portfolio 2

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1.

I used the fertility_rate dataset from CDC. The dataset has data of fertility rate for each state in U.S. from 2014-2020. In this portfolio assignment, I visualized the fertility rate for each state from 2014 to 2020.

Some interesting fact: Firstly, between 2014 to 2020, states in Midwest and West have highest fertility rate in the U.S.; while Northeast always have lowest fertility rate in the U.S. Secondly, fertility rates in all states are decreasing, no matter what region they are in. Thirdly, the decreasing rates of fertility rate seems stable in these 7 years, which are surprising because most people believe Covid-19 is the most main reason of the drop of fertility rate.

The structure of the interface is side panel to control the region and state, which are defaulted as select all when you open the app. You can select the state you want to compare with the panel. In the main panel, there are a plot and a dataframe. The plot shows the fertility rate change for states over years. The dataframe shows the data used for the plot. The plot are colored by region, which is a change based on the suggestions of the portfolio 1. It helps the readers to clearly see the difference between region.

The reactive function in the server filter the dataset based on the regions and states selection of the user (Input: Region and State). The filtered dataset is later used into the graph and dataframe (Output: graph and dataframe).

```r
fertility_rate <- read.csv("birthrate.csv")
region <- read.csv("region.csv")

table <- merge(x=fertility_rate,y=region,
               by.x="STATE", by.y="State.Code",all.x=TRUE) %>%
  select(-c(STATE,BIRTHS,URL,Division)) %>%
  rename(Year = YEAR, Fertility_rate = FERTILITY.RATE)

table$Year = table$Year - 2000 #turn year 2015 to 15

table = table %>%
  filter(Year %in% 14:20) %>%  #only use fertility_rate from 14 to 20
  arrange(desc(Fertility_rate)) #rank fertility_rate

state = table %>%
  pull(State) %>%
  unique() #pull state with fertility rate from high to low

region <- table %>%
  pull(Region) %>%
  unique()
```

```r
ui <- fluidPage(
  sidebarLayout(
    sidebarPanel(
      # select region
      pickerInput("Region_input", "Region", choices = region, selected = region,
                  options = list(`actions-box` = TRUE), multiple = TRUE),
      # select state
      pickerInput("State_input", "State", choices = state, selected = state,
                  options = list(`actions-box` = TRUE), multiple = TRUE),
      width = 2
    ),
    mainPanel(
      plotOutput("graph_1", width = "1150px", height = "870px"),
      dataTableOutput("table_1")
    )
  )
)

server <- function(input, output, session) {
  table_1 <- reactive({
    table %>%
      filter(Region %in% input$Region_input) %>%
      filter(State %in% input$State_input)
  })

  observeEvent(input$Region_input,{
    # update state based on region input
    updatePickerInput(session, "State_input", choices = unique(table_1()$State),
                      selected = unique(table_1()$State))
  })

  options(ggrepel.max.overlaps = Inf)
  output$graph_1 <- renderPlot({
    ggplot(table_1(), aes(x=Year, y=Fertility_rate, # color line by region
                          group=interaction(State, Region), color=Region)) +
      geom_line() +
      theme(legend.position = "bottom", axis.title = element_text(size = 16),
            axis.text = element_text(size =12), panel.grid.major.y = element_blank(),
            legend.text=element_text(size=12)) +
      title("Fertility rate from 2014-2020") +
      ylab("Fertility rate") +
      scale_color_brewer(palette = "Set2") +
      geom_text_repel(aes(label = State), size = 5,
                      data = filter(table_1(), Year %in% c(14,20)),
                      show.legend = FALSE)
  }, height = 870, width = 1150)

  output$table_1 <- renderDataTable({
    table_1()
  })
}

app <- shinyApp(ui, server)
```

```
app
```

```
##
## Listening on http://127.0.0.1:4913
```

Region

| West, Midwest, South, Northeast | ▾ |

State

| Utah, North Dakota, South Dakota, Alaska, Nebraska, Idaho, Texas, Wyoming, Kansas, Oklahoma, Hawaii, Louisiana, Iowa, Arkansas, Montana, Arizona, Minnesota, Kent | ▾ |