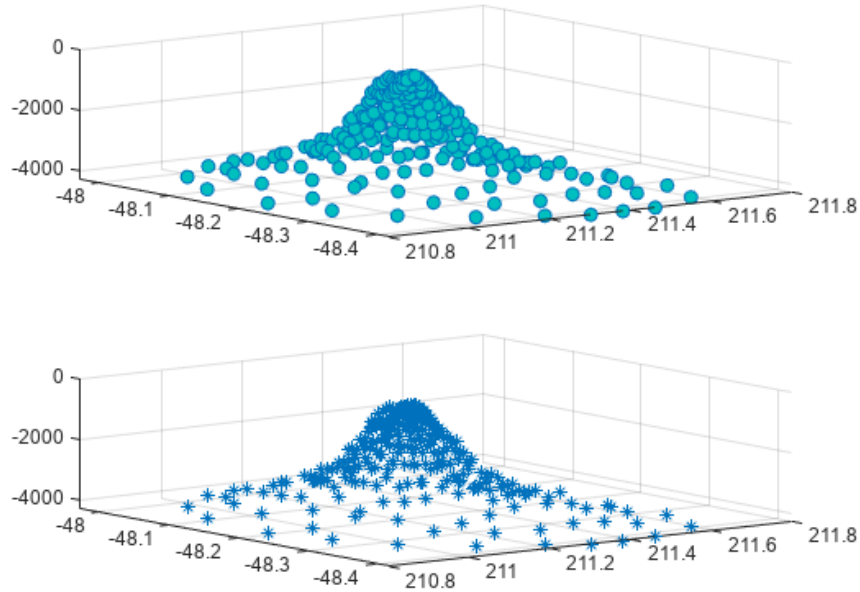


Figure 5: "Specify Axes for 3-D Scatter Plot" [2]

MATLAB is a programming and numeric computing platform which contains the ability to create graphs for data visualisation through built in plots. But, MATLAB truly shines in its data analytic ability. Allowing the use of multiple different built in functions and libraries to be ran on data combined with the MATLAB language itself which is a fully featured programming language built for data analysis. Alternatively, a UI based interface is also available to create data visualisation. But MATLAB is not a free tool and requires a licence to use. Great split of option between an easy to use UI, and the alternatively more power programming tools. [1]

7 deck.gl

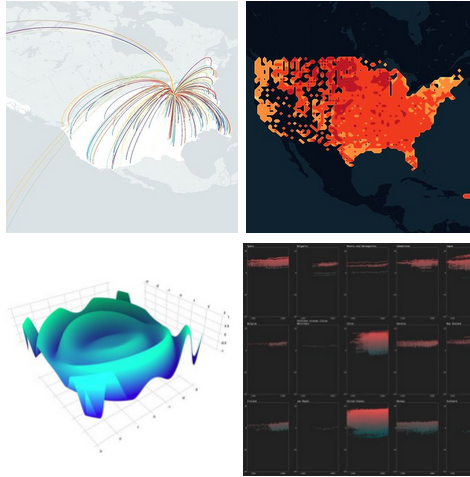


Figure 6: Example Plots [7]

deck.gl is a visualisation framework using WebGL for the analysis of large data sets. It mainly works by taking in JSON objects and building them into a stack of layers to create some impressive visual out of a very large number of data points. This is essentially an application that uses the GPU to visualize large number of data points in a accessible graphic. Layers allow usage of different visuals such as heat maps upon which you can add another layer like labels etc. deck.gl seems to focus on geospatial data but is part of the vis.gl family of frameworks which all do roughly the same things but for different data. [7]

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