

CSSS 569 Visualizing Data and Models

Lab 8: Interactive Visual Display with R + Shiny

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Basic structure of a Shiny app

- ▶ Four lines to build a Shiny app

```
library(shiny)
ui <- fluidPage(...)
server <- function(input, output) {...}
shinyApp(ui = ui, server = server)
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- ▶ Create output values via `render()` or `reactive()` **in a reactive context**
 - ▶ Within `render()` or `reactive()`, write code to perform some tasks
 - ▶ Store them as elements of output via `output$...`

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- ▶ Reactivity: connecting inputs to outputs
 - ▶ Allow outputs to automatically update when an input is changed by the users
 - ▶ Output has a *reactive dependency* on input
 - ▶ You can't read `input$....` or modify `output$....` outside of a reactive context

Basic Input functions

Buttons

Action

Submit

`actionButton()`
`submitButton()`

Single checkbox

Choice A

`checkboxInput()`

Checkbox group

Choice 1
 Choice 2
 Choice 3

`checkboxGroupInput()` `dateInput()`

Date input

2014-01-01

Date range

2014-01-24 to 2014-01-24

`dateRangeInput()`

File input

Choose File No file chosen

`fileInput()`

Numeric input

1

`numericInput()`

Password Input

.....

`passwordInput()`

Radio buttons

Choice 1
 Choice 2
 Choice 3

`radioButtons()`

Select box

Choice 1

`selectInput()`

Sliders



`sliderInput()`

Text input

Enter text...

`textInput()`

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- ▶ Taken from R Studio [Shiny tutorial](#)
- ▶ See more in [Shiny Widgets Gallery](#)

Basic Output and render functions

Output functions	Insert	Corresponding render
<code>dataTableOutput()</code>	an interactive table	<code>renderDataTable()</code>
<code>imageOutput()</code>	image	<code>renderImage()</code>
<code>plotOutput()</code>	plot	<code>renderPlot()</code>
<code>tableOutput()</code>	table	<code>renderTable()</code>
<code>textOutput()</code>	text	<code>renderText()</code>
<code>verbatimTextOutput()</code>	text	<code>renderText()</code>
<code>uiOutput()</code>	a Shiny UI element	<code>renderUI()</code>
<code>htmlOutput()</code>	raw HTML	<code>renderUI()</code>

Practice time!

- ▶ Start with these four lines of code:

```
library(shiny)

ui <- fluidPage()

server <- function(input, output) {}

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

Layouts in UI: Sidebar Layout

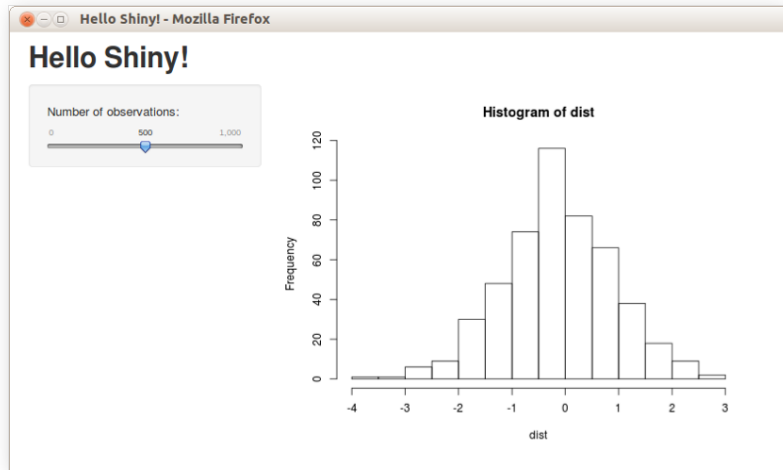
- ▶ See more here [Application layout guide](#)

```
ui <- fluidPage(  
  titlePanel("Hello Shiny!"),  
  sidebarLayout(  
    sidebarPanel(  
      sliderInput("obs", "Number of observations:",  
                  min = 1, max = 1000, value = 500)  
    ),  
    mainPanel(  
      plotOutput("distPlot")  
    )  
  )  
)
```

Layouts in UI: Sidebar Layout

Sidebar Layout

The sidebar layout is a useful starting point for most applications. This layout provides a sidebar for inputs and a large main area for output:



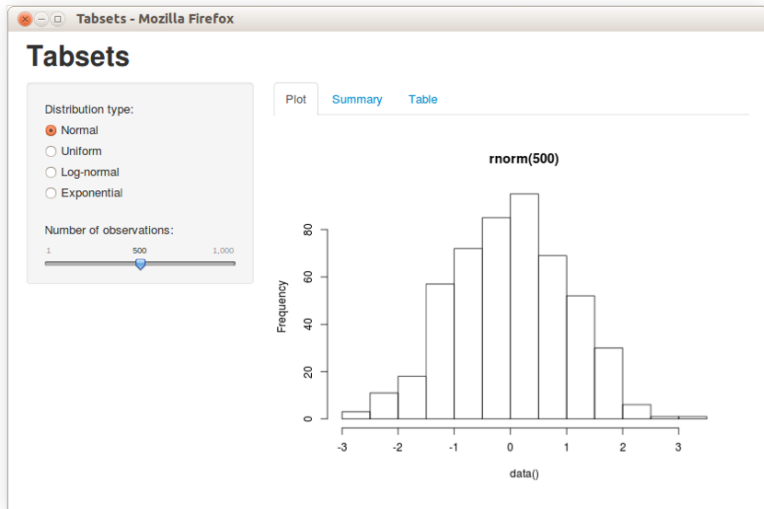
Layouts in UI: Tabsets

```
ui <- fluidPage(  
  
  titlePanel("Tabsets"),  
  
  sidebarLayout(  
  
    sidebarPanel(  
      # Inputs excluded for brevity  
    ),  
  
    mainPanel(  
      tabsetPanel(  
        tabPanel("Plot", plotOutput("plot")),  
        tabPanel("Summary", verbatimTextOutput("summary")),  
        tabPanel("Table", tableOutput("table"))  
      )  
    )  
  )  
)
```

Layouts in UI: Tabsets

Tabsets

Often applications need to subdivide their user-interface into discrete sections. This can be accomplished using the `tabsetPanel()` function. For example:



Extension packages to check out

- ▶ `plotly` for interactive plots (e.g. hovering over points)
- ▶ `highcharter` for R wrapper for Highcharts javascript library
- ▶ `shinyWidgets` for even more widgets
- ▶ `shinythemes` for Shiny themes
- ▶ A complete list of extension packages [here](#)

Other resources

Introductory book on R Shiny:

- ▶ [Wickham \(2021\) - Mastering Shiny](#)

Deployment of Shiny apps on the web:

- ▶ [Hosting and deployment.](#)
- ▶ [Deploying Shiny apps to the web](#)
- ▶ [How to publish a Shiny app? An example with shinyapps.io.](#)
- ▶ [Deploy Shiny App on Github Pages](#)

You can also find video tutorials in YouTube!