CREATING INTERACTIVE SHINY APS IN R

R Shiny Apps allow authors to write small self contained applications to better display results/data in an interactive manner or to allow skeptical readers to perform live robustness tests.

Here is an example of what a finished App could look like. Click on the *March-June Pillar 1 Synthetic Controls* tab to perform your own live robustness analysis for this recent paper looking at the impact of *Track and Trace* on Covid-19 spread on the Isle of Wight.

Creating your own App

I will use the default Shiny App example to illustrate its features. You can follow along by simply selecting File - New File - Shiny Web App in R-studio. First, we will load the library.

```
library(shiny)
```

Every Shiny App has three components- the UI (user interface), the server, and the one that calls the application. The UI determines the *front end* of your app i.e. how it looks and feels to the user. In this case, it'll contain two tabs- one that displays a histogram, and the other that will just contain a piece of text.

```
# Define UI for application that draws a histogram and another which
# has some simple text. In the first tab, I include a sidebar with a slider
# allowing the user to change the number of bins in a histogram and then
# plot the histogram next to it.

ui <- fluidPage(
   tabsetPanel(

   tabPanel("Old Faithful Geyser Data",
   # Application title

   # Sidebar with a slider input for number of bins
   sidebarLayout(
      sidebarPanel(
        sliderInput("bins",
                    "Number of bins:",
                    min = 1,
                    max = 50,
                    value = 30)
      ),

      # Show a plot of the generated distribution
      mainPanel(
```

```
          plotOutput("distPlot")
        )
      )
    ),
  tabPanel("Another Tab",
         textOutput("text1")
    ) # end "About" tab
    ) # end tabsetPanel
)
```

The second component (i.e. the *server*) draws the dynamic items from user inputs. This section is a little more heavy on the R code. We take *bins* from the user input and define some plot object *distPlot* to pass back to the UI.

```
# Define server logic required to draw a histogram
server <- function(input, output) {

  output$distPlot <- renderPlot({
    # generate bins based on input$bins from ui.R
    x    <- faithful[, 2]
    bins <- seq(min(x), max(x), length.out = input$bins + 1)

    # draw the histogram with the specified number of bins
    hist(x, breaks = bins, col = 'darkgray', border = 'white')
  })

   # now make the text output
   output$text1 <- renderText({
      "This is another tab, SO exciting!"
   })
}
```

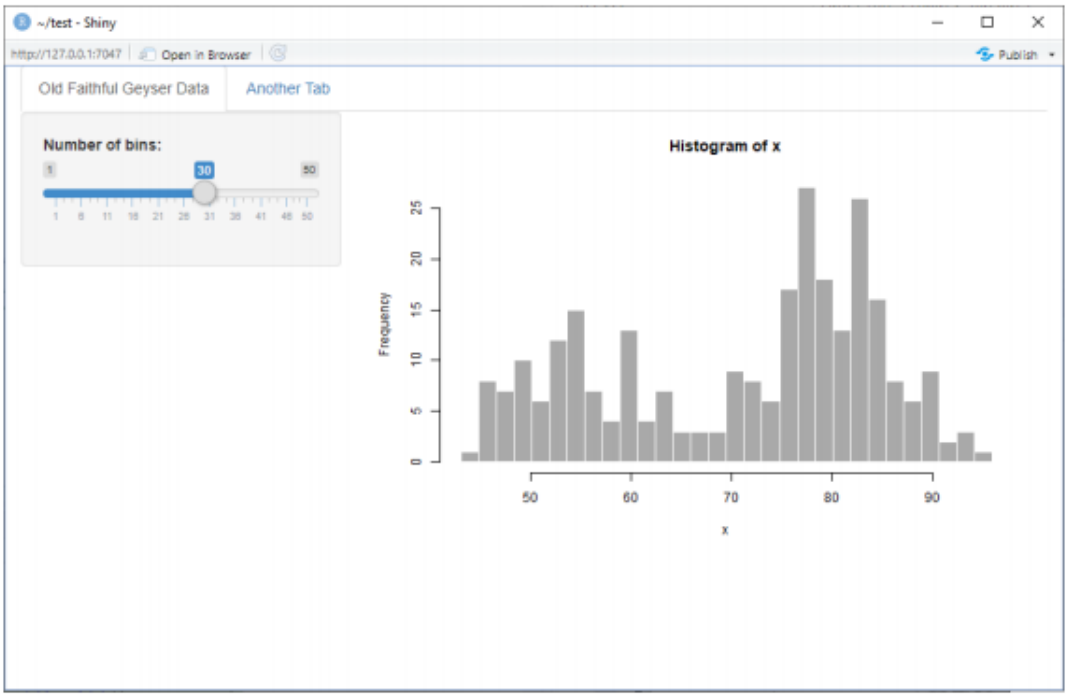
Finally, we can run the application by combining the front end and back end together.

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

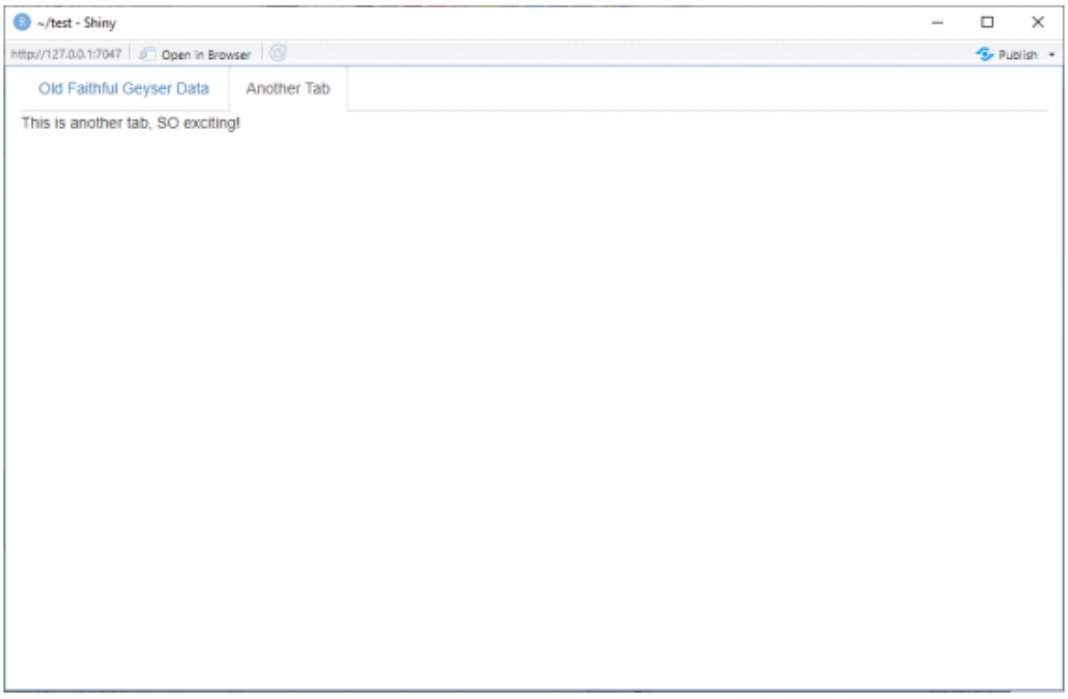
The finished app looks like this:

Figure 1: Screen shots of the Shiny App

(a) Main page



(b) Another tab



Once you've created your own Shiny App, you can publish it using shineyapps.io or another method described here.

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