

Creating Interactive Data Visualizations with



GW Libraries Workshop
Dan Kerchner ~ November 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 soccer game on a dirt field. A goalpost is visible on the right side of the field. Several players are on the field, including one in the foreground who is jumping or kicking the ball. The background shows a line of trees under a blue sky with some clouds. The word "Goals" is overlaid in the center of the image in a large, white, serif font.

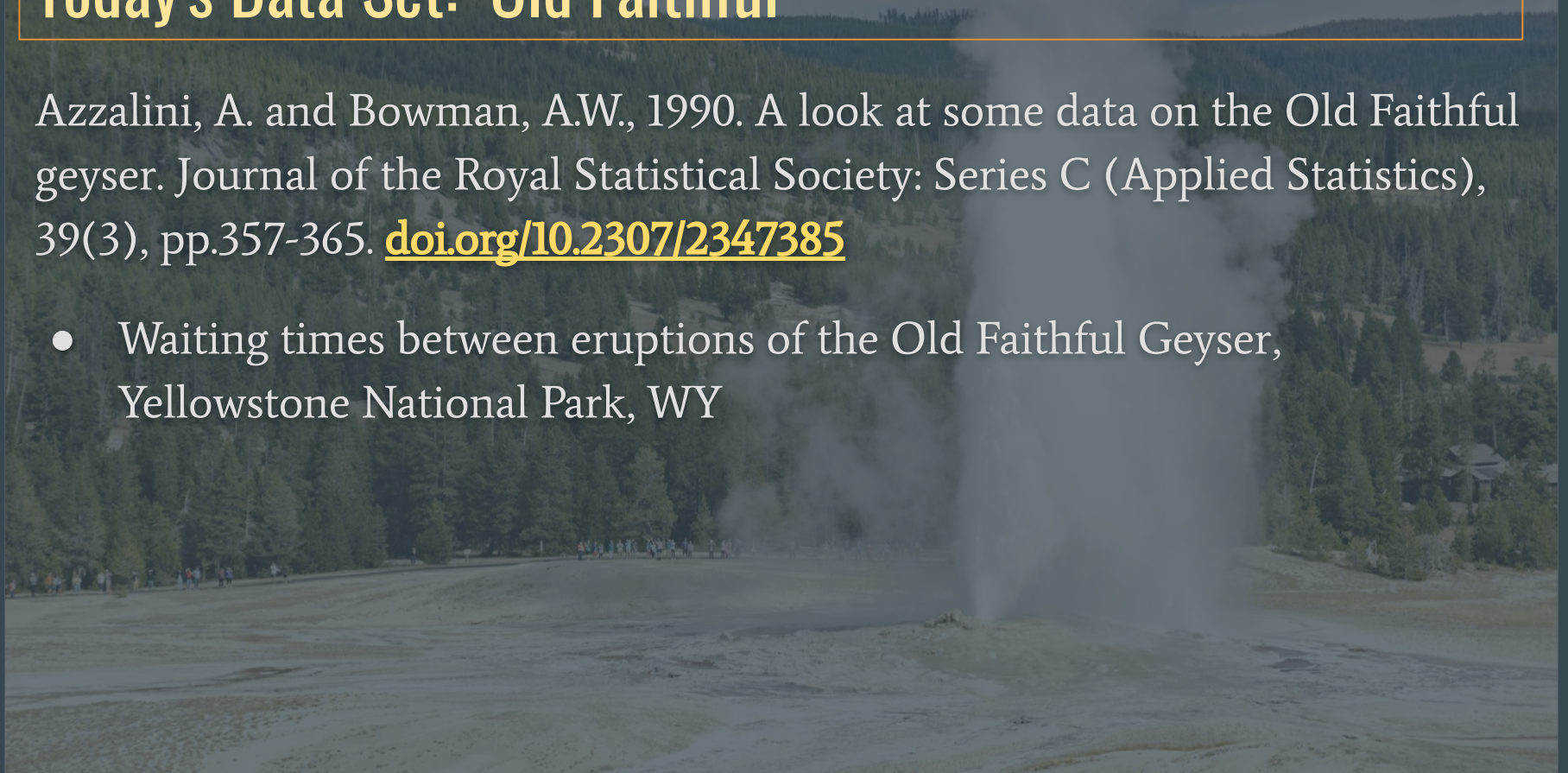
Today's Goal

- 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
}
```

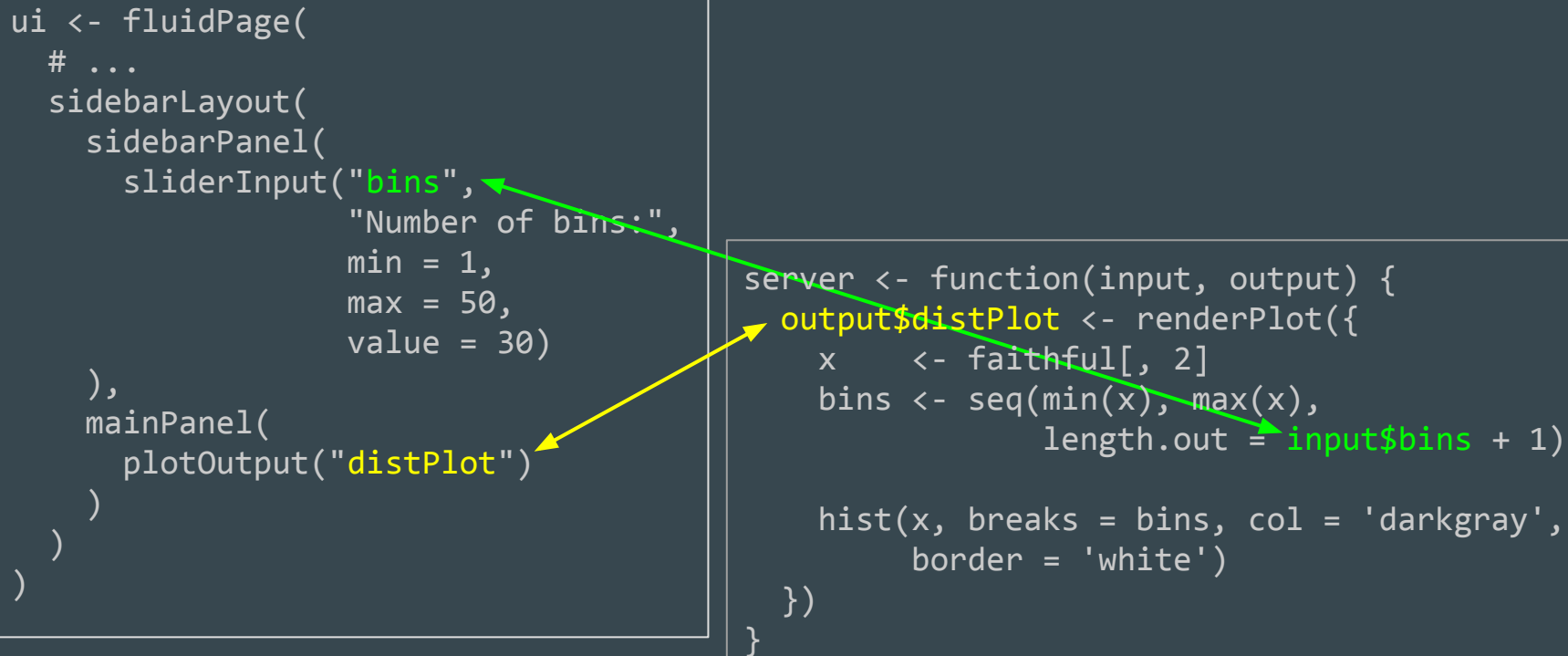
← FUNCTION

```
# 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")  
    )  
  )  
)
```

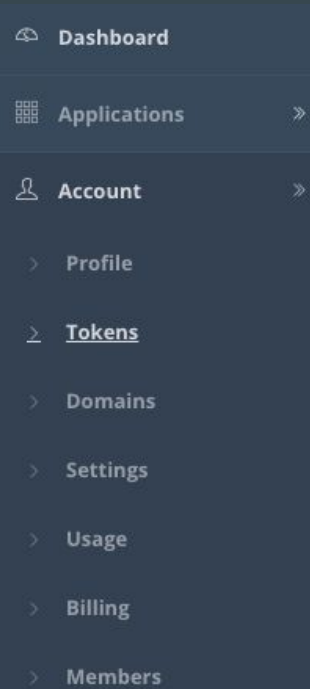
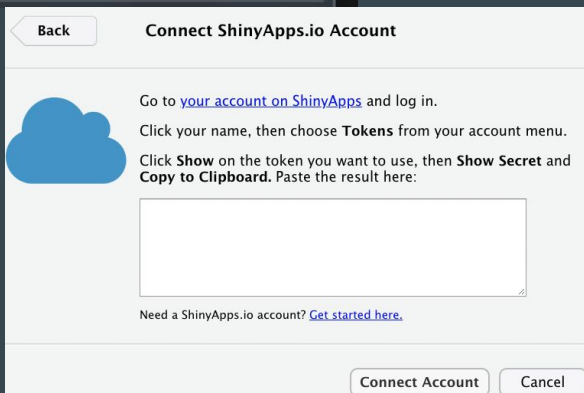
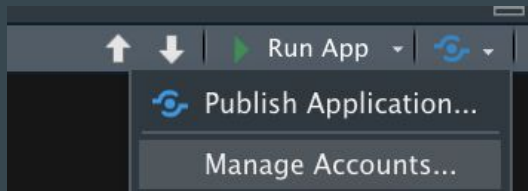
```
server <- function(input, output) {  
  output$distPlot <- renderPlot({  
    x <- faithful[, 2]  
    bins <- seq(min(x), max(x),  
      length.out = input$bins + 1)  
  
    hist(x, breaks = bins, col = 'darkgray',  
      border = 'white')  
  })  
}
```



Publishing your app to shinyapps.io

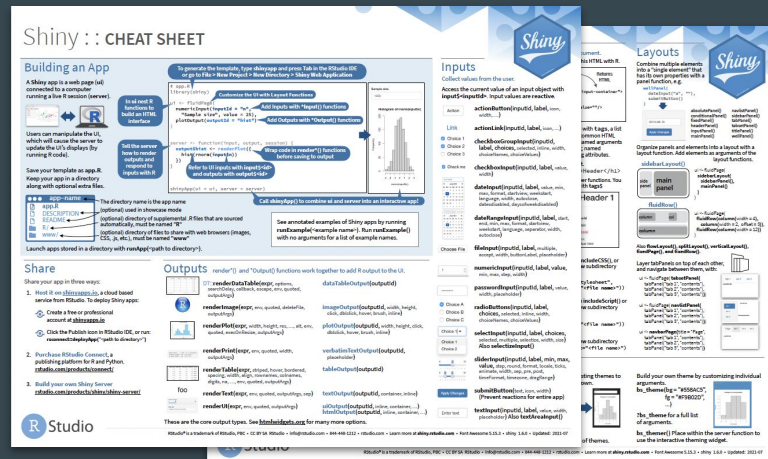
- Create account
- Create a token
- Copy the token (*with secret*) into RStudio "Connect Account"
- Publish your application
- View at:

youraccount.shinyapps.io/yourapp



Shiny Resources

- Reference: shiny.rstudio.com/reference/shiny/latest
- 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!

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