

Creating Interactive Visualizations in



...

GW Libraries Workshop
Dan Kerchner ~ March 25, 2022

go.gwu.edu/rshinyworkshop

Shiny is a **web application framework** for R

Why R Shiny?

- You can add interactivity to R data visualizations you've built using *any* R libraries
- There are R visualization libraries which add interactivity when deployed on R Shiny
 - learnr
 - flexdashboard
 - ...

Goals

A photograph of a beach volleyball game in progress. The scene is set on a sandy beach with tall grass in the foreground. A volleyball net is visible in the middle ground. Several players are on the court; one player in a yellow shirt is jumping towards the net. The sky is blue with some clouds. The word "Goals" is overlaid in a large, bold, yellow font in the center of the image.

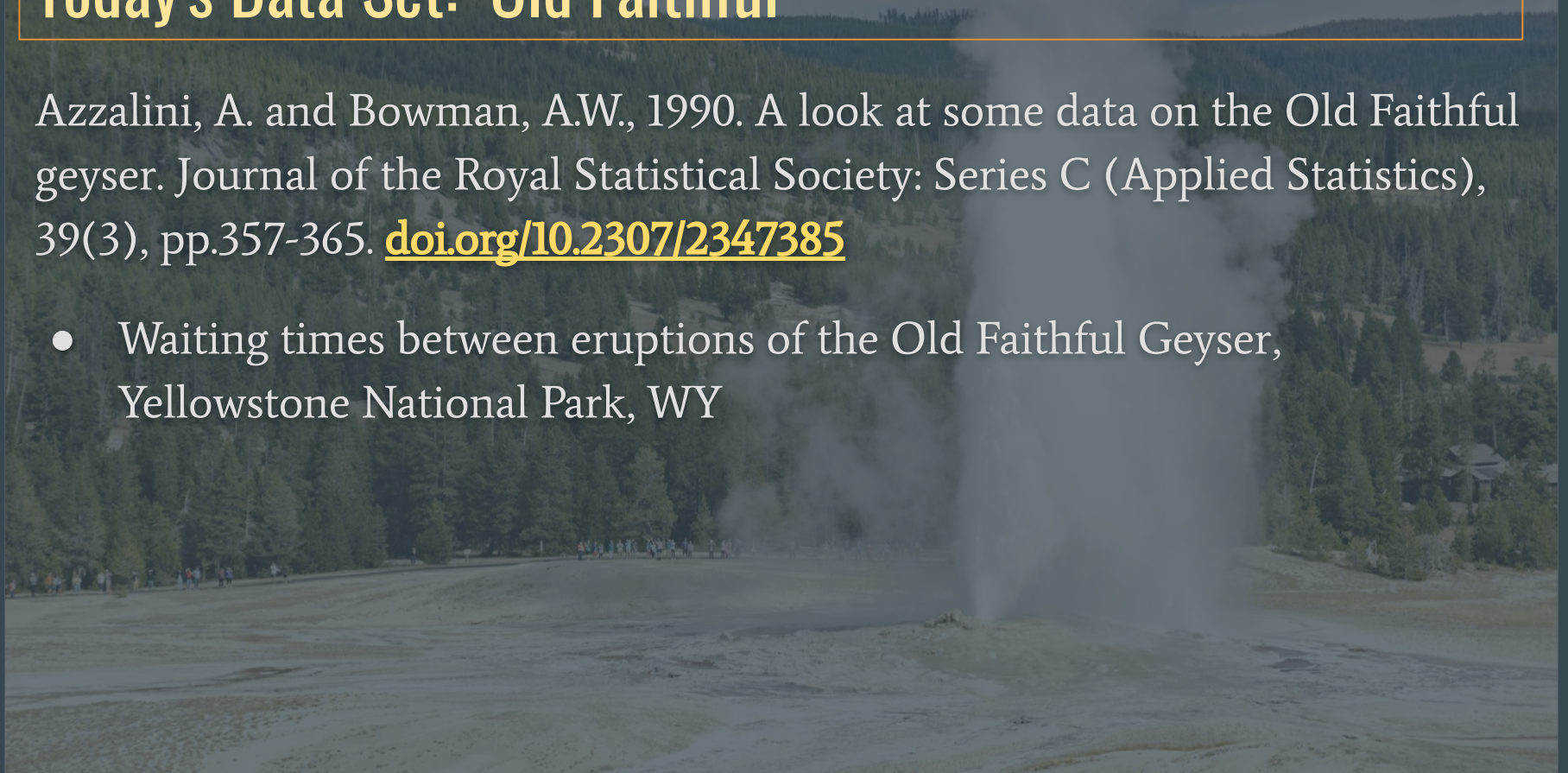
Today's Goal

- Create 2 Shiny apps:
 - Old Faithful
 - Framingham study data
- Publish a Shiny app in shinyapps.io

Today's Data Set: Old Faithful

Azzalini, A. and Bowman, A.W., 1990. A look at some data on the Old Faithful geyser. *Journal of the Royal Statistical Society: Series C (Applied Statistics)*, 39(3), pp.357-365. doi.org/10.2307/2347385

- Waiting times between eruptions of the Old Faithful Geyser, Yellowstone National Park, WY



Today's Data Set: Framingham Heart Study

- [framinghamheartstudy.org](https://www.framinghamheartstudy.org)
- Long-term prospective study of the etiology of cardiovascular disease among a population of subjects in Framingham, MA
- Began in 1948 with 5,209 subjects
- Is the source of the term "risk factor"
- Over 3,000 peer-reviewed papers published based on this study
- Participants were each followed for a total of 24 years for cardiovascular events (heart attack, stroke, death, etc.)

Structure of an R Shiny app

```
library(shiny)
ui <- fluidPage(
  # Comma-separated list of components
  # collecting input from the user
  # using output in rendering
)
```

← FORM

shiny.rstudio.com/articles/layout-guide.html

```
server <- function(input, output, session) {
  # server logic
  # using parts of input
  # and setting parts of output
}
```

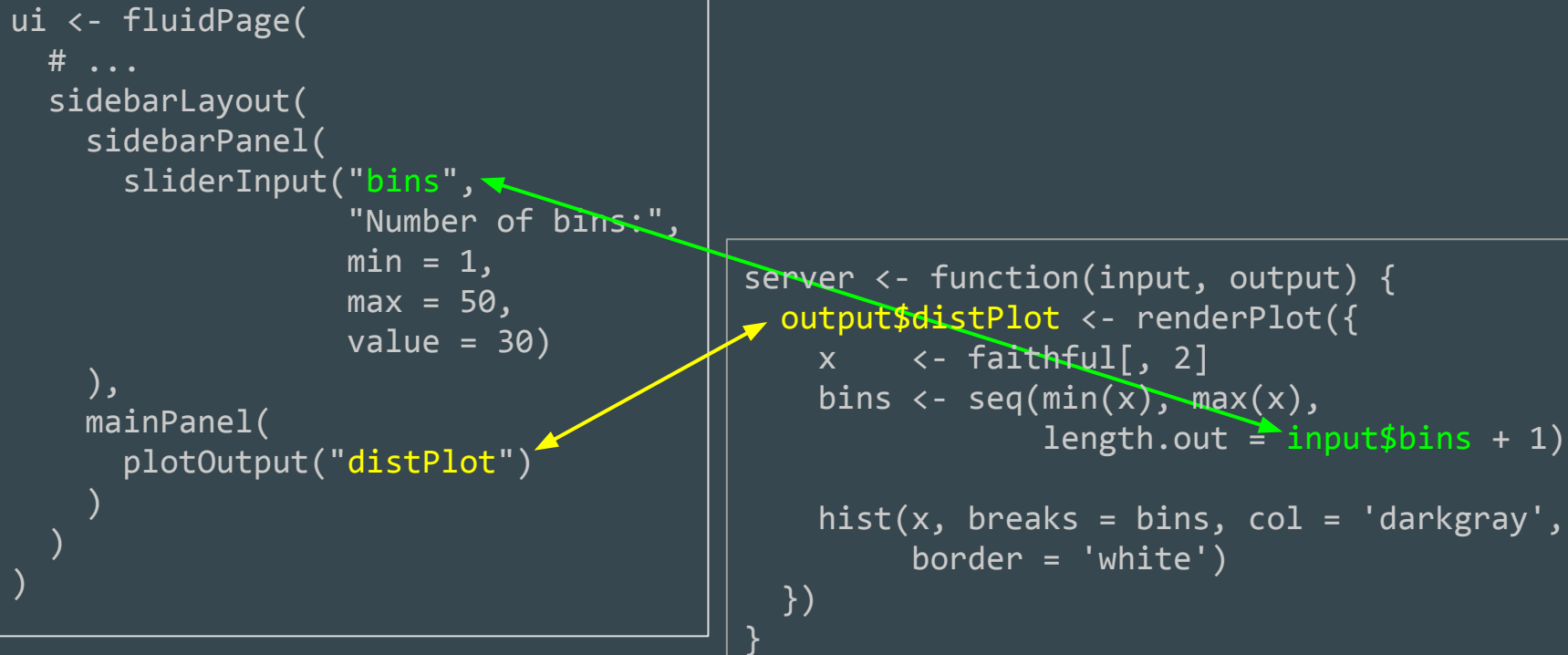
← FUNCTION

```
# Run the app - ties together ui and server
shinyApp(ui, server)
```


Connecting **inputs** and **outputs**

```
ui <- fluidPage(  
  # ...  
  sidebarLayout(  
    sidebarPanel(  
      sliderInput("bins",  
        "Number of bins:",  
        min = 1,  
        max = 50,  
        value = 30)  
    ),  
    mainPanel(  
      plotOutput("distPlot")  
    )  
  )  
)
```

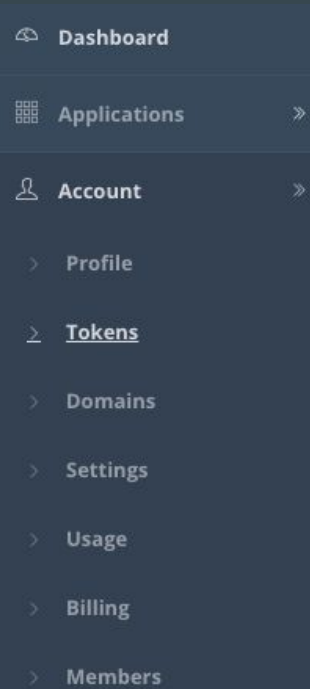
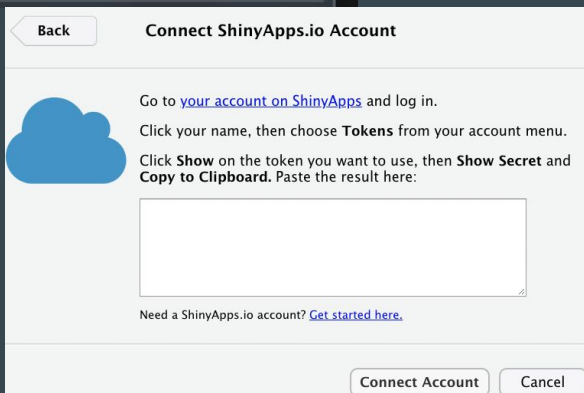
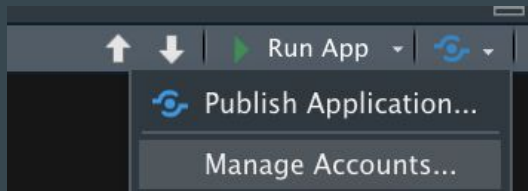
```
server <- function(input, output) {  
  output$distPlot <- renderPlot({  
    x <- faithful[, 2]  
    bins <- seq(min(x), max(x),  
      length.out = input$bins + 1)  
  
    hist(x, breaks = bins, col = 'darkgray',  
      border = 'white')  
  })  
}
```



Publishing your app to shinyapps.io

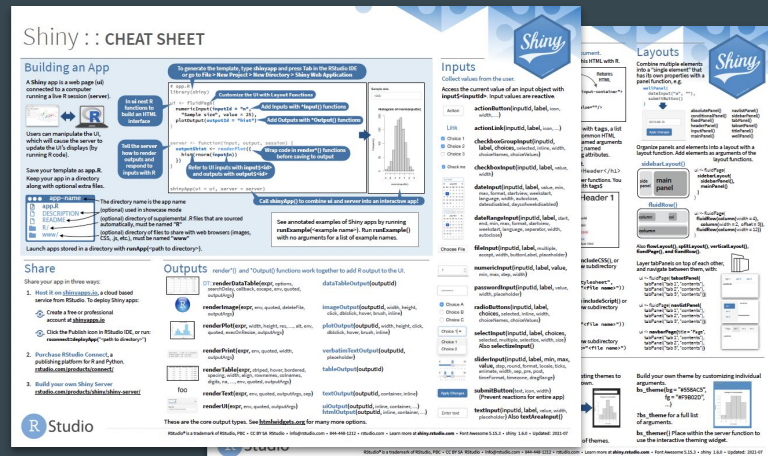
- Create account
- Create a token
- Copy the token (*with secret*) into RStudio "Connect Account"
- Publish your application
- View at:

youraccount.shinyapps.io/yourapp



Shiny Resources

- Tutorial : shiny.rstudio.com/tutorial/
- Online book: mastering-shiny.org
- Gallery : shiny.rstudio.com/gallery/
- Cheat sheet : shiny.rstudio.com/articles/cheatsheet.html
- Dashboards with RShiny: shiny.rstudio.com/articles/dashboards.html
- LinkedIn Learning
- Library Resources



Interactive Data Visualization - in R, beyond Shiny

- Libraries

- plotly, d3heatmap, heatmaply, leaflet

- Resources

- htmlwidgets.org - htmlwidgets for R
- r-graph-gallery.com/interactive-charts.html
- rstudio.com/resources/cheatsheets
- ggplot2-book.org
- rkabacoff.github.io/datavis
- worldbank.github.io/r-econ-visual-library

Interactive Data Visualization - Not in R

- Tableau
- Power BI
- Python libraries
- ...

Statistics+R help @ GW

R-Statistics Appointments:

academiccommons.gwu.edu/data-consulting

Also...

Appointments with me:

calendly.com/kerchner

Coding consultations (Python, R, git, etc.):

calendly.com/gwul-coding/

Thanks!

Dan Kerchner

kerchner@gwu.edu