

Tableau Tutorial for CS5346 Students

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About Me

I am a librarian in Digital Scholarship Team, NUS Libraries.



About My Team

Digital Scholarship Team offers space, consultations, workshops and resources for the NUS community working on digital projects. The team also partners with researchers to work on collaborative projects.



Level 4, NUS Central Library



<https://libds.nus.edu.sg/>



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Learning Materials

Learning Materials

All learning materials have been uploaded [here](#).

- [Sample data](#)
- [Workbooks used in demos](#)
- [Steps demonstrated in demos \(Text\)](#)

Introduction

Tableau: What?

- A data analysis and visualisation software with interactive graphs and dashboards
- Good explanatory analysis and reporting purpose
- Easy to get started with
- Minimal programming knowledge needed

Overview

- I. Connecting to a Data Source
- II. Creating a Simple Chart
- III. Common Types of Charts in Tableau
- IV. Tableau Dashboard

Learning Outcomes

After this tutorial, you will be able to:

- Be able to import data into Tableau
- Be able to create different types of visualization using Tableau
- Be exposed to Tableau Dashboard

Part I. Connecting to a Data Source

The following features will be covered in this section.

- Import an excel sheet
- Data preview & Metadata view
- Filter data from your data source
- Join tables
- Union tables

Demo

- Download sample data [here](#)
- View the steps in details [here](#)

Demo – Import an Excel Sheet

Demo – Data Preview & Metadata View

Demo – Filter data from your data source

Relevant sources:

- [Filter Your Data Carefully, Tableau Website](#)

Demo – Join tables

Demo – Union Tables

Part II. Creating a Simple Chart

Tableau Concepts

- **Dimensions:** Qualitative fields that can be used to categorize, e.g., cities, dates, names
- **Measures:** Fields that contain measurable numeric/quantitative values
- **Aggregation:** Summarize the data, e.g., SUM, Mean.
 - Useful resources:
 - [Data Aggregation in Tableau, Tableau Website](#)
 - [Aggregate Functions in Tableau, Tableau Website](#)

Demo

- View steps [here](#)

Demo – A simple bar chart

Which is the month that has the largest sales volume on average based on 3 years of order data?

- Key concepts
 - Dimensions: month
 - Measures: sales volume
 - Aggregation: average
- Comparison -> bar chart
- Useful resources
 - [Build a Bar Chart, Tableau Website](#)

Demo – A stacked bar chart

On top of the previous question, you would like to take a look at the distribution of products in different categories.

- Useful resources:
 - [Creating a Stacked Bar Chart Using Multiple Measures, Tableau Website](#)
 - [Transform Values with Table Calculations, Tableau Website](#)

Demo – A dual line chart

What was the trend of sales and profits over months?

- Key concepts
 - Dimensions: month
 - Measures: sales volume & profits
 - Aggregation: sum
- Trends -> line chart
- Useful resources
 - [Build a Line Chart, Tableau Website](#)
 - [Add Axes for Multiple Measures in Views, Tableau Website](#)

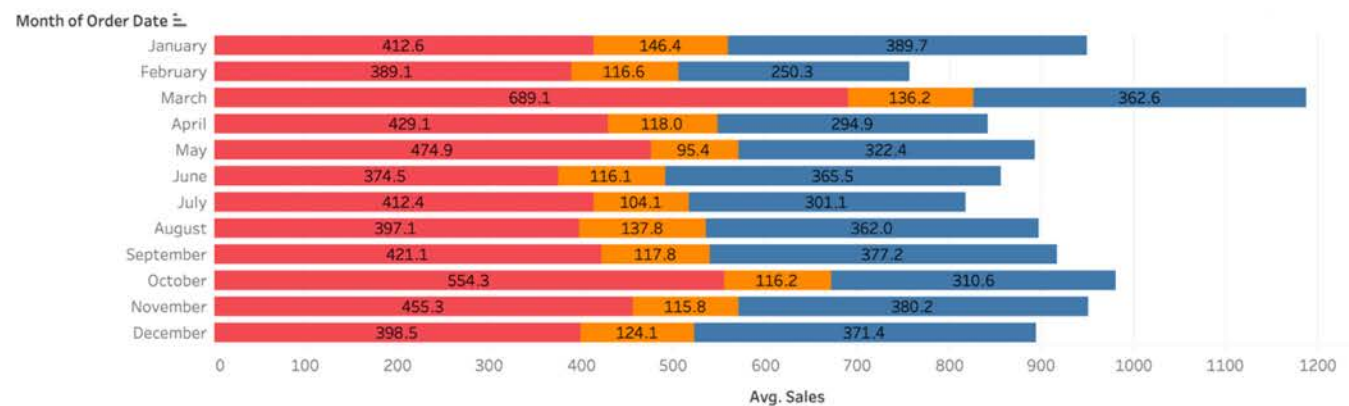
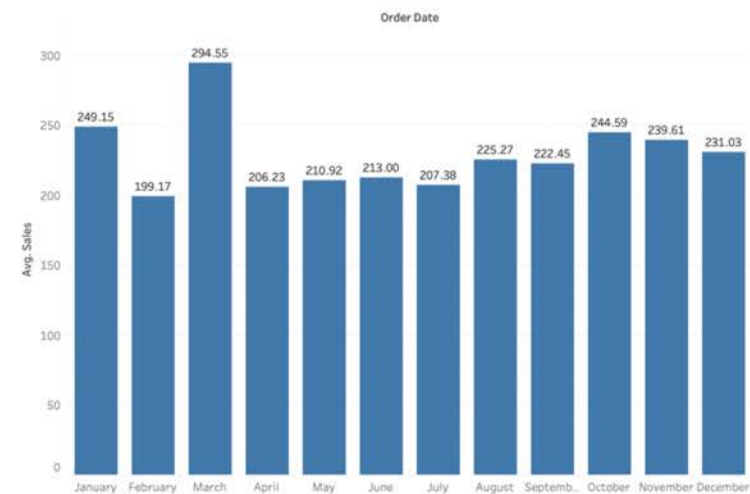
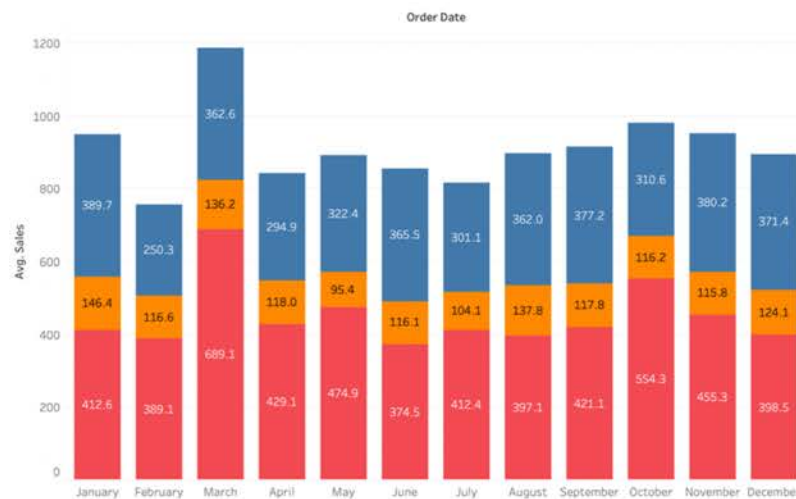
Demo – An area chart

Want to highlight the differences between sales and profit while comparing their trends?

- Trends & Differences -> Area chart
- Useful resources
 - [Build an Area Chart, Tableau Website](#)

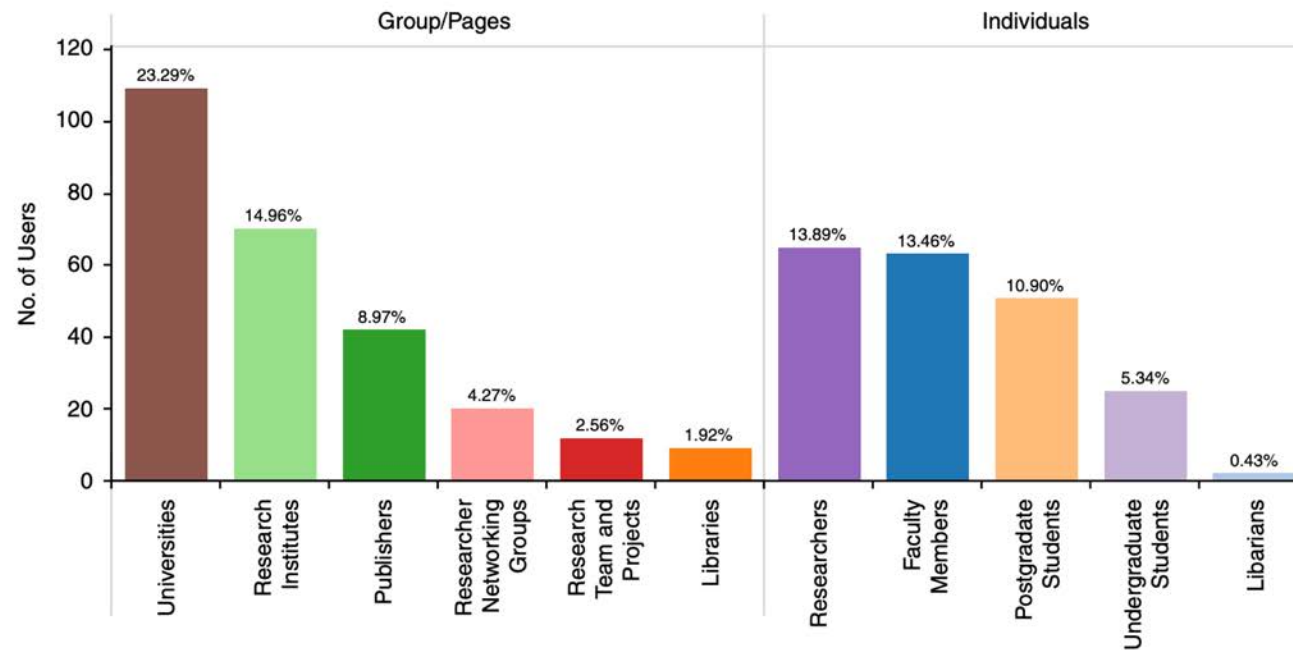
Part III. Common Types of Charts in Tableau

Bar Chart



Example

Who are mentioning psychological articles (academic users) on Facebook?
(Sample size: 2084)

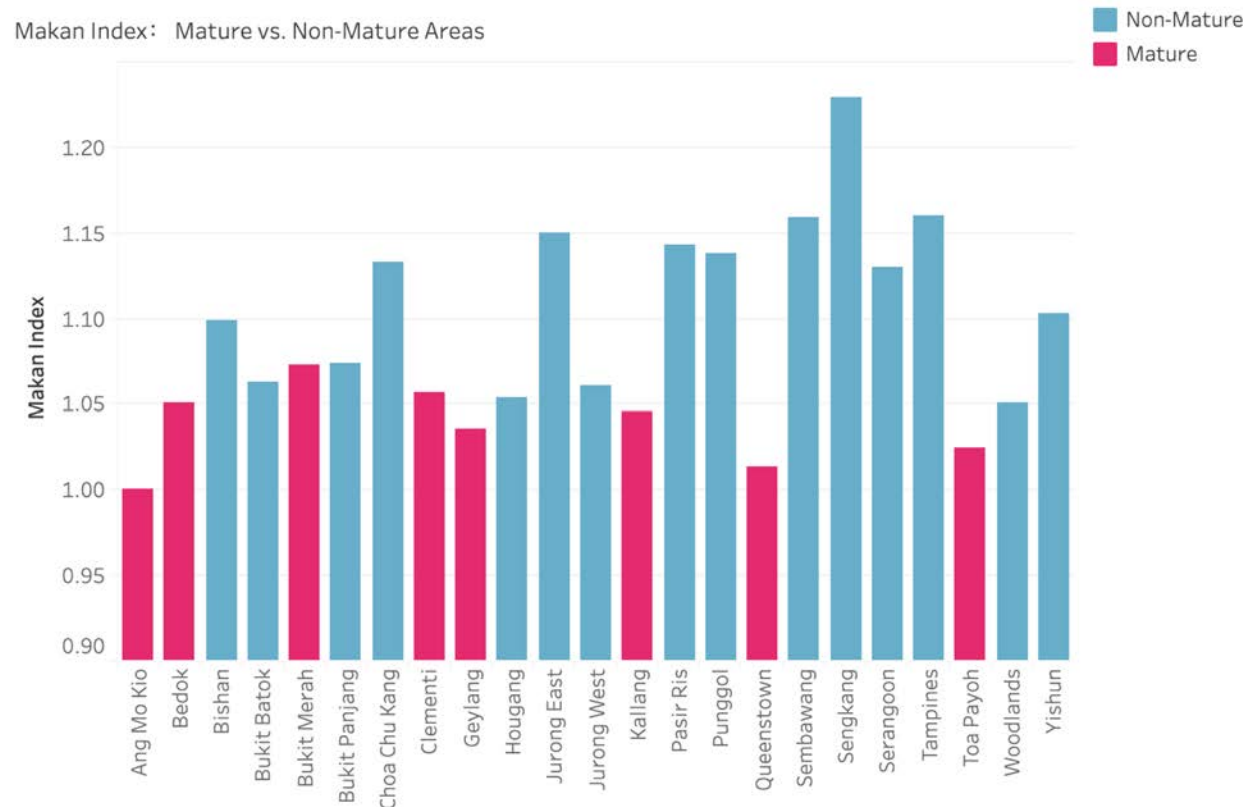


Too many colors!!!

Figure 1.
The number of
academic users
involved in scholarly
discussions on
Facebook

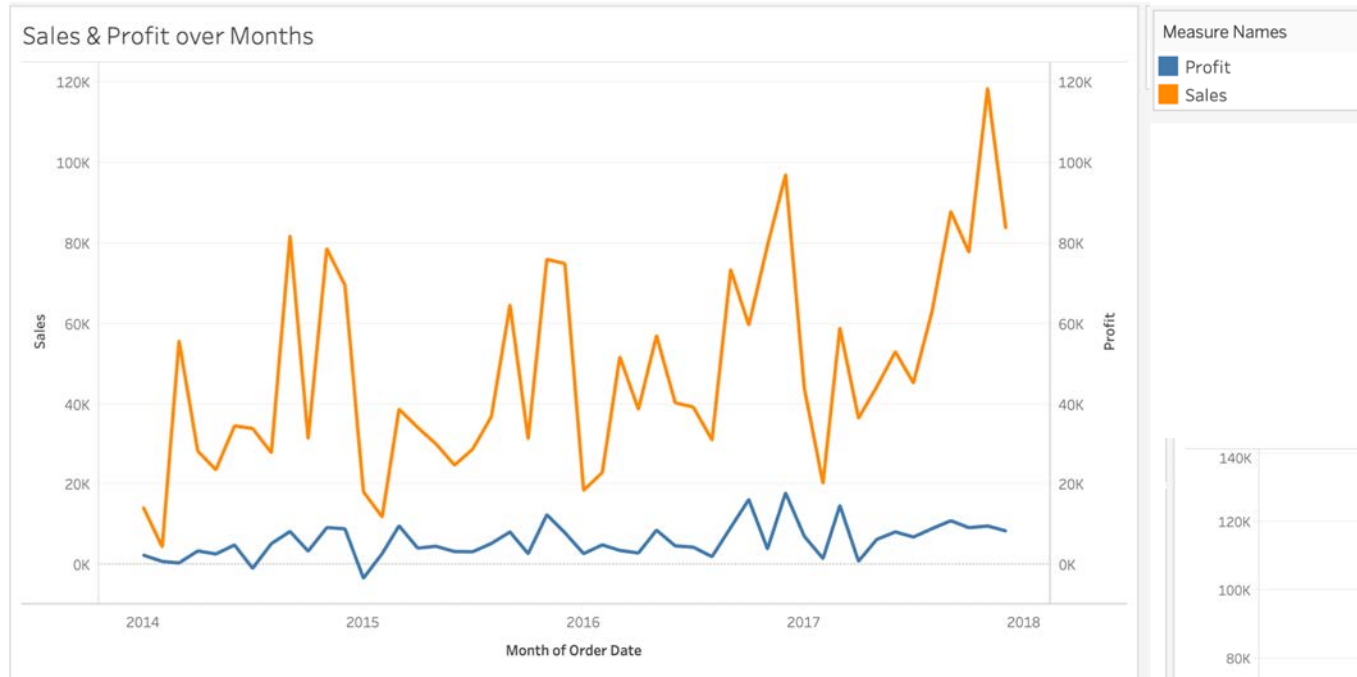
Example

Food in non-mature areas is more expensive?

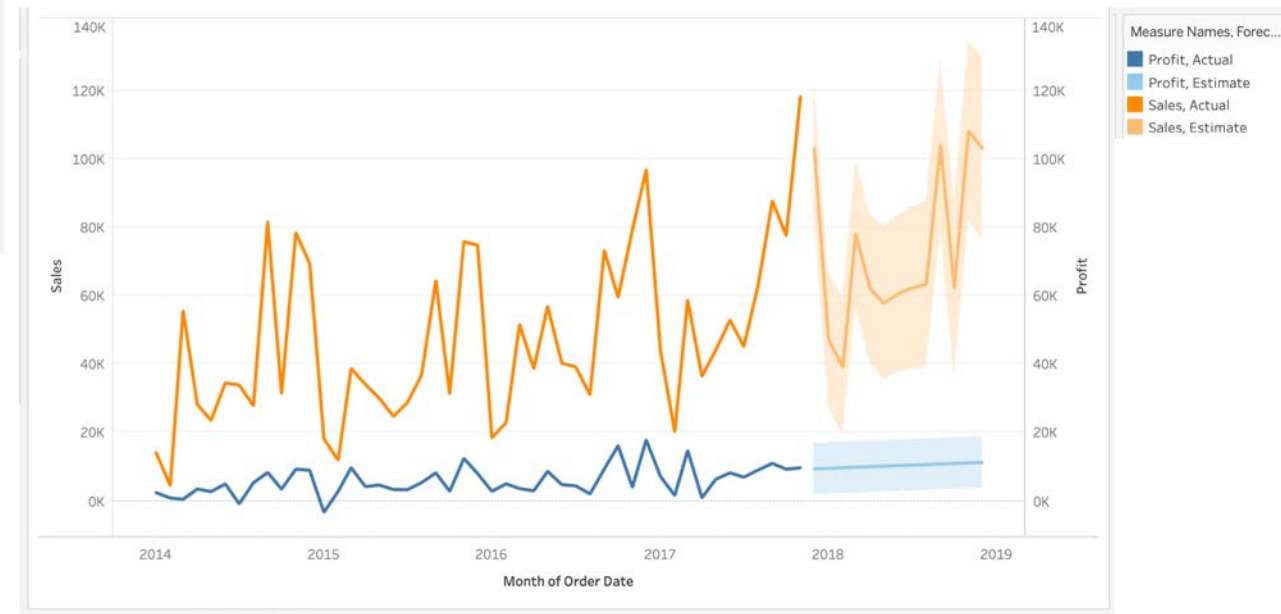


Makan Index (MI) is a measure of the cost of eating out introduced by the researchers from the [Institute of Policy Studies, Lee Kuan Yew School of Public Policy](https://libds.nus.edu.sg/makan_index_2017/socioeconomic_characteristics).

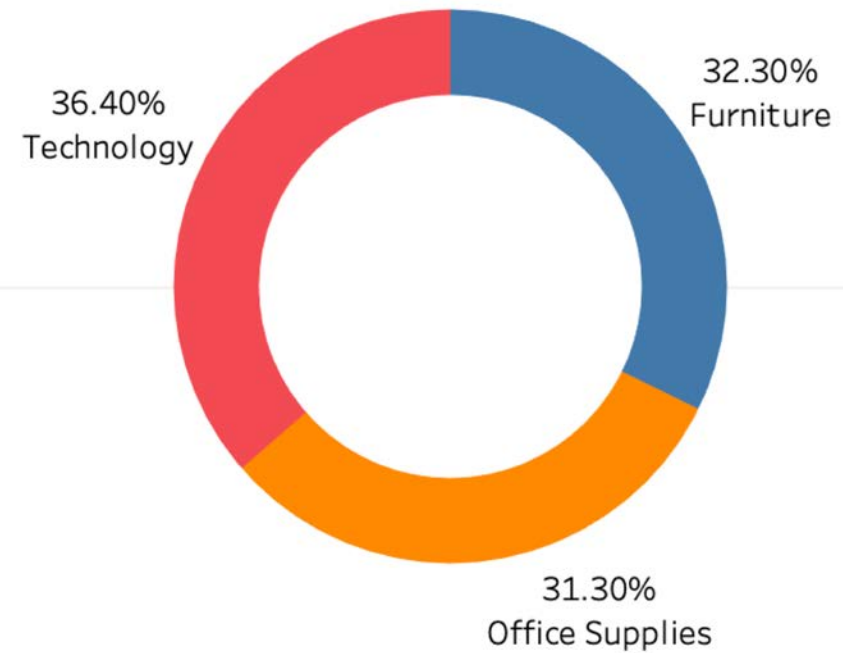
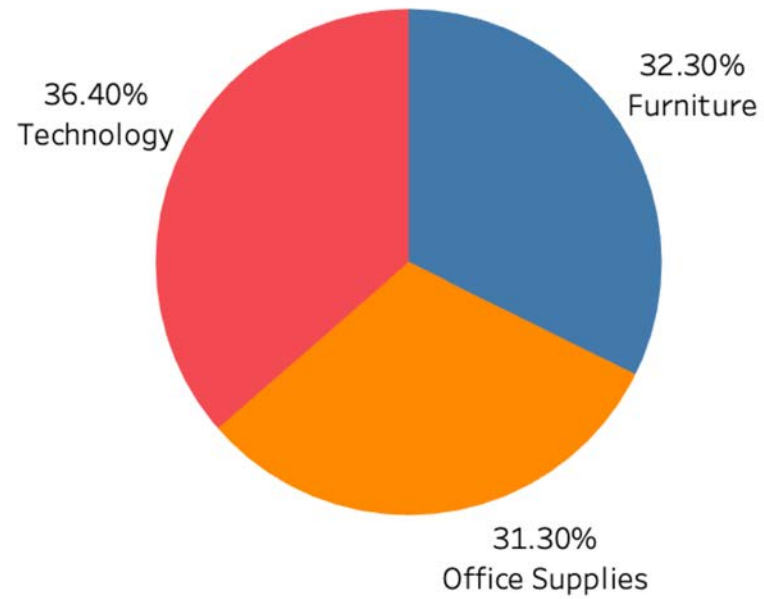
Line Chart



- [Build a Line Chart, Tableau Website](#)
- [Create a Forecast, Tableau Website](#)
- [How Forecasting Works in Tableau, Tableau Website](#)



Pie/Donut Chart

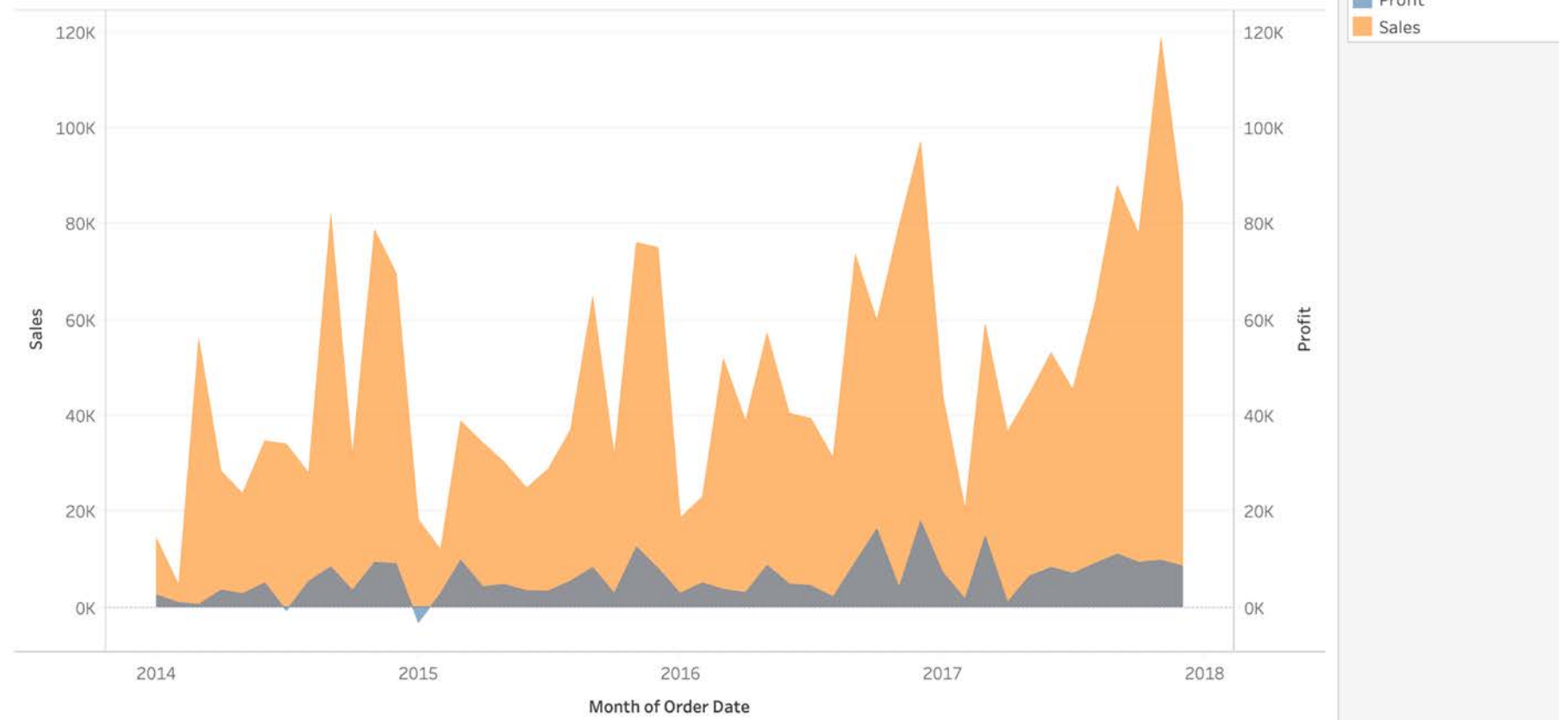


[Build a Pie Chart, Tableau Website](#)

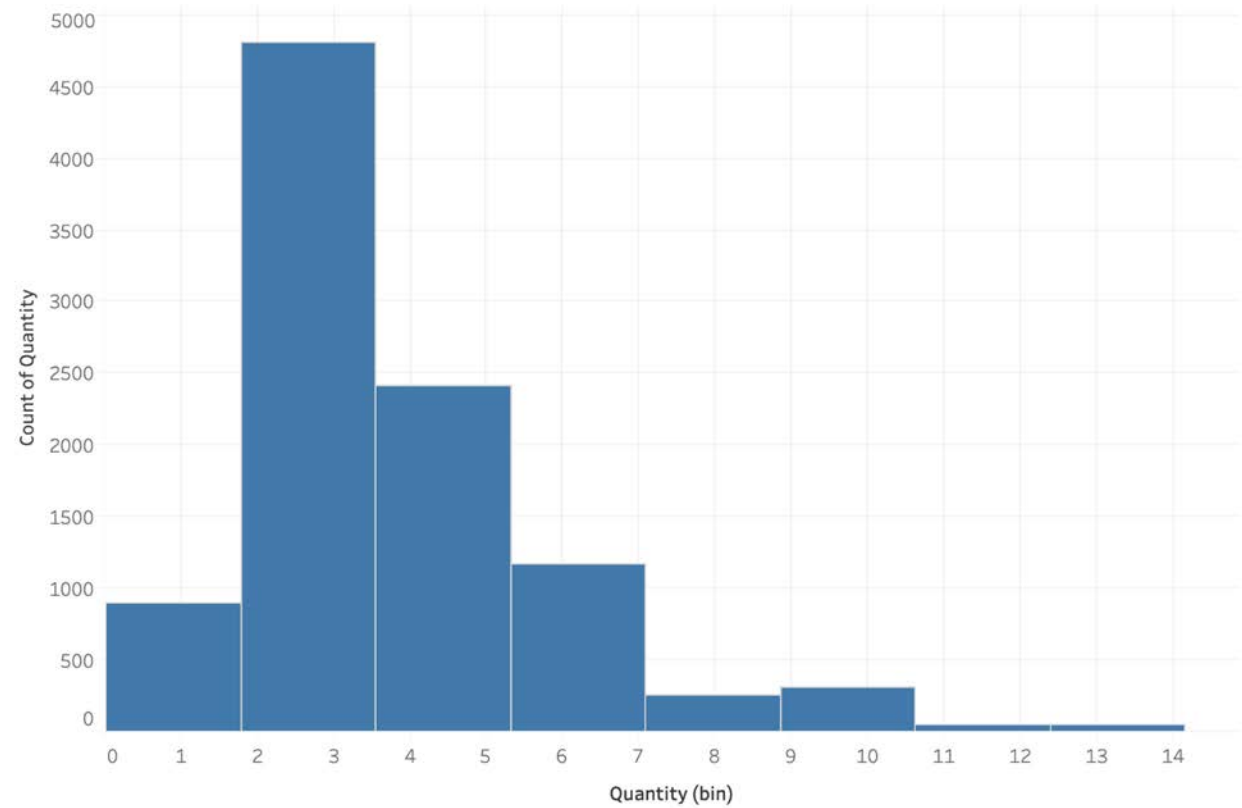
[Creating Doughnut Charts, Tableau Website](#)

Area Chart

Sales & Profit over Months



Histogram

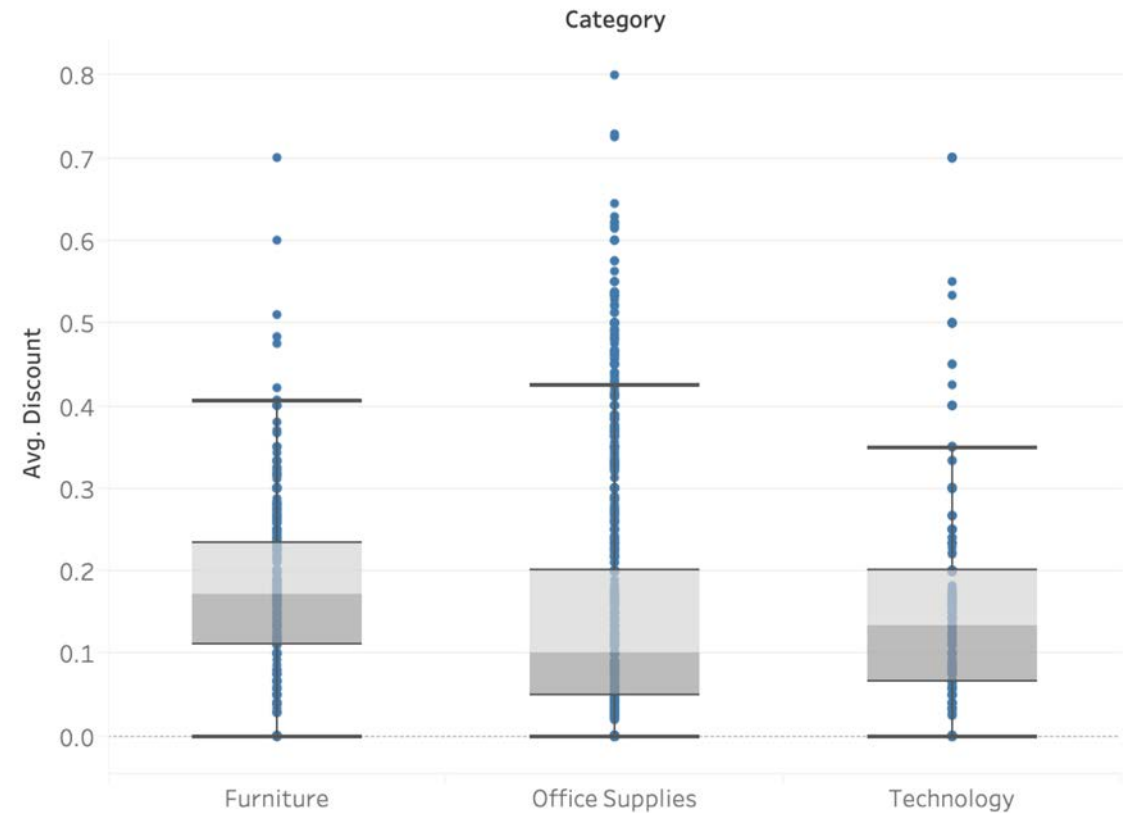


[Build a Histogram, Tableau Website](#)

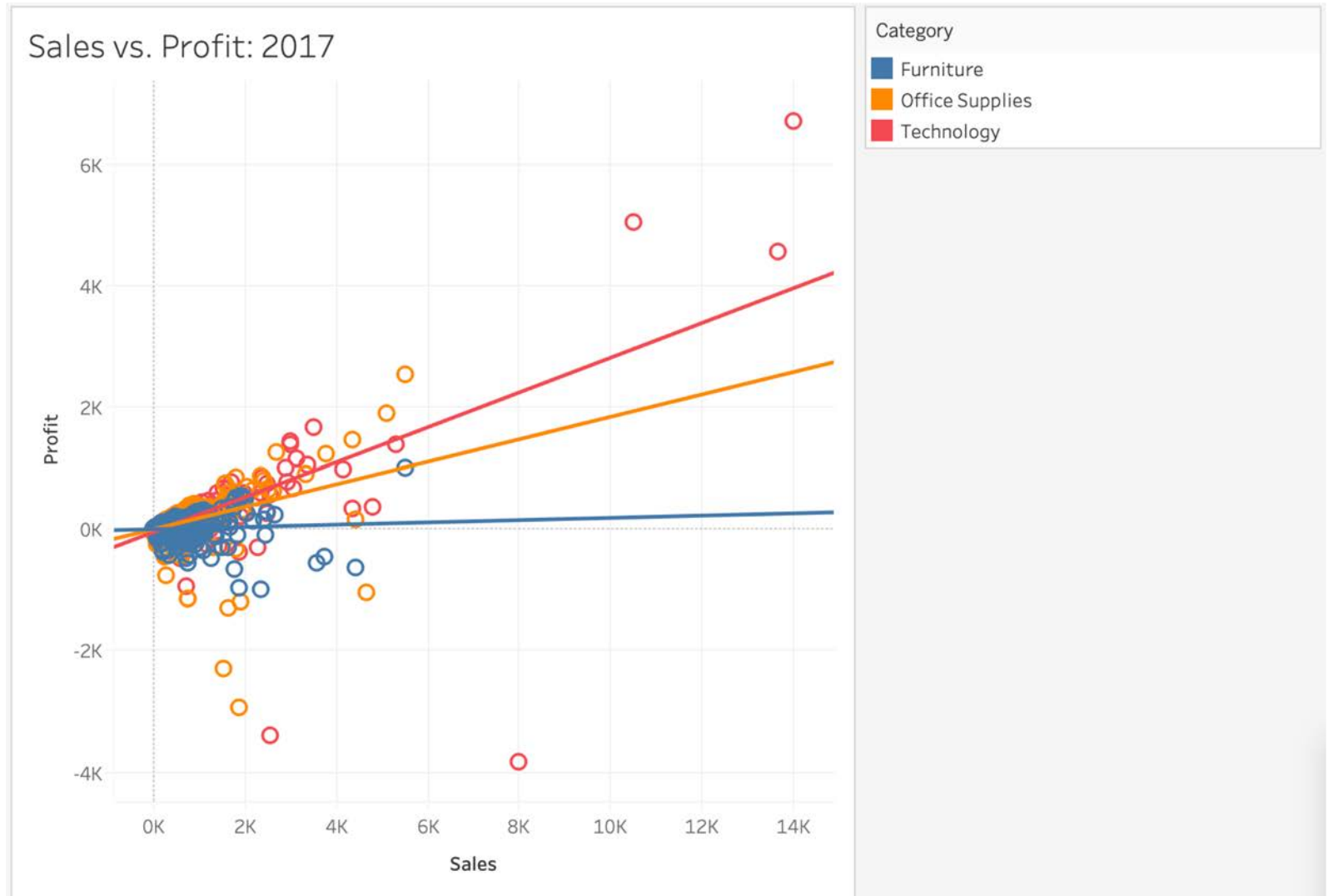
Box Plot

•Provides information about the data distribution, specifically

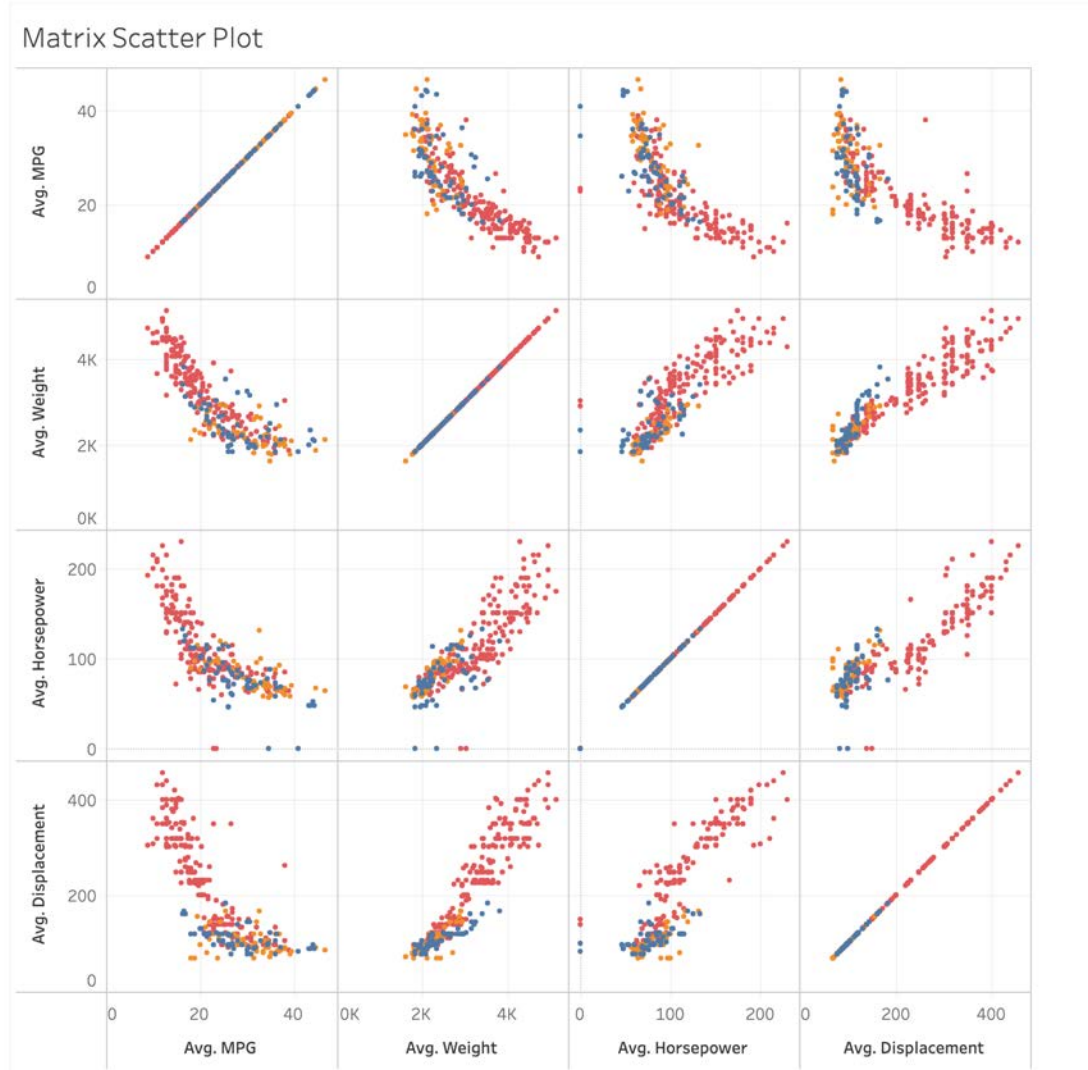
- Lower Whisker: Lower hinge - $1.5 * \text{IQR}$ (Interquartile Range)
- 25th Percentile (Lower hinge)
- 50th Percentile (Median)
- 75th Percentile (Upper hinge)
- Upper Whisker: Upper hinge + $1.5 * \text{IQR}$



Scatter Plot



Example

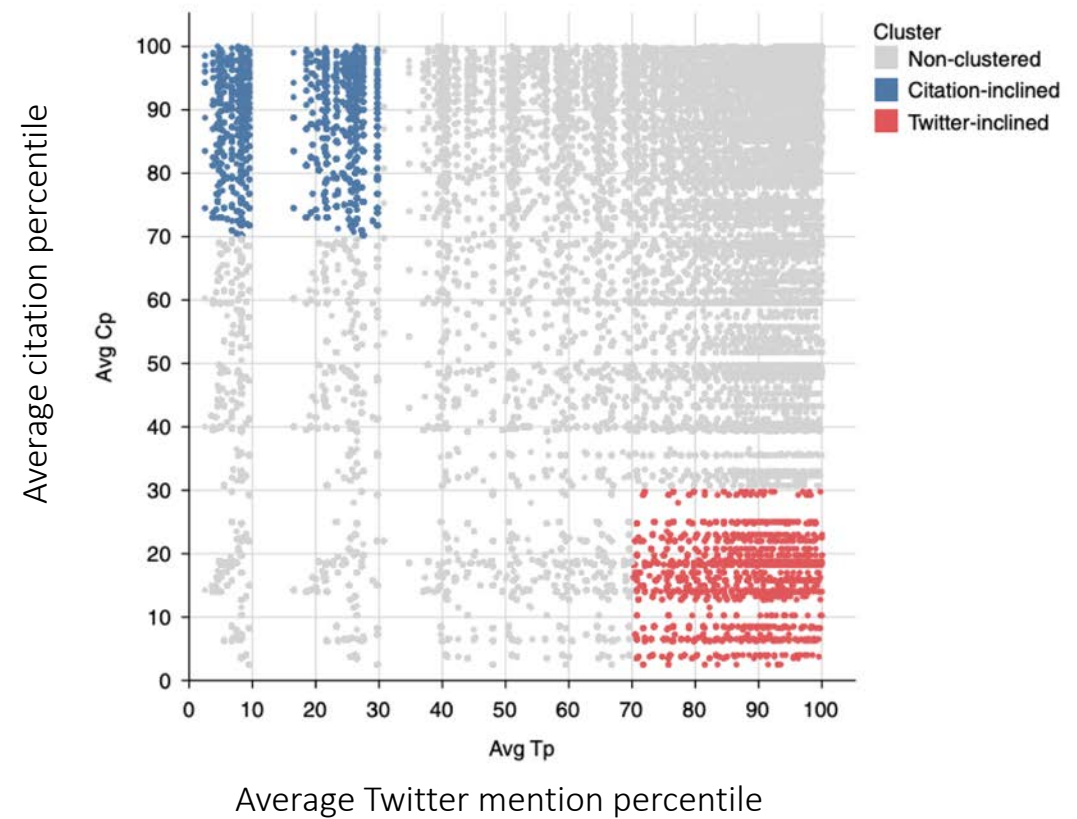


Source: [Matrix Scatter Plot, Ashwin Padmanabhan, Tableau Public Gallery](#)

Example

Identify the twitter-inclined and citation-inclined articles (Sample size: 49,150)

Figure 1.
Clustering articles
based on the 70th and
30th percentiles of
citation counts and
twitter mentions

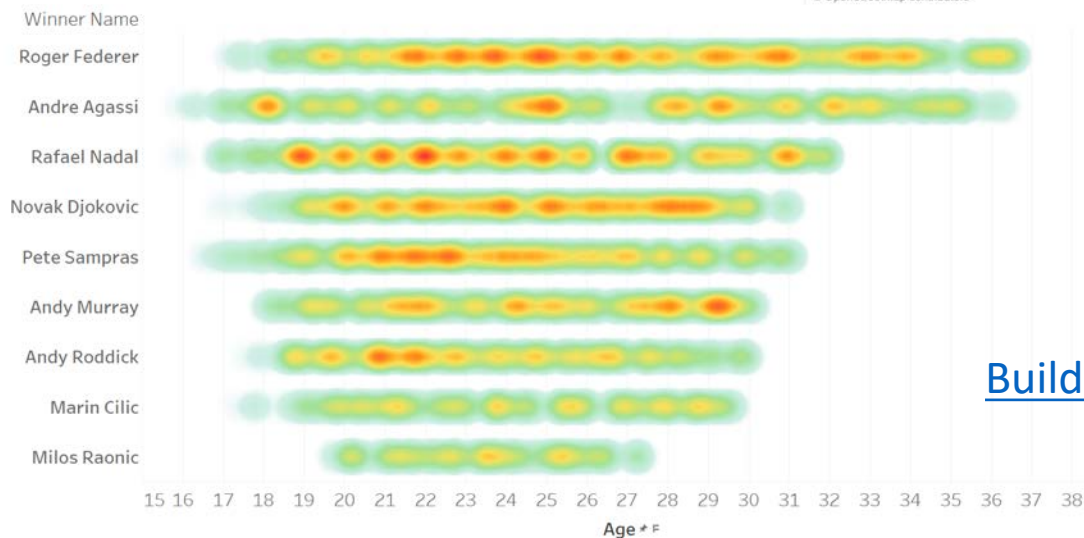
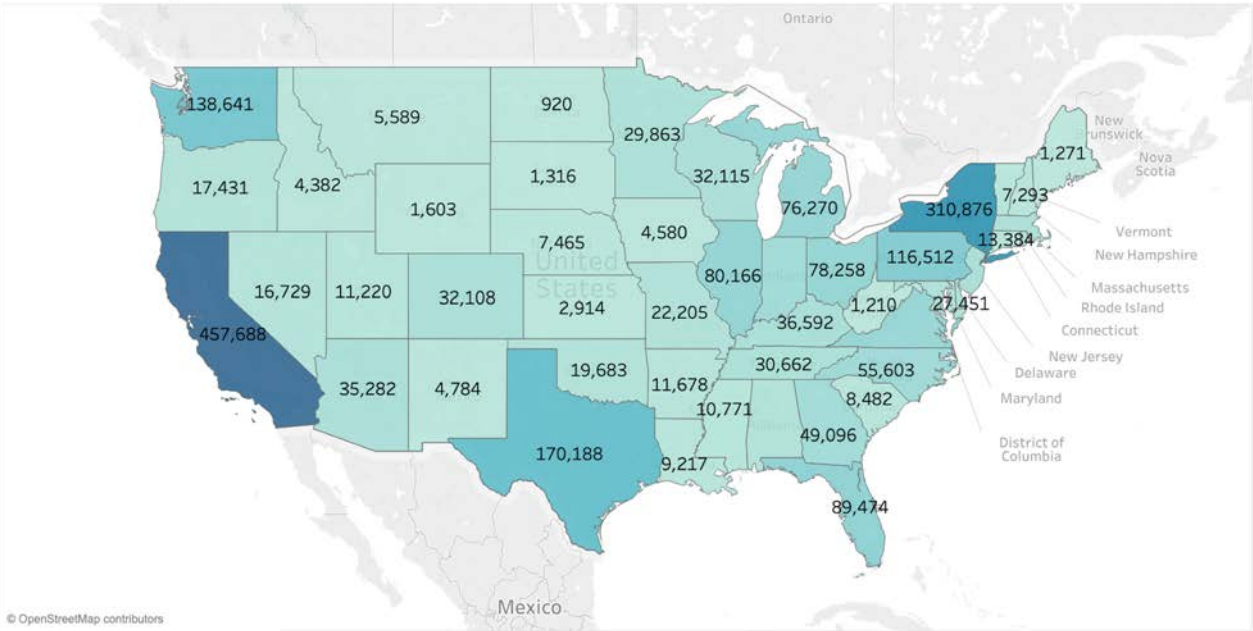


Heatmap

No. of Orders by Month & Weekday: 2017

	Order Date						
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
January	35	37	7		19	15	42
February	17	23	3		26	26	12
March	34	50	24	5	41	49	35
April	60	34	21	5	25	27	31
May	41	34	27	9	43	43	45
June	31	45	21	5	59	35	49
July	28	44	23	9	28	48	46
August	46	51	16	7	43	31	24
September	73	83	34	15	59	90	105
October	39	84	19	1	59	54	42
November	90	79	47	11	87	79	66
December	70	83	28	14	57	108	102

Total Sales by State: 2014-2017



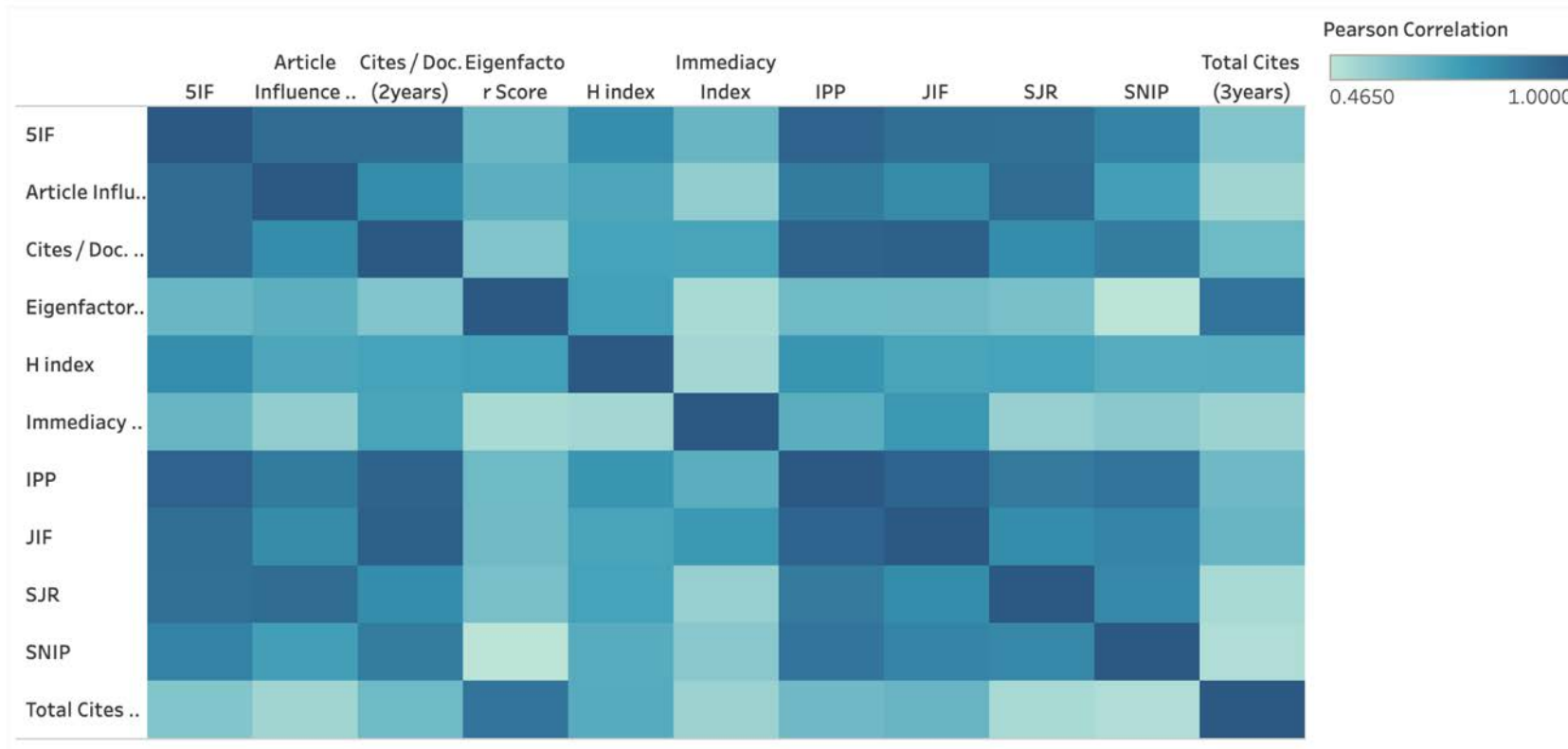
[Build with Density Marks \(Heatmap\), Tableau Website](#)

Example

No. of Orders by Month & Weekday: 2017

	Order Date						
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June	31	45	21	5	59	35	49
July	28	44	23	9	28	48	46
August	46	51	16	7	43	31	24
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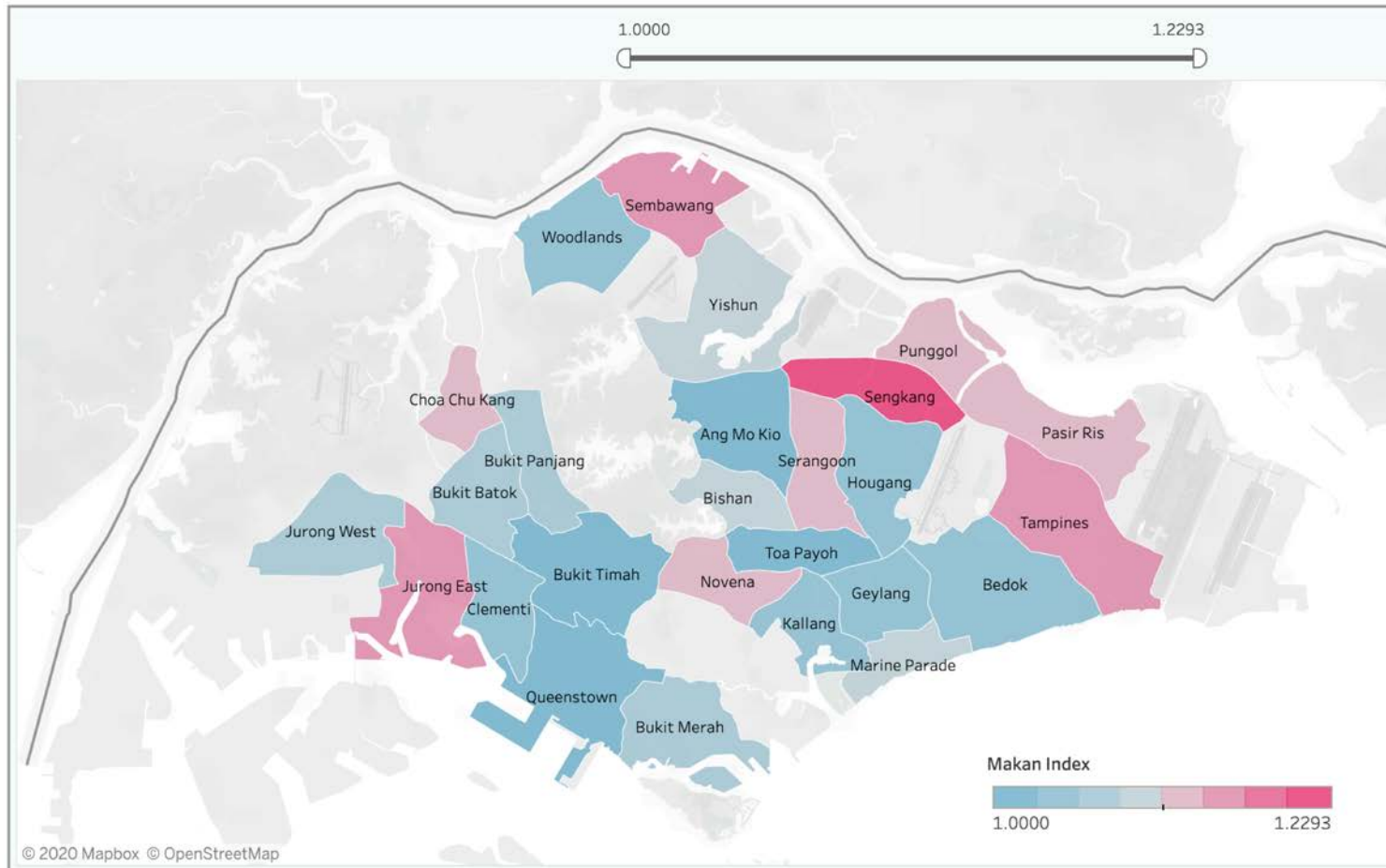
Example



Source: [Pearson Correlation Matrix, YFS, Tableau Public Gallery](#)

[Creating a Correlation Value Matrix, Tableau Website](#)

Example



Singapore Makan Index 2017, Institute of Policy Studies, National University of Singapore,
https://libds.nus.edu.sg/sg_makan_index_2017/cost_eating_out

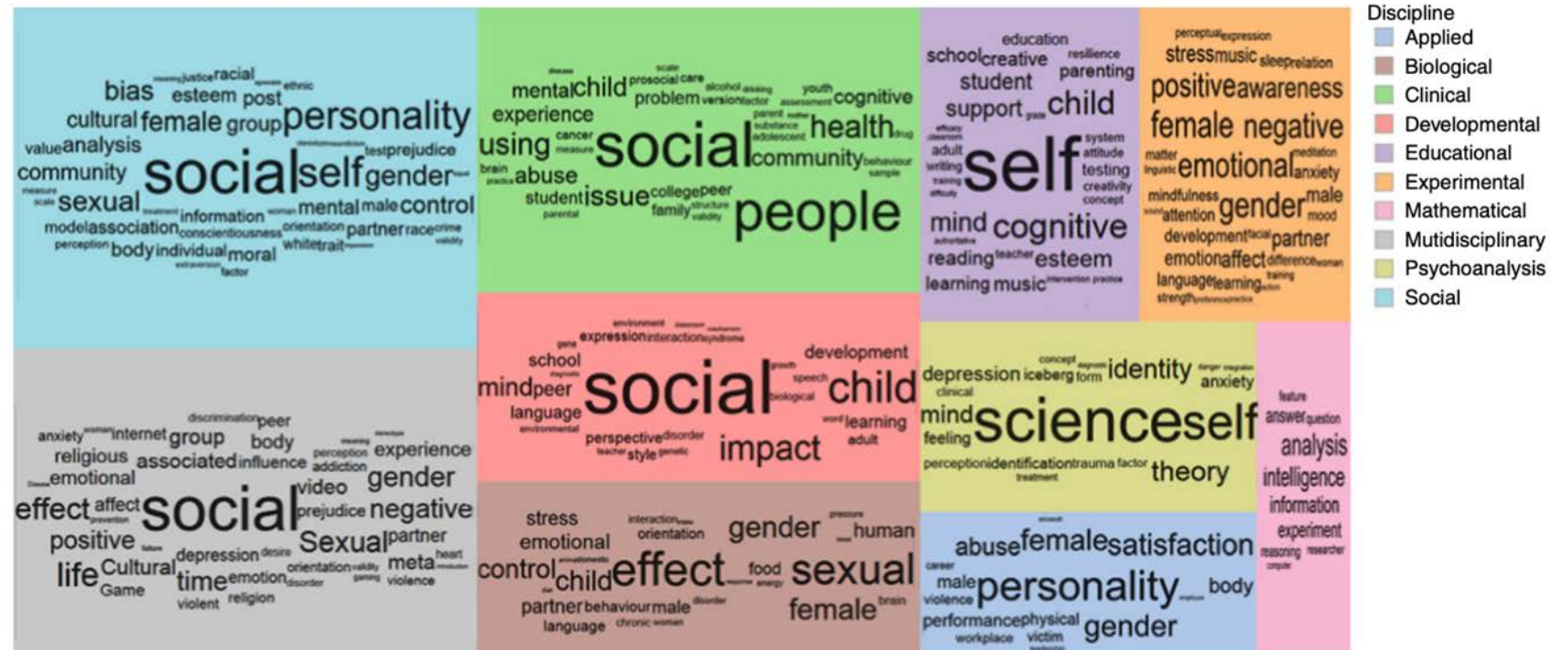
Word Cloud



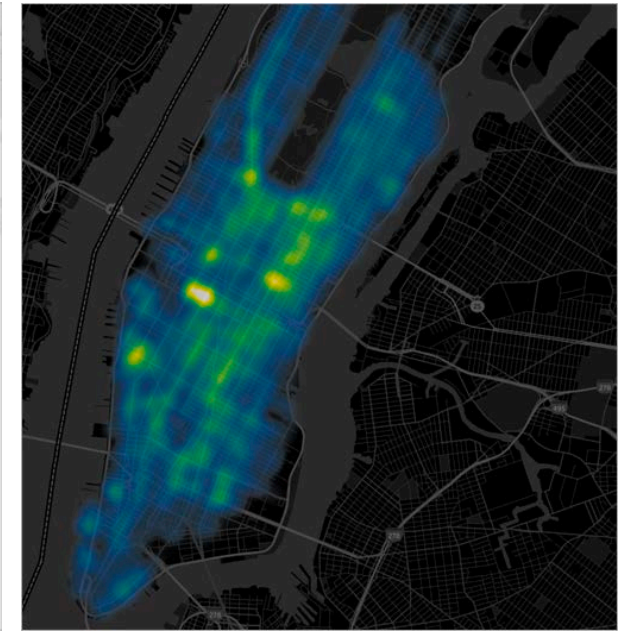
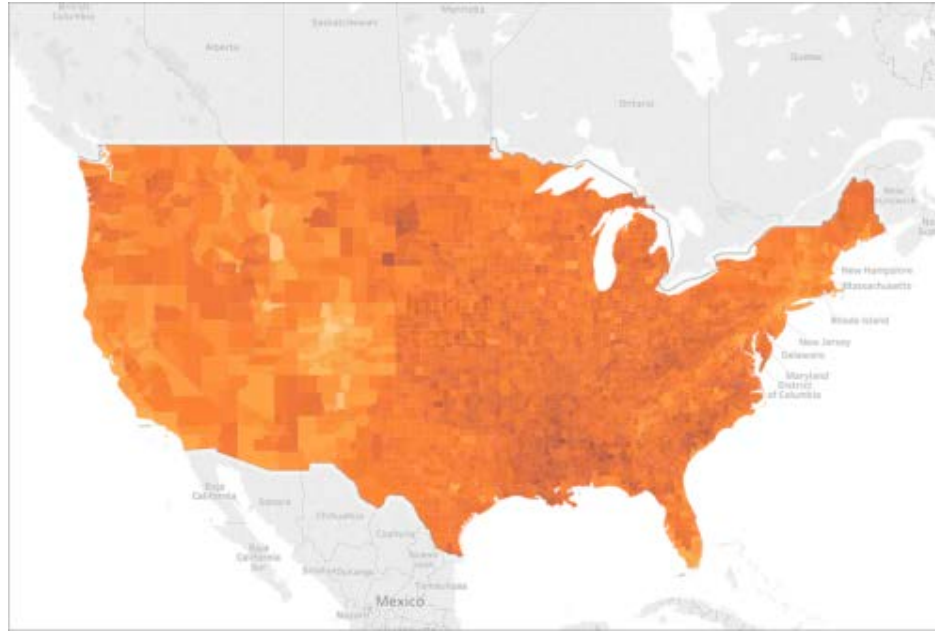
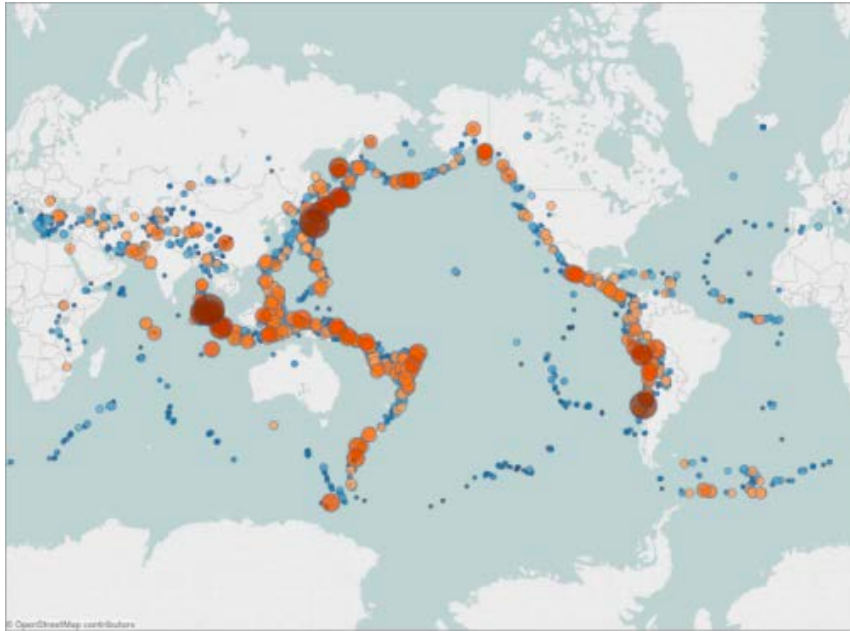
Example

How psychological articles were discussed on Facebook?

Visualized the featured terms extracted from the topic modelling results



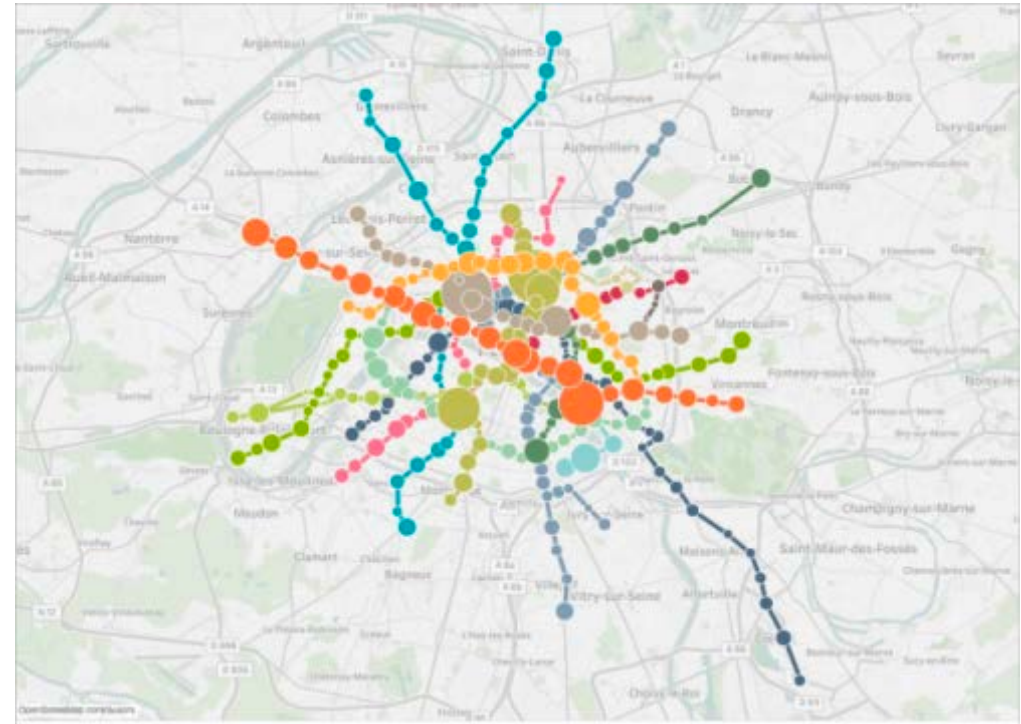
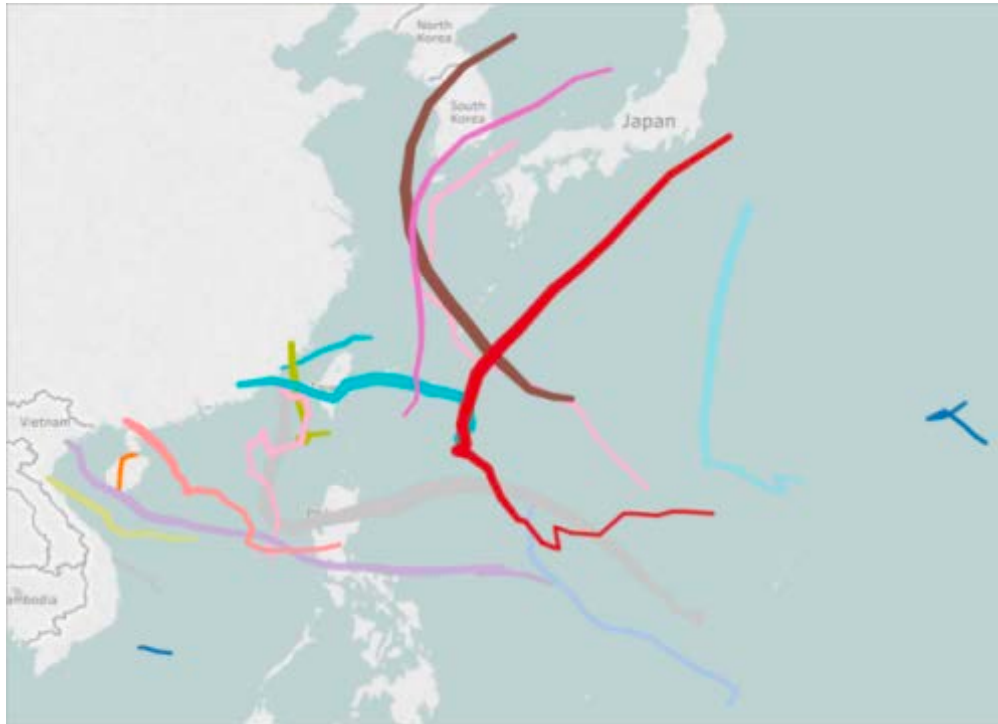
Maps – Quantitative



Source of images: Tableau Website

Maps – Directions/Paths

[Mapping Concepts in Tableau, Tableau Website](#)



Source of images: Tableau Website

Part IV. Tableau Dashboard

Tableau Dashboard

Tableau dashboard is a consolidated display of multiple worksheets.

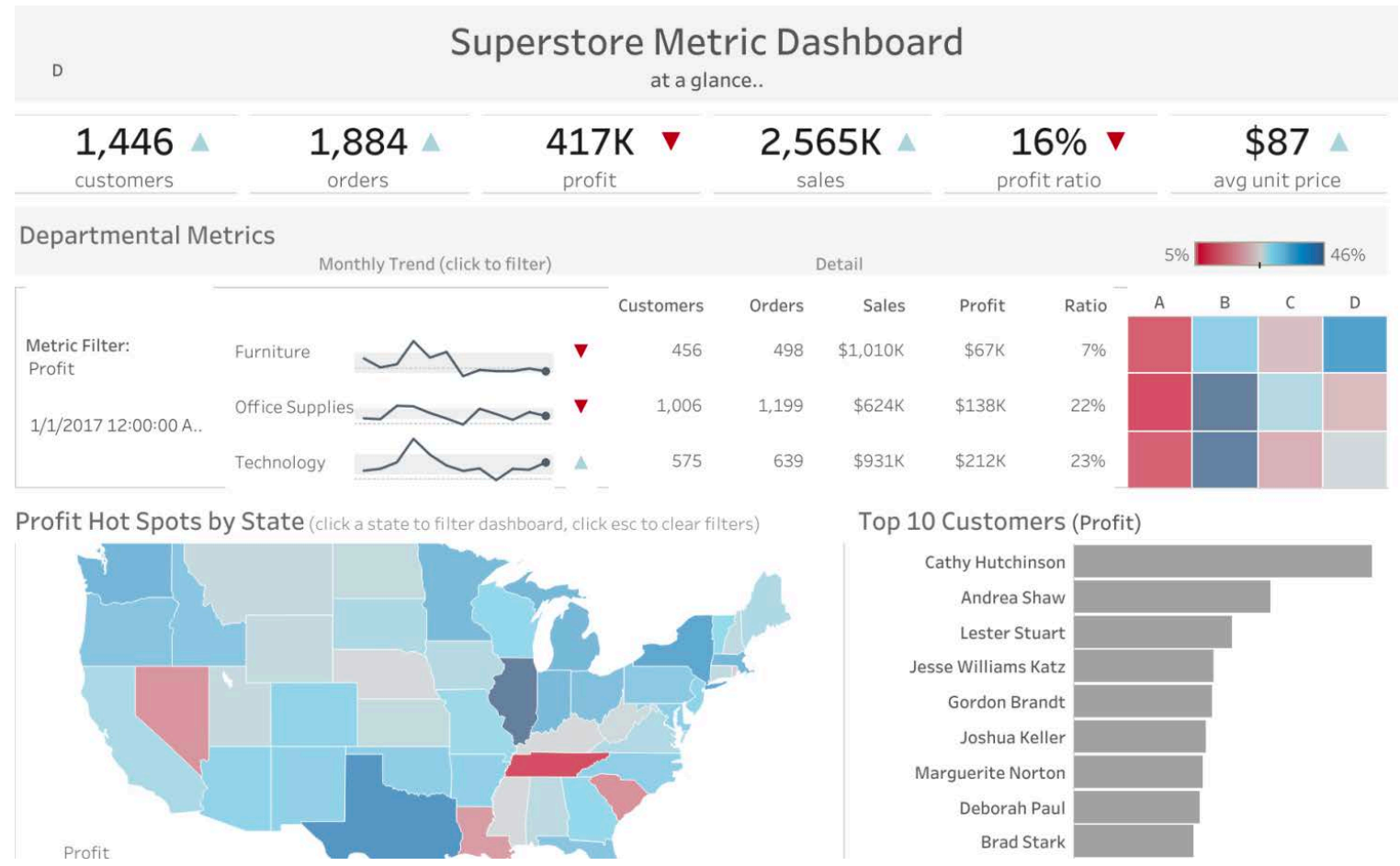
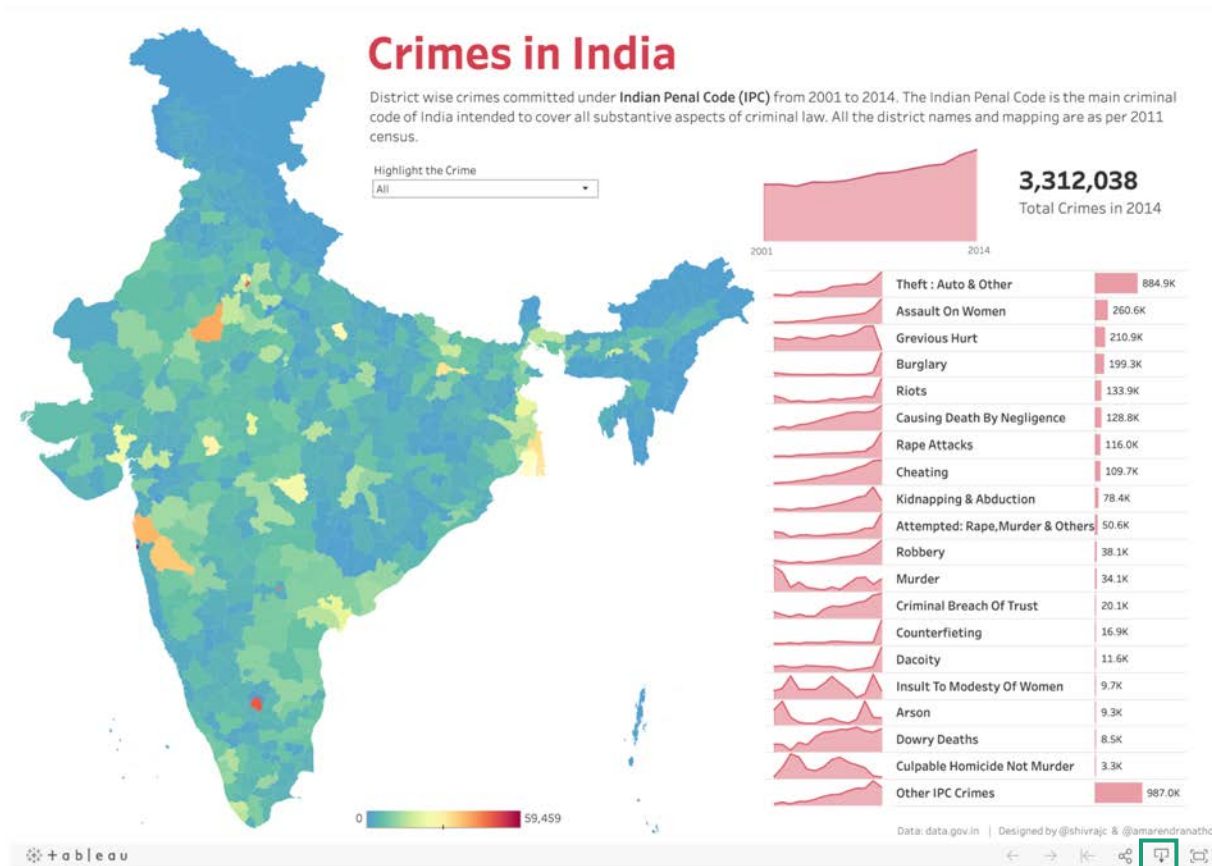


Image source: [Superstore Metric Dashboard, Jon Dugger, Tableau Public Gallery](#)

Tableau Dashboard – Best practices

- Be clear about your purpose and the intended audience
- Leverage the most-viewed spot (usually the upper-left corner)
- Limit the number of views to avoid information overload
- Add interactivity
 - Show filters
 - Enable highlighting

Example



[Crimes in India, Amarendra, Tableau Public Gallery](#)

- How many sheets are there in the dashboard?
- What kind of interactivity is available in this dashboard?

Demo – Add a filter

How to add a filter to keep/exclude data points from

- A single chart
- Multiple charts on a dashboard

Useful resources

- [Filter Data from Your Views, Tableau Website](#)
- [Apply Filters to Multiple Worksheets, Tableau Website](#)

Demo – Use a chart as a filter

How to use a chart as a filter to other charts

Useful resources

- [Tableau 201: 3 Creative Ways to Use Dashboard Actions](#)

Demo – Turn on the data point highlighter

How to turn on the data highlighter to highlight the marks that match the selected fields or keywords

Useful resources

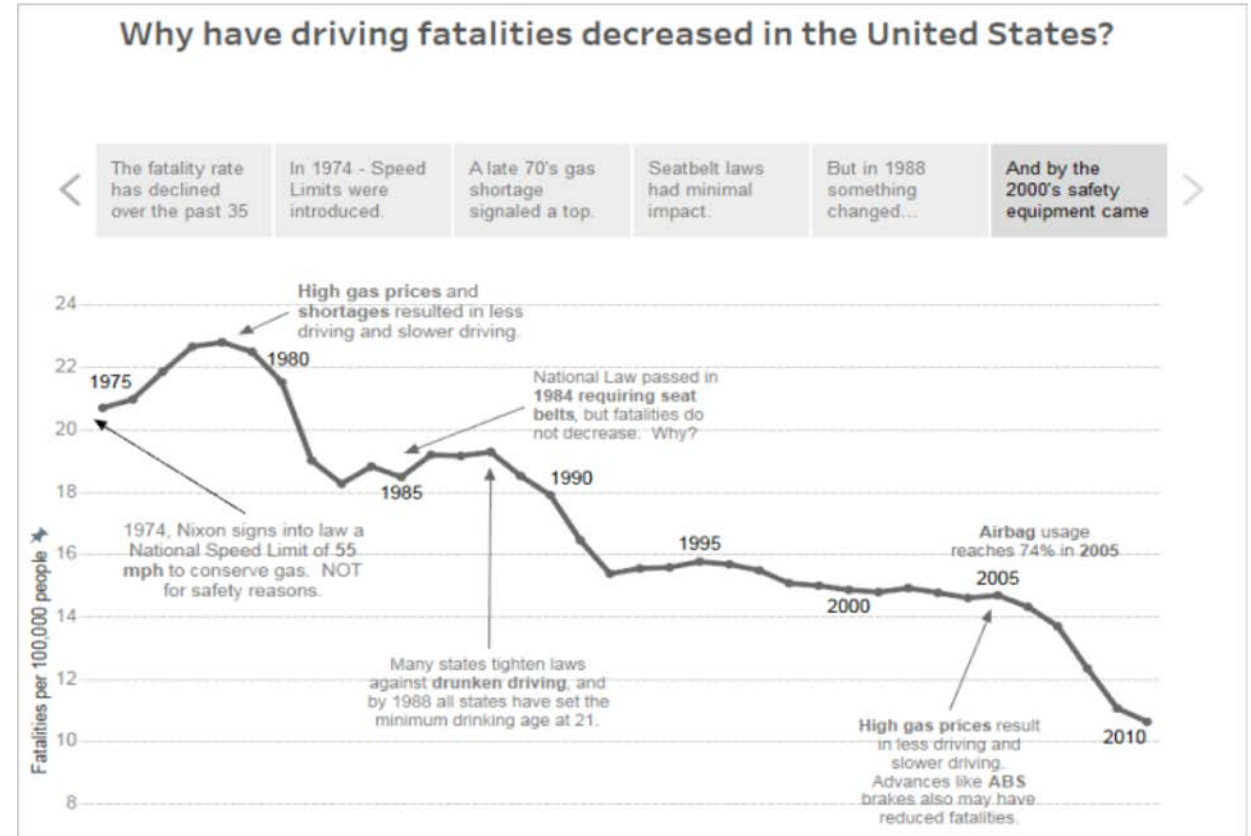
- [Highlight Data Points in Context](#)

Other Helpful Features

Tableau Stories

A story is a sequence of visualizations that work together to convey information.

- [Create a Story, Tableau Website](#)



Source: <https://help.tableau.com/current/pro/desktop/en-us/stories.htm>

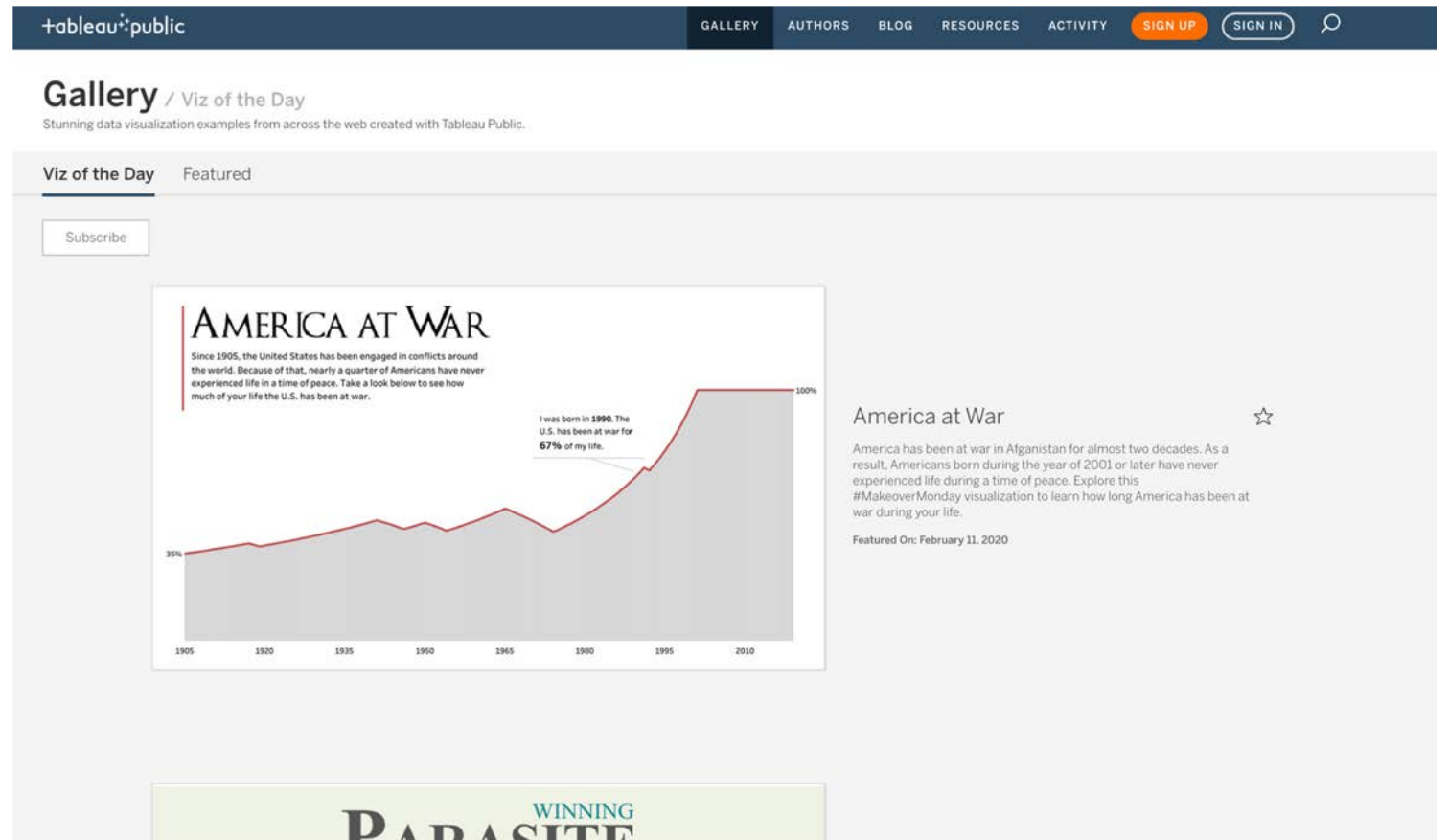
Data Extract

- Extract and work with a subset of your data
- Improve the performance of reports and explorations

[Extract Your Data, Tableau Website](#)

Tableau Public Gallery

- Needs some inspirations? <https://public.tableau.com/en-us/gallery/>



End

Thank you!