Developing Interactive Online Applications for Economic Analysis

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Outline

- Overview of R Shiny
- Structuring R Shiny Syntax
- Demonstration of R Shiny for UNL/RFI Thriving Index
- Conclusion

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R Shiny

- Developed by R Studio (R studio is an Integrated Development Environment for R)
- R Shiny allows you to build interactive web applications for whatever your purposes
- Layout uses Twitter Bootstrap
  - Allows for responsive design (resizes for different sized screens)
- You can adjust the look and layout of the Shiny App if you are familiar with HTML, CSS, Boostrap, and Javascript
- Reactivity is a key concept in R Shiny
  - Things on the page change as the user select different values
- Gallery: https://shiny.rstudio.com/gallery/

Structuring R Shiny Syntax

- Two primary components
  - **User Interface** (UI) allows you adjust the look and layout of the application
  - **Server Function** allows you to control the data you would like to present
- Once you've created your application, you can publish it online through Shiny servers
  - Different tiers of service (Free Version, and 3 Levels of Paid Access)

Shiny from RStudio

Get Started | Gallery | Articles | Reference | Deploy | Help | Contribute

Google Trend Index

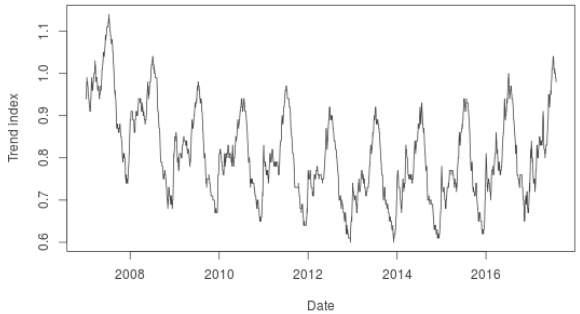
Trend index

Travel

Date range

2007-01-01 to 2017-07-31

☐ **Overlay smooth trend line**



The Google Travel Index tracks queries related to airlines, hotels, beach, southwest, las vegas, flights, etc. The index is set to 1.0 on January 1, 2004 and is calculated only for US search traffic.

Source: Google Domestic Trends

Description | app.R

```r
# Load packages
library(shiny)
library(shinythemes)
library(dplyr)
library(readr)

# Load data
trend_data <- read_csv("data/trend_data.csv")
trend_description <- read_csv("data/trend_description.csv")

# Define UI
ui <- fluidPage(theme = shinytheme("lumen"),
  titlePanel("Google Trend Index"),
  sidebarLayout(
    sidebarPanel(

      # Select type of trend to plot
      selectInput(inputId = "type", label = strong("Trend index"),
                  choices = unique(trend_data$type),
                  selected = "Travel"),

      # Select date range to be plotted
      dateRangeInput("date", strong("Date range"), start = "2007-01-01", end = "2017-07
                     min = "2007-01-01", max = "2017-07-31"),

      # Select whether to overlay smooth trend line
      checkboxInput(inputId = "smoother", label = strong("Overlay smooth trend line"),

      # Display only if the smoother is checked
      conditionalPanel(condition = "input.smoother == true",
                       sliderInput(inputId = "f", label = "Smoother span:",
                                   min = 0.01, max = 1, value = 0.67, step = 0.01,
                                   animate = animationOptions(interval = 100)),
                       HTML("Higher values give more smoothness.")
      )
    ),

    # Output: Description, lineplot, and reference
    mainPanel(
      plotOutput(outputId = "lineplot", height = "300px"),
      textOutput(outputId = "desc"),
      tags$a(href = "https://www.google.com/finance/domestic_trends", "Source: Google D
    )
  )
)

# Define server function
server <- function(input, output) {

  # Subset data
  selected_trends <- reactive({
    req(input$date)
    validate(need(!is.na(input$date[1]) & !is.na(input$date[2]), "Error: Please provide
    validate(need(input$date[1] < input$date[2], "Error: Start date should be earlier t
    trend_data %>%
      filter(
        type == input$type,
        date > as.POSIXct(input$date[1]) & date < as.POSIXct(input$date[2]
        ))
  })


  # Create scatterplot object the plotOutput function is expecting
```

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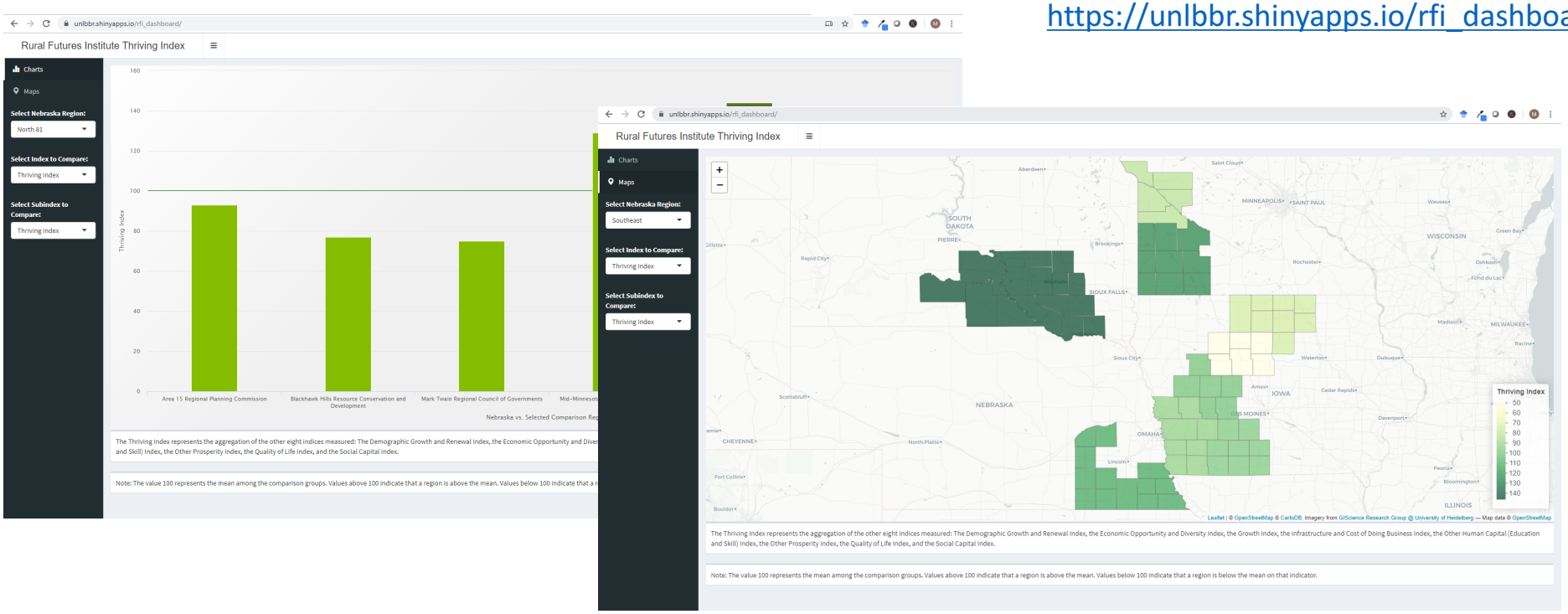
UNL/RFI Nebraska Thriving Index

https://unlbbr.shinyapps.io/rfi_dashboard/



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Conclusion

- While other tools allow for the presentation of data online, R Shiny allows for a bit more flexibility

- Pros of R Shiny
  - Can produce very attractive dashboards and web applications
  - Allows for a wide range of computations to be used when working with the data in the application
  - Fun for the user (in my opinion)
  - Learning curve is not as steep as it would seem

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