Tabulator: Automatic Table Design on the Web

Pontus Orraryd, Oskar Ankarberg

Stanford University

Introduction

Tabulator is a web app to quickly create and download a well-designed table for use in papers and similar. The table generated upholds known principles in visualization and perception and is very easy to use. All the user needs is a data file containing the data they want to tabulate. After creation, some optional customization of the table is possible to allow users to specialize the table for their needs.

Motivation

A user not experienced in programming or advanced software often resort to tools in popular software as Excel to create tables. These tools do not create a very good table initially. While there are usually customizations available to make it better, most users do not know specifically what is needed to be done.

As an example, the table in Figure 1 is generated in Excel and is what you get initially. Headers and data have the same formatting. Some rows have been cut of and it is hard to see and separate some rows.

Order Date	Order Priorit	Order Quant	Sales	Discount	Ship Mode
13/10/10	Low	6	261,54	0,04	Regular Air
20/02/12	Not Specifiec	2	6,93	0,01	Regular Air
15/07/11	High	26	2808,08	0,07	Regular Air
15/07/11	High	24	1761,4	0,09	Delivery Truck
15/07/11	High	23	160,2335	0,04	Regular Air
15/07/11	High	15	140,56	0,04	Regular Air

Figure 1: Table generated in Excel

With Tabulator, we hope to fill the gap between these table generators and complex visualization tools not really suited for people not used to programming or advanced computer systems. We believe there is a need for an easy and quick way to produce a table that has good design automatically.

Showing data by Order Date

Order Date	Order Priority	Order Quantity	Sales	Discount	Ship Mode
13/10/10	Low	6.00	261.54	0.04	Regular Air
20/02/12	Not Specified	2.00	6.93	0.01	Regular Air
15/07/11	High	26.00	2808.08	0.07	Regular Air
15/07/11	High	24.00	1761.40	0.09	Delivery Truck
15/07/11	High	23.00	160.23	0.04	Regular Air
15/07/11	High	15.00	140.56	0.04	Regular Air

Figure 2: Table generated in Tabulator

Approach

We identified multiple principles that our system would try to uphold.

- Quick and easy to use
- Visual perception over pretty design
- Minimize users impact on design

Our design is primarily based on the ideas by Stephen Few. He have formulated a lot of design principles involving table design that we have automated. Some examples of design choices we have made:

- Nominal and ordinal values will not be repeated when sorted.
- Avoid as much rules and grids as possible.
- Use a lot of white space to improve readability.

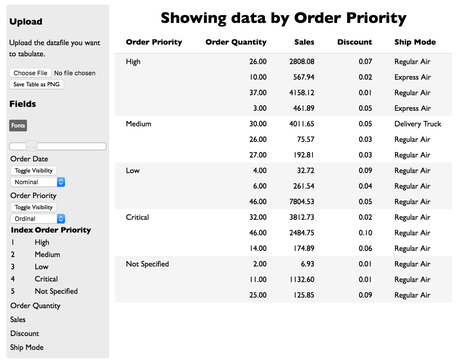

Figure 3: Tabulator with user interaction

The system also do some automatic processing of the data:

- Margins depend on the amount data, and low margins will also add a fill color to help differentiate rows.
- Automatic detection of numbers to apply special formatting.
- Reformatting titles to remove things like camel case.

We have also added some interactive features. Some control over the look of the table is important to make the system useful in practice.

- Users can reorder columns by dragging them.
- Users can specify the ordering of ordinal data.
- Represent numbers as shapes.

Results & Future Work

The system has been implemented in javascript and uses d3.js for the data handling. The system receives a csv file and creates a table that can be downloaded as a png image.

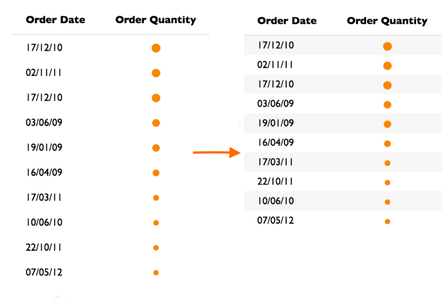

Figure 4: Fill color is added when margins get smaller

There are multiple ways this system could be extended and improved. For example, an extension would be the inclusion of some kind of word processing to infer meaning and context automatically. This would enable automatic detection of ordering of ordinal data, hierarchical patterns (like country, state and county) and in turn design the table with this knowledge in mind.

The system can not yet create ”branching” or grouping of cells and rows, which can be a really effective way to structure a table. This is a feature that we would like to implement in the future.

References

[1] Stephen Few.
Show Me the Numbers.
Analytics Press, 2nd edition, 2012.