

Plotly: Data interpretation and Visualization



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# **Introduction:**

For this project the basis is to look at functional API’s or libraries that can be used as a means of improving or developing better practices as a system administrator. One such action is to retrieve user entered data and present it in a visual manner to provide ease of understanding of the complexity or severity of the data presented. Simplifying and Automating such developments can prove useful for a company.

# **Technology:**

The technology to be used to present this simplification of data manipulation and visualization is with the use of the API Plotly. Plotly is an API that is designed to take in values that are assigned to storage containers to be transcribed to visual representations of the values provided. With the use of file manipulation API Panda and the calculation API Numpy values and titles can be assigned as appropriately needed to construct a diagram as needed.

One of the main requirements of this however is data needs to be constructed in a format easily read by the API, the one most commonly used is comma separated value file(csv). The format of this file is rows and columns of data presented in a way that values can be associated with an index value or a title.

# **Goals:**

The goal of the usage of the API Plotly is to gain a foundational understanding of the construction of complex data files and the ease at which an API can interpret the values given.

Once looked at Plotly can determined to be used in certain environment and a foundational course of learned can be undertaken to show the complexity of the features available to it and the differing visual aids that can be created through its use.

To further develop on the foundation of construction a practical research into the construction of data files required by the API should be undertaken to personalize the process of data creation and storage of information with the API web structure.

A final development of the interaction between the creation of a variable data set and a custom visual aid to prove an understanding of the functions in usage throughout this research of data manipulation.

# **What Is Plotly:**

Plotly is described as an “interactive , browser based charting library” working as an open source graphing library using frameworks.(Bauer and Traunmüller, 2016) Plotly is not only set as set as an API for python but it has libraries for multiple different languages like Matlab, Javascript and ‘R’.(Mesquita, 2018) The structure of Plotly has three main components to its structure the ‘Data’, the ‘Layout’ and the ‘Figure’. The data part defines what will be displayed within the charts structure and is represented by the specifications set on the data known as a trace by Plotly. The layout is all the other components not related to the data, such as the titles of the axis or the type of chart that is going to be constructed. The figure it the constructed chart object that is created at the end.(Mesquita, 2018)

To understand how to use Plotly the best way to breakdown how to use it is to go through the base tutorial. For a better breakdown Jupyter notebook is the python application of choice to use. The first step described is usage of pip installations to add the packages Plotly, NumPy, SciPy and Pandas for one to interact with their functions.(plotly, 2019) Before going through that the user must create an account with plotly to gain a login username an API access key to make use of the service.

The first thing to learn is the usage of panda to import a dataset file to make use of for the functions of plotly. Panda.read\_csv(variable) command takes a url or system location and reads the data within as a csv format. By then piping the data into a variable for the first example an iplot, an excel like format will be displayed in the output window of jupyter, as well as piped to the users plotly storage container for files.

Panda can then breakdown the structure of the data set into columns based on the titles given so they can be piped into the data access of plotly x and y axis. When importing the capability to create charts plotly must call to the graph\_objs to access the current library of chart type available. This allows for defining the data as a Bar, Scatter, or Pie chart and when a variable is set as one of these inside the function called one can set constraints on how the data is displayed, colorize the data and define which heading are pulled to which axis.

After data is defined the Layout can be called to apply the formatting touches to the description of the chart being created, and contextually have its colour defined.

The advanced capabilities of this API is full animated plotted charts changing visually based on the users input, which in turn can change the values in the data being accessed by the plotly chart.

# **Creating a DataSet File:**

# **Manipulating Data into Visual Aid:**

# **Conclusion:**

# **Future work:**

# **Links:**

Plotly main website: <https://plot.ly/#/>

Pandas main website: <https://pandas.pydata.org/>

Python documentation: <https://www.programiz.com/python-programming/>

**References:**

Bauer, P. C. and Traunmüller, R. (2016) *Interactive Data Visualization (2nd Day)*, *bookdown.org*. Available at: https://bookdown.org/paulcbauer/idv2/ (Accessed: 2 May 2019).

Mesquita, D. (2018) *How and why I used Plotly (instead of D3) to visualize my Lollapalooza data*, *freecodecamp*. Available at: https://medium.freecodecamp.org/how-and-why-i-used-plotly-instead-of-d3-to-visualize-my-lollapalooza-data-d48345e2ca68 (Accessed: 2 May 2019).

plotly (2019) *Jupyter Notebook Tutorial | plotly*, *Plotly*. Available at: https://plot.ly/python/ipython-notebook-tutorial/#import-data (Accessed: 2 May 2019).