

Data Visualization with R Shiny tutorial - Part 1

Ariane Ducellier

University of Washington - Fall 2025

What is Shiny?

- R is an package that enables building interactive web applications that can execute R code on the backend.
- What can you do with Shiny?
 - Host standalone applications on a webpage
 - Embed interactive charts in R Markdown documents.
 - Build dashboards.
 - Perform any R calculation and display the results on the webpage or dashboard.
 - Extend your Shiny applications with CSS themes, HTML widgets, and JavaScript actions.

Examples

Let us run several examples:

```
library(shiny)
```

```
runExample("08_html")
```

```
runExample("01_hello")
```

Examples

UI part:

```
ui <- fluidPage(  
  titlePanel(...),  
  sidebarLayout(  
    sidebarPanel(  
      sliderInput(  
        ...  
      )  
    ),  
    mainPanel(  
      plotOutput(outputId="distplot")  
    )  
  )  
)
```

Examples

Server part:

```
server <- function(input, output) {  
  output$distplot <- renderPlot({  
    ...  
  })  
}
```

Creation of Shiny app:

```
shinyApp(ui=ui, server=server)
```

R Markdown with interactive Shiny elements

```
Go to File >  
  New File >  
    R Markdown >  
      Shiny
```

Fill the document with the code from `tutorial_shiny_1.Rmd`.

Click on Run Document.

Minimal example

We need the files `ui.R` and `server.R` that are kept within the same folder. `ui.R` describe the user interface.

```
fluidPage(...,  
  title = NULL, theme = NULL, lang = NULL)
```

indicates that we are going to use a fluid page layout with rows containing columns.

```
titlePanel(title, windowTitle = title)
```

describes the title of the application.

Minimal example

```
sidebarLayout(sidebarPanel,  
              mainPanel,  
              position = c("left", "right"),  
              fluid = TRUE)
```

describe the general layout of the page, with:

- Inputs on the side (sidebarPanel),
- Outputs in the middle (mainPanel).

Minimal example

The panels contain input and output widgets:

```
textInput(inputId = "comment",  
          label,  
          value = "",  
          width = NULL,  
          placeholder = NULL)
```

```
textOutput(outputId = "textDisplay",  
           container = if (inline) span else div,  
           inline = FALSE)
```

`server.R` contains functions which use `inputId` as an input, and produce `outputId` as an output.

Minimal example

`server.R` contains a function describing how to use the input from `ui.R` to produce the outputs from `ui.R`.

```
function(input, output){  
  output$textDisplay = renderText({...input$comment...  
  })  
}
```

The `function(input, output)` contains the reactive components of the application. For example:

```
renderText(expr,  
            env = parent.frame(),  
            quoted = FALSE,  
            func = NULL)
```

Run the minimal example

Set the working directory to the folder that contains `ui.R` and `server.R`,

```
setwd("/Users/my_name/Documents/my_folder/")
```

load the Shiny package:

```
library(shiny)
```

and run the application:

```
runApp()
```

Various widgets

```
checkboxGroupInput(inputId, label, choices=NULL, ...)
```

```
checkboxInput(inputId, label, value=FALSE, ...)
```

```
dateInput(inputId, label, ...)
```

```
dateRangeInput(inputId, label, ...)
```

```
numericInput(inputId, label, value, ...)
```

```
radioButtons(inputId, label, choices=NULL, ...)
```

Various widgets

```
selectInput(inputId, label, choices, ...)
```

```
sliderInput(inputId, label, min, max, value, ...)
```

```
textInput(inputId, label, ...)
```

To see an example of how the widgets look like, type:

```
library(shiny)  
runGist(6571951)
```