

Data Visualization – MATH2270 – Assignment-3

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URL To Published Shiny App: - <https://vikasvirani.shinyapps.io/Assignment3/>

Code Used for Assignment 3(Single app.R file): -

```
#  
# This is a Shiny web application. You can run the application by clicking  
# the 'Run App' button above.
```

```
library(shiny)  
library(dplyr)  
library(tidyr)  
library(plotly)  
library(shinydashboard)  
library(readxl)  
library(shinyWidgets)
```

```
Crime_data <- read_excel("Dataset.xlsx", sheet = "Sheet3")  
Crime_data <- na.omit(Crime_data)
```

```
Crime_data_age <- read_excel("Dataset.xlsx", sheet = "Sheet2")  
Crime_data_age <- na.omit(Crime_data_age)
```

```
Crime_data_long <- Crime_data %>% gather(Year, Crime, `2008-09`:`2018-19`, factor_key=TRUE)

Crime_data_long_age <- Crime_data_age %>% gather(State, Crime, `New South Wales`:`Australian
Capital Territory`, factor_key=TRUE)
```

```
# View(Crime_data)
# View(Crime_data_long)
# View(Crime_data_long_age)
```

```
Crime_data_long$`Principal offence` <- as.factor(Crime_data_long$`Principal offence`)
Crime_data_long$State <- as.factor(Crime_data_long$State)
Crime_data_long$Gender <- as.factor(Crime_data_long$Gender)
Crime_data_long$`Data Type` <- as.factor(Crime_data_long$`Data Type`)
```

```
Crime_data_long_age$Age <- as.factor(Crime_data_long_age$Age)
Crime_data_long_age$Gender <- as.factor(Crime_data_long_age$Gender)
Crime_data_long_age$Year <- as.factor(Crime_data_long_age$Year)
Crime_data_long_age$`Data Type` <- as.factor(Crime_data_long_age$`Data Type`)
```

```
# Define UI for application that draws a histogram
```

```
ui <- fluidPage(
```

```
  # Application title
```

```
  titlePanel("What's decreasing (Which state is safer)? Who is committing more Crimes?"),
```

```
  # Sidebar of application
```

```
  sidebarLayout(
```

```
    sidebarPanel(
```

```
      h3("About this interactive app"),
```

helpText(HTML("<p> This app allows you to see the change in crime rates for the period of 2008-09 to 2018-19,

for the selected Australian State. Crime Rate can be visualised and compared based on different variables like

Principal offences, Gender, Age group etc. to see which Gender and Age group is committing more crimes than others,

which Principal Offences are increasing/decreasing in which state compared to previous years etc. i.e.

All states have recorded a decrease in Public order Offences. Australian Capital Territory and Victoria are Safer in

terms of Crime Rates compared to other state. Overall, Male population of teenager (15-19 year) has more crime rate than others.</p>"))),

```
selectizeInput("StateValue", "Track State",  
  choices = c("All",levels(Crime_data_long$State)),  
  selected = "All"),
```

helpText("Select the state to track it's related attributes in graph 1. If all states selected, legend will be shown for

states otherwise for a particular state, legends will be shown for gender."),

```
pickerInput("OffenseValue", "Principal Offense(s):",  
  choices = c(levels(Crime_data_long$`Principal offence`)),  
  selected = c("Public order offences"),  
  multiple = TRUE,  
  options = list(  
    `actions-box` = TRUE,  
    `deselect-all-text` = "None",  
    `select-all-text` = "Select All!",  
    `none-selected-text` = "Nothing Selected"  
  )),
```

helpText("Select one or more principal offences to display. If nothing is selected, all offences are displayed. Configure this with other attribute combinations to visualise it in 1st graph."),

```
# pickerInput("YearValue", "Year",  
#   choices = c(levels(Crime_data_long$Year)),
```

```

#       multiple = TRUE),

# br(),

selectizeInput("TypeValue", "Data Type",
               choices = c(levels(Crime_data_long`Data Type`)),
               selected = "Rate"),

helpText("Select the data type for Crime; Raw Count or Rate(Per 100,000 population of
group)."),

pickerInput("GenderValue", "Gender",
            choices = c(levels(Crime_data_long$Gender)),
            selected = c("Males", "Females"),
            multiple = TRUE,
            options = list(
              `actions-box` = TRUE,
              `deselect-all-text` = "None...",
              `select-all-text` = "Select All!",
              `none-selected-text` = "Nothing Selected"
            )),

helpText("Persons is the total of Males and Females. Gender and Data Type will be
changed for both graphs. Also select State to visualise for Graph 2."),

selectizeInput("StateValue2", "State in Graph 2",
               choices = c(levels(Crime_data_long_age$State)),
               selected = "Victoria"),

pickerInput("AgeValue", "Age Category",
            choices = c(levels(Crime_data_long_age$Age)),
            multiple = TRUE,
            options = list(
              `actions-box` = TRUE,
              `deselect-all-text` = "None...",
              `select-all-text` = "Select All!",
              `none-selected-text` = "Nothing Selected"
            )),

```

```

    helpText("Select Age group of population to visualise in 2nd graph.")
  ),

  # Show a plot based on attributes selected
  mainPanel(
    plotlyOutput("CrimePlot",height = "520px"),
    tabsetPanel(type = "tabs",
      tabPanel("Statewise Crime Statistics with Age group and
Gender",plotlyOutput("StatewiseCrimePlot")),
      tabPanel("References", helpText(HTML("<b>Australian Bureau of Statistics (2019).
Recorded Crime - Offenders, 2018-19. Retrieved June 08, 2020, from Australian Bureau of Statistics
website</b>:
<a href=\"https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/4519.02018-
19?OpenDocument\">Link to Data Source</a>")))))
    )
  )
)

# Define server logic required to draw plots
server <- function(input, output) {

  output$CrimePlot <- renderPlotly({

    if (length(input$OffenseValue) < 1) {
      filtered_data <- Crime_data_long
    }
    else{
      # filtered_data <- dplyr::filter(Crime_data_long, `Principal offence` %in% input$OffenseValue)
      filtered_data <- Crime_data_long %>% filter(`Principal offence` %in% input$OffenseValue)
    }

    if (length(input$YearValue) < 1) {

```

```

    filtered_data <- filtered_data
  }
  else{
    filtered_data <- filtered_data %>% filter(Year %in% input$YearValue)
  }

  if (length(input$GenderValue) < 1) {
    filtered_data <- filtered_data
  }
  else{
    filtered_data <- filtered_data %>% filter(Gender %in% input$GenderValue)
  }

  if (length(input$GenderValue) > 2) {
    Gender_names_comma <- paste(input$GenderValue[-length(input$GenderValue)], collapse = ',
                                ')
    Gender_names <- paste0(Gender_names_comma, ", and ",
                          input$GenderValue[length(input$GenderValue)])
  } else {
    Gender_names <- paste(input$GenderValue, collapse = ' and ')
  }

  filtered_data <- filtered_data %>% filter(`Data Type` == input$TypeValue)
  # filtered_data <- filtered_data %>% filter(State == input$StateValue)
  # filtered_data <- filtered_data %>% filter(Gender == input$GenderValue)

  yTitle <- ifelse(input$TypeValue == "Rate", "Crime Rate (Per 100,000 population of Group)",
                  "Number of Crimes")

  MainTitle <- paste("Crime Statistics for different Offences in",input$StateValue,"
Australia","for:",Gender_names)

  if (input$StateValue == "All") {

```

```
filtered_data <- filtered_data
```

```
p1 <- # marker = list(sizeref=0.1)
```

```
plot_ly(filtered_data, x = ~`Principal offence`, y = ~Crime,color = ~State, frame = ~Year
,text = ~paste("Year: ",Year,"</br> Gender: ",Gender,"</br> State: ",State),
hovertemplate = paste('<b>Crime Rate: %{y:.2f}<br>',
                      'Offence: %{x}<br>',
                      '%{text}<br></b>')) %>%
```

```
layout(title = MainTitle,
```

```
  yaxis = list(title = yTitle, zeroline = FALSE),
```

```
  xaxis = list(title = "", zeroline = FALSE, tickangle = -15))
```

```
# alpha = 1, type = "scatter", mode = "markers",frame = ~Year,sizes = c(1,30)
```

```
}
```

```
else{
```

```
filtered_data <- filtered_data %>% filter(State == input$StateValue)
```

```
p1 <- # marker = list(sizeref=0.1)
```

```
plot_ly(filtered_data, x = ~`Principal offence`, y = ~Crime,color = ~Gender, frame = ~Year
,text = ~paste("Year: ",Year,"</br> Gender: ",Gender,"</br> State: ",State),
hovertemplate = paste('<b>Crime Rate: %{y:.2f}<br>',
                      'Offence: %{x}<br>',
                      '%{text}<br></b>')) %>%
```

```
layout(title = MainTitle,
```

```
  yaxis = list(title = yTitle, zeroline = FALSE),
```

```
  xaxis = list(title = "", zeroline = FALSE))
```

```
# alpha = 1, type = "scatter", mode = "markers",frame = ~Year,sizes = c(1,30)
```

```
}
```

```
p1
```

```
}}
```

```
output$StatewiseCrimePlot <- renderPlotly({
```

```
  if (length(input$AgeValue) < 1) {
```

```
    filtered_data_age <- Crime_data_long_age
```

```
  }
```

```
  else{
```

```
    # filtered_data_age <- dplyr::filter(Crime_data_long_age, Age %in% input$AgeValue)
```

```
    filtered_data_age <- Crime_data_long_age %>% filter(Age %in% input$AgeValue)
```

```
  }
```

```
  if (length(input$GenderValue) < 1) {
```

```
    filtered_data_age <- filtered_data_age
```

```
  }
```

```
  else{
```

```
    filtered_data_age <- filtered_data_age %>% filter(Gender %in% input$GenderValue)
```

```
  }
```

```
  if (length(input$GenderValue) > 2) {
```

```
    Gender_names_comma <- paste(input$GenderValue[-length(input$GenderValue)], collapse = ',  
                                ')
```

```
    Gender_names <- paste0(Gender_names_comma, ", and ",  
                           input$GenderValue[length(input$GenderValue)])
```

```
  } else {
```

```
    Gender_names <- paste(input$GenderValue, collapse = ' and ')
```

```
  }
```

```
  filtered_data_age <- filtered_data_age %>% filter(`Data Type` == input$TypeValue)
```

```
  filtered_data_age <- filtered_data_age %>% filter(State == input$StateValue2)
```



```

# filtered_data_age <- filtered_data_age %>% filter(Gender == input$GenderValue)

yTitle_age <- ifelse(input$TypeValue == "Rate", "Crime Rate(Per 100,000 population of Group)",
"Number of Crimes")

MainTitle_age <- paste("Crime Stats in",input$StateValue2,"for different Age groups
for:",Gender_names,"for last

                2 consecutive years")

# marker = list(sizeref=0.1)

plot_ly(filtered_data_age, x = ~Age, y = ~Crime,color = ~Year,

        text = ~paste("Year: ",Year,"</br> Gender: ",Gender,"</br> State: ",State), textposition = 'top'

        ,hovertemplate = paste('<b>Crime Rate: %{y:.2f}<br>',

                                'Age Group: %{x}<br>',

                                '%{text}</b>')) %>%

layout(title = MainTitle_age,

        yaxis = list(title = yTitle_age, zeroline = FALSE),

        xaxis = list(title = "Age Group", zeroline = FALSE))

})

}

# Run the application

shinyApp(ui = ui, server = server)

```