Introduction to Dashboards & Dash

February 13, 2022

DSCI 551 - Lecture 1

10 minutes

Part 1:
Vision for Visualization II

Effective Visualizations

Effective Visualizations

ggplot2

Effective Visualizations

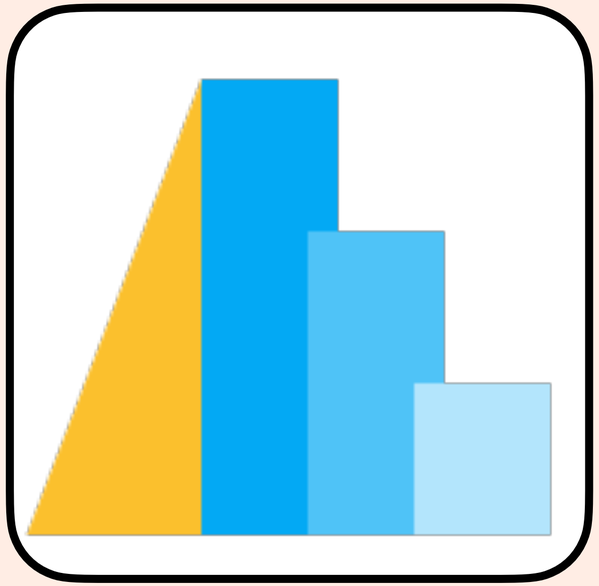
ggplot2

Altair

Dash


SYLLABUS
Calling
Data Reasoning in a


ggplot2
www.rstudio.com



Source

“One ring to bring them all, and in the darkness bind them.”

Source

“One ring to bring them all, and in the darkness bind them.”

We will see…

Motivation

- DSCI 551 is a group project course!

- There are many cool & exciting new things you will learn in this course

- You **have to** get practice with these tools before Capstone and before you graduate!

High level course structure

Week 1

Project set-up Language Agnostic

Week 2

Prototype in Python

Week 2

Prototype in R

Week 4

Pick ONE and finalize Dashboard

plotly | Dash

DASH - UBER DATA APP

Select different days using the date picker or by selecting different time frames on the histogram.

April 1, 2014

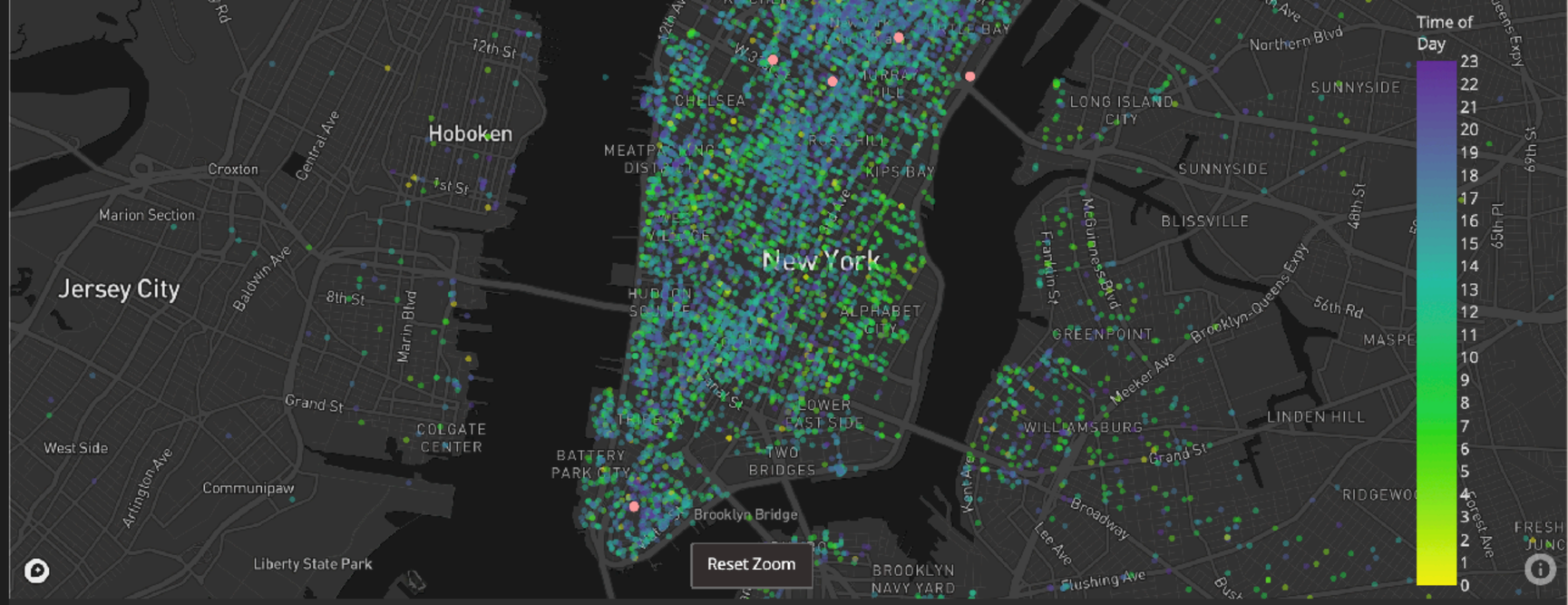
Select a location

Select certain hours

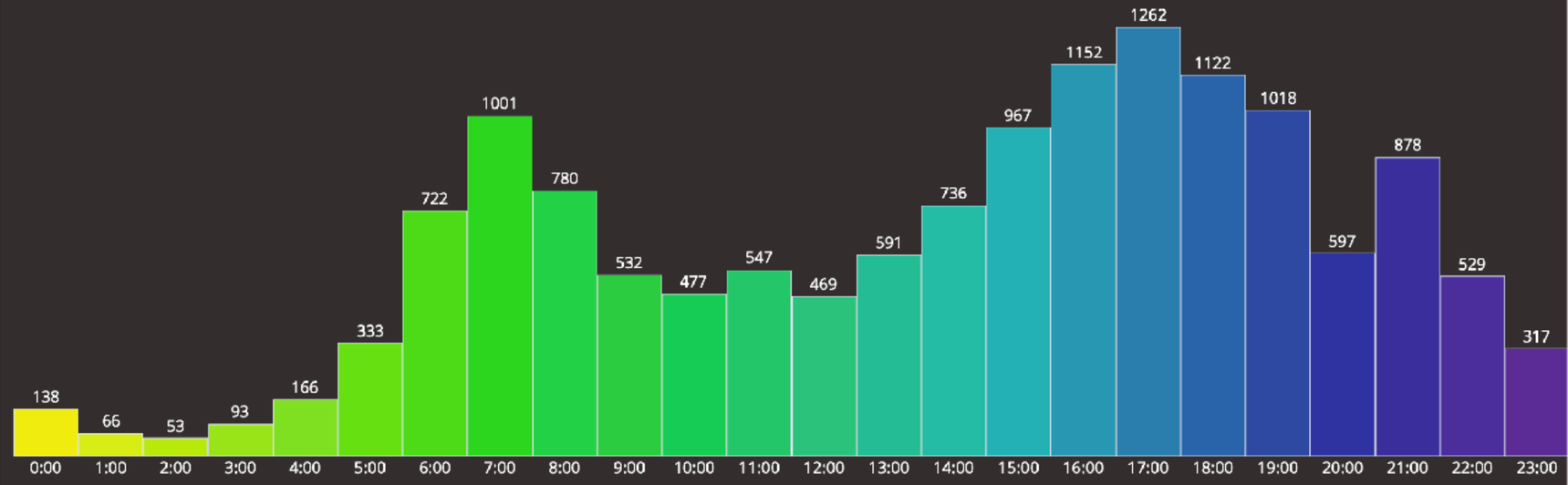
Total rides in selection: 0

2014-04-01 - showing hour(s): All

Source: FiveThirtyEight



Select any of the bars on the histogram to section data by time.



45 minutes

Part 2:
What *is* a dashboard?

Slides for this section courtesy of Dr. Joel Ostblom, post-doc at UBC-V MDS

DSCI 532 - Lecture 1

Dashbord intro

- Understand what dashboards are
- Know when to use them
- Design effective dashboards
- Identify when interactivity is beneficial

What is a dashboard?

British Columbia COVID-19 Dashboard

Filter Dashboard Values by Health Authority: All | Interior | Fraser | Vancouver Coastal | Vancouver Island | Northern

Total Cases
56,632

Laboratory Diagnosed: 56,131
Epi-Linked: 501

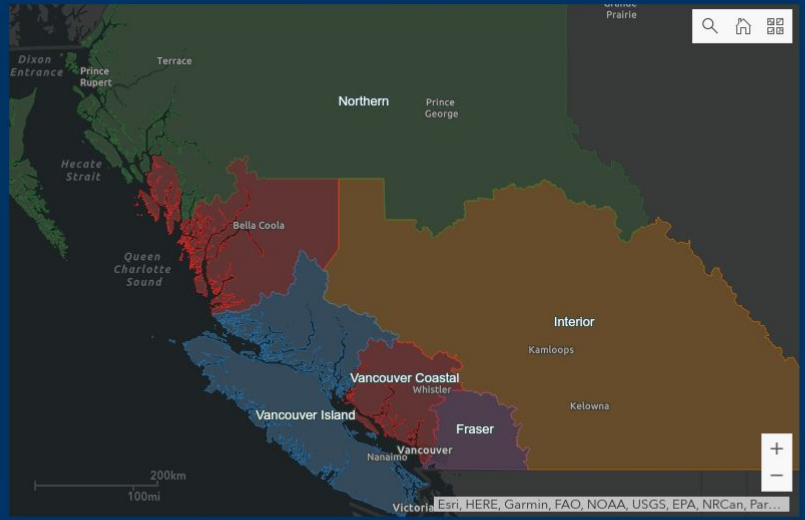
Currently Hospitalized
358
Total to Date: 3,165

Currently in Critical Care
75

Confirmed Deaths
988

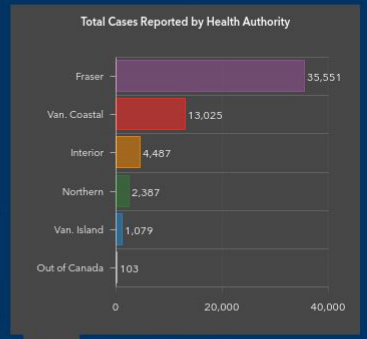
Recovered
48,205

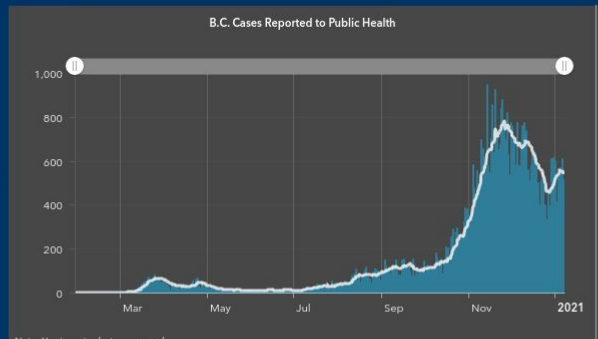
Last Update
1/8/2021, 4:30 PM

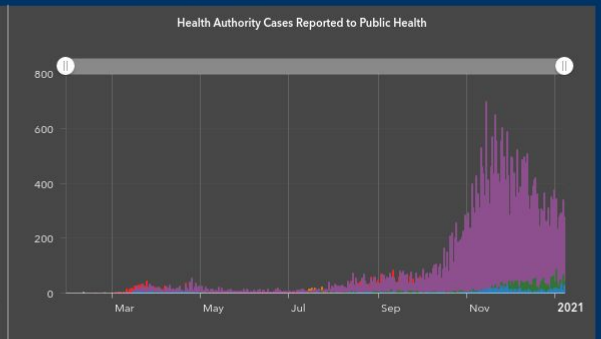


Today's New Cases
617

Active Cases
6,118







Note: In an effort to provide as current information as possible, "Today's New Cases" (as shown on this dashboard and reported publicly through daily media statements) are calculated at different points in time and may not align exactly to what is reported on the graphs. See the Data Notes for details.

Cases by Day | Cases (Moving Avg.) | New Tests | Turn-Around | Positivity

Total Tests
1,518,311

New Tests
9,345

B.C. Testing Rate
194,070
People per 1,000,000

Canadian Testing Rate
381,241
People per 1,000,000

Note: As of January 7, 2021, the number of cases over time are reported by the result date of the client's first positive lab result where available; otherwise by the date they are reported to public health. Please refer to the data notes below for additional information.

Data notes, terms of use, disclaimer and limitations of liability

Provincial Health Services Authority
Province-wide solutions. Better health.

BC Centre for Disease Control

https://experience.arcgis.com/experience/a6f23959a8b14bfa989e3cda29297ded

BCCDC COVID-19 Epidemiology App

Date Range

2020-03-01 to 2021-01-09

Select Comparison Groups:

- (•) Pre-selected Groups
- ( ) Custom Groups

Select Comparison Group:

BC Health Service Delivery Areas

Select Y Scale

(•) Single Scale ( ) Individual Scales

Click the button below to download the figure shown:

Download graph

For more BC data, please visit BCCDC COVID-19 data page:

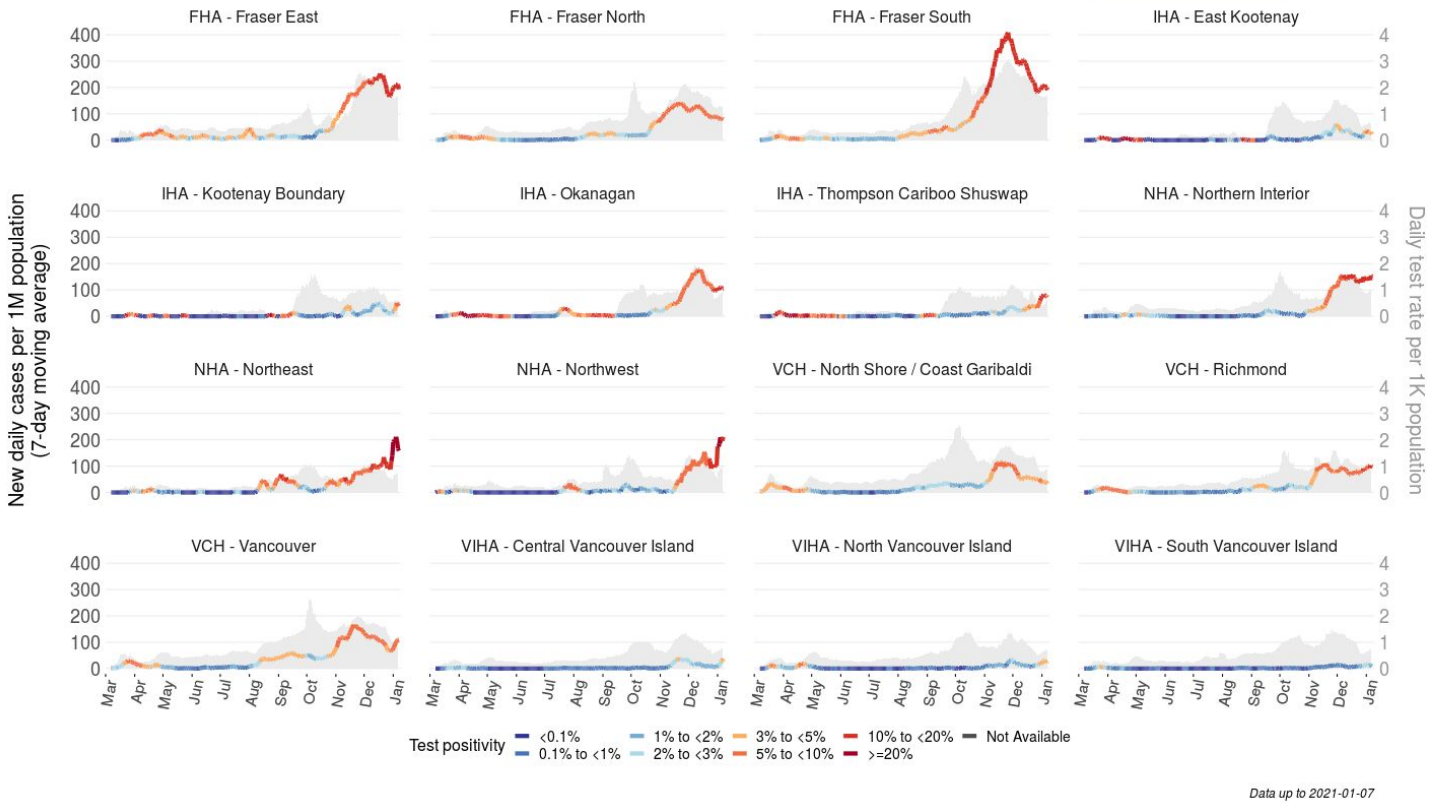
http://www.bccdc.ca/health-info/diseases-conditions/covid-19/data

BC Centre for Disease Control

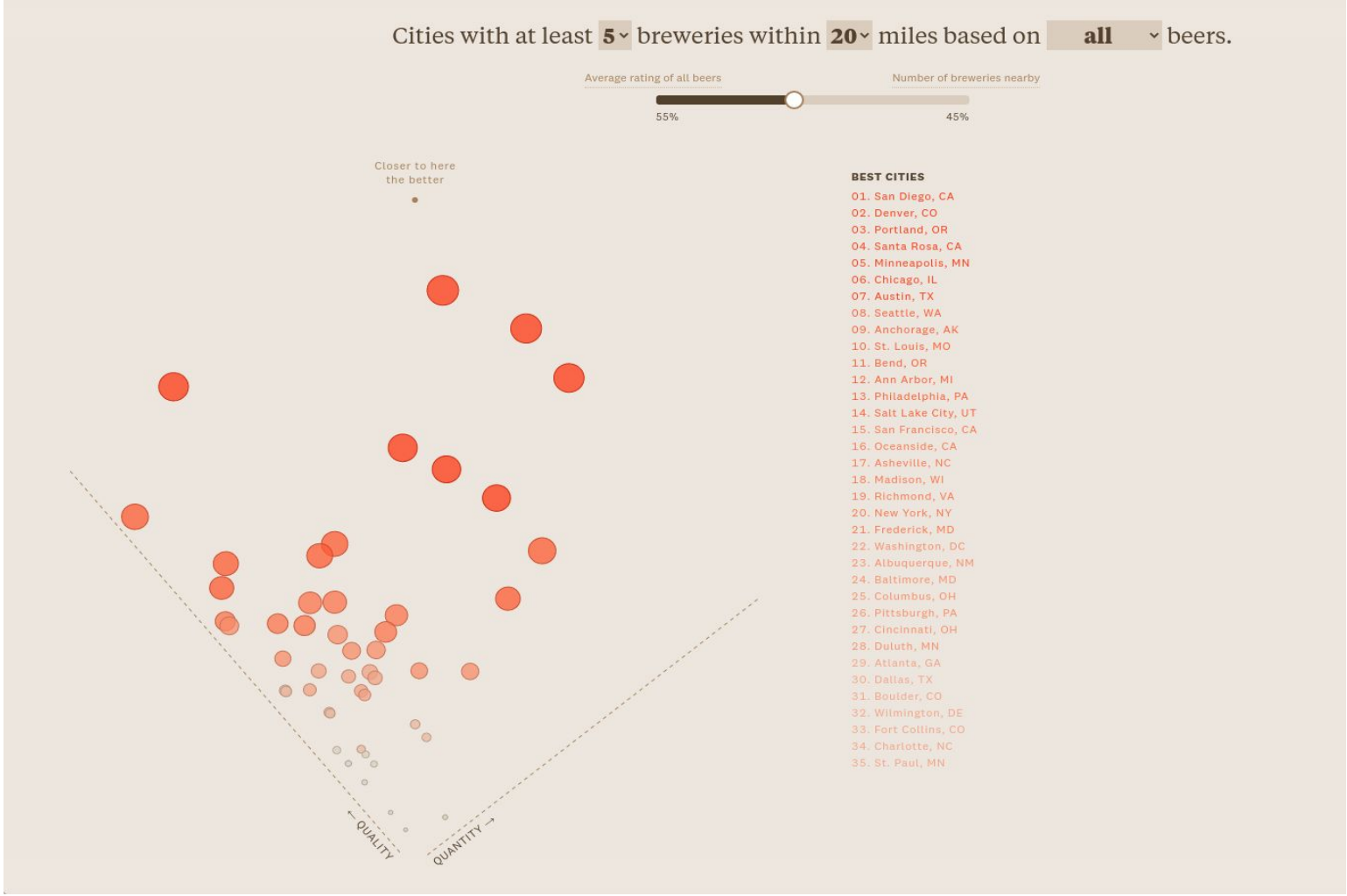
Provincial Health Services Authority
Province-wide solutions. Better health.

Cases and testing - panel view | Cases and deaths - panel view | Cases and deaths - single plot view | Data notes

How to read this graph?



https://bccdc.shinyapps.io/covid19_global_epi_app/



https://pudding.cool/2017/04/beer/

SMALL BUDGET | SALE | NEW | LIVING ROOM | DINING ROOM | BEDROOM | OFFICE | LIGHTING | DECOR

HIDE FILTERS

SORT BY Position: Ascending

CATEGORY

Decor

- Wall Art & Paintings
- Cushions & Throws
- Mirrors
- Lanterns & Candleholders
- Vases, Bowls & Trays
- Storage & Baskets
- Bedding
- Rugs
- Planters, Artificial Plants & Flowers
- Home Accents & Sculptures
- Curtains & Curtain rods
- **Dinnerware & Table Linen**
- Lightbulbs

PRICE RANGE

$0 $39

AVAILABILITY

- In Stock online (8)
- In Store (6)

SPECIAL OFFERS

- On Sale (3)
- Last Chance (7)

BAUHAUS
basket 37cm
$24
IN STOCK
ADD TO CART

MICAH
dinnerware set
($39) $29
IN STOCK
IN STORE ONLY

LUCE
porcelain mug
($2) $1
IN STOCK
ADD TO CART

SHANA
dinnerware set
($49) $39
IN STOCK
IN STORE ONLY

RIPPLE
set of 4 tumblers
$13
IN STOCK
ADD TO CART

SWIRL
set of 4 wine glasses
$16
IN STOCK
ADD TO CART

https://www.structube.com/en/decor/dinnerware-and-table-linen

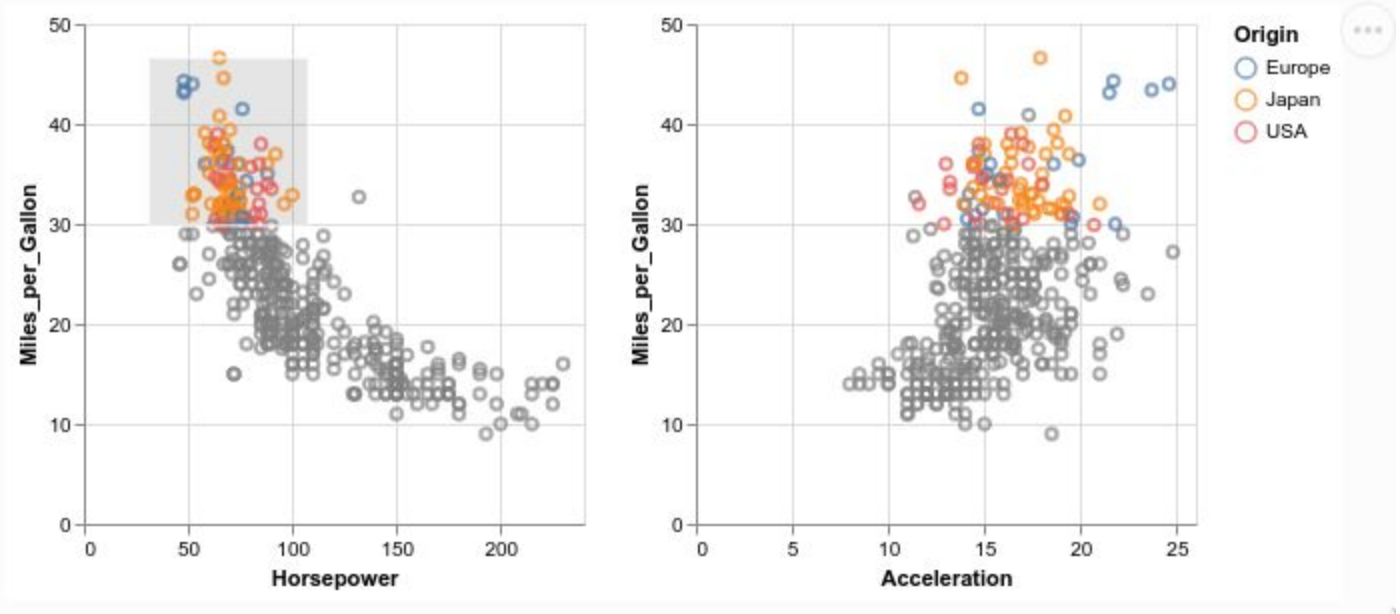
In essence, a dashboard is a board that displays information, usually as some key numbers and a few panels of plots.


rpm x 1000
lb/in²
mph
°F
SPORT

Interactivity

Multi-panel Scatter Plot with Linked Brushing

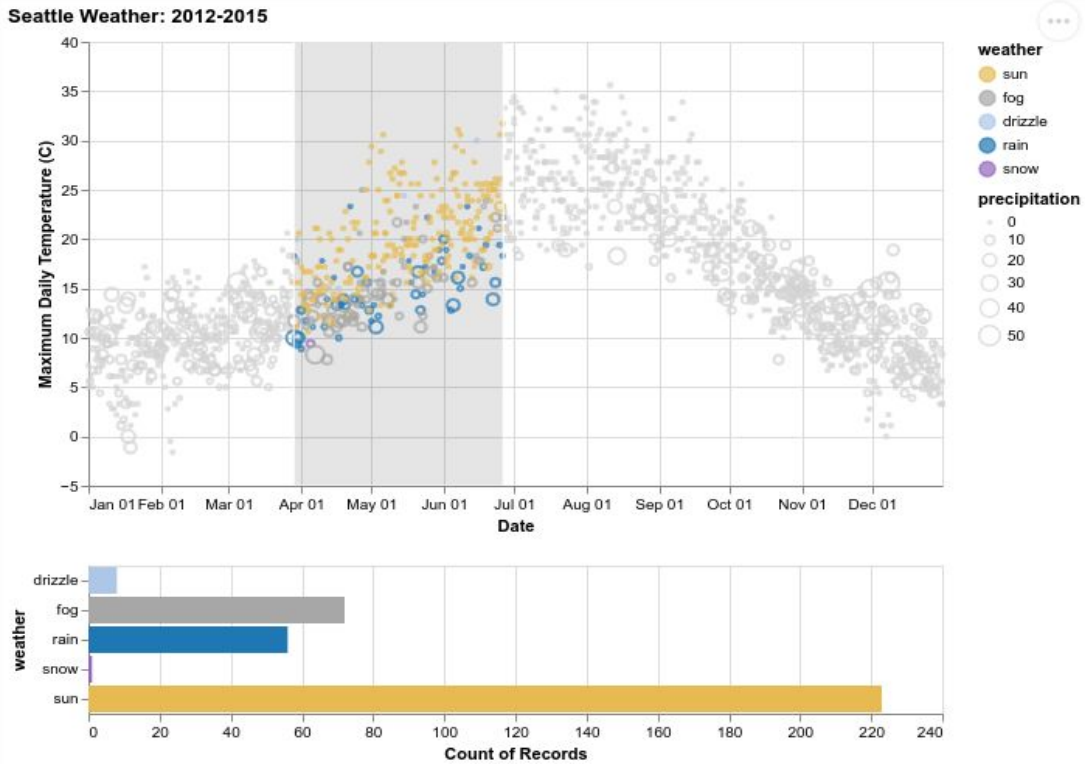
This is an example of using an interval selection to control the color of points across multiple panels.



https://altair-viz.github.io/gallery/scatter_linked_brush.html

Seattle Weather Interactive

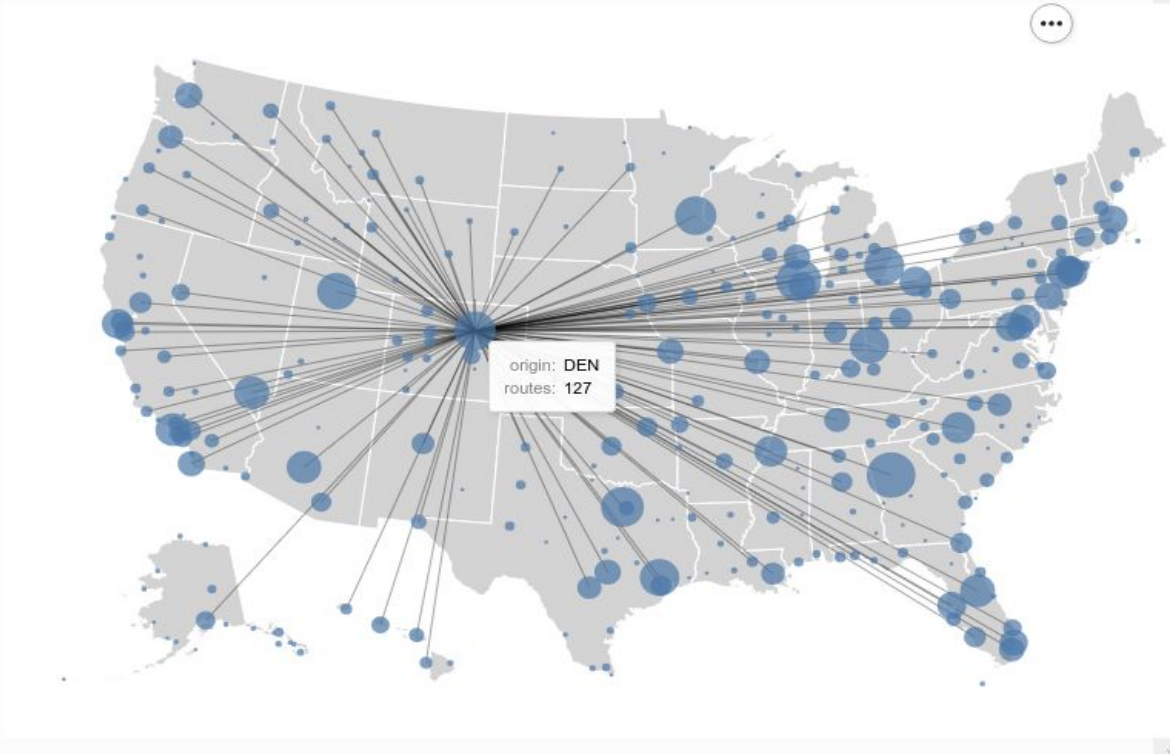
This chart provides an interactive exploration of Seattle weather over the course of the year. It includes a one-axis brush selection to easily see the distribution of weather types in a particular date range.



https://altair-viz.github.io/gallery/seattle_weather_interactive.html

Connections Among U.S. Airports Interactive

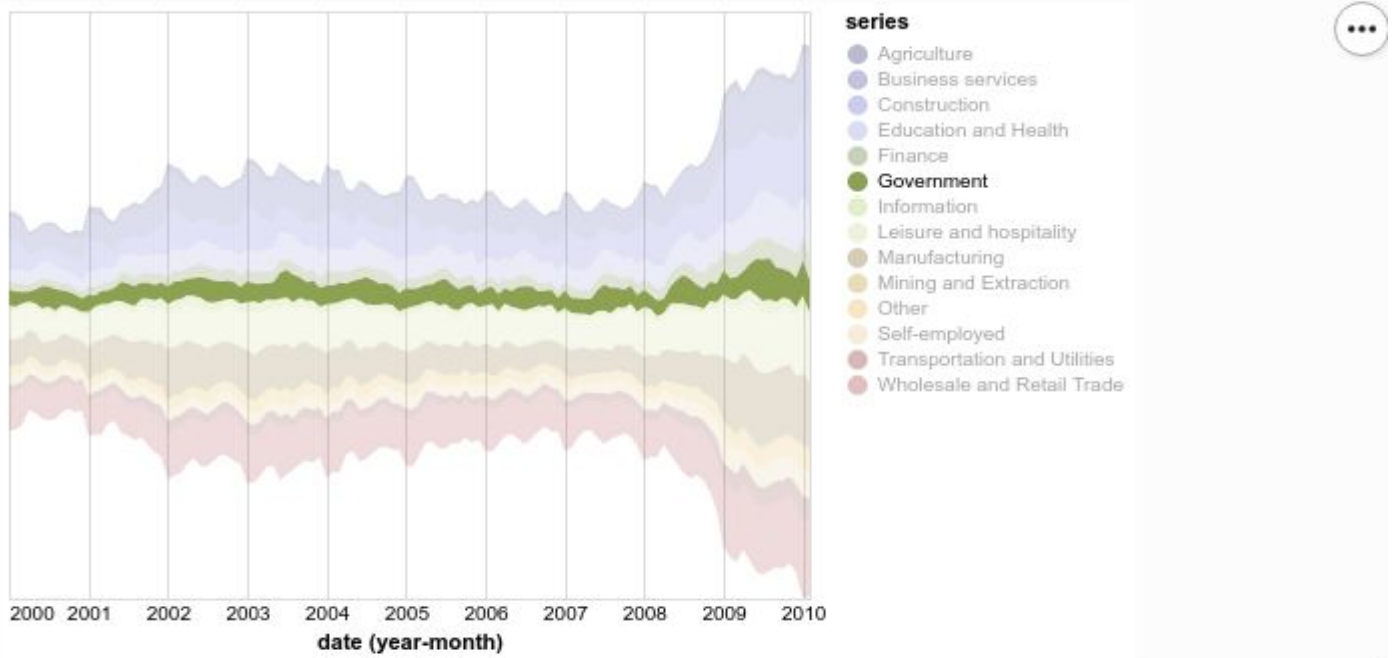
This example shows all the connections between major U.S. airports. Lookup transformations are used to find the coordinates of each airport and connecting airports. Connections are displayed on mouseover via a single selection.



https://altair-viz.github.io/gallery/airport_connections.html

Interactive Legend

The following shows how to create a chart with an interactive legend, by binding the selection to `"legend"`. Such a binding only works with `selection_single` or `selection_multi` when projected over a single field or encoding.



https://altair-viz.github.io/gallery/interactive_legend.html

Why use dashboards?

1. Quicker exploration than with coding
2. Can enable people without programming skills to explore and understand data better.
3. Can engage users more than static viz
4. Can lead to more engaging storytelling in data journalism.
5. When there is too much data, interactivity can allow us to look at subsets.
6. People can be interested in different things when they look at the same data.

A few examples

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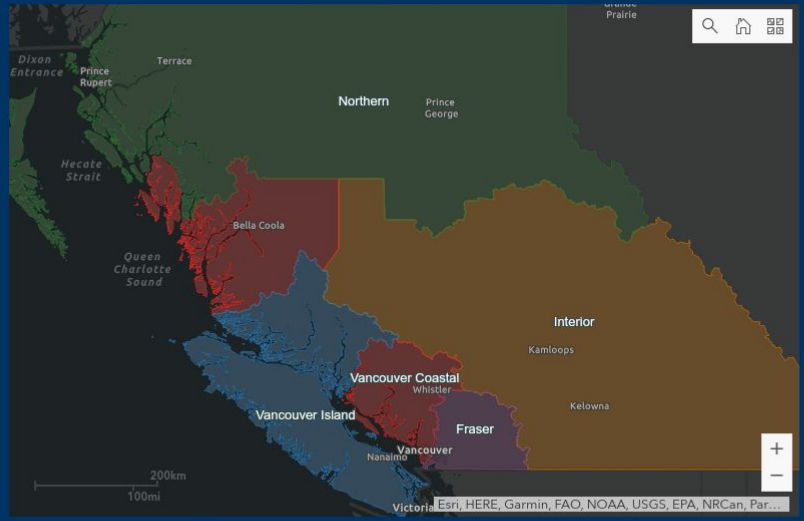
Distribution by Age

Age | Sex



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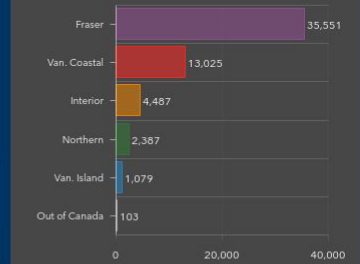
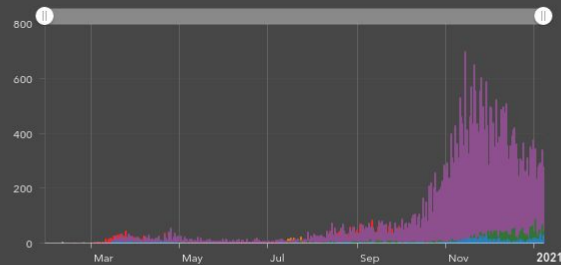
Total Cases Reported by Health Authority



Cases | New | Active | List

B.C. Cases Reported to Public Health

Health Authority Cases Reported to Public Health



Note: Y-axis varies between graphs.

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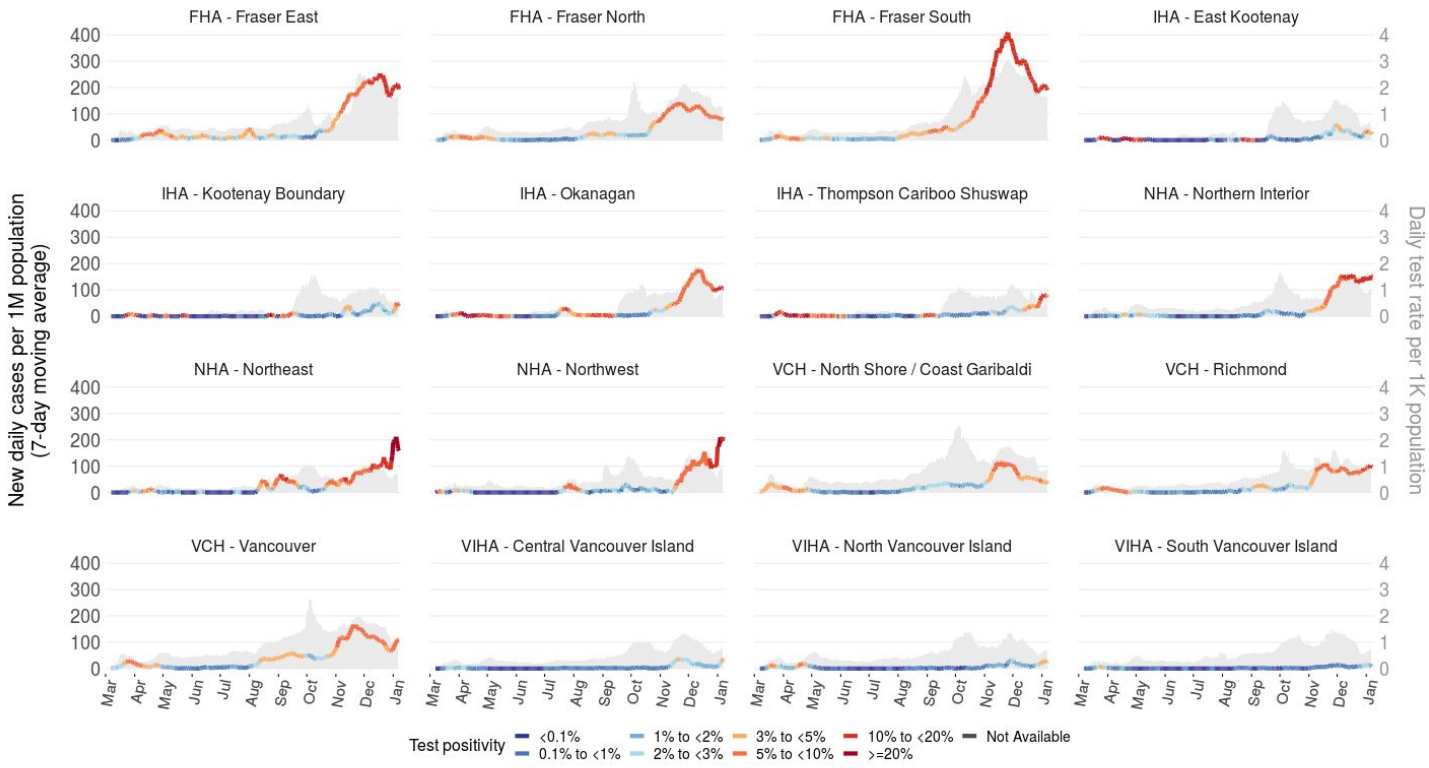
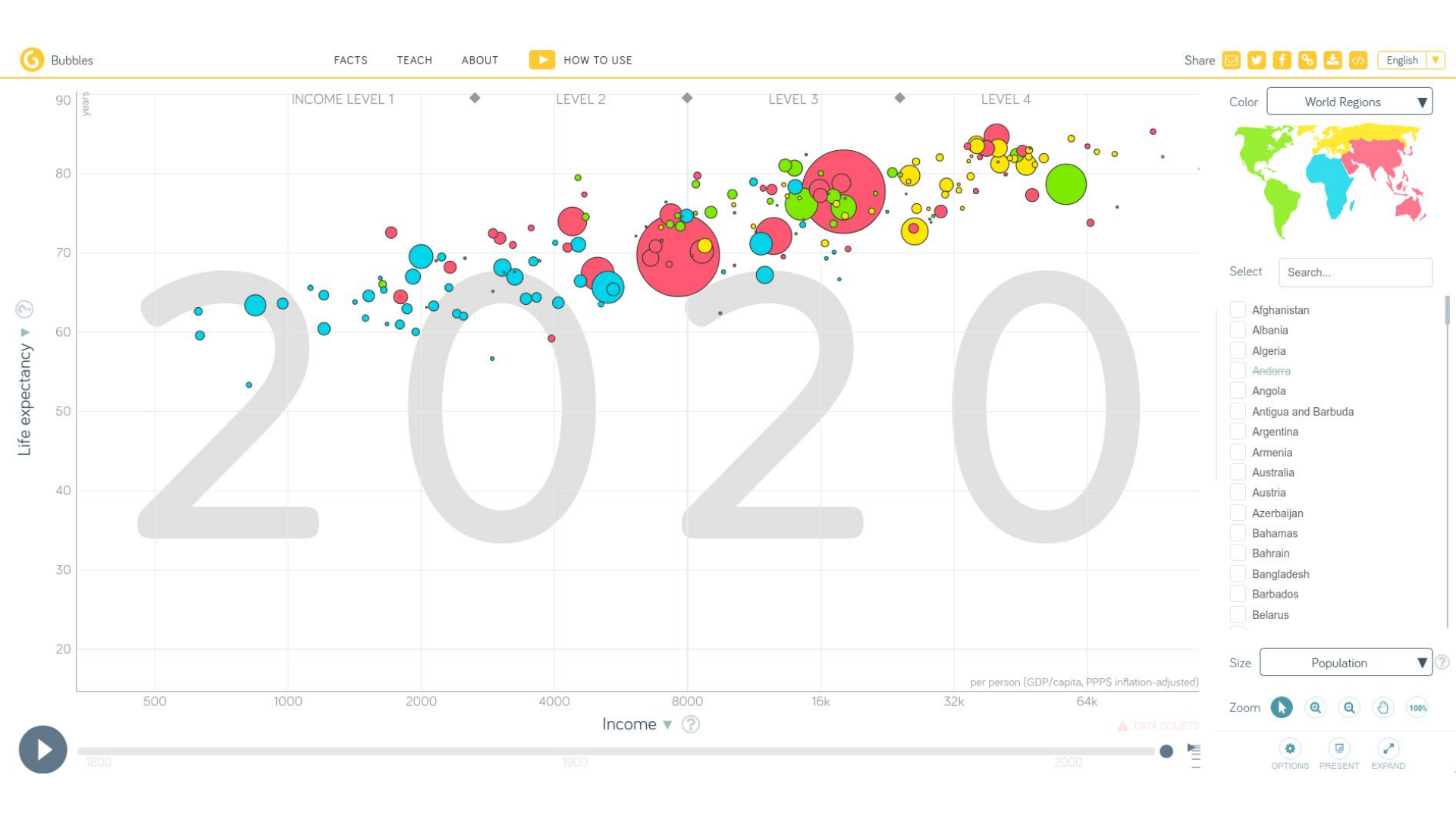
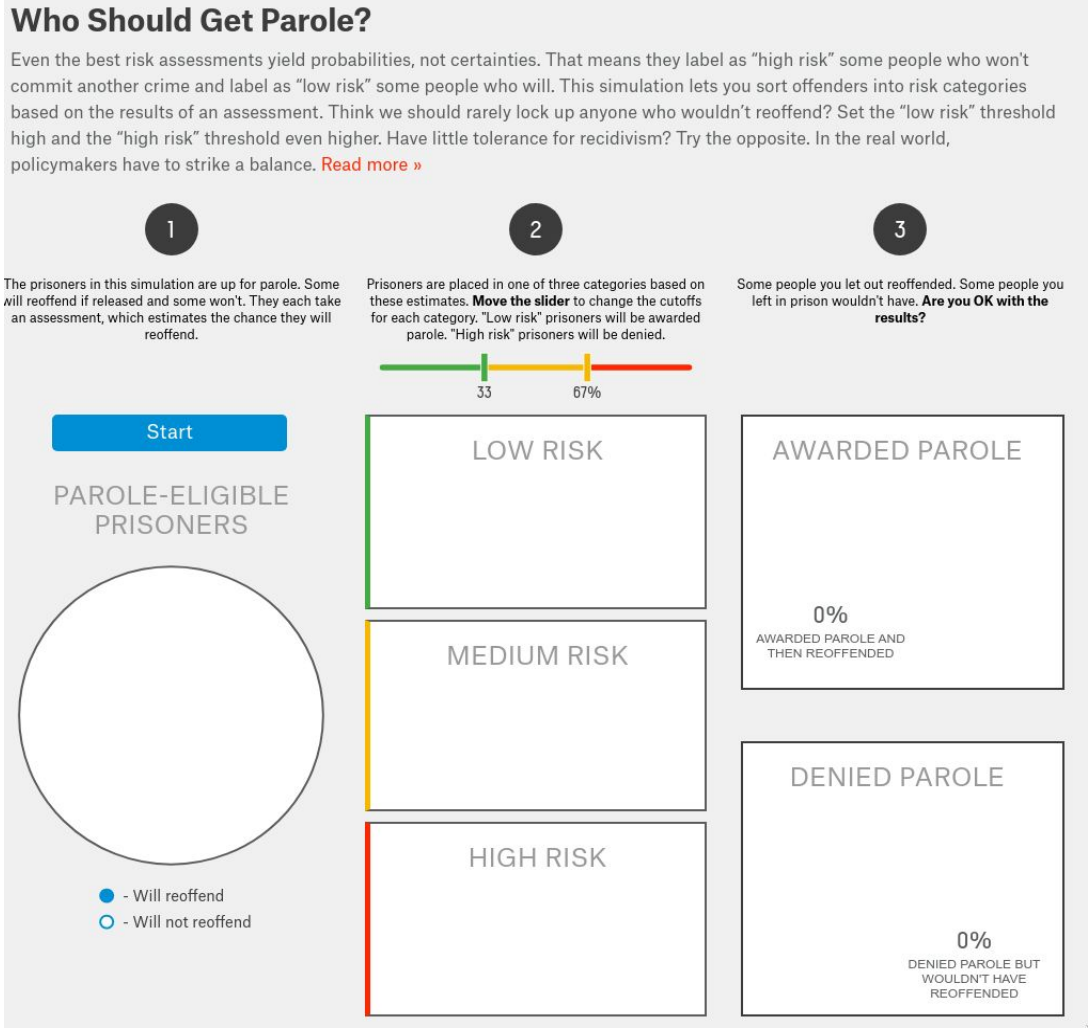
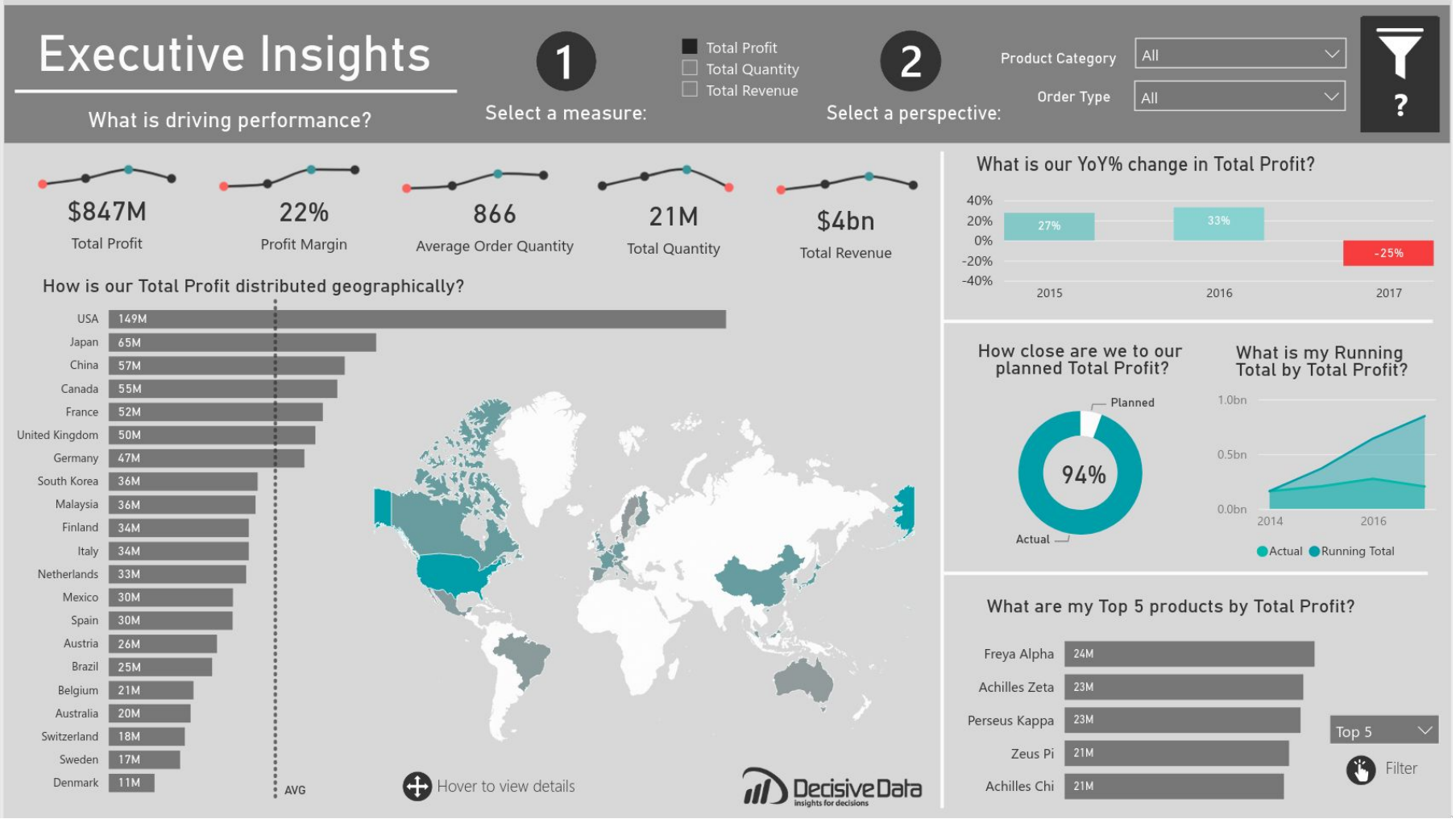


Data up to 2021-01-07


Bubbles
FACTS
TEACH
ABOUT
HOW TO USE
Share
English
INCOME LEVEL 1
LEVEL 2
LEVEL 3
LEVEL 4
years
90
80
70
60
50
40
30
20
Life expectancy
2020
500
1000
2000
4000
8000
16k
32k
64k
per person (GDP/capita, PPP$ inflation-adjusted)
Income
DATA DOUBTS
1800
1900
2000
Color
World Regions
Select
Search...
Afghanistan
Albania
Algeria
Andorra
Angola
Antigua and Barbuda
Argentina
Armenia
Australia
Austria
Azerbaijan
Bahamas
Bahrain
Bangladesh
Barbados
Belarus
Size
Population
Zoom
100%
OPTIONS
PRESENT
EXPAND



https://fivethirtyeight.com/features/prison-reform-risk-assessment/



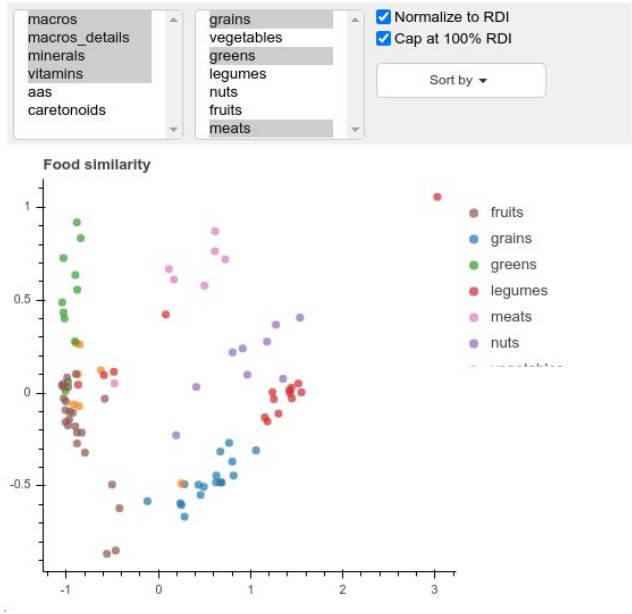
https://community.powerbi.com/t5/Data-Stories-Gallery/Executive-Insights-by-Decisive-Data/td-p/181742

Nutrimap

This dashboard facilitates comparisons of nutrient composition between common food items to give an overview of which foods are high and low in what nutrients. I think colors are more efficient at presenting overviews than tables with numbers, so I chose to present this information as heatmaps. The data is from USDA, who don't yet collect phytonutrients, which are generally abundant in plant-based foods. Evenutally I want to add more options computing the RDI, but for now, the RDI is based on a 70 kg male in his 30s. This is a minor issue since the dashboard mainly use RDI to provide a reference value for coloring the heatmap rather than recommending how much of a certain food item one should eat. For the latter, I highly reccomend Cronometer.

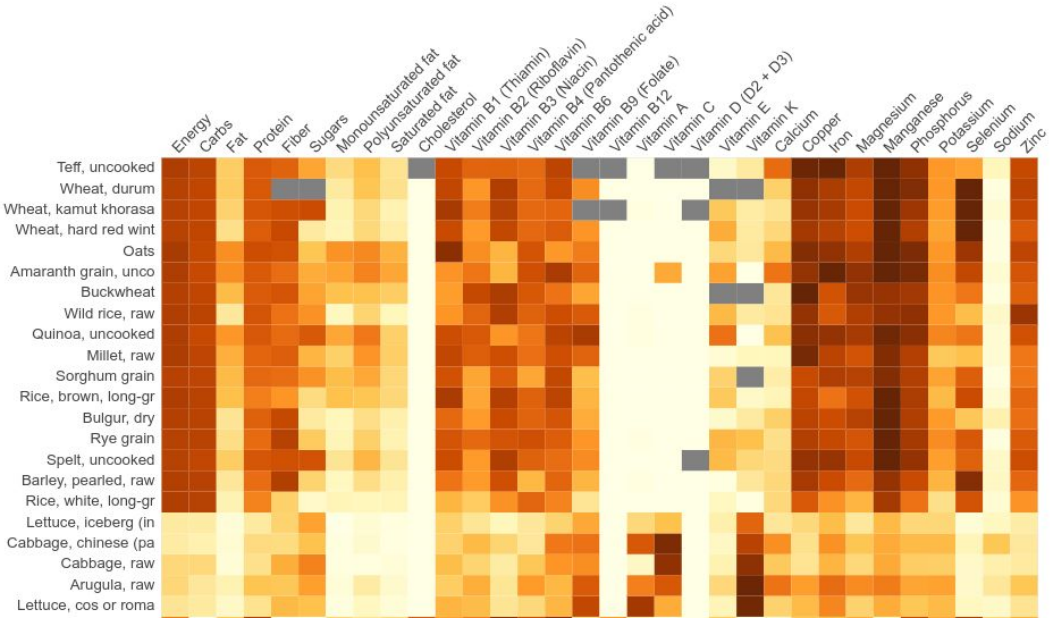
Selection tools

Pick nutrients and food groups to visualize using the lists or select individual food items in the food similarity scatter plot by dragging with the mouse or clicing to select. Ctrl and shift can be used to select multiple items.



Nutrient visualization

The nutrients for 100g of each food are shown (dry weight for grains and legumes, wet weight for everything else). The colors are normalized to RDI and capped at 100% by default.



https://nutrimap.herokuapp.com/nutrimap

Examples from MDS previous years

World Wide Arms and Ammunition Movement and GDP Effects

This app is designed to explore how the movement of weapons globally has changed over the last 30 years, and how imports and exports of arms and ammunition relate to a country's GDP.

Choose statistic:

- (•) Import
- ( ) Export

Choose country:

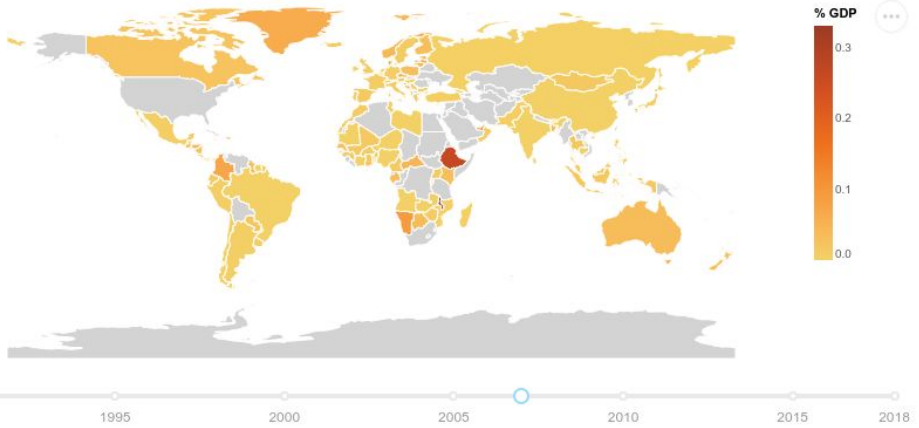
Togo

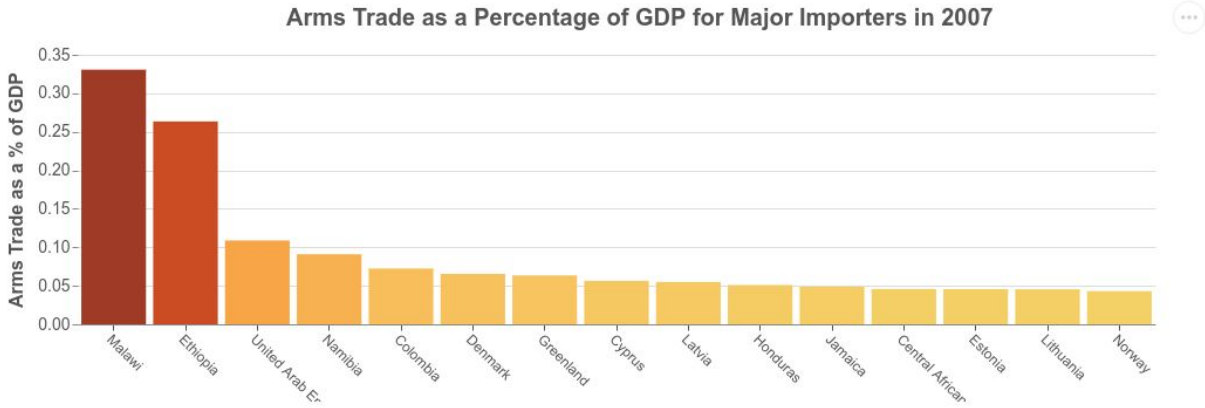
Explore changes through time of a single country using the lowermost visualizations.

Include USA

Remove the outlier USA to better visualize differences between other nations.

% of GDP





https://world-wide-weapons-report.herokuapp.com/

Geographic Analysis | Explore Rating, Price & Value of Wines

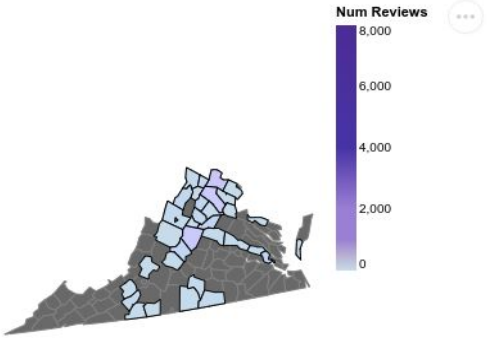
WINE REVIEWS BY GEOGRAPHIC LOCATION

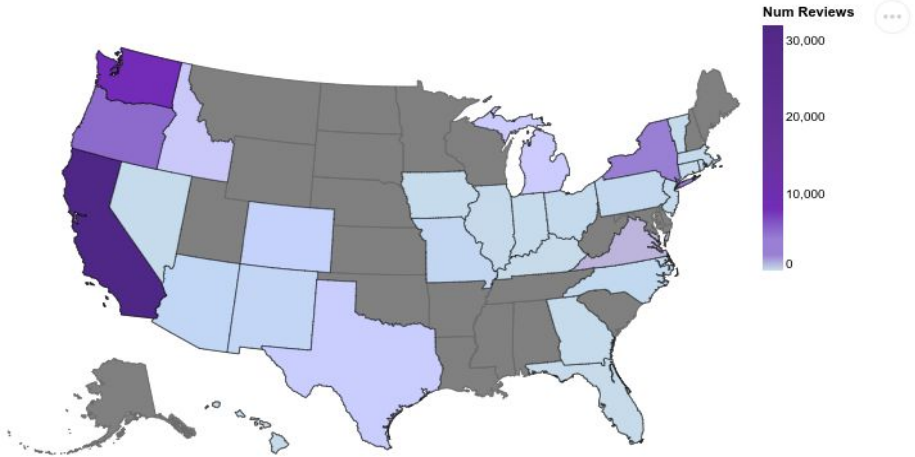
See how wine is distributed across the U.S. Hover over a particular state or county to see some summary information for things like average price, points, or value rating. Use the dropdown menu to take a closer look at a particular state, where you can see a breakdown by county. Hover over a county to get more summary information. In no time at all you'll be an expert on where you can find the best wine's at the best prices in America.

TOTAL NUMBER OF REVIEWS

CHOOSE A STATE

Virginia





https://group204-vino-milestone2.herokuapp.com/

https://akanshav.shinyapps.io/crime_new/

World Wine Explorer

This application will help you explore the world of wine!

*Reviews are only published for wines rated 80+ points

Rating range

80 — 100

80 82 84 86 88 90 92 94 96 98 100

Price range ($USD).

($11 - $30) Popular

Country

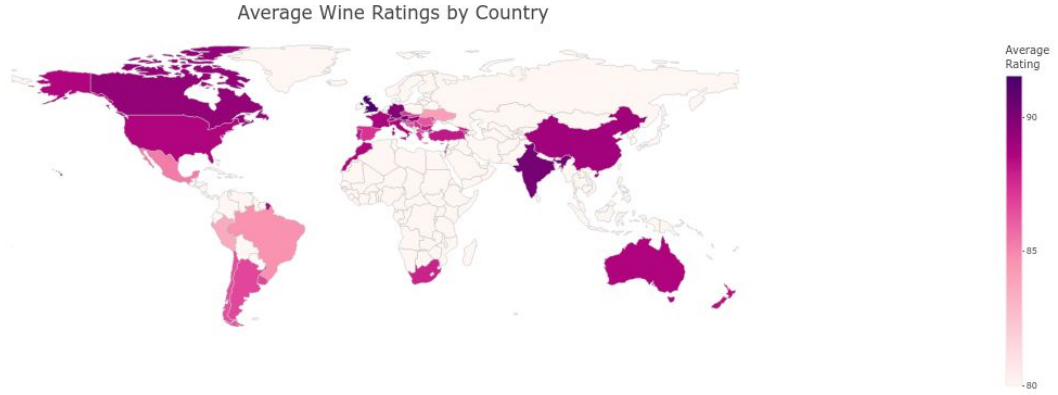
Canada

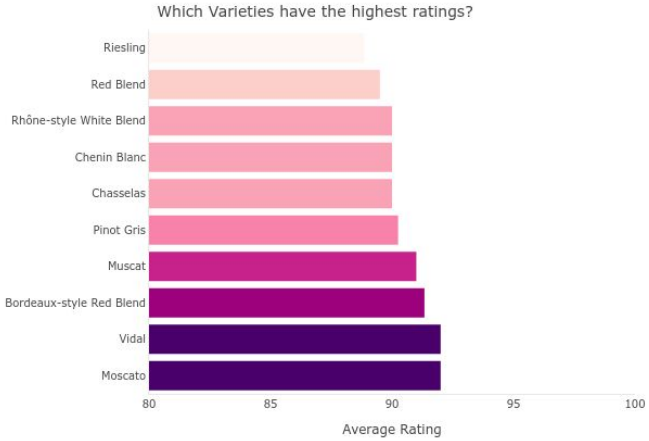
Region

Nothing selected

Vintage

Nothing selected





https://pall-v.shinyapps.io/wine_viz_mkpv/

More MDS examples

https://dsci-532-group203-maintenance.herokuapp.com/

https://panntingg.shinyapps.io/mental_health_app_3_0/

https://hfboyce.shinyapps.io/dsci_532-boston-crime-rate/

https://adityashrm21.shinyapps.io/us-police-shootings-analysis/

https://g105-milestone3.herokuapp.com/

https://dsci-532-l02-gr212-milestone3.herokuapp.com/

https://dsci532group114milestone3.herokuapp.com/