



A Gentle Introduction to R from a SAS Programmer's Perspective

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Agenda

- Part 1: Quick Review of R (5 min)
- Part 2: Introduction to ggplot2 (10 min)
- Part 3: Introduction to Shiny (5 min)
- Questions/Discussion (10 min)

Smörgåsbord

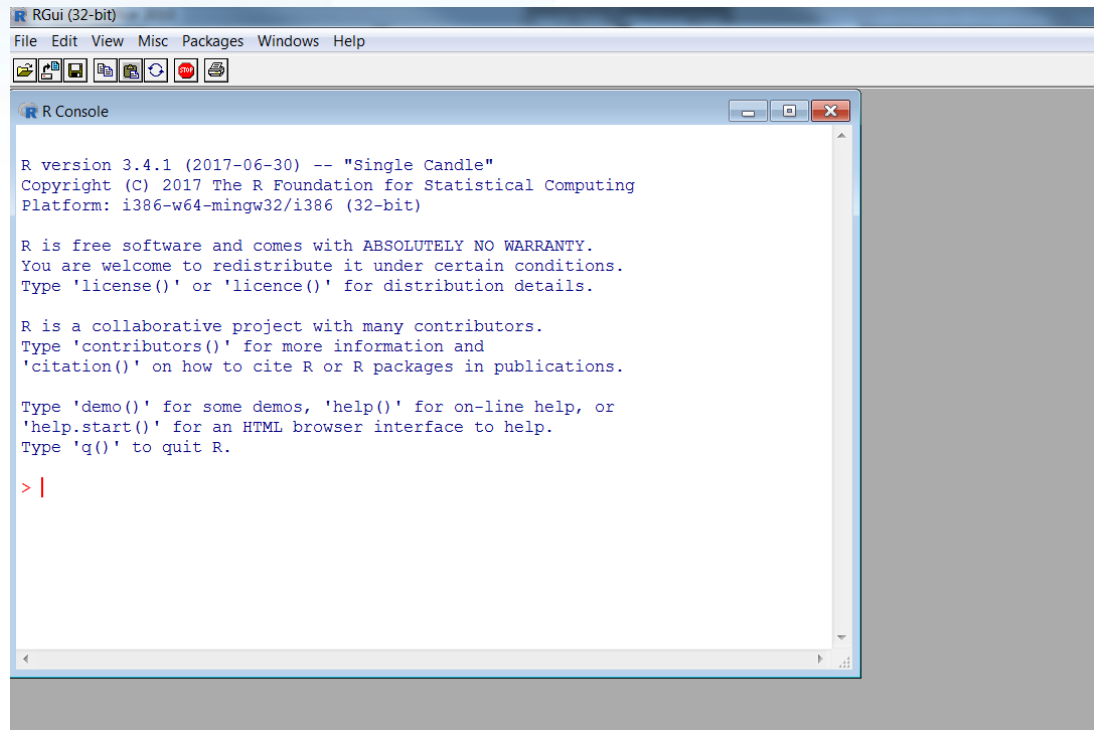


Review of R

- Base R is great, but limited so we extend with **packages**. Packages are collections of **R** functions, data, and compiled code in a well-defined format.
- We call them in using the library (<package>) statement
 - Examples: ggplot2, tidyverse, shiny.... Etc.
- Rstudio is a free Graphical User Interface for R.
 - Similar to Enhanced Editor for SAS... can type scripts, see objects, etc.



Basic R Interface



The screenshot shows the RGui (32-bit) application window. The title bar reads "RGui (32-bit)". The menu bar includes "File", "Edit", "View", "Misc", "Packages", "Windows", and "Help". Below the menu bar is a toolbar with icons for file operations and running code. The main window is titled "R Console" and contains the following text:

```
R version 3.4.1 (2017-06-30) -- "Single Candle"
Copyright (C) 2017 The R Foundation for Statistical Computing
Platform: i386-w64-mingw32/i386 (32-bit)

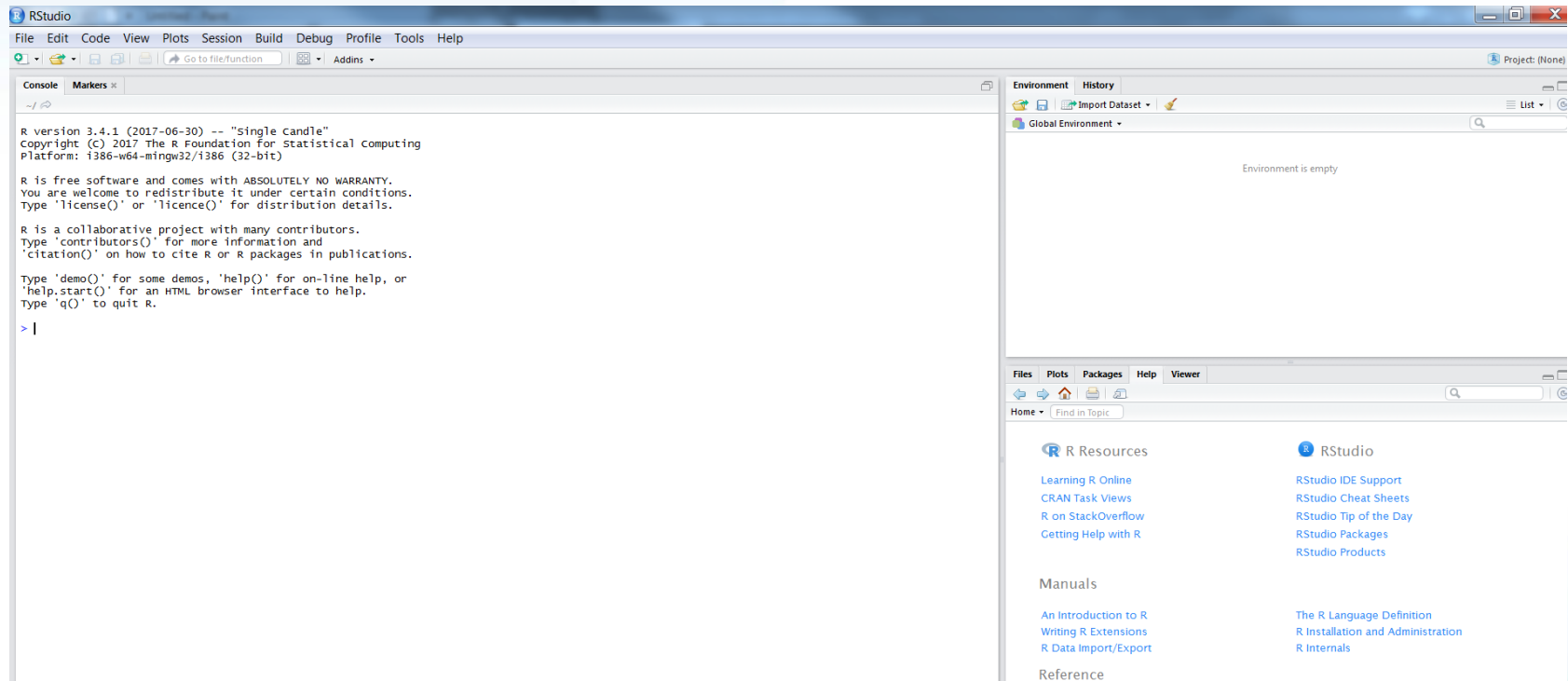
R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.

R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

> |
```

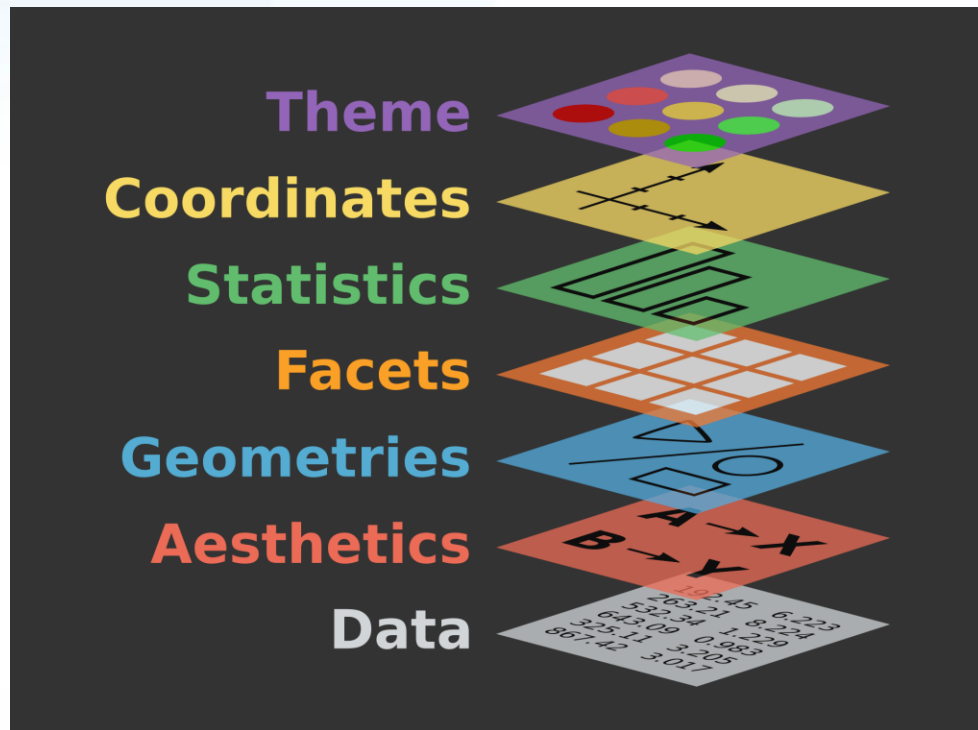
A GUI for R – Also free!



The Grammar of Graphics

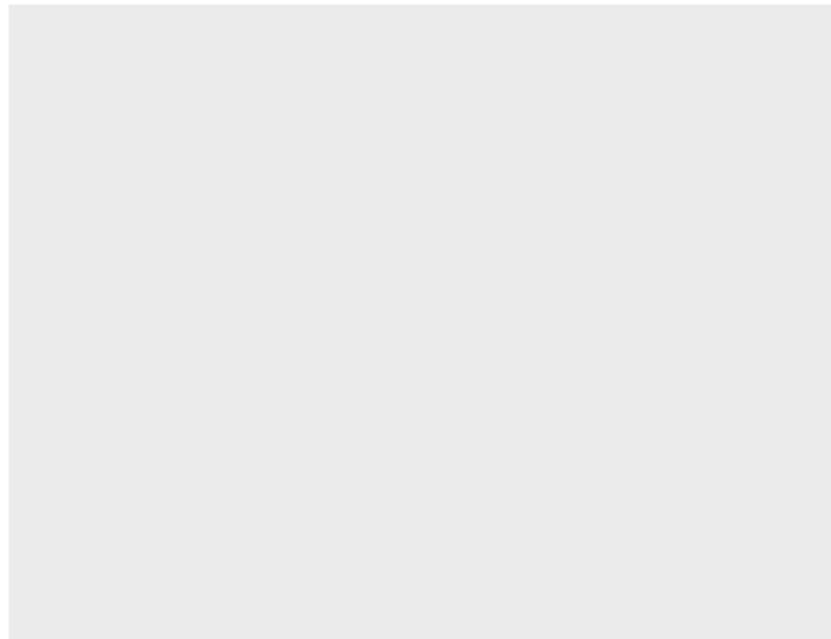


The Sandwich of Graphics



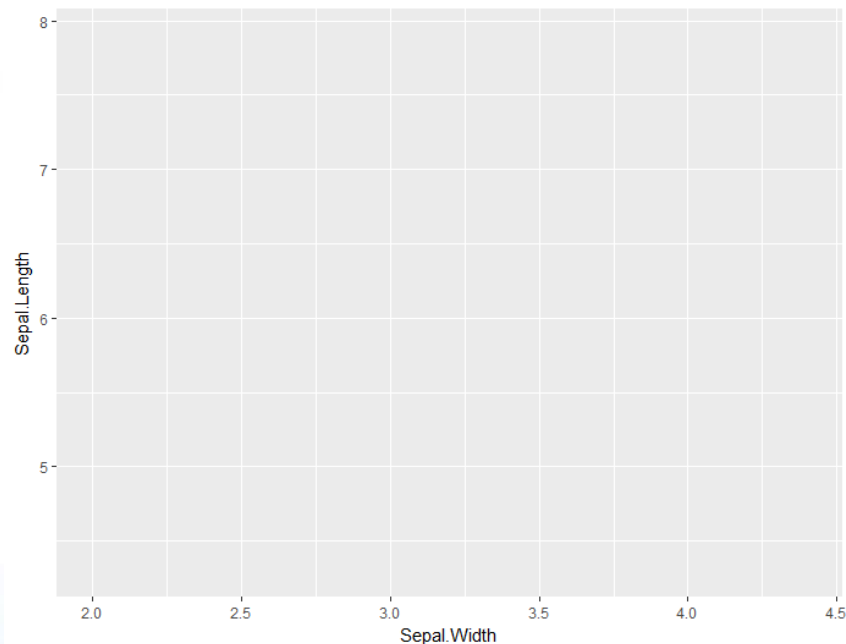
Stacking a Plot

- `ggplot(data=iris)`

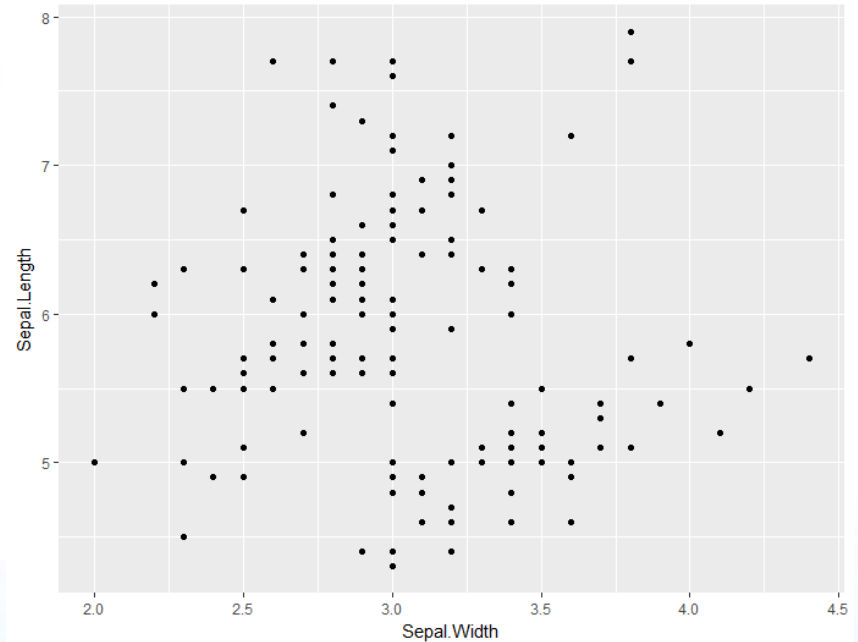


Stacking a Plot

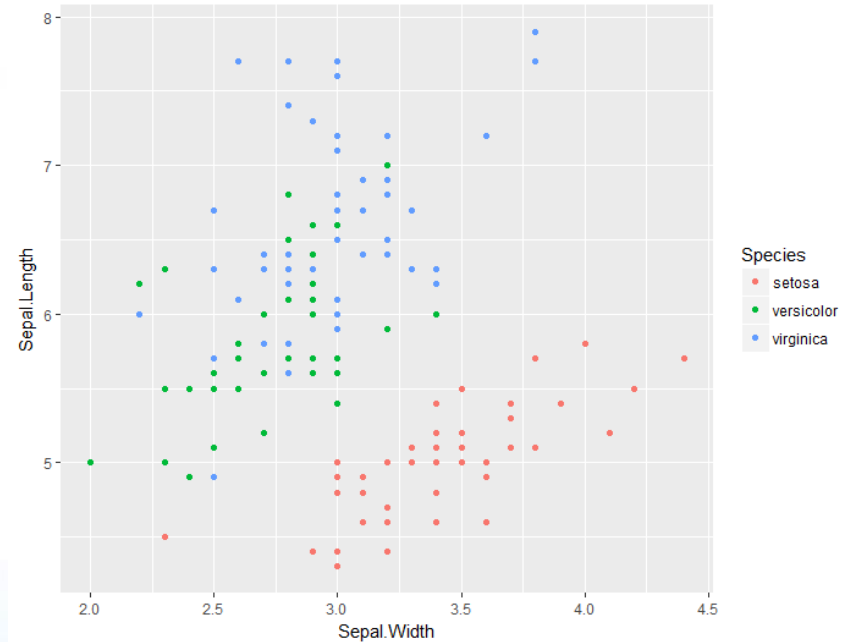
- ▶ `ggplot(data=iris) +
aes(x=Sepal.Width,
y=Sepal.Length)`



► `ggplot(data=iris) +
aes(x=Sepal.Width,
y=Sepal.Length) +
geom_point()`



► `ggplot(data=iris) +
aes(x=Sepal.Width,
y=Sepal.Length,
color=Species) +
geom_point()`



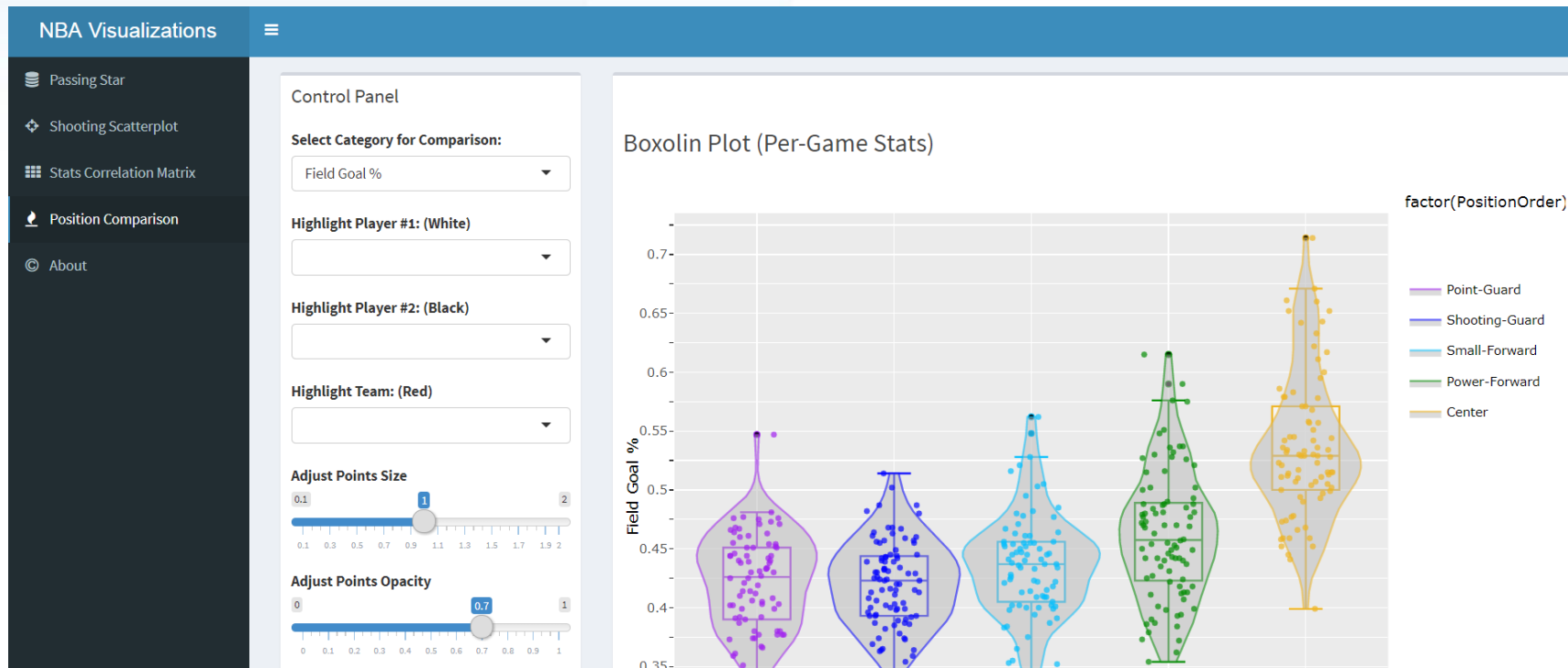
► `ggplot(data=iris) +
aes(x=Sepal.Width,
y=Sepal.Length,
color=Species) +
geom_point() +
facet_wrap(~ Species)`



Shiny

- Shiny is a web application framework for R, developed by RStudio
- Allows you to combine the interactive functionality of the web with the statistical power of R without having to learn another language.
- Right now, Shiny will use your personal computer as a server, but you can set this up on your company's Intranet, or online (shinyapps.io)
- Who has time to learn another language?

Example of Shiny Dashboard



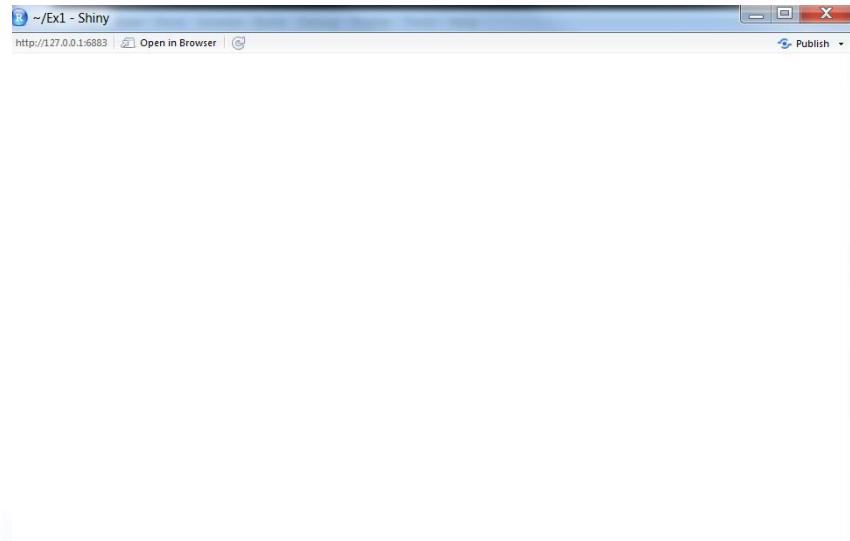
Building the app from Scratch

```
library(shiny)
```

```
ui <- fluidPage(  
)
```

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

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



Creating a table

```
library(shiny)
library(haven)

dm <- read_sas("J:/drug/study/R_training/dm.sas7bdat")

ui <- fluidPage( selectInput("variable", "Variable:",
                           c("Arm" = "ARM",
                             "Country" = "COUNTRY",
                             "Race" = "RACE"))
                )
server <- function(input, output) {
  output$data <- renderTable({
    dm[, c("USUBJID", input$variable), drop = FALSE]
  }, rownames = TRUE)
}
# Run the application
shinyApp(ui = ui, server = server)
```



Changing to Plot

```
library(shiny)
```

```
library(haven)
```

```
dm <- read_sas("J:/drug/study/R_training/dm.sas7bdat")
```

```
ui <- fluidPage(  radioButtons("variable", "Variable:",  
                             c("Arm" = "ARM",  
                               "Country" = "COUNTRY",  
                               "Race" = "RACE")),  
  plotOutput("plot")  
)
```

```
server <- function(input, output) {  
  output$plot <- renderPlot({  
    ggplot(dm, aes_string(input$variable)) + geom_bar()  
  })  
}
```

```
# Run the application
```

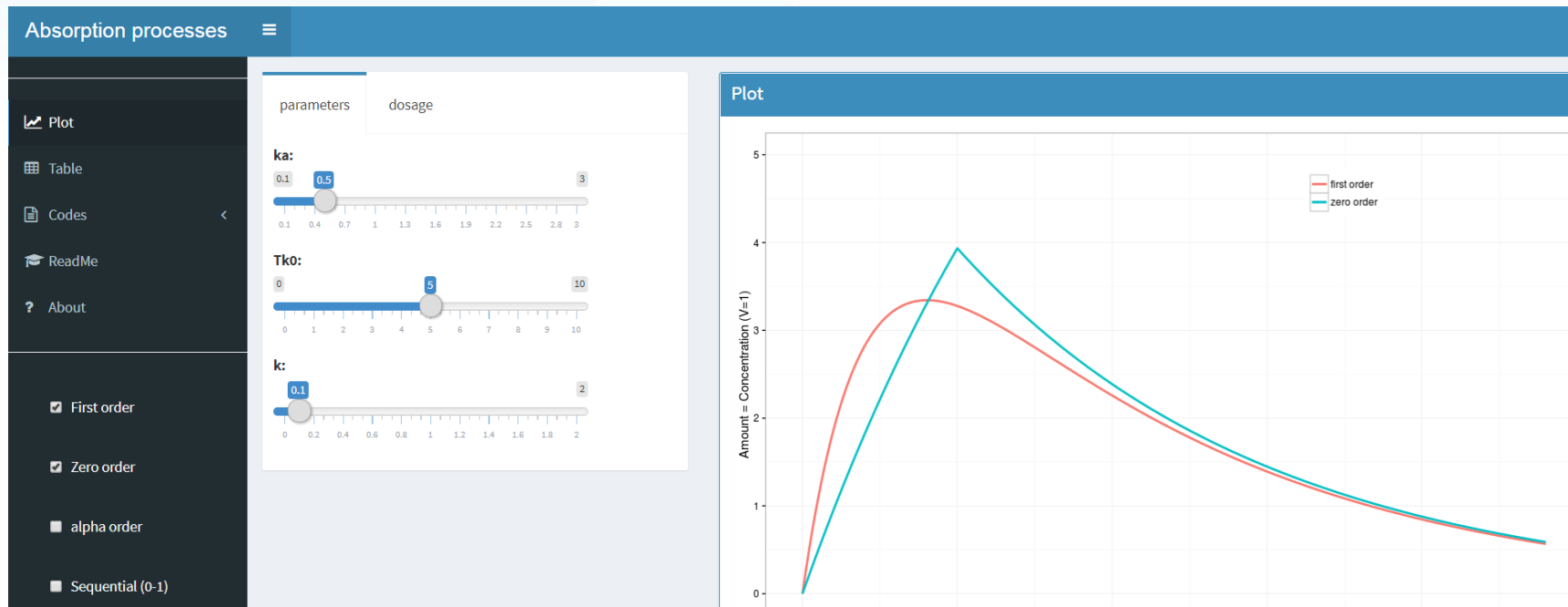
```
shinyApp(ui = ui, server = server)
```

Variable:

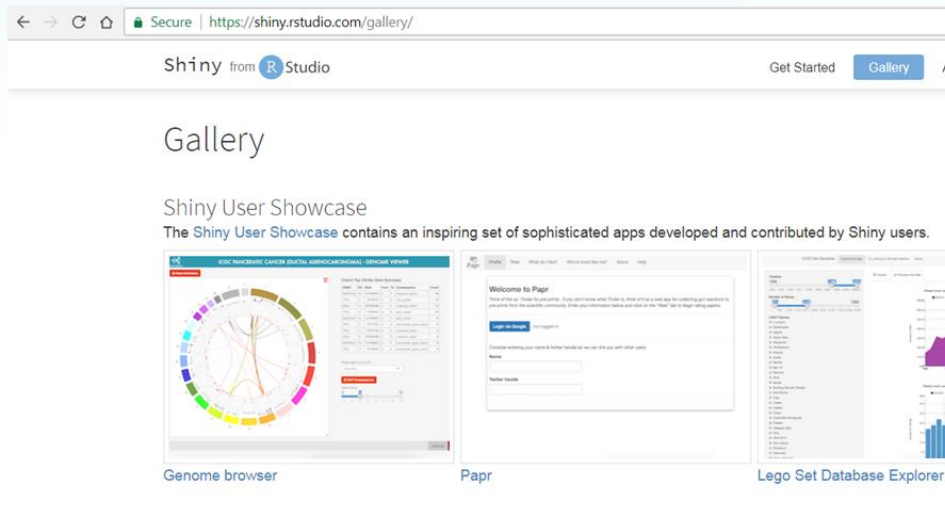
- ☒ Arm
- ☐ Country
- ☐ Race



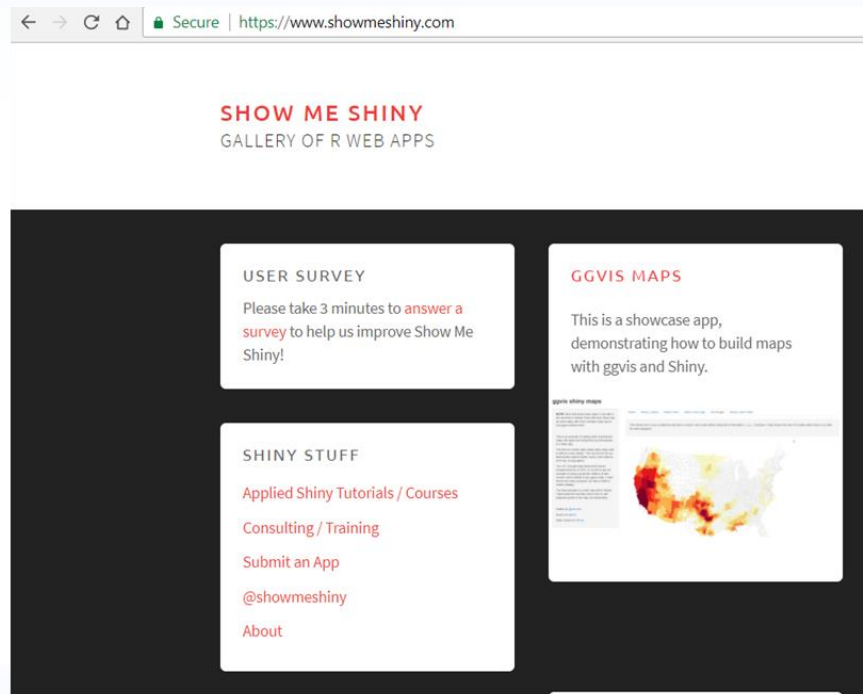
Shinydashboard Package



Examples of Shiny Apps



[Shiny.rstudio.com/gallery](https://shiny.rstudio.com/gallery)



www.showmeshiny.com

What You Can Do With R

- Interactive Dashboards!
- Machine Learning!
- Big Data Analytics!
- Accessible through SAS (Using PROC IML)*
- And So Much More!

Credits

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