Visualization for Data Science in R

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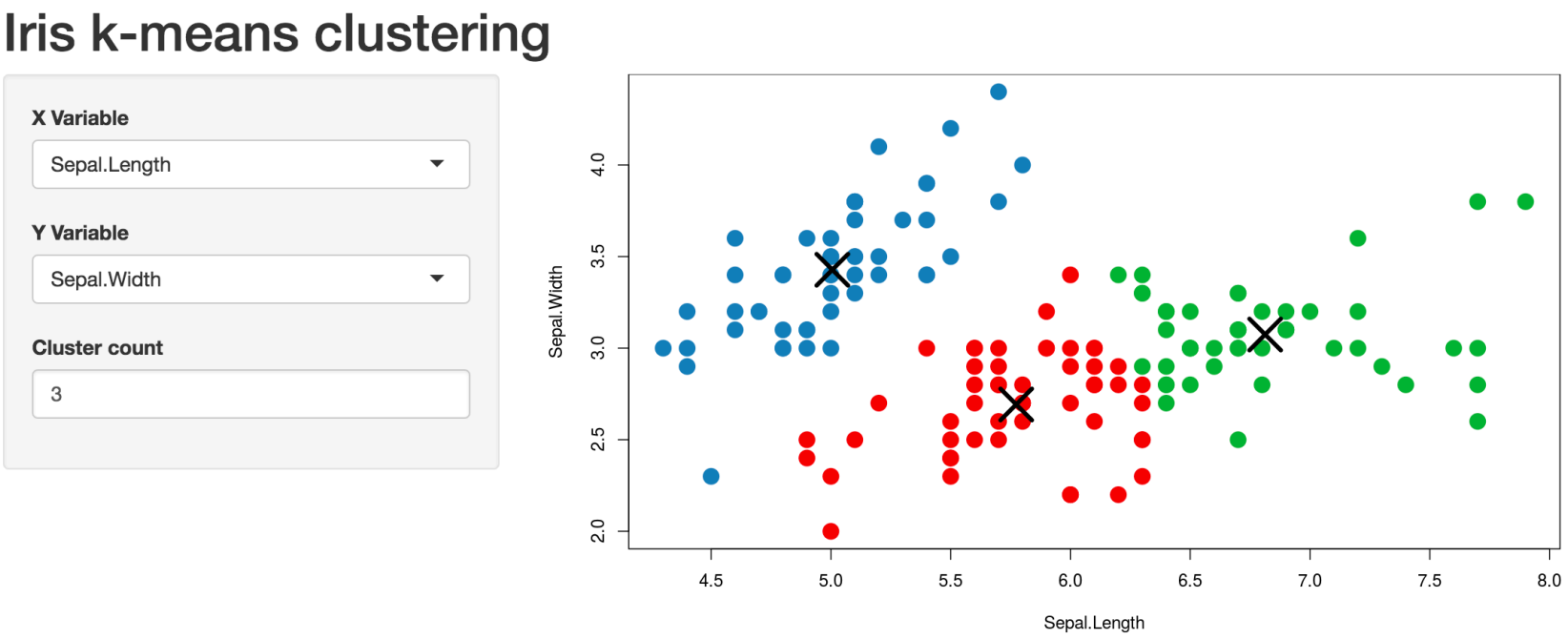
Data Matters 2017

http://bit.ly/RVisDay2

Shiny

What is Shiny?

An interactive interface onto an R program



http://shiny.rstudio.com/

How can you use Shiny for visualization?

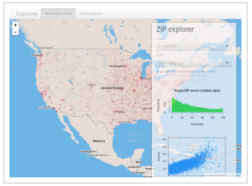
- Use Shiny to control some kind of simulation interactively, visualize the results
- Use Shiny to change components within the chart (e.g., switch the mappings)
- Use Shiny to filter data to subsets to highlight patterns
- Change type of regression, plot results

Shiny examples

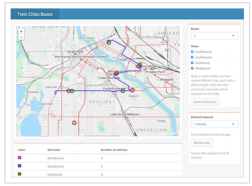
Gallery

Interactive visualizations

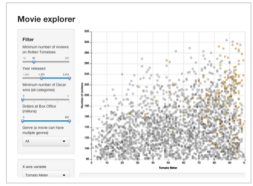
Shiny is designed for fully interactive visualization, using JavaScript libraries like d3, Leaflet, and Google Charts.



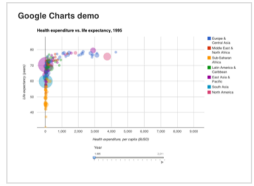
SuperZip example



Bus dashboard



Movie explorer

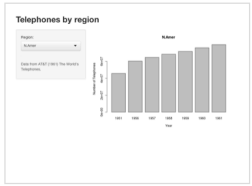


Google Charts

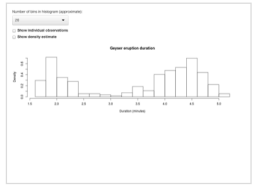
Start simple

If you're new to Shiny, these simple but complete applications are designed for you to study.

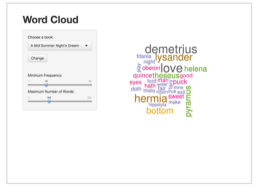
Kmeans example



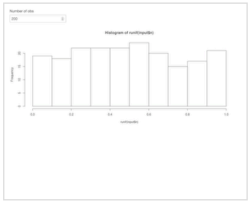
Telephones by region



Faithful



Word cloud



Single-file shiny app

https://shiny.rstudio.com/gallery/

How do you build a Shiny app?

User Interface (UI)

the website people will see and interact with

Server

takes values from the interface, does some calculations, and creates more content for the interface

Step 1: Create the interface

What to put in the UI?

- Layout elements
- HTML elements
- Control widgets
- Placeholders for reactive output

Page layout

- fluidPage
  - titlePanel
  - sidebarLayout
    - sidebarPanel
    - mainPanel
  - fluidRow
    - column
    - wellPanel
  - tabsetPanel
  - navlistPanel
- fixedPage
  - fixedRow
- navbarPage
  - tabPanel
  - navbarMenu
    - tabPanel

http://shiny.rstudio.com/articles/layout-guide.html

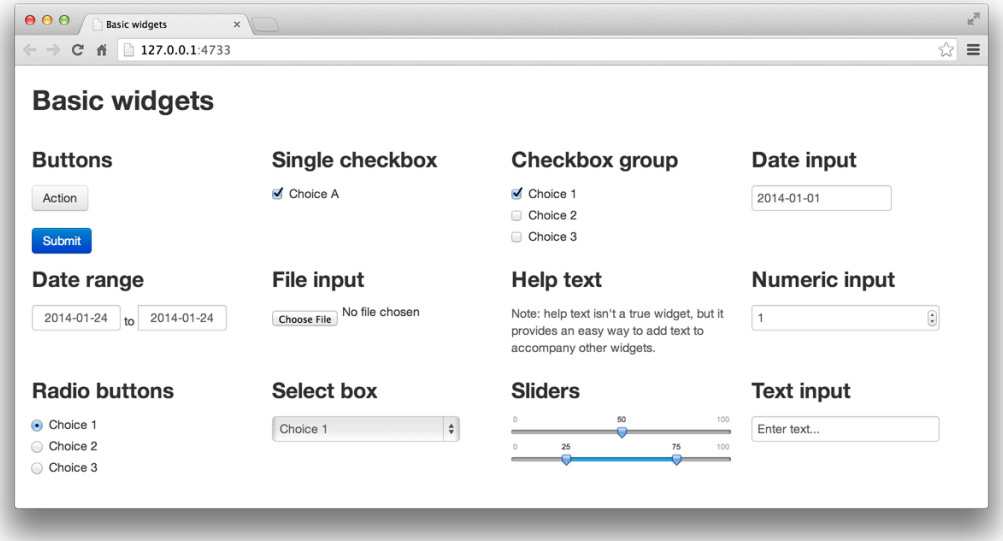
HTML elements

- Shiny has special wrapper functions for this – e.g., h2(), p()

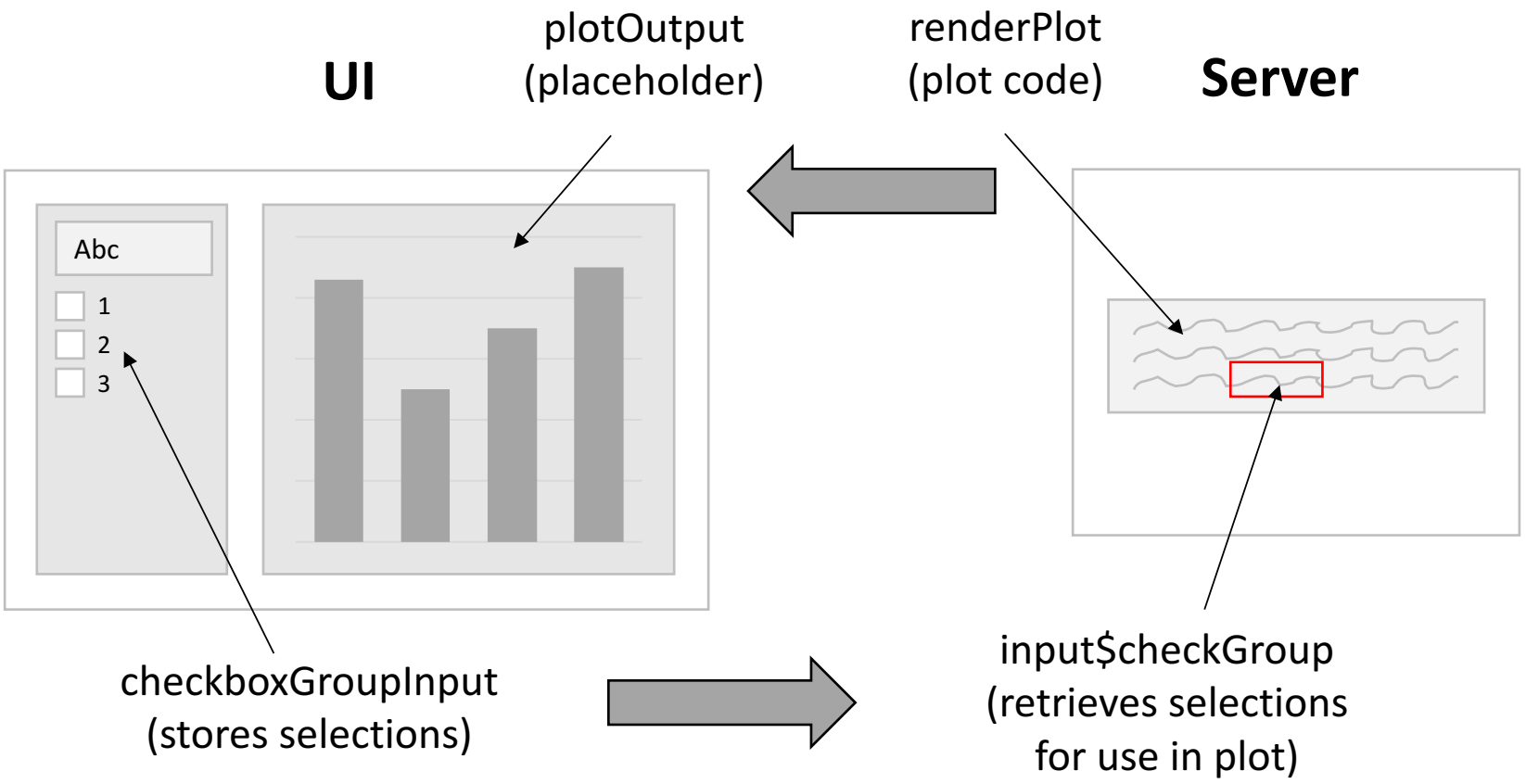
http://shiny.rstudio.com/tutorial/lesson2/

Control widgets

- Button
- Checkboxes
- Date, date range input
- File input
- Numeric input
- Radio buttons
- Drop-down (select) box
- Slider bar
- Text input
- Text



http://shiny.rstudio.com/tutorial/lesson3/
http://shiny.rstudio.com/gallery/widget-gallery.html


UI
plotOutput
(placeholder)
renderPlot
(plot code)
Server
Abc
1
2
3
checkboxGroupInput
(stores selections)
input$checkGroup
(retrieves selections
for use in plot)

Anatomy of a widget

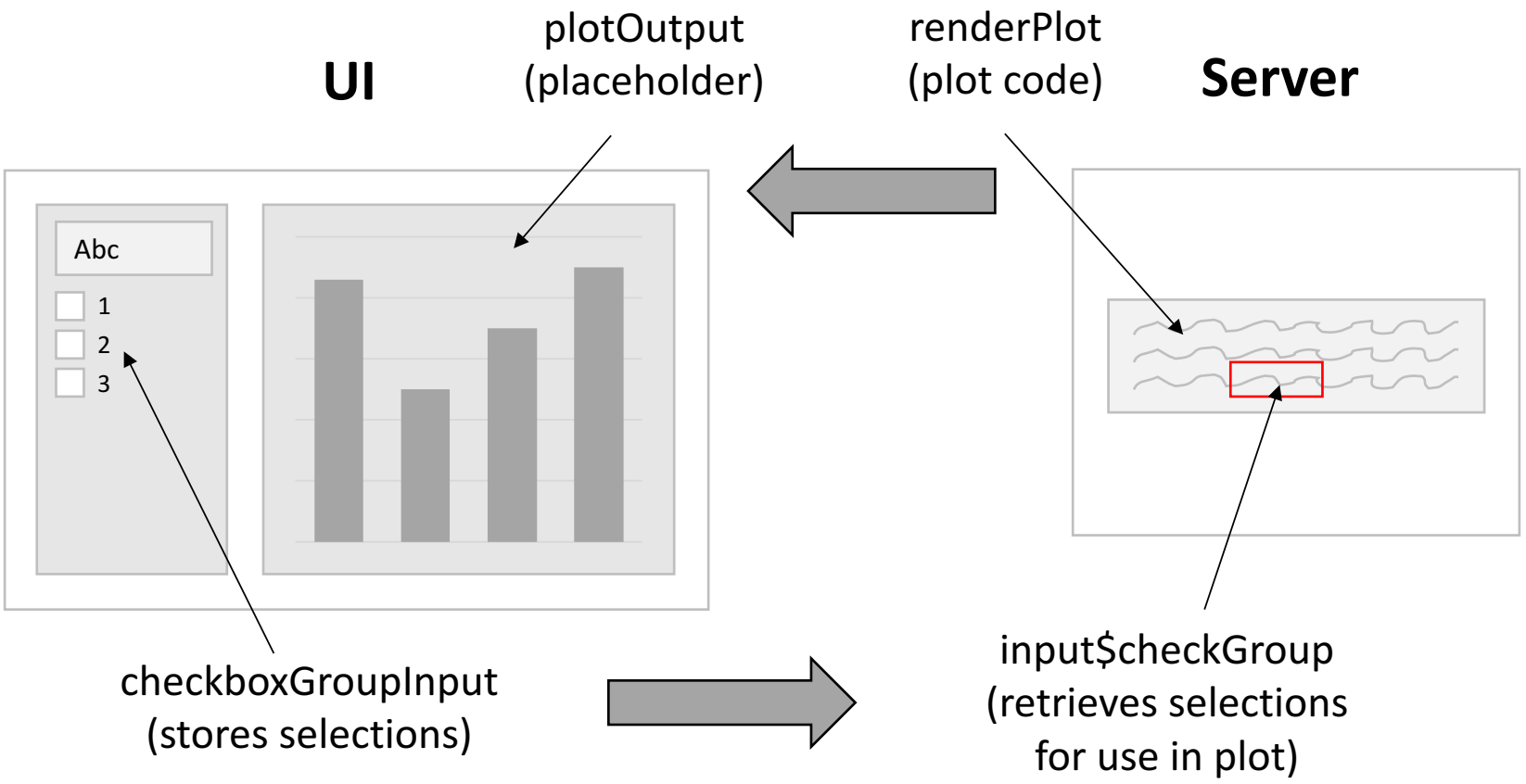
- **Name** for the widget (internal only)
- **Label** (will be visible)
- Check documentation for other required arguments

Reactive output objects

UI	Server
htmlOutput	renderUI
imageOutput	renderImage
plotOutput	renderPlot
tableOutput	renderTable
textOutput	renderText
uiOutput	renderUI
verbatimTextOutput	renderPrint

http://shiny.rstudio.com/tutorial/lesson4/

Step 2: Set up server to create dynamic objects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(retrieves selections
for use in plot)

What to put in the server

- R code
- Render objects with same names and types as the ones listed in UI
- Input objects with the same names as the control widgets

UI:

```
sliderInput("slider1")

textOutput("text1")
```

Server:

```
output$text1  <-  renderText({
                    input$slider1
                  })
```

http://shiny.rstudio.com/tutorial/lesson4/

Step 3: Test

Running the app

Set options in RStudio:

- Window
- Viewer
- External

Sharing an app

- Shiny Apps
  http://www.shinyapps.io/
- Shiny Server (free)
  https://github.com/rstudio/shiny-server/blob/master/README.md
- Shiny Server Pro (fee)
  https://www.rstudio.com/products/shiny/shiny-server/

Shiny resources

- http://shiny.rstudio.com/gallery/
- http://shiny.rstudio.com/tutorial/
- http://shiny.rstudio.com/articles/
- https://shiny.rstudio.com/reference/shiny/latest/
- https://www.rstudio.com/wp-content/uploads/2016/01/shiny-cheatsheet.pdf
- http://www.shinyapps.io/

ggplot2: Output

ggplot2: Mapping