DSCI 532

Data Visualization 2

1. Intro to dashboards

Lecture learning goals

1. Understand what dashboards are
2. Explain the advantages of using dashboards
3. Define what constitutes an effective dashboard layout
4. Explain the advantages of using interactive visualizations
5. Distinguish server side from client side interactivity

Required activities

Before class:

- Nothing!

After class:

- Don't rush into coding Sections 7.1.1, 7.2.1, 7.2.2.
- UX Matters Sections 6, 6.1, 6.1.1 (until the first code chunk), 6.1.2.

What is a dashboard?

(in a data science context)

Definitions

- “A dashboard is a way of displaying various types of visual data in one place. Usually, a dashboard is intended to convey different, but related information in an easy-to-digest form. And oftentimes, this includes things like key performance indicators (KPI)s or other important business metrics that stakeholders need to see and understand at a glance.

https://www.tableau.com/learn/articles/dashboards/what-is

Definitions

- “An information management tool that visually tracks, analyzes, and displays key performance indicators, metrics, as well as key data points, allowing you to monitor the current state of your business, department, team, or specific process”

https://databox.com/data-dashboard#what

Definitions

- “Dashboards are a way to monitor your business and see all your most important metrics at a glance. ... A dashboard combines on-premises and cloud data, providing a consolidated view of data.”

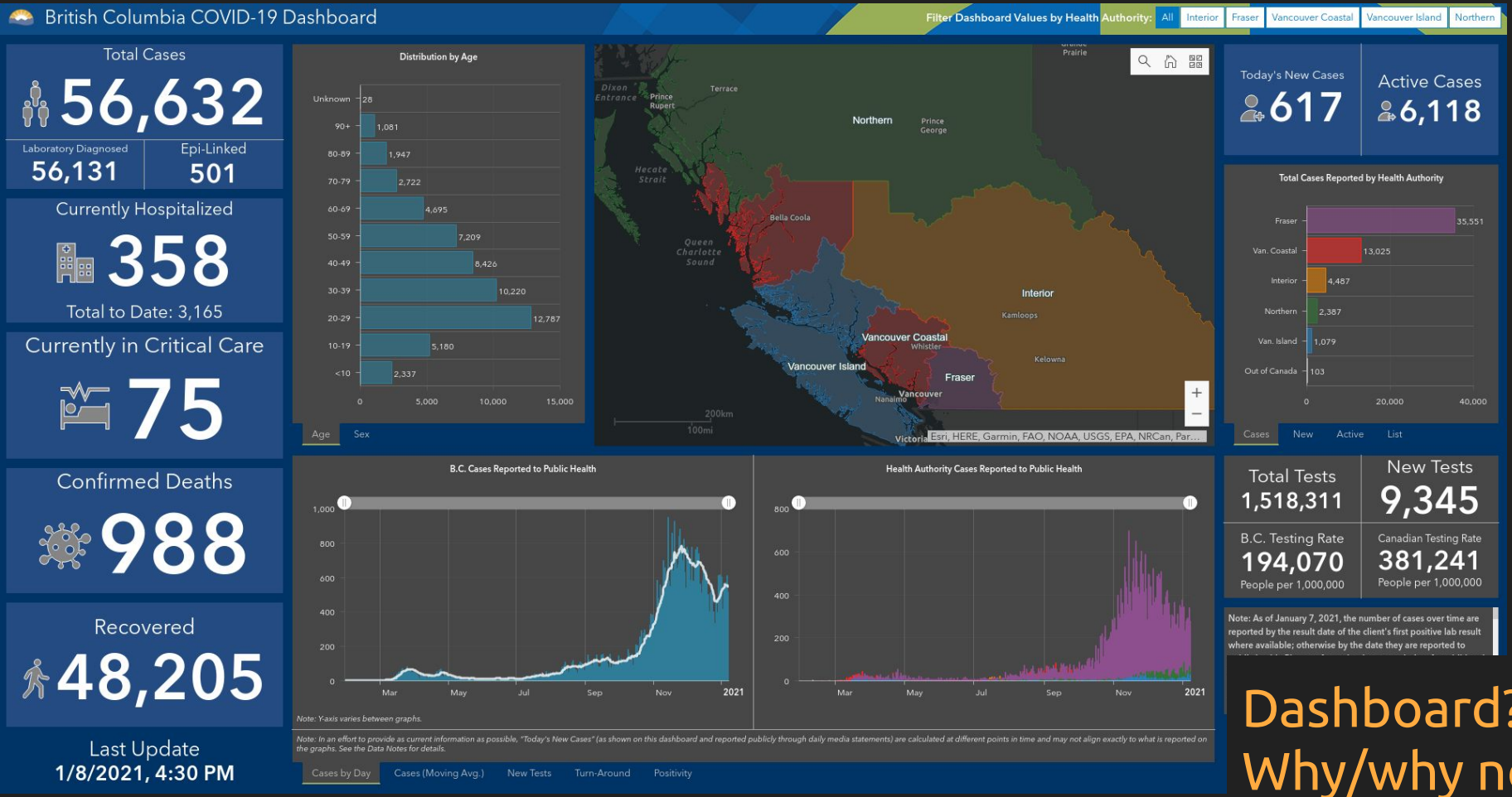
https://learn.microsoft.com/en-us/power-bi/create-reports/service-dashboards#dashboard-basics

Definitions

- “Dashboards are tools that provide up-to-date information, using visuals to communicate the stories behind the data. They guide decision-makers through the relationships of complex, big data. They present visuals in a practical order enabling quicker understanding and appreciation of data to the business.”

https://www.appsilon.com/post/dashboards-in-rshiny

Which of these are dashboards?



Dashboard? Why/why not?

A. Yes B. No

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:

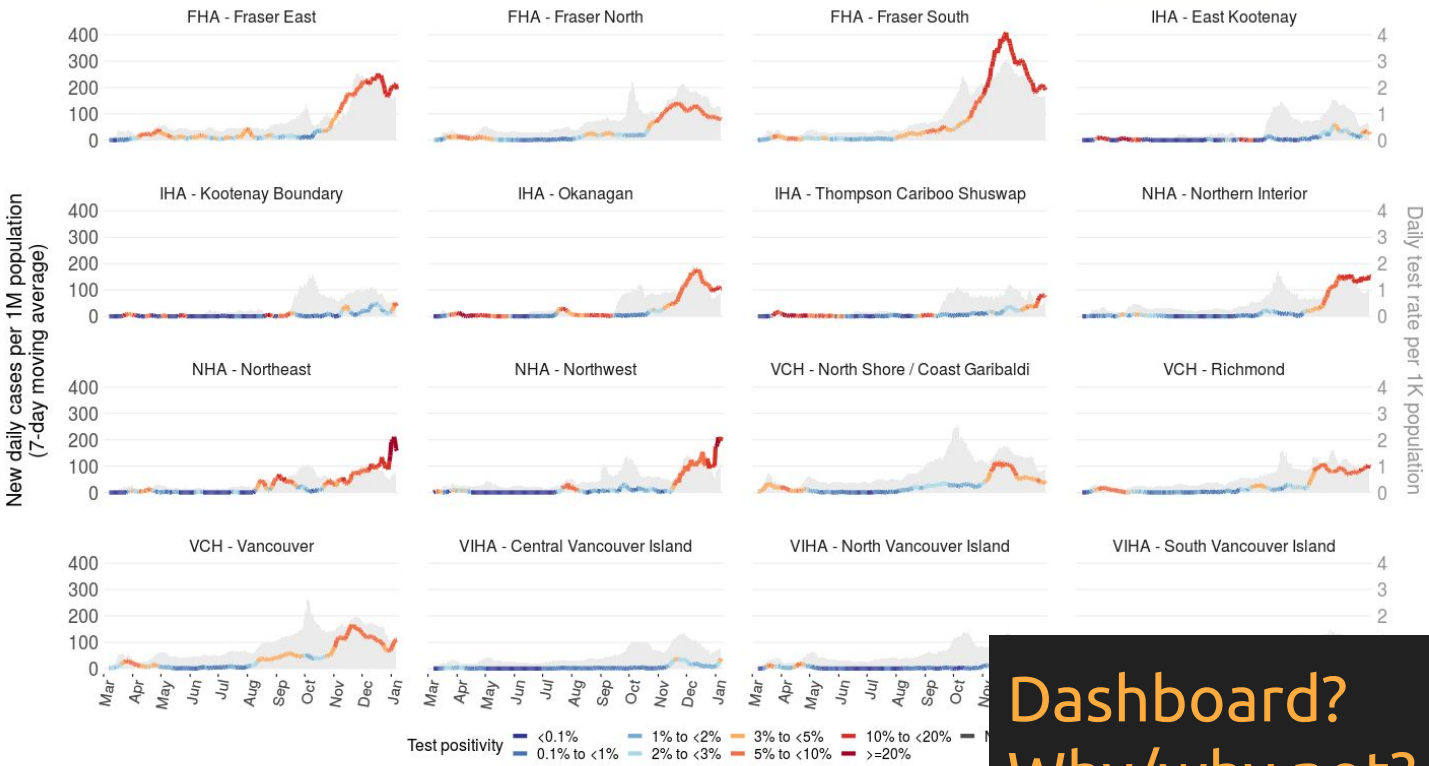
http://www.bccdc.ca/health-info/diseases-conditions/covid-19/data

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

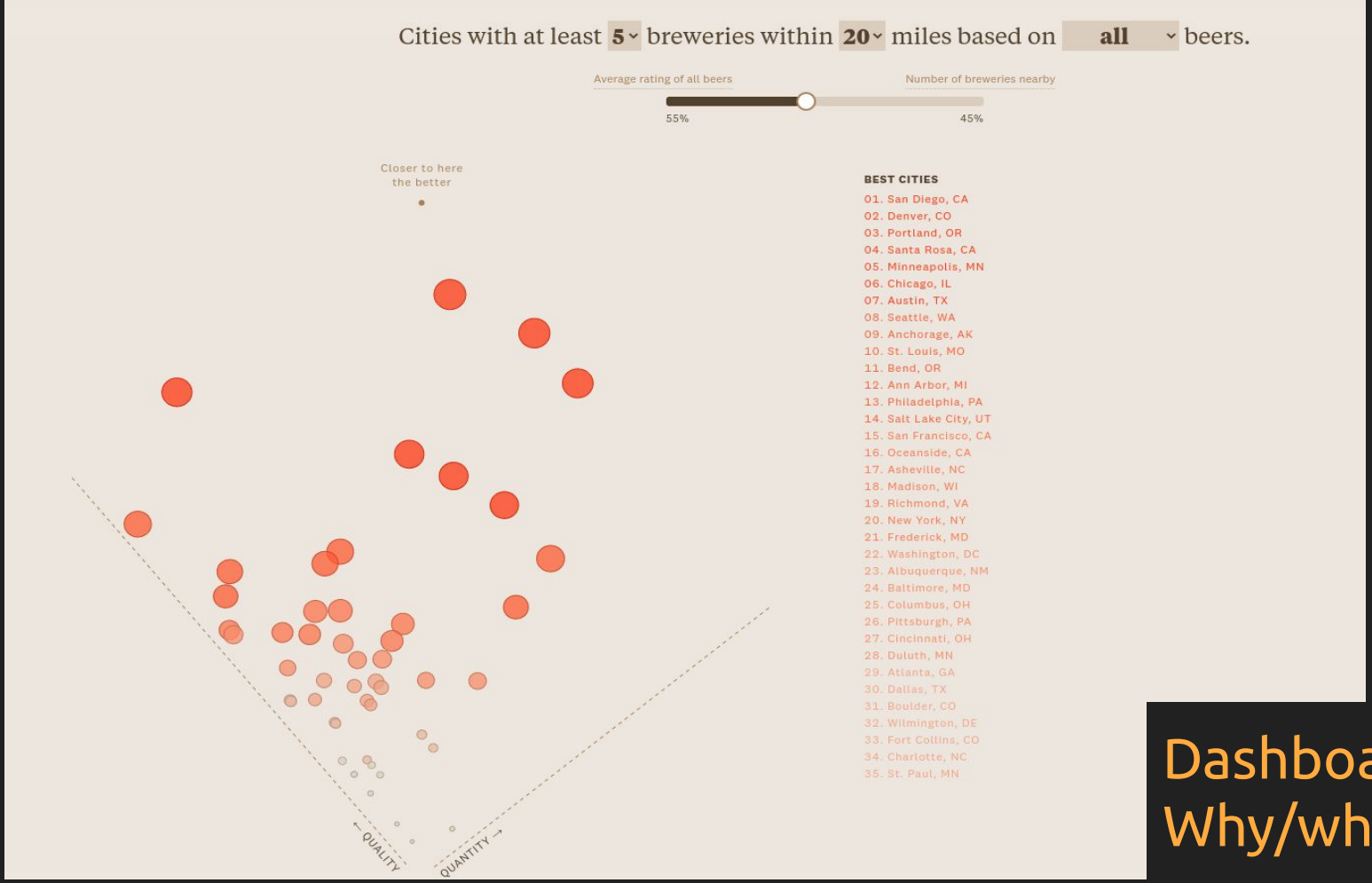
How to read this graph?



Dashboard?
Why/why not?

A. Yes B. No

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



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

Dashboard?
Why/why not?

A. Yes B. No

HIDE FILTERS

1 - 24 of 920 items

VIEW 24 SORT BY Best Match

AVAILABILITY –

IN STOCK

CATEGORIES –

FURNITURE
LIVING ROOM
DINING ROOM
BEDROOM
OFFICE
STORAGE & ORGANISATION
ENTRYWAY
RUGS
LIGHTING
DECOR
WALL DECOR

PRICE –

$0 $3,000

OFFERS –

ON SALE

SIZE

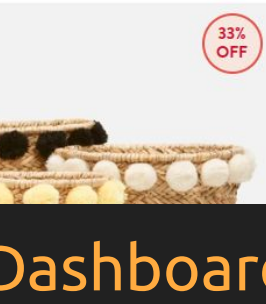
HAYDEN
dining chair
~~$89~~ $79
IN STOCK

ROSIE
woven straw tote bag
~~$35~~ $19
IN STORE ONLY
CHECK IN-STORE AVAILABILITY

BENXI
16-piece flatware set
~~$15~~ $10
IN STOCK

BENXI
16-piece flatware set
~~$15~~ $10
IN STOCK

PAPASAN
rattan accent chair
~~$189~~ $139
IN STOCK

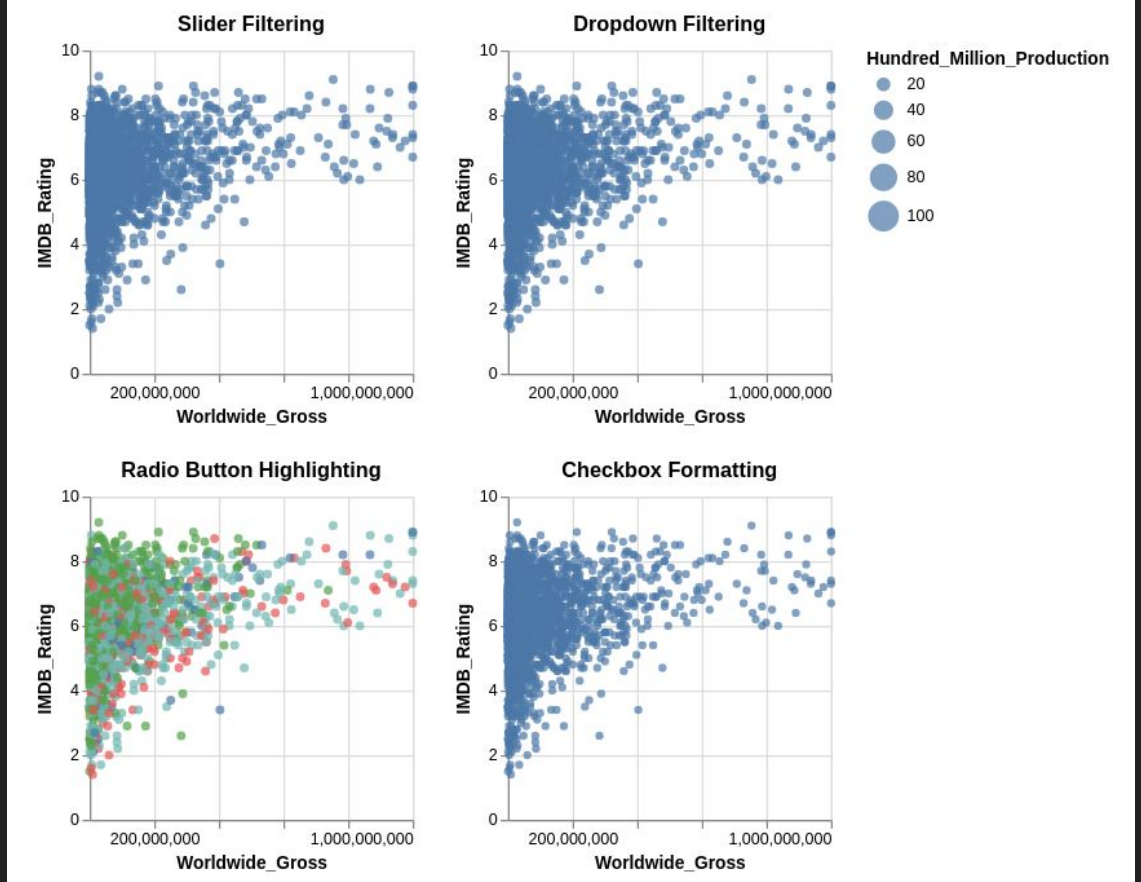


KORB
set of 3 basket

Dashboard?
Why/why not?

A. Yes B. No

https://www.structube.com/en_ca/sale?page=1&sort-by=position-asc



Dashboard?
Why/why not?

A. Yes B. No

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

In essence, a dashboard allows for monitoring and (usually) interaction with some key information (numbers/charts).

You need to clarify with your client/boss more precisely what they want if they just as for “a dashboard” (and iterate)

Why is it called “dashboard”?


rpm x 1000
mph
lb/in²
°F


DASHBOARD

532 =

Why bother using dashboards?

(and other types of interactive viz)

1. Can allow for quicker/more accessible exploration than via code
    - Coding is one type of interactive data exploration
    - Can enable people without programming skills to explore data.
2. Can engage users more than static viz
    - E.g. engaging storytelling in presentations/data journalism.
3. Can explain more information as needed
    - When there is too much data, interactivity can allow us to look at subsets.
    - People can be interested in different things when they look at the same data.
4. Often the interface between the data science product/model and the end user
    - If people cannot understand how to use your application, it is not successful no matter how innovative and incredible the computation algorithms in the back-end are.

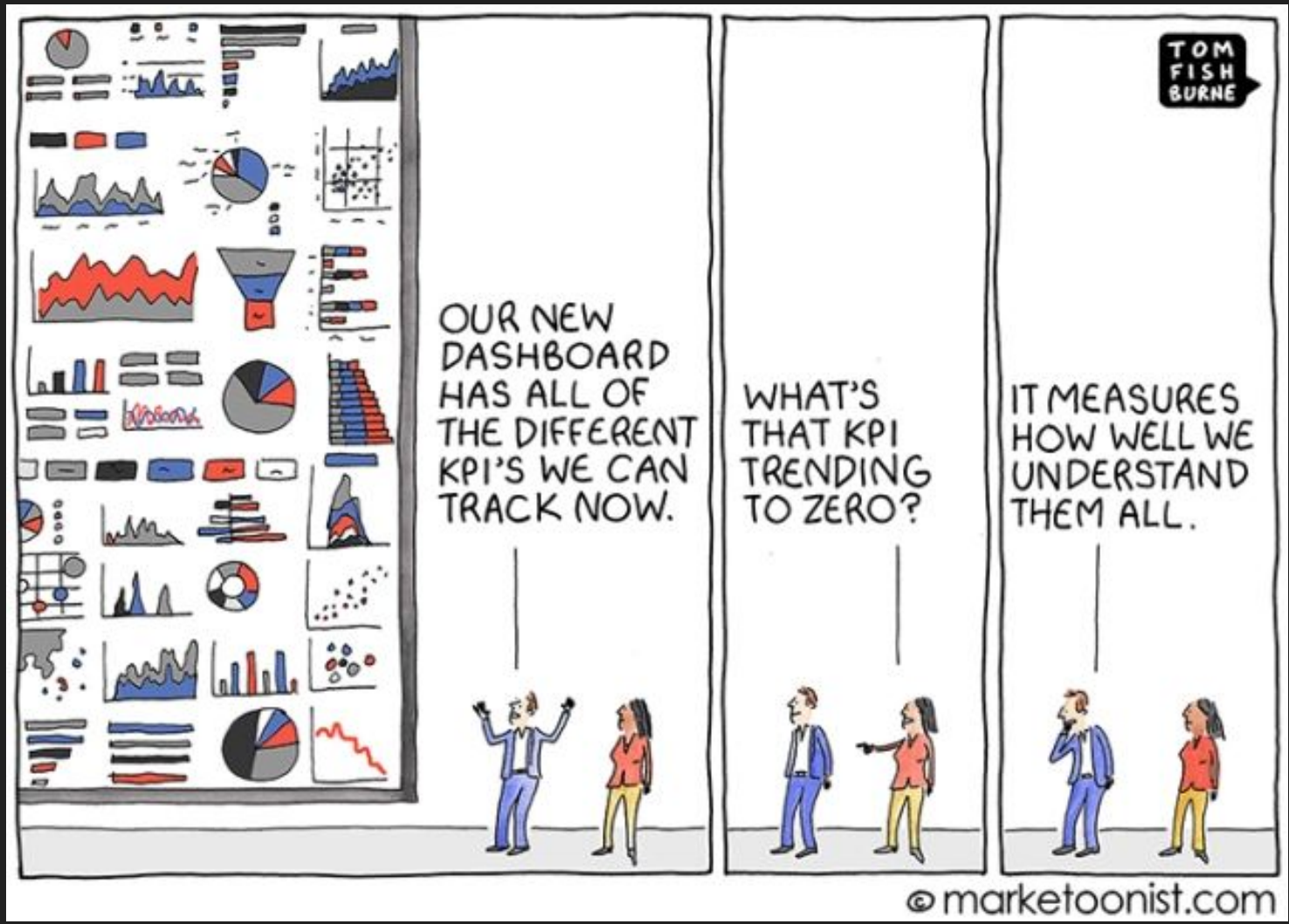
Effective dashboard design

1. General points

1. Identify the purpose of the dashboard
    - Who are the stakeholders?
        - Talk to them if possible
    - Which stakeholder problem are you trying to solve?
        - Create a user story
    - How will the stakeholder interact with the dashboard
        - Eat your own dogfood (test the dashboard yourself)
2. Understand the data (EDA)
3. Choose appropriate visualizations (what we learned in 531)
4. Iterate with the stakeholders/client/manager
    - Don’t try to one shot deliver

2. Be as concise as possible

1. Show only relevant info, not everything possible
    a. Identify the story for your default app state
    b. Then allow the user to explore more info as needed
2. Exactly what “concise” entails is context dependent


OUR NEW DASHBOARD HAS ALL OF THE DIFFERENT KPI'S WE CAN TRACK NOW.
WHAT'S THAT KPI TRENDING TO ZERO?
IT MEASURES HOW WELL WE UNDERSTAND THEM ALL.
TOM FISH BURNE
© marketoonist.com

- “A dashboard is a tool that aggregates and displays key data metrics and KPIs in a single, **easy-to-view** interface.”

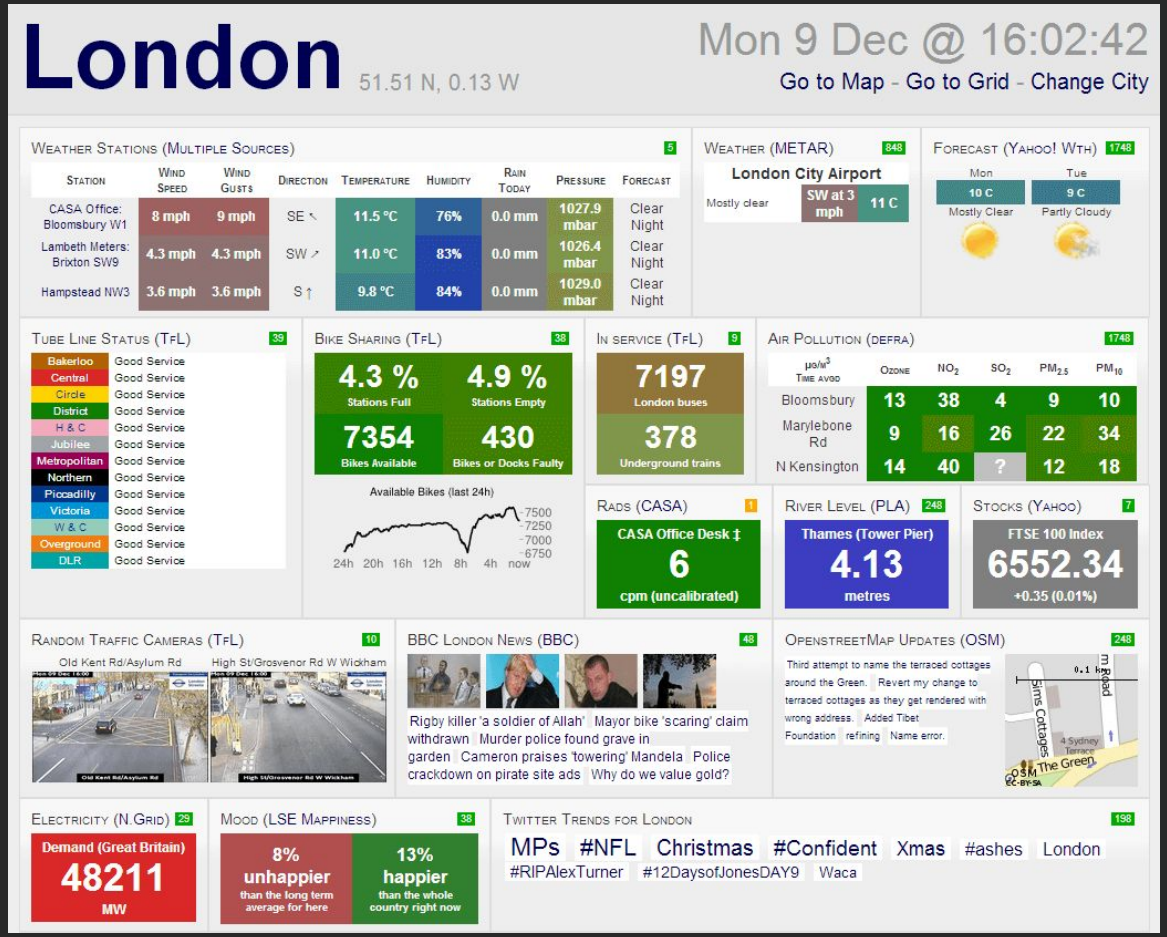
Complexity level depends on the target user

Complexity level depends on the target user

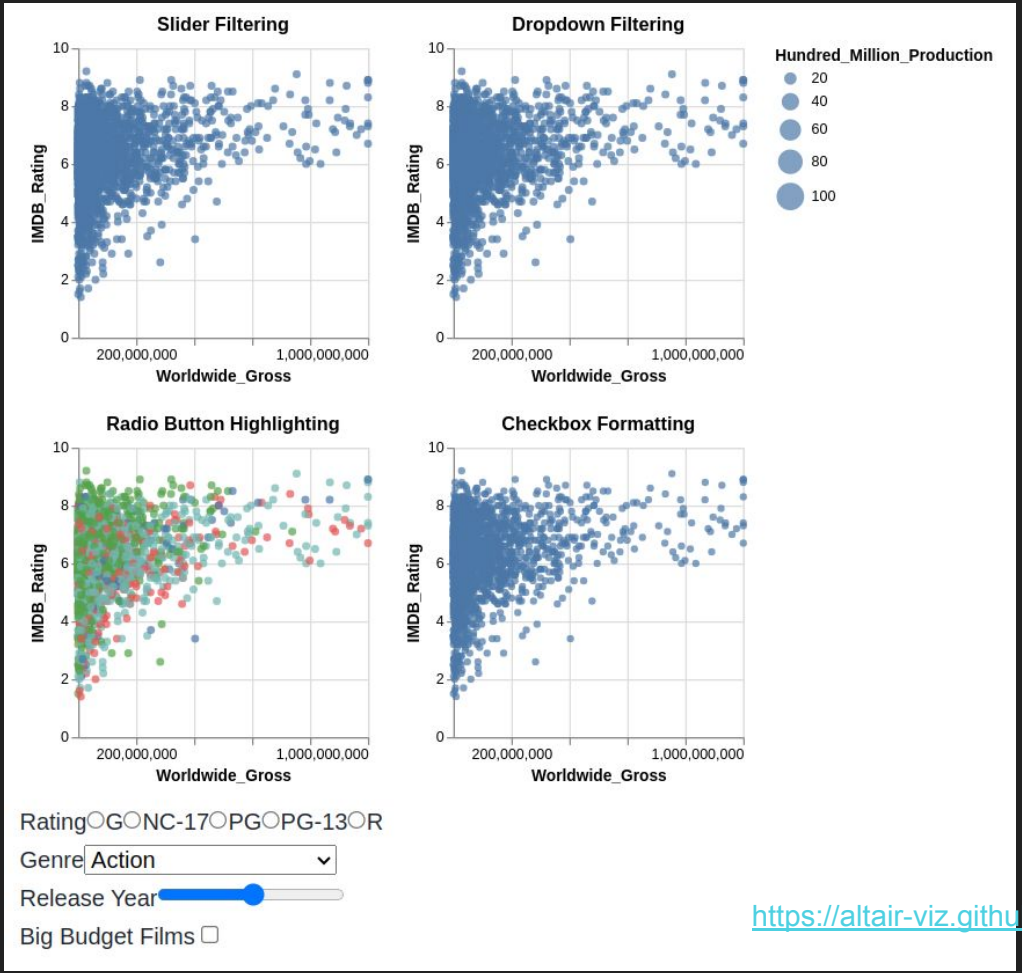
3. Layout the app logically

1. Design your app in a grid layout
2. Think about the flow you want the end customer to follow
3. Place global widgets together
    - An effective default layout is a sidebar with all global widgets
4. Place local widgets close to the plots they control (or with a clear label together with the global widgets)

The lack of a grid layout makes this dashboard hard to read

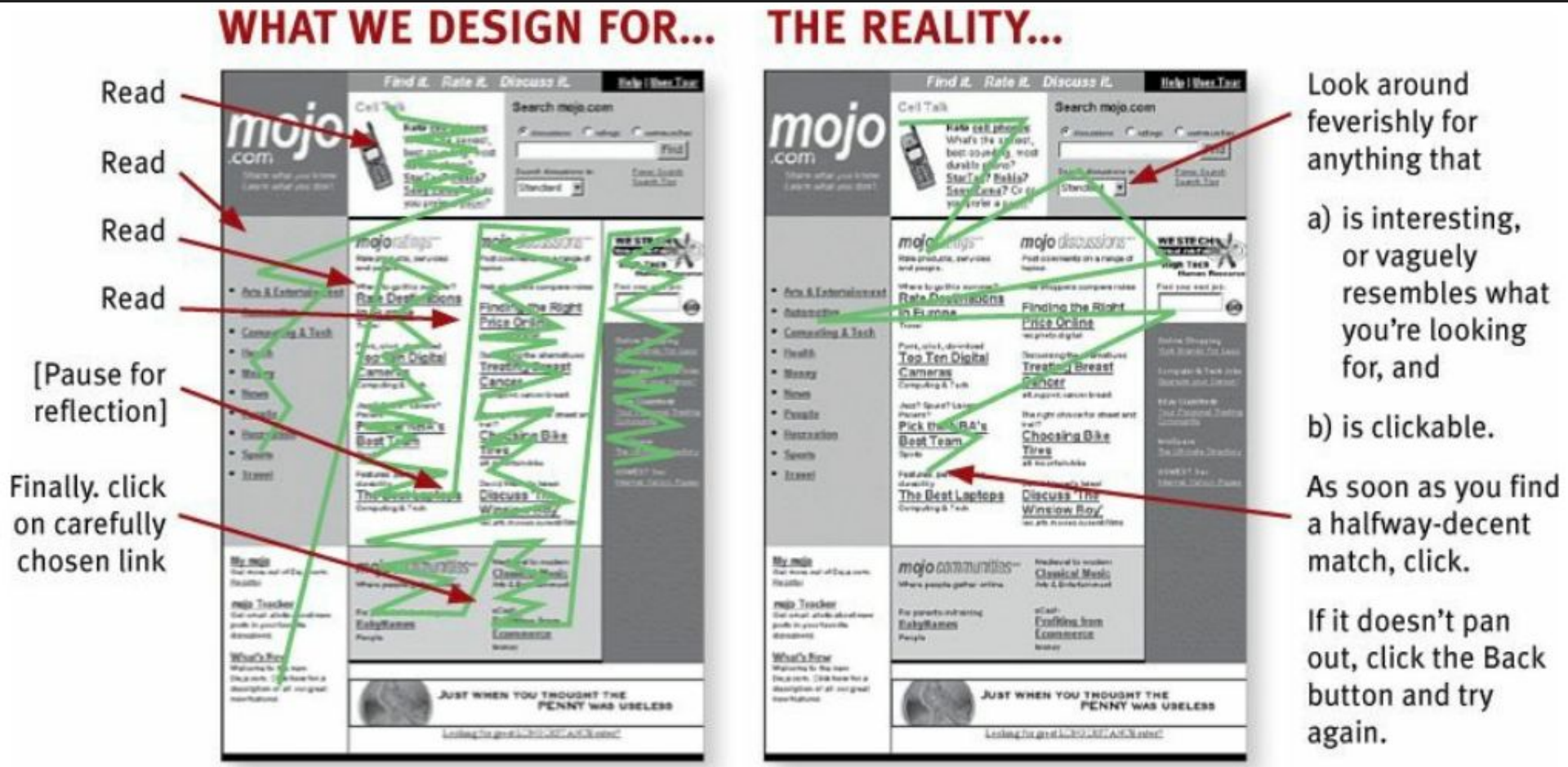


It’s unclear which widgets control which charts

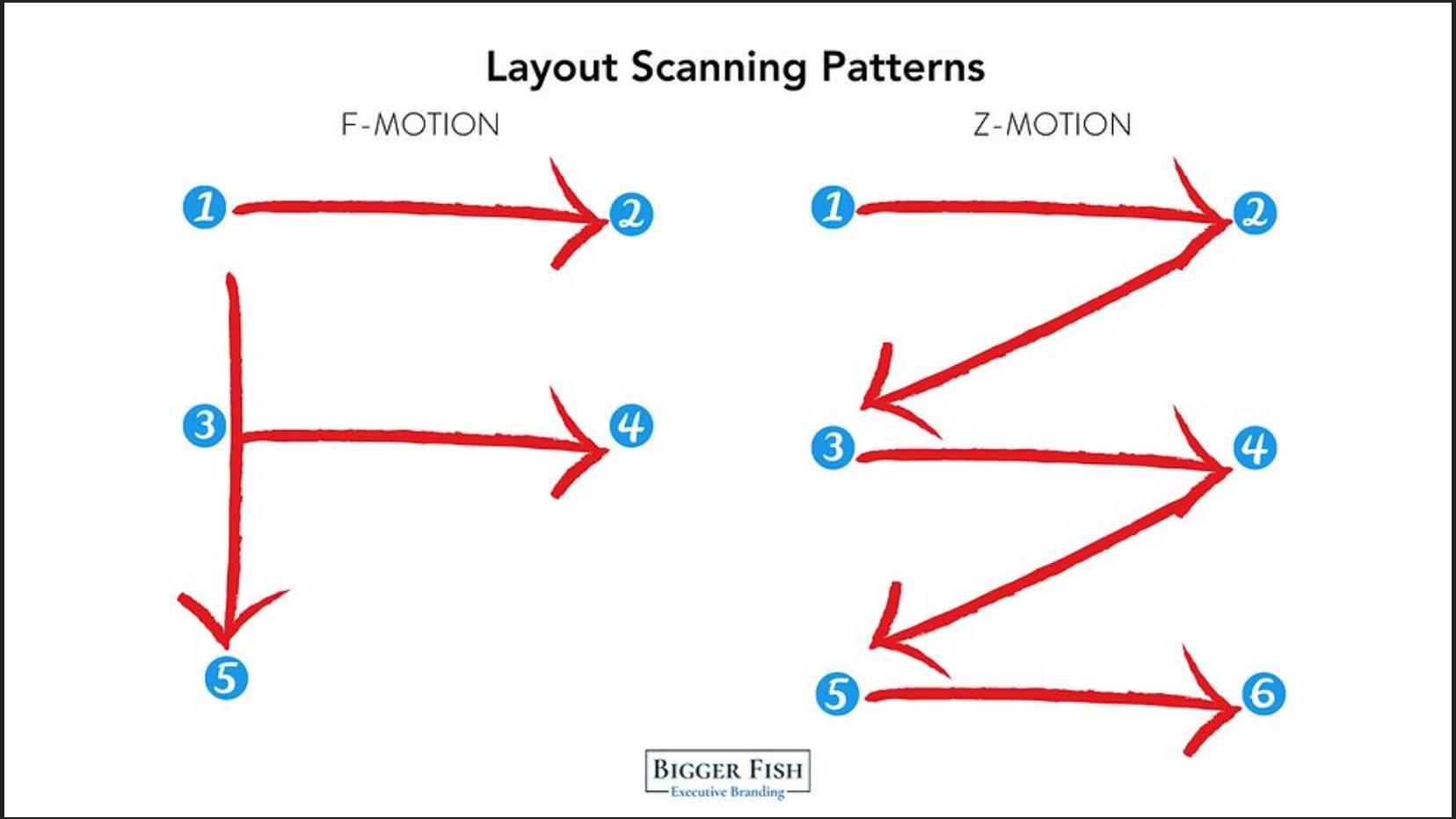


https://altair-viz.github.io/gallery/multiple_interactions.html

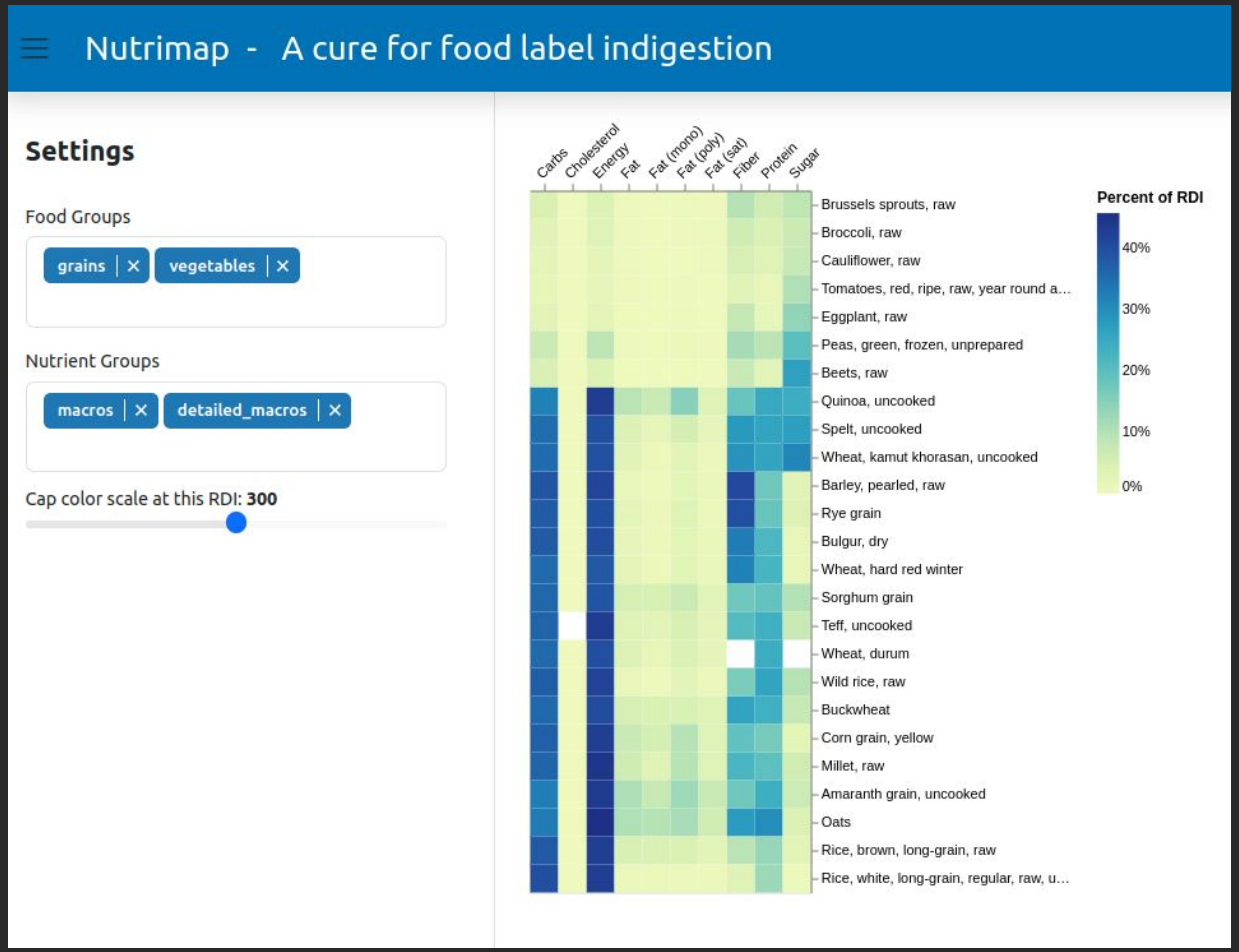
Think about how the audience will actually read your dashboard



People often read in “F” or “Z” patterns



A single panel to the left with all widgets is a sensible default



4. Include Summaries/Key indicators

1. Include some summarized key numbers/metrics, e.g. on cards.
2. Give numbers context and labels
3. Consider text and number formatting (e.g. round many decimals)
4. Group related metrics close together

Give labels and context to numbers (e.g. relative a previous measure or a target)

Group related metrics

Group related metrics

https://www.geckoboard.com/best-practice/dashboard-design/

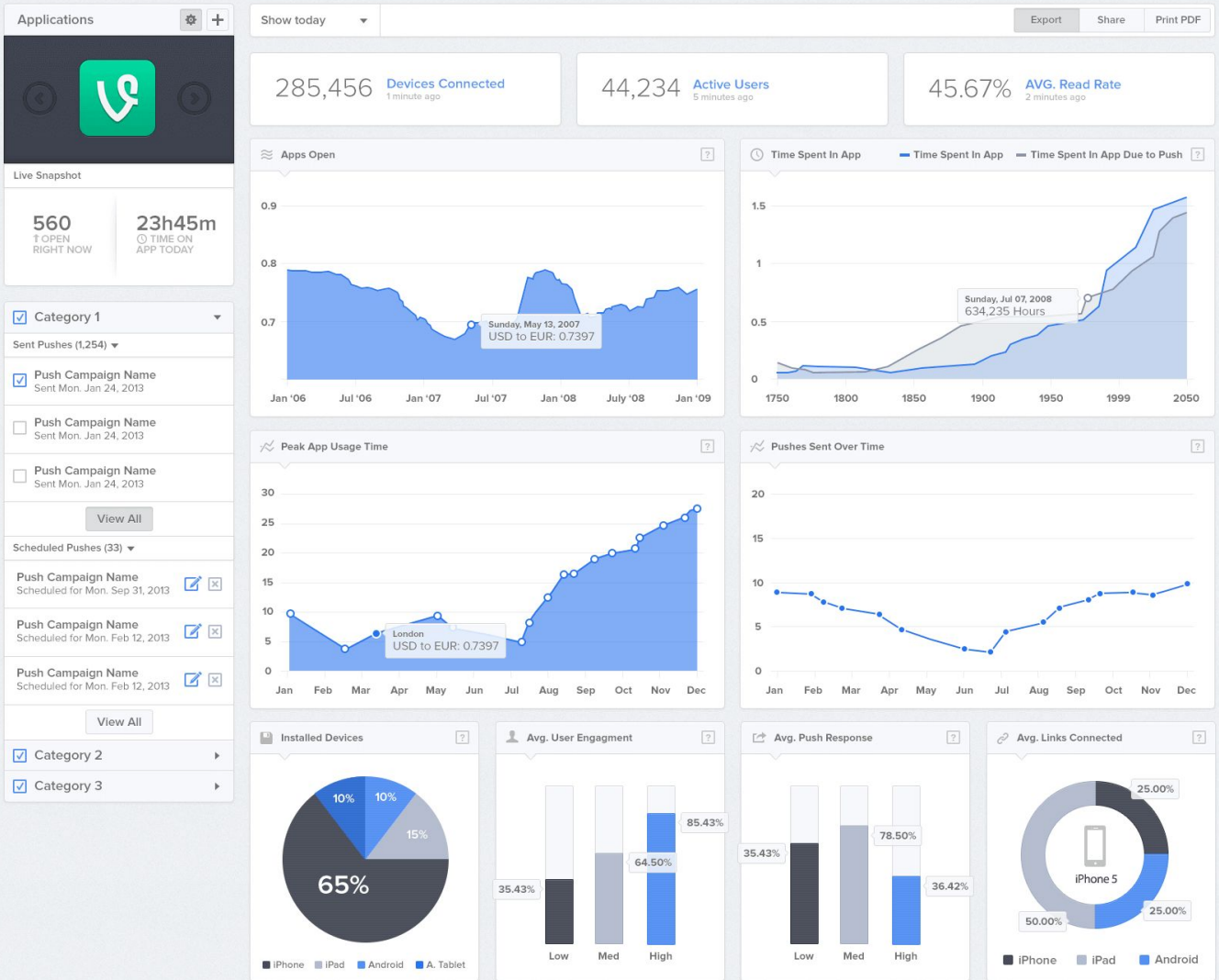
5. Misc

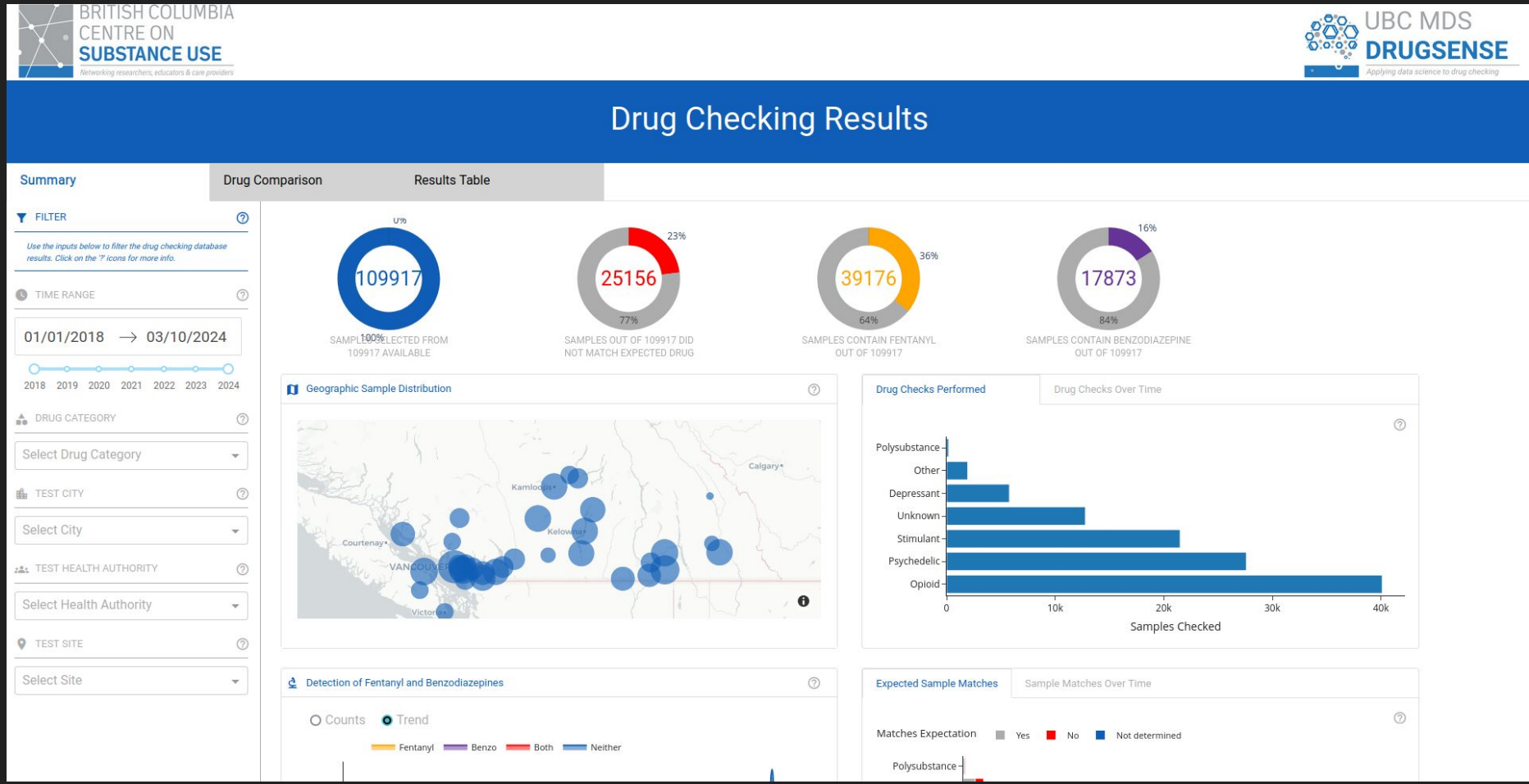
1. Use style sheets with premade css templates
    - Don’t waste time on reinventing the wheel

2. Match layout and behavior with end user expectations
    - Reduce cognitive load by avoiding surprising use cases
        - E.g. don’t use a slider to choose between categories or expect the user to start reading the app from the bottom of the page

3. Include contact info, link to source code/data, last updated timestamp

A few effective dashboards


Applications
Live Snapshot
560
OPEN RIGHT NOW
23h45m
TIME ON APP TODAY
Category 1
Sent Pushes (1,254)
Push Campaign Name
Sent Mon. Jan 24, 2013
Push Campaign Name
Sent Mon. Jan 24, 2013
Push Campaign Name
Sent Mon. Jan 24, 2013
View All
Scheduled Pushes (33)
Push Campaign Name
Scheduled for Mon. Sep 31, 2013
Push Campaign Name
Scheduled for Mon. Feb 12, 2013
Push Campaign Name
Scheduled for Mon. Feb 12, 2013
View All
Category 2
Category 3
Show today
Export
Share
Print PDF
285,456
Devices Connected
1 minute ago
44,234
Active Users
5 minutes ago
45.67%
AVG. Read Rate
2 minutes ago
Apps Open
Sunday, May 13, 2007
USD to EUR: 0.7397
Jan '06
Jul '06
Jan '07
Jul '07
Jan '08
July '08
Jan '09
Time Spent In App
Time Spent In App
Time Spent In App Due to Push
Sunday, Jul 07, 2008
634,235 Hours
1750
1800
1850
1900
1950
1999
2050
Peak App Usage Time
London
USD to EUR: 0.7397
Pushes Sent Over Time
Installed Devices
10%
10%
15%
65%
iPhone
iPad
Android
A. Tablet
Avg. User Engagment
35.43%
64.50%
85.43%
Low
Med
High
Avg. Push Response
35.43%
78.50%
36.42%
Low
Med
High
Avg. Links Connected
25.00%
iPhone 5
50.00%
25.00%
iPhone
iPad
Android



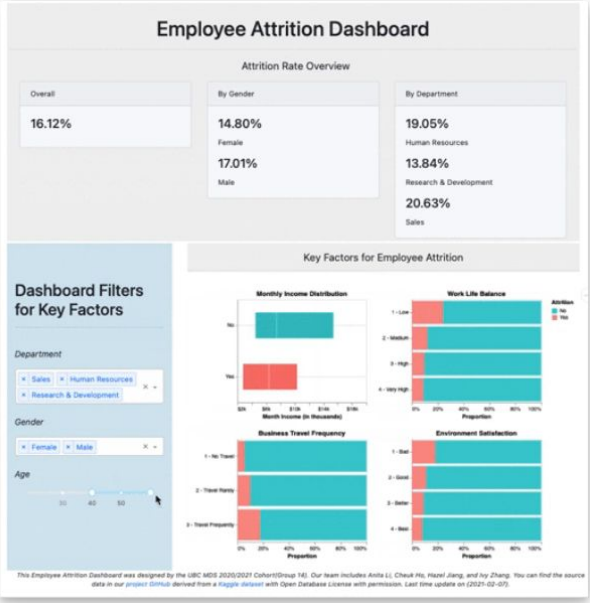
https://bccsu-drugsense.onrender.com/

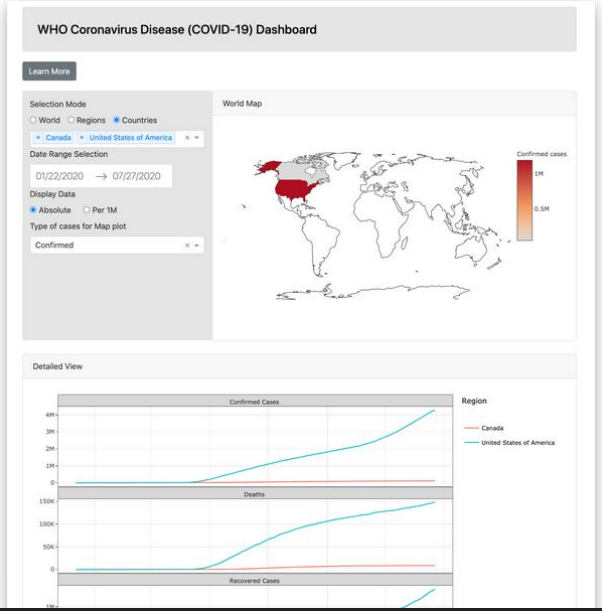
FiveThreeTwo

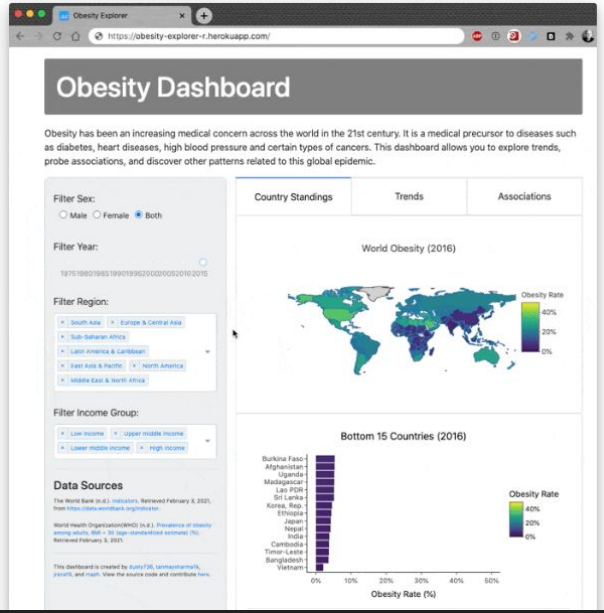
Dashboard Showcase

Hover over a thumbnail to read more

Click here to select tags. The (#) is the count of dashboards.







https://five32-dashboard-showcase.onrender.com