flexdashboard for Prototyping and Profit

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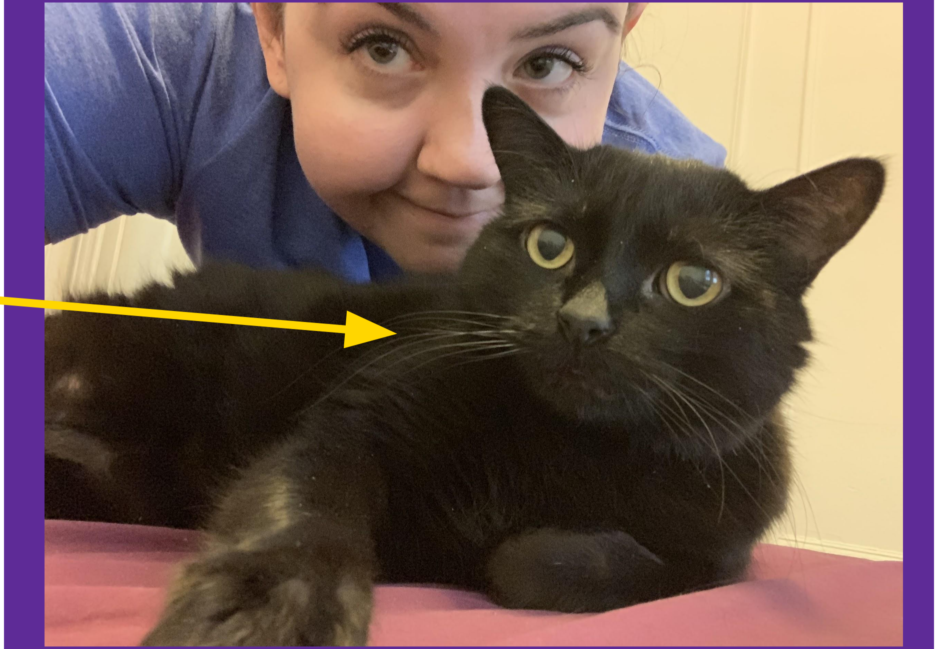
I’m Kaelen!!!!!
(That’s Scully)

- Recently became a data scientist on the microservices DS/DE team @ Medidata Solutions
- MS in Biostatistics
- Loves R, data, aliens, and podcasts



flexdashboard for Prototyping & Profit

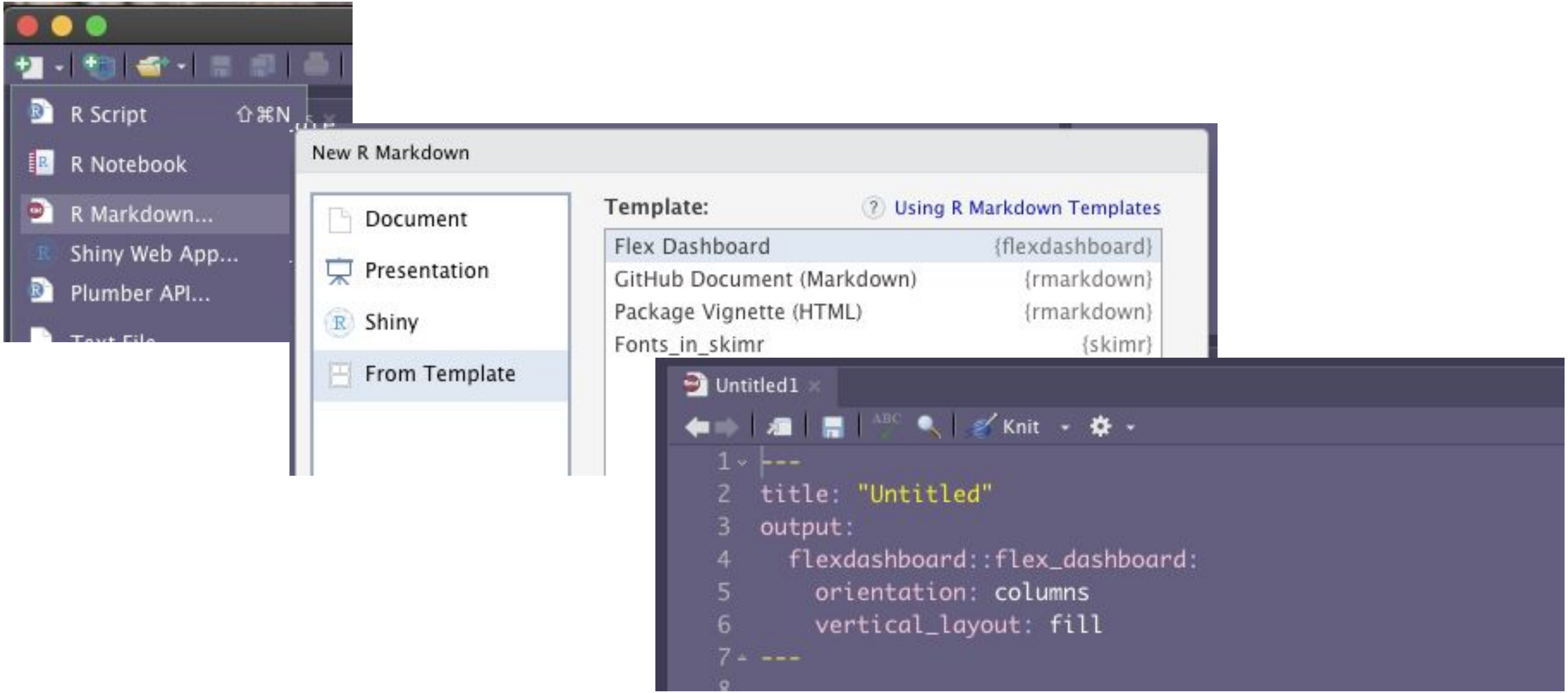
- flexdashboard basics
- flexdashboard for prototyping
- flexdasbhoard for profit
- Extentions

flexdasboard basics

What is flexdashboard?

- An extension of RMarkdown that allows you to use a RMarkdown document to create an interactive dashboard
- Like many RStudio products (literally bless them 🙌) it has an amazing website of documentation that shows you:
    - How to set up a flexdashboard
    - Layouts
    - How to integrate Shiny
    - Example flexdashboards
- HTMLwidgets are supported!
    - Can use DT::datatable, Leaflet maps, Plotly plots, and more!

Creating a flexdashboard



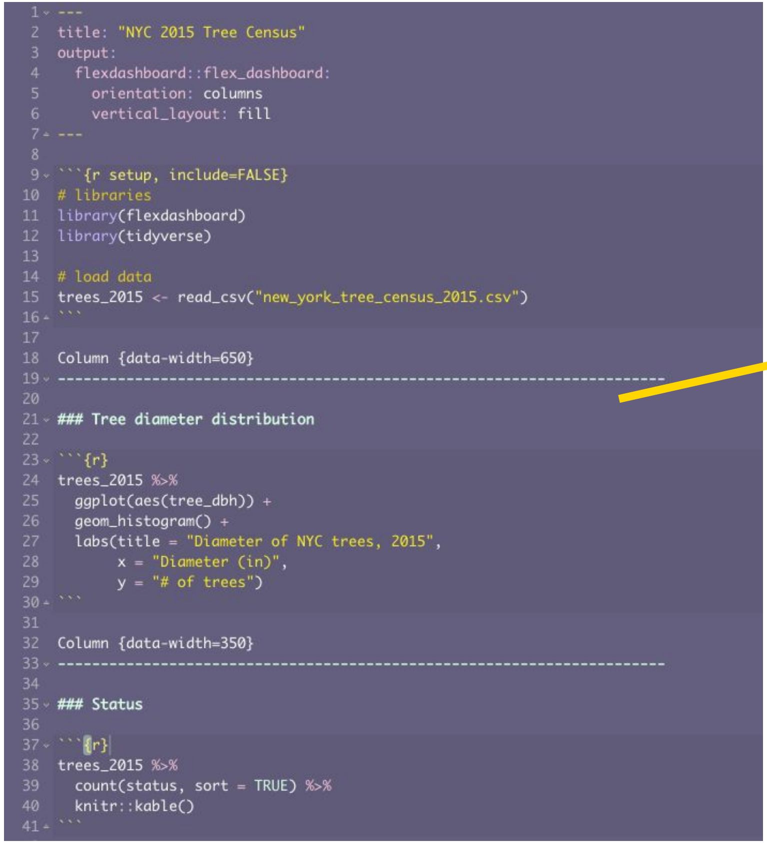
New R Markdown

Template:

Flex Dashboard	{flexdashboard}
GitHub Document (Markdown)	{rmarkdown}
Package Vignette (HTML)	{rmarkdown}
Fonts_in_skimr	{skimr}

```
---
title: "Untitled"
output:
  flexdashboard::flex_dashboard:
    orientation: columns
    vertical_layout: fill
---
```

Write your RMarkdown document, then knit…



~~~
---
title: "NYC 2015 Tree Census"
output:
  flexdashboard::flex_dashboard:
    orientation: columns
    vertical_layout: fill
---

```{r setup, include=FALSE}
# libraries
library(flexdashboard)
library(tidyverse)

# load data
trees_2015 <- read_csv("new_york_tree_census_2015.csv")
~~~

Column {data-width=650}

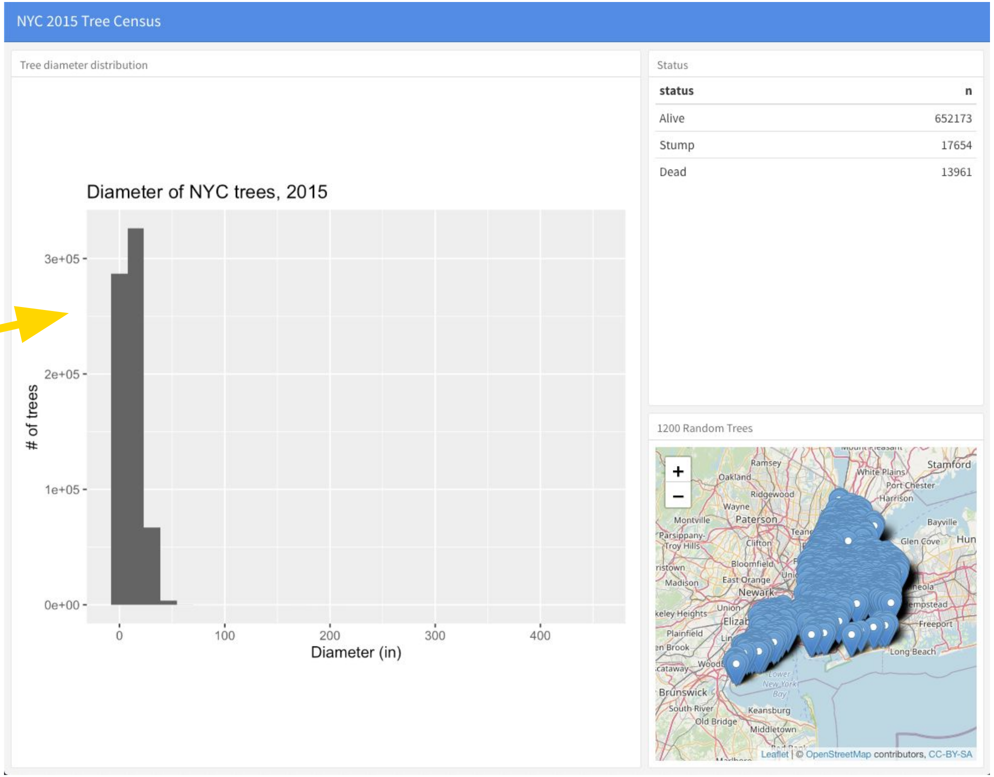
Tree diameter distribution

```{r}
trees_2015 %>%
  ggplot(aes(tree_dbh)) +
  geom_histogram() +
  labs(title = "Diameter of NYC trees, 2015",
       x = "Diameter (in)",
       y = "# of trees")
```

Column {data-width=350}

Status

```{r}
trees_2015 %>%
  count(status, sort = TRUE) %>%
  knitr::kable()
```
```



NYC 2015 Tree Census

Tree diameter distribution

Status

status	n
Alive	652173
Stump	17654
Dead	13961

1200 Random Trees
```

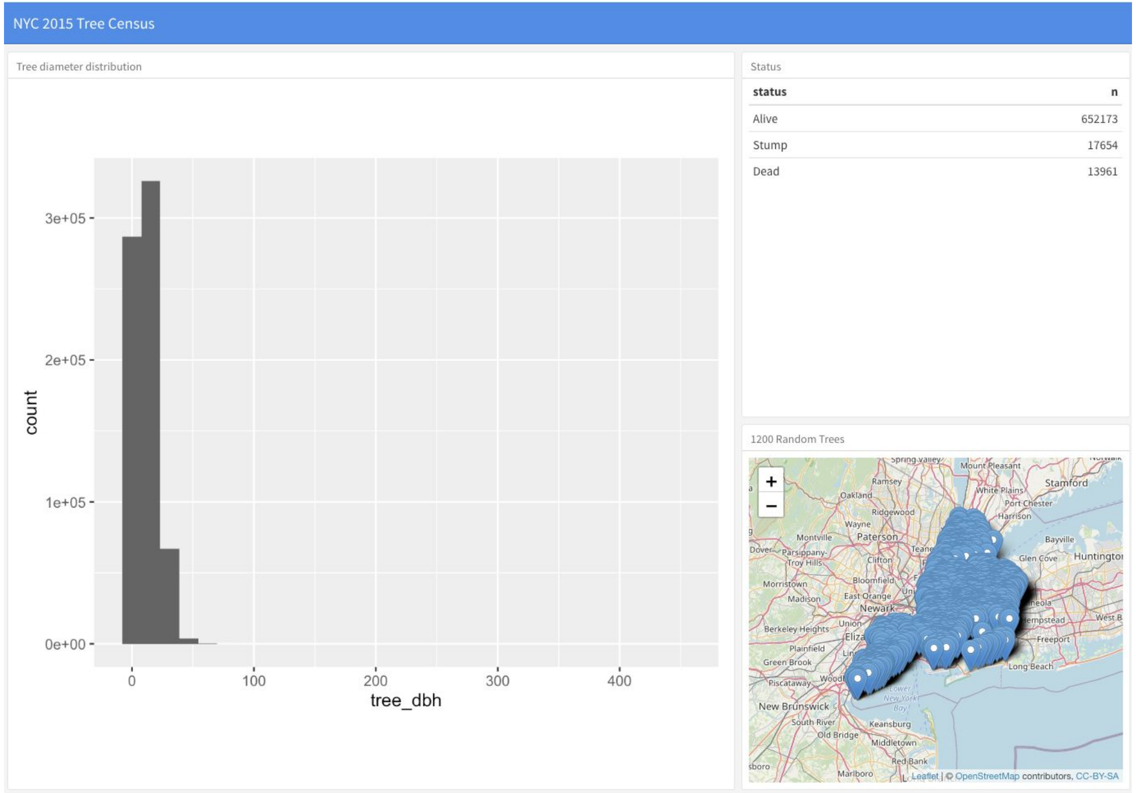
# flexdashboard for prototyping

# Let’s ~disrupt~ the Tree Industry.

- NYC Tree Census 2015 dataset
    - I downloaded directly from Kaggle and then used the NYC Open data portal as a reference (the originators of the data)
- Boss wants to get an overview of NYC’s trees so we can understand our competition (the NYC Parks department)

# V0 of the dashboard

- In the nyc_tree_census_2015_dash_1.Rmd file
- Static ggplot of tree diameter distribution
- Static table of tree status
- Leaflet map of 1200 random NYC trees
- Standard layout (that comes with the template flexdashboard)



NYC 2015 Tree Census

Tree diameter distribution

Status

| status | n |
|---|---|
| Alive | 652173 |
| Stump | 17654 |
| Dead | 13961 |

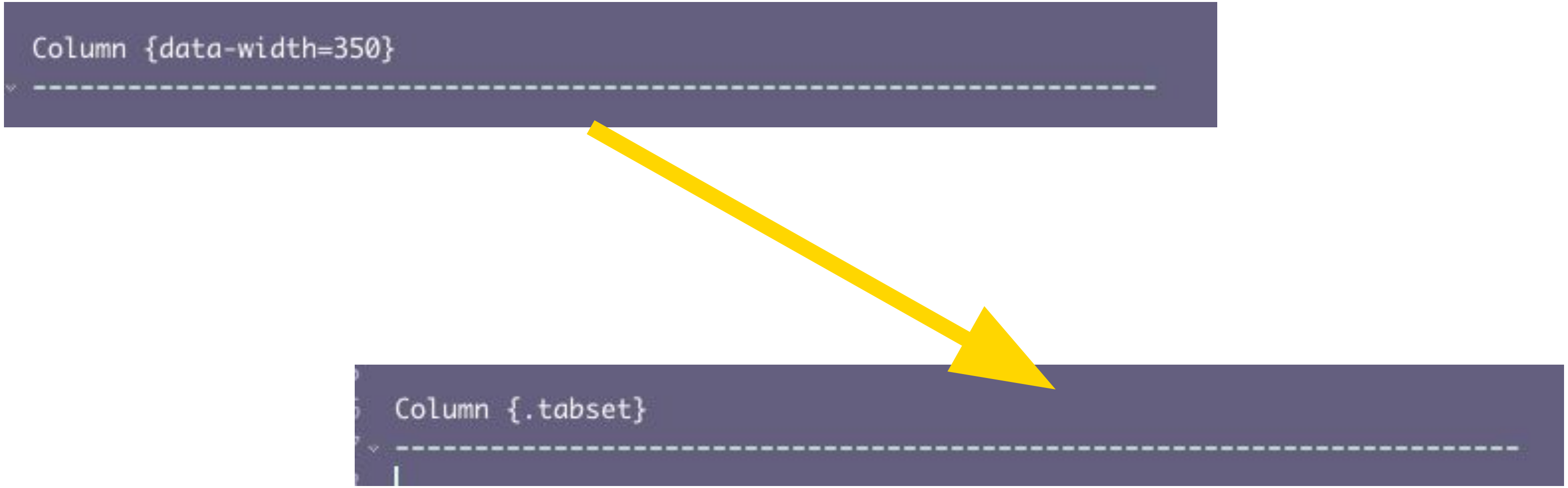
1200 Random Trees

# Changes are straightforward...

- Add context and information for users the same way you add information in an RMarkdown document
  - Write text outside the code blocks
  - Can include links, images, anything usually available in Markdown
- Use DT::datatable() to make an interactive, searchable table
- Use plotly::ggplotly() to make an interactive plot
- Change the layout
  - The documentation provides a lot of example layouts

# V0.1 of the dashboard

- Change to tabset columns on the right, with one “showcase” graphic on the left (in this case the map)
    - Changing the layout involves editing the row/column code that controls the layout, so:

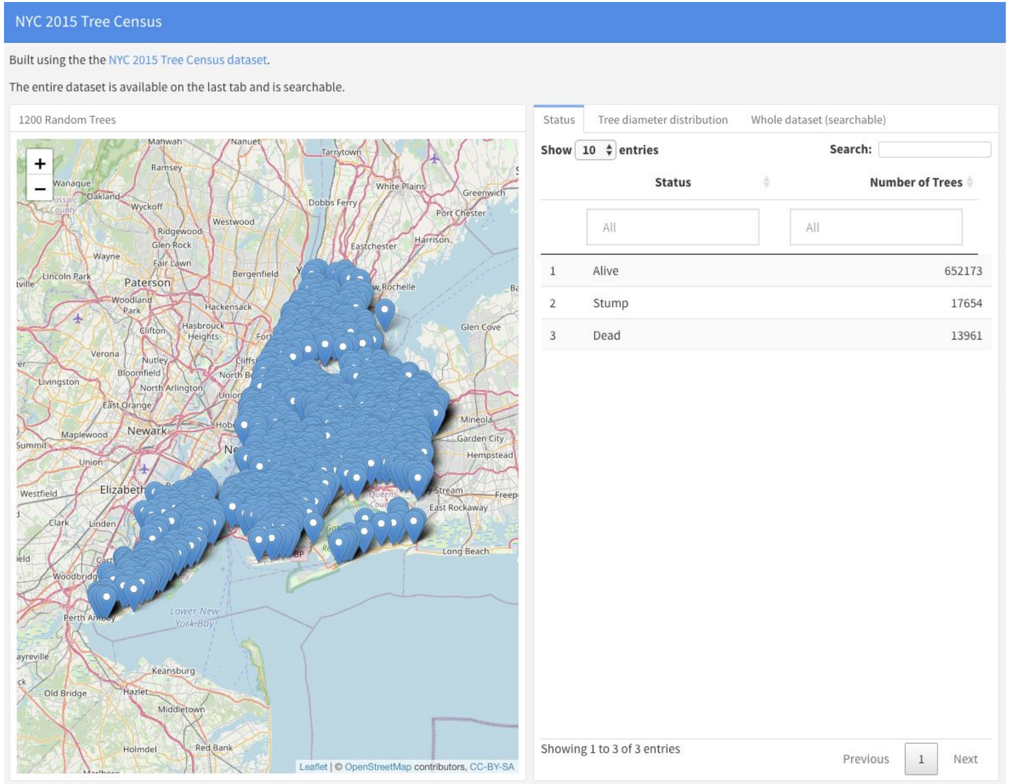


```
Column {data-width=350}
-----------------------------------------------------------------------
```

```
Column {.tabset}
-----------------------------------------------------------------------
```

V0.1 of the dashboard

- In the nyc_tree_census_2015_dash_2.Rmd file
- Added some context and a link to the dataset at the top of the app
- Make the status table searchable and sortable using DT::datatable()
- Make the diameter graph interactive using plotly::ggplotly()
- Added in the “entire dataset” and made it searchable



NYC 2015 Tree Census

Built using the the NYC 2015 Tree Census dataset.

The entire dataset is available on the last tab and is searchable.

1200 Random Trees

Status | Tree diameter distribution | Whole dataset (searchable)

Show 10 entries   Search:

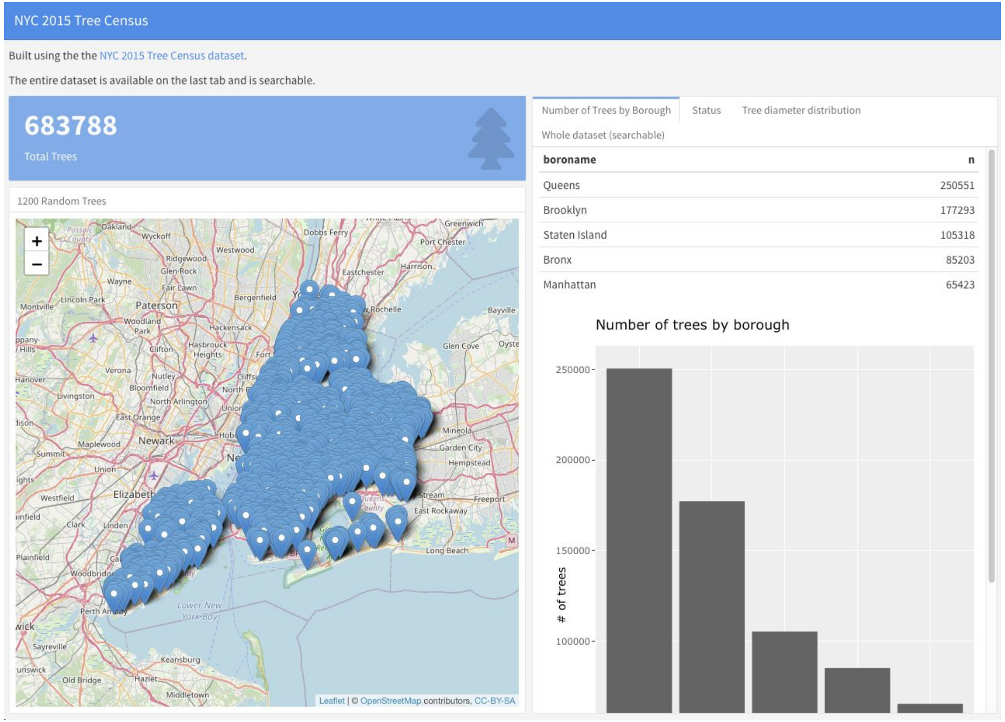
	Status	Number of Trees
	All	All
1	Alive	652173
2	Stump	17654
3	Dead	13961

Showing 1 to 3 of 3 entries

Previous 1 Next

V0.2 of the dashboard

- In the nyc_tree_census_2015_dash_3.Rmd file
- Added a valuebox showing the total number of trees
- Added a tab with Number of Trees by Borough with both a static table and a graph on the same tab



NYC 2015 Tree Census

Built using the the NYC 2015 Tree Census dataset.

The entire dataset is available on the last tab and is searchable.

683788

Total Trees

1200 Random Trees

Number of Trees by Borough
Status
Tree diameter distribution
Paterson
Newark
Elizabeth
Lower New York Bay
Long Beach
East Rockaway
Glen Cove
Port Chester
Leaflet | © OpenStreetMap contributors, CC-BY-SA

Whole dataset (searchable)

boroname	n
Queens	250551
Brooklyn	177293
Staten Island	105318
Bronx	85203
Manhattan	65423

Number of trees by borough

And so on!

- This dashboard is getting unwieldy (and sort of ugly in my opinion) but you can keep iterating and adding things as the stakeholder desires
- **In my experience, stakeholders don't always know what they actually want**
  - **Flexdashboard can allow you to build and show new features to them quickly**

flexdashboard for profit

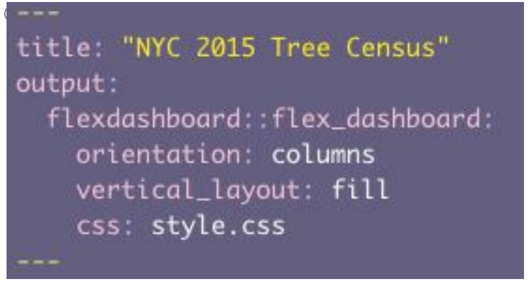
Profit???

- Probably some money, eventually
- But the best profit of all???? You know how to use another cool new thing in R
    - ~*~ the real profit is the stuff we learned along the way ~*~

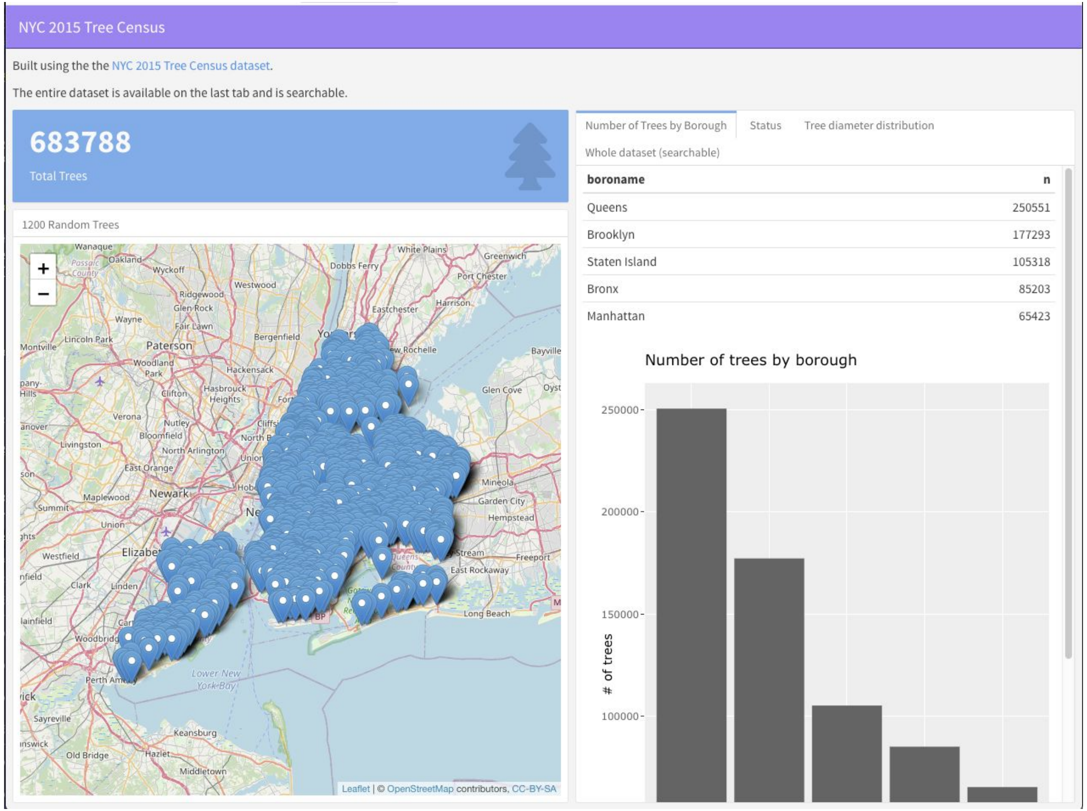
Extensions

flexdashboard and CSS

- Add custom styling to your flexdashboard using CSS
  - Created a style.css text file
  - Adjusted the .navbar-inverse property to make it purple
  - Added the css option to my yaml header:



```
---
title: "NYC 2015 Tree Census"
output:
  flexdashboard::flex_dashboard:
    orientation: columns
    vertical_layout: fill
    css: style.css
---
```



NYC 2015 Tree Census

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Total Trees

1200 Random Trees

Number of Trees by Borough | Status | Tree diameter distribution

Whole dataset (searchable)

boroname	n
Queens	250551
Brooklyn	177293
Staten Island	105318
Bronx	85203
Manhattan	65423

Number of trees by borough

flexdashboard and Shiny

- You can combine flexdashboard with more traditional Shiny code to make your dashboards even more advanced
  - Add inputs to help personalize outputs
  - Modularize
- Detailed in documentation

When should I convert to a Shiny app?

- If you anticipate a high number of users (enterprise-scale), you may want an actual Shiny app
  - And will want to consider enterprise Shiny app needs, such as number of users at a given time.
  - This is another talk entirely!

Thank you!!

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Code and slides @
bit.ly/klm-rladiesnyc-june2020