MATH2270 – Assignment 3

Group Details:

Group No	6
Group Members	Sridevi Pamarthi (s3778317) & Divya Ulaganathan (s3759465)

Shiny-App URL:

https://sridevi.shinyapps.io/Annual_change_in_number_of_crimes_in_USA/

Code used to produce the Shiny-App as follows:

```
# Required libraries
library(readxl)
library(plotly)
library(dplyr)
library(Hmisc)
library(tidyr)
library(ggplot2)
library(shiny)
getwd()

#Read Crimes data
crimes_data <- read_excel("crimes.xlsx",skip = 1, col_names = c("Year","Violent","Murder","Property",
"Rape","Robbery","Assault","Burglary", "Larceny_Theft","Vehicle_Theft") )

str(crimes_data)
#calculting total rates
crimes_data <- mutate(crimes_data, Average_Rate =((rowSums(crimes_data[,c(2,4)]))/2))

#Reshaping columns from wide to long format For Barplot
crimes_data_barplot <- crimes_data %>% gather(key = 'crimes_data', value = 'Rate', -
c(Year,Violent,Property,Average_Rate))


#Reordering factors in crimes_data column
crimes_data_barplot$crimes_data <- factor(crimes_data_barplot$crimes_data, levels =
c("Murder","Rape","Assault","Robbery","Vehicle_Theft","Larceny_Theft","Burglary"), ordered = TRUE)



# Define UI for application

ui <- fluidPage(
  #Title of visualisation
  titlePanel("Annual change in number of crimes committed in USA from 1961 to 2018"),
  h6("Created by : Divya Ulaganathan & Sridevi Pamarthi"),
```

```
 mainPanel(position = "top" ,
 tabsetPanel(
  tabPanel("Crime Rate Change Comparision Barplot",

           plotOutput("barPlot",width = "100%", height = "350px"),
       br(),

       fluidRow(
        column(4, sliderInput("Year", label = "Year", min = 1961, sep="",
                    max = 2018, value = 1961,
                    animate = animationOptions(interval = 500, loop = TRUE)
        )),
        column(7,h6("* Press play to view the crime rate changes across time."),
           h6("* Press pause to view the crime rate of different crimes for a particular year.")


       ))),
  tabPanel("Detailed Plot For each crime",
       plotlyOutput("linePlot_plotly",width = "100%", height = "350px"),
       p("* To choose a different crime press the button on top"),
       p("* To compare different crimes click on the legends on the right side of the graph"),
       p("* For a detailed rate value of a specific year, hover the mouse pointer on the line graph")
       )

 )


 ),
 br(),
 h4("Information:"),
 h5("This visualisation aims to represent the change in crime rates."),
 h5("The crimes committed in USA are classified into two groups: violent and property crimes"),
 h5("* Crimes such as murder, rape, robbery and assault belongs Violent crimes."),
 h5("* Crimes such as burglary, larcent theft and vehicle theft belongs Property or Non-Violent
crimes."),
 h5("In order to calculate the rate of change for a specific crime, the below formula is used"),
 h5("Change Rate Calculation:"),
 h5("Rate(Current_Year/Previous_Year) = (value(Current_Year) - value(Previous_Year)) /
value(Previous_Year)"),

br(),
br(),
h6("Source data : Disastercenter.com. (2019). United States Crime Rates 1960 - 2018."),
h6("Available at: http://www.disastercenter.com/crime/uscrime.htm")


)
```

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```
#Assigning server function
server <- function(input, output) {



  #Line graph Using Plotly
  output$linePlot_plotly <- renderPlotly ({

    plot_ly(data = crimes_data) %>%
      add_lines(x=~Year, y=~Average_Rate, name = "Average Crime Change Rate", visible = "TRUE",line =
list(color = 'black')) %>%
      add_lines(x=~Year, y=~Violent, name = "Violent", visible = "legendonly",line = list(color = "#8c510a"))
%>%
      add_lines(x=~Year, y=~Murder, name = "Murder", visible = "legendonly",line = list(color =
"#67000d") )%>%
      add_lines(x=~Year, y=~Rape, name = "Rape", visible = "legendonly",line = list(color = "#fb6a4a"))
%>%
      add_lines(x=~Year, y=~Assault, name = "Assault", visible = "legendonly",line = list(color = "#993404"))
%>%
      add_lines(x=~Year, y=~Robbery, name = "Robbery", visible = "legendonly",line = list(color =
"#fe9929")) %>%

      add_lines(x=~Year, y=~Property, name = "Property", visible = "legendonly",line = list(color =
"#4d004b")) %>%
      add_lines(x=~Year, y=~Vehicle_Theft, name = "Vehicle Theft", visible = "legendonly",line = list(color =
"#ffffcc")) %>%

      add_lines(x=~Year, y=~Larceny_Theft, name = "Larceny Theft", visible = "legendonly",line = list(color
= "#bdbdbd")) %>%

      add_lines(x=~Year, y=~Burglary, name = "Burglary", visible = "legendonly",line = list(color =
"#525252")) %>%
      layout(xaxis=list(fixedrange=TRUE)) %>% layout(yaxis=list(fixedrange=TRUE))%>%
      layout(title = "Trend of various crimes in USA", showlegend= TRUE,
             xaxis=list(zeroline = TRUE,title="Year"),
             yaxis=list(zeroline = TRUE,title="% change in crime rate"),
             updatemenus= updatemenus)
  })



  # update indicator variable menu - for Line graph Using Plotly
  updatemenus <- list(
    list(
      active = 0,
```

```
type= 'buttons',
direction = "right",
xanchor = 'center',
yanchor = "top",
pad = list('r'= 0, 't'= 5, 'b' = 5),
x = 0.60,
y = 2.00,
buttons = list(
 list(
  label = "Average Change Rate",
  method = "update",
  args = list(list(visible = c(TRUE, "legendonly", "legendonly",
                        "legendonly", "legendonly","legendonly",
                        "legendonly","legendonly", "legendonly", "legendonly" ))),
 list(
  label = "Violent",
  method = "update",
  args = list(list(visible = c("legendonly", TRUE, "legendonly", "legendonly",
                        "legendonly", "legendonly","legendonly",
                        "legendonly","legendonly", "legendonly" ))),
 list(
  label = "Murder",
  method = "update",
  args = list(list(visible = c("legendonly", "legendonly", TRUE, "legendonly",
                        "legendonly", "legendonly", "legendonly",
                        "legendonly","legendonly", "legendonly"))),
 list(
  label = "Rape",
  method = "update",
  args = list(list(visible = c("legendonly", "legendonly", "legendonly", TRUE,
                        "legendonly", "legendonly", "legendonly",
                        "legendonly", "legendonly", "legendonly"))),

 list(
  label = "Assault",
  method = "update",
  args = list(list(visible = c( "legendonly", "legendonly", "legendonly","legendonly",
                         TRUE,"legendonly","legendonly",
                         "legendonly","legendonly", "legendonly"))),
 list(
  label = "Robbery",
  method = "update",
  args = list(list(visible = c("legendonly", "legendonly", "legendonly","legendonly",
                        "legendonly",TRUE,"legendonly",
                        "legendonly","legendonly", "legendonly"))),
 list(
  label = "Property",
  method = "update",
```

```
        args = list(list(visible = c("legendonly", "legendonly", "legendonly", "legendonly",
                                     "legendonly", "legendonly",TRUE,
                                     "legendonly", "legendonly" ,"legendonly")))),
      list(
        label = "Vehicle Theft",
        method = "update",
        args = list(list(visible = c("legendonly",  "legendonly", "legendonly","legendonly",
                                     "legendonly","legendonly", "legendonly",
                                     TRUE,"legendonly", "legendonly" ))),
      list(
        label = "Larceny Theft",
        method = "update",
        args = list(list(visible = c("legendonly", "legendonly", "legendonly", "legendonly",
                                     "legendonly", "legendonly", "legendonly",
                                     "legendonly", TRUE, "legendonly")))),
      list(
        label = "Burglary",
        method = "update",
        args = list(list(visible =  c("legendonly", "legendonly", "legendonly", "legendonly",
                                      "legendonly", "legendonly", "legendonly",
                                      "legendonly","legendonly", TRUE ))))
    )
   )
  )



  #Barplot function
  output$barPlot <- renderPlot({
    #Subsetting dataset to be used in function
    data <- subset(crimes_data_barplot, crimes_data_barplot$Year == input$Year)
    #ggplot function
    ggplot(data = data, aes(x = crimes_data, y = Rate)) + geom_col(aes(fill = crimes_data), color =
"black",show.legend = TRUE) +
      labs(title = " " , x = "Crime Types", y = "% change in crime rate") +
      theme_bw() + scale_y_continuous(limits = c(-30,30), expand = c(0,0)) + geom_hline(yintercept=0,
linetype="solid", color = "black")+
      scale_fill_manual(values = c("#67000d","#fb6a4a", "#993404","#fe9929","#ffffcc",
"#bdbdbd","#525252"))

  })


}

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

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Data Reference:

- Disastercenter.com. (2019). United States Crime Rates 1960 - 2017. [online] Available at: http://www.disastercenter.com/crime/uscrime.htm [Accessed 20 Oct. 2019].