4.8 Introduction to R: Shiny

Julia Gallucci

Data Science Institute, University of Toronto

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Overview

- Creating your first Shiny app (Wickham, 2021, Chapter 1)

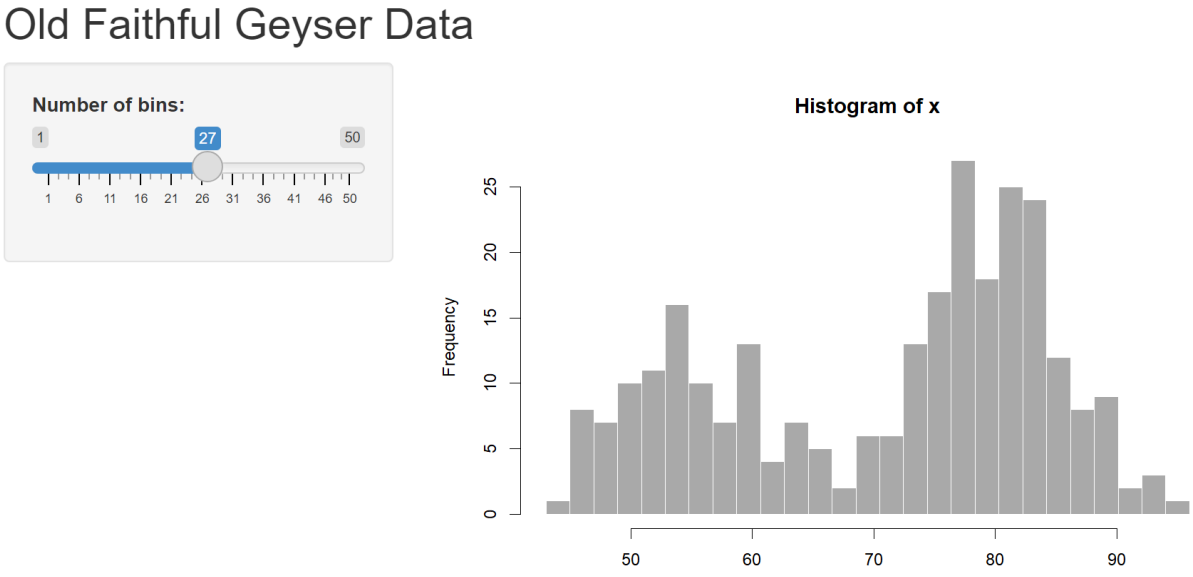
What you need

Packages:

- `library(shiny)`
- `library(ggplot2)`

Creating an App Directory and File

- File > New File > Shiny Web App > Single File > Create
- Hit Run App. What happens?



Note where it says "Listening on http://127.0.0.1:. This is the URL where your app can be found, which is local at this point.

App Layout

```
library(shiny)

ui <- fluidPage(
<Define UI for application to draw
graphs etc>
)

server <- function(input, output) {
<Define the server logic necessary for
the graphs above>
}

# Run the application
shinyApp(ui = ui, server = server)
```

A Basic App

```
ui <- fluidPage(
  "Hello, world!"
  )

server <- function(input, output,
session) {
}

shinyApp(ui, server)
```

Adding UI Controls

```
ui <- fluidPage(
  selectInput("dataset",
              label = "Dataset",
choices = ls("package:datasets")),
  verbatimTextOutput("summary"),
  tableOutput("table")
)
```

- fluidPage specifies the basic visual layout of the page
- selectInput is what makes it so the user can interact with the app by providing a value, for example in a dropdown menu.
- verbatimTextOutput and tableOutput specify where to put the outputs

Adding Behavior

Shiny apps use reactive programming, which tells the app how to perform an action but does not instruct it to perform the action.

Adding Behavior

```
server <- function(input, output,
session) {
  output$summary <- renderPrint({
    dataset <- get(input$dataset,
                   "package:datasets")
    summary(dataset)
  })
  output$table <- renderTable({
    dataset <- get(input$dataset,
                   "package:datasets")
      dataset
    })
  }
```

This tells the app how to construct the table and summary outputs. Note that verbatimTextOutput("summary") above matches output$summary, and tableOutput("table") above matches output$table. Each type of output has a different render function.

Reducing Duplication with Reactive Expressions

```
server <- function(input, output,
session) {
dataset <- reactive({ # reactive
expression is created
get(input$dataset, "package:datasets")
  })

  output$summary <- renderPrint({
summary(dataset()) #reactive expression
is called
  })

  output$table <- renderTable({
    dataset()
  })
}
```

Exercises

The following app is very similar to one you've seen earlier: Here, you select a dataset from a package (this time we're using the **ggplot2** package) and the app prints out a summary and plot of the data. It also follows good practice and makes use of reactive expressions to avoid redundancy of code. However there are three bugs in the code provided below. Can you find and fix them?

Exercises

```
datasets <- c("economics", "faithfuld",
"seals")
ui <- fluidPage(
selectInput("dataset", "Dataset",
choices = datasets),
  verbatimTextOutput("summary"),
  tableOutput("plot")
)
server <- function(input, output,
session) {
  dataset <- reactive({
get(input$dataset, "package:ggplot2")
  })
  output$summmry <- renderPrint({
    summary(dataset())
  })
  output$plot <- renderPlot({
    plot(dataset)
  }, res = 96)
}
shinyApp(ui, server)
```

Questions?