Shiny about Cook Islands

Table of contents

1 data preprocess

```r
library(data.table)
library(ggplot2)
library(plotly)
library(glue)
readLines('data.txt')->info
grep('^#',info)->tou
cbind(tou,c(tail(tou,-1)-2,length(info)))->ww


lapply(1:nrow(ww),\(ii)
{
ww[ii,]->x
info[x[1]:x[2]]->inter
inter[0-1:2]->inter
strsplit(inter,"\\s+")->inter
```

```r
do.call('rbind',inter)->inter
as.data.table(inter)->inter
names(inter)<-c('year','value')
inter[,year:=as.integer(year)]
inter[,value:=as.numeric(gsub(",","",value))]
n2<-'value'
if(ii %% 3==1) n2<-'population'
if(ii %% 3==2) n2<-'GDP'
if(ii %% 3==0) n2<-'Tourist'
inter[,what:=n2]
inter[,country:=fcase(ii %in% 1:3,'Cook',ii %in% 4:6,'Fiji',ii %in% 7:9,'Tonga',default='')]
inter
})->dat

rbindlist(dat)->resu


###timeseries and forcast
library(forecast)

resu[,.N,.(what,country)]
split(resu,resu[,.(what,country)])->fen

lapply(fen,function(x)
{
x[order(year)]->x
x$value->xv
inter.ts<-ts(xv, start = x$year[1], frequency = 1)
inter.fit <- auto.arima(inter.ts)
inter.pred<-forecast(inter.fit, h = 2)
as.data.table(as.data.frame(inter.pred),keep='year')->inter.ok
inter.ok[,type:='Forecast']
setnames(inter.ok,'Point Forecast','value')
inter.ok[,what:=unique(x$what)]
inter.ok[,country:=unique(x$country)]
inter.ok
})->preds

rbindlist(preds)->preds


save(resu,preds,file='dataUsed.RData')
```

2

2 load libraries & data

```r
library(shiny)
library(shinydashboard)
library(leaflet)
library(ggplot2)
library(dplyr)
library(bslib)
library(shinyWidgets)
library(data.table)
load('dataUsed.RData')
```

3 the UI logic

```r
ui <- dashboardPage(
  skin = "green",

  dashboardHeader(title = "Cook  Islands"),

  dashboardSidebar(
    sidebarMenu(

      id = "Sidebar",

      ### MENUS
      menuItem("Homepage", tabName = "homepage", icon = icon("home"), badgeColor = "green"),
      menuItem("General Description", tabName = "general", icon = icon("info-circle"), startE
              menuSubItem("Map", tabName = "map", icon = icon("map-marker")),
              menuSubItem("Key Facts", tabName = "facts", icon = icon("key")),
              menuSubItem("Narrative", tabName = "narrative", icon = icon("align-left"))
      ),
      menuItem("Key Demographics", tabName = "demographics", icon = icon("globe")),
      menuItem("Regional Comparison", tabName = "comparison", icon = icon("chart-bar")),
      menuItem("SWOT Analysis", tabName = "swot", icon = icon("table"), badgeLabel = "hot!",
      menuItem("Reference & Special Thanks", tabName = "thanks", icon = icon("heart"))
    )
  ),

  dashboardBody(
```

```
## Set Font style and Background
tags$head(
  tags$style(HTML("
  .main-header .logo {font-family: 'Comic Sans MS', sans-serif; font-size: 18}
  .main-sidebar {font-family: 'Comic Sans MS', sans-serif; font-size: 16}
  .content-wrapper, .content-wrapper * {font-family: 'Comic Sans MS', sans-serif;font-si
  .content-wrapper:before {
      content: '';
      display: block;
      position: absolute;
      top: 0; bottom: 0; left: 0; right: 0;
      background: url('https://cookislands.travel/sites/default/files/2020-08/rarotonga_
      background-size: cover;
      opacity: 0.5;
      z-index: -1;
    }

  .image-container {
      display: flex;
      justify-content: space-around; /* Align images evenly */
      align-items: center; /* Center images vertically */
    }
  .image-container img {
      width: 200px; /* Set a fixed width */
      height: auto; /* Maintain aspect ratio */
    }

  .content-wrapper {
    position: relative;
    }
               "))
),

## Set Background Photo


tabItems(
  ## Homepage
  tabItem(tabName = "homepage",

          ## title
```

```
          hr(style = "border-top: 2px solid black; width: 90%;margin-top:5px;margin-botto
          hr(style = "border-top: 4px solid black; width: 90%; margin-top:5px;margin-bott
          h2("Welcome to",
             style = "text-align: center; font-style: italic; font-size: 35px"),
          h2("Cook Islands!",
             style = "text-align: center; font-style: italic; font-size: 55px"),
          hr(style = "border-top: 4px solid black; width: 90%; margin-top:5px;margin-bott
          hr(style = "border-top: 2px solid black; width: 90%;margin-top:5px;margin-botto
          div(p("By Lee"), style = "text-align: center;", textOutput(outputId = "currentl
          div(style = "height: 30px;"),

          ## Info box

          fluidRow(
            column(8,
                   infoBox(title = "General Description", value = "Map, Key Facts, and Na
                           subtitle = "Learn Basic information about Cook  Islands!",
                           color = "navy", width = NULL),
                   infoBox(title = "Key Demographics",
                           value = "Total Population, Education levels, Economic Activiti
                           subtitle = "See charts, graphs, and tables here!",
                           color = "blue", width = NULL),
                   infoBox("Regional Comparison", fill = TRUE,
                           value = "Comparison with Other Pacific Island Countries",
                           subtitle = "Check out differences in geography and economy!",
                           color = "light-blue", width = NULL),
                   infoBox("SWOT", fill = TRUE,
                           value = "strengths, weaknesses, opportunities, and threats",
                           subtitle = "Evaluation of Cook  Islands in a competitive posit
                           color = "teal", width = NULL)
            ),
            column(4,
                   img(src = "person.jpg", height = "100%", width = "100%", style = "bord
            )
          )

          ),

  ## GD: MAP
  tabItem(tabName = "map",
          h2("Map of Cook  Islands",
             style = "text-align: center; font-style: italic; font-size: 40px"),
```

```
            hr(style = "border-top: 2px solid black; width: 90%;margin-top:10px;margin-bott
            box(leafletOutput(outputId = "islandmap"), width = NULL,
              p("The Cook Islands is an island country in Polynesia,
part of Oceania in the South Pacific Ocean. It consists of 15 islands whose total land
area is approximately 236.7 square kilometres (91 sq mi).
The Cook Islands' Exclusive Economic Zone (EEZ) covers 1,960,027 square kilometres (756,771 s
Avarua is its capital."),
p("The Cook Islands comprise 15 islands split between two island groups, which have been cal
              )
            ),

      ## GD: Key Facts
      tabItem(tabName = "facts",
            h2("Key facts of Cook  Islands",
              style = "text-align: center; font-style: italic; font-size: 40px"),
            hr(style = "border-top: 2px solid black; width: 90%;margin-top:10px;margin-bott
            tabBox(
              id = "tabset1", height = "400px", width = NULL,

              tabPanel("Geography",
              HTML("    <p>The Cook Islands is a group of 15 islands located in the South I
    <ul>
        <li><strong>Southern Cook Islands:</strong> Includes Rarotonga, Aitutaki, and several
        <li><strong>Northern Cook Islands:</strong> Consists of less populated islands like I
    </ul>
    <p>The islands are characterized by their volcanic origins, lush vegetation, and coral at
    <ul>
        <li><strong>Mountains:</strong> Some islands have mountainous interiors, particularly
        <li><strong>Beaches:</strong> The islands are known for their beautiful white sandy l
        <li><strong>Lagoon:</strong> Most islands have a surrounding lagoon, rich in marine I
    </ul>
    <p>The climate is tropical, with warm temperatures year-round and a rainy season from Nov

    tags$img(src='administrative_divisions.png')


              ),
              tabPanel("History",
HTML("    <h4>1. Early Settlement</h4>
    <p>The first inhabitants of the Cook Islands were Polynesians, arriving around 1000 AD. 1

    <h4>2. European Exploration</h4>
    <p>In 1769, British explorer James Cook became the first European to visit the Cook Islar
```

```
    <h4>3. Colonial Period</h4>
    <p>In the 19th century, European powers began colonizing the South Pacific region. The Co

    <h4>4. Modern History</h4>
    <p>In 1965, the Cook Islands gained self-governance as a free association with New Zealan


    tags$div(class='image-container',
    tags$img(src="hist1.jpg"),
    tags$img(src="hist2.jpg")
    )


            ),

            tabPanel("Religion",
            HTML("<p>The Cook Islands has a rich religious landscape, primarily influence
<ul>
    <li><strong>Christianity:</strong> The predominant religion, with the majority of the
    <li><strong>Other Denominations:</strong> Other Christian groups present include Roma
    <li><strong>Indigenous Beliefs:</strong> Some traditional beliefs and practices still
</ul>
<p>Religious festivals and church activities play a significant role in community life, w

    tags$img(src="CHURCH_IN_AVARUA,_RAROTONGA,_COOK_ISLANDS.jpg")


            ),

            tabPanel("Culture",
            HTML("<p>The culture of the Cook Islands is a vibrant blend of Polynesian tra
<ul>
    <li><strong>Language:</strong> The official languages are English and Cook Islands Ma
    <li><strong>Dance and Music:</strong> Traditional dance forms, such as the 'ura' and
    <li><strong>Arts and Crafts:</strong> The islands are known for their handicrafts, in
    <li><strong>Cuisine:</strong> Cook Islands cuisine features local ingredients, such a
    <li><strong>Community and Family:</strong> Strong family ties and community involveme
</ul>
<p>Festivals and events, such as the annual Te Maeva Nui, celebrate the culture and herit
    tags$img(src="330px-Rarotonga-8-Maeva-Nui.jpg")


            )
)           ##end tabBox
            ),
```

```
      ## GD: Narrative
      tabItem(tabName = "narrative",
              box(width = NULL, div(class = "narrative-container",
                      h2("Narrative of Cook  Islands", style = "text-align: center; margin-bott
                      hr(style = "border-top: 2px solid black; width: 90%;margin-top:10px;marg:
                      HTML("
    <p>The Cook Islands, a stunning archipelago in the South Pacific, comprises 15 islands kr
    <p>Culture thrives in the Cook Islands, where traditional Polynesian customs blend seamle
"),

tags$div(class="image-container",
tags$img(src="fmiddle.jpg"),
tags$img(src="fleft.jpg"),
tags$img(src="fright.jpg")
)

              ))),

      ## Key Demographics
      tabItem(tabName = "demographics",
              h2("Key Demographics of Cook  Islands", style = "text-align: center; font-style
              hr(style = "border-top: 2px solid black; width: 90%;margin-top:10px;margin-bott

fluidRow(
column(6,
              prettyRadioButtons(
   inputId = "whatV",
   label = "What to Plot?",
    choices = unique(resu$what),
   #icon = icon("user"),
    animation = "tada",
    inline=T
)),
column(6,
              prettyRadioButtons(
   inputId = "plot1type",
   label = "Type of plot",
    choices = c('Scatter','Bar'),
   #icon = icon("user"),
    animation = "tada",
    inline=T
))
```

```r
        ),

plotOutput('plot1OUT')

                        ),

        ## Regional Comparison
        tabItem(tabName = "comparison",
                h2("Regional Comparsion", style = "text-align: center; font-style: italic; font
                hr(style = "border-top: 2px solid black; width: 90%;margin-top:10px;margin-bott
                tabBox(id = "tabset3", height = "400px", width = NULL,

                        ## Countries Introduction
                        tabPanel("Similar Island Countries",
                                div(class = "row",
                                        div(class = "col-sm-6",
                                            h3("Fiji"),
                                            p("Fiji and the Cook Islands are both stunning Pacific
                                            img(src = "https://upload.wikimedia.org/wikipedia/comm
                                        ),
                                        div(class = "col-sm-6",
                                            h3("Tonga"),
                                            p("Both are Pacific island nations with tropical clima
                                            img(src = "https://upload.wikimedia.org/wikipedia/comm
                                        )
)
                                ),

                        ## Total Population
                        tabPanel("Metrics Comparison",
                        fluidRow(
column(6,
            prettyRadioButtons(
   inputId = "whatV2",
   label = "What to Plot?",
    choices = unique(resu$what),
   #icon = icon("user"),
    animation = "tada",
    inline=T
)),
column(6,
            prettyRadioButtons(
```

```
      inputId = "plot2type",
      label = "Type of plot",
       choices = c('Scatter','Bar'),
      #icon = icon("user"),
       animation = "tada",
       inline=T
))
),
plotOutput('plot2OUT')
)


                )
                ),

       ## SWOT
       tabItem(tabName = "swot",
               h2("Strengths, Weaknesses,", style = "text-align: center; font-style: italic;
               h2("Opportunities, and Threats Analysis", style = "text-align: center; font-st
               hr(style = "border-top: 2px solid black; width: 90%;margin-top:10px;margin-bot

fluidRow(

                 box(title = "Strengths", status = "primary", solidHeader = TRUE, collapsible
                    fluidRow(box(title = "Natural Attractions", status = "primary", solidHead
                              tags$p('With pristine tropical beaches, coral reefs, and bea
                    fluidRow(box(title = "Stable Political Environment", status = "primary",
                              tags$p('The Cook Islands are a free association with New Zea
                    fluidRow(box(title = "Cultural Uniqueness", status = "primary", solidHead
                              tags$p('A rich Polynesian cultural heritage, including trad:
                    fluidRow(box(title = "Close Ties with New Zealand", status = "primary", s
                              tags$p('Citizenship is interconnected with New Zealand, allo
                  box(title = "Opportunities", status = "success", solidHeader = TRUE, collaps:
                    fluidRow(box(title = "Develop Sustainable Tourism", status = "success", s
                              tags$p('With the increasing global demand for eco-tourism, t
)),
                    fluidRow(box(title = "Expand Fisheries and Marine Economy", status = "su
                              tags$p('Utilize the vast exclusive economic zone to develop
)),
                    fluidRow(box(title = "Attract International Investment", status = "succes
                              tags$p('Government policies encourage foreign investment, a:
)),
                    fluidRow(box(title = "Strengthen Economic Cooperation with New Zealand a:
```

10

```r
                                     tags$p('Leverage the markets of New Zealand and Australia to
))),
           ),
           fluidRow(
             box(title = "Weaknesses", status = "warning", solidHeader = TRUE, collapsible
                  fluidRow(box(title = "Economic Monoculture", status = "warning", solidHea
                                tags$p('The economy is highly dependent on tourism, lacking
                  fluidRow(box(title = "Geographical Isolation", status = "warning", solidH
                                tags$p('Located in the South Pacific, transportation is inc
                  fluidRow(box(title = "Small and Aging Population", status = "warning", so
                                tags$p('The limited workforce and outflow of young people r
                  fluidRow(box(title = "Scarcity of Natural Resources", status = "warning"
                                tags$p('Limited exploitable resources, small-scale agricult
             box(title = "Threats", status = "danger", solidHeader = TRUE, collapsible =
                  fluidRow(box(title = "Climate Change and Natural Disasters", status = "da
                                tags$p('Facing climate threats such as rising sea levels an
)),
                  fluidRow(box(title = "Global Economic Uncertainty", status = "danger", s
                                tags$p('A slowdown in the international economy or pandemics
)),
                  fluidRow(box(title = "Competition with Other Pacific Tourist Destination
                                tags$p('Countries like Fiji and Vanuatu are also developing
)),
                  fluidRow(box(title = "Overtourism and Environmental Degradation", status
                                tags$p('An increase in the number of tourists may lead to e
))),
           ),

    ),

    ## Reference and Special Thanks
    tabItem(tabName = "thanks",
           h2("Reference & Special Thanks", style = "text-align: center; font-style: ital
           hr(style = "border-top: 2px solid black; width: 90%;margin-top:10px;margin-bot
           tabBox(id = "tabset4", width = NULL, height = "250px",
                   tabPanel("Data Sources",
                            a("Wikipedia of Cook  Islands", href = "https://en.wikipedia.o
                   tabPanel("Technical References",
                            a("Mastering Shiny", href = "https://mastering-shiny.org/index
                            p(""),
                            a("leaflet for R", href = "https://rstudio.github.io/leaflet/"
                            p(""),
```

11

```
                                a("Shiny Dashboard", href = "https://rstudio.github.io/shinydas
                                p(""),
                                a("ChatGPT", href = "https://chat.openai.com")),
                        tabPanel("Literature References",
                                a("Wikipedia of Cook Islands", href = "https://en.wikipedia.org
                                p(""),
                                a("Wikipedia of Figi", href = "https://en.wikipedia.org/wiki/Fi
                                p(""),
                                a("Wikipedia of Tonga", href = "https://en.wikipedia.org/wiki/T
                                p(""),
                                a("ChatGPT", href = "https://chat.openai.com")),
                        tabPanel("Speical Thanks",
                                h4("Haviland Wright, Ph.D.", style = "text-align: center"),
))
                )
                )


        )
)
```

4 the server logic

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

  ## Homepage Date
  output$currentDate <- renderText({
    format(Sys.Date(), "%Y-%m-%d, %A")
  })

  ## Leaflet Map
  output$islandmap <- renderLeaflet({
    leaflet() |>
      addProviderTiles(providers$Esri.WorldStreetMap)|>
      addMarkers(lng = -159.785278, lat = -18.857952, popup=HTML("Cook Islands<br/>168.7345 K
      setView(lng = -159.785278, lat = -18.857952, zoom = 7) |>
      addCircles(lng = -159.785278, lat = -18.857952, weight = 1,
                radius = 50000,
                color = "black", fillColor = "lightgreen",
```

```
                  fillOpacity = 0.2, popup=HTML("Cook Islands<br/>159.7777° W, 21.2367° S"))
  })


###
output$plot1OUT<-renderPlot({
inter<-resu[what==input$whatV & country=='Cook']

if(input$plot1type=='Scatter')
{
ggplot(inter,aes(x=year,y=value))+
   geom_point(colour='#8EEBEC')+
   geom_line(group='a',colour='#8EEBEC')+
   theme_bw()+
   scale_x_continuous(breaks=inter$year)+
   labs(x='Year',y=input$whatV,title=paste('Time chart of ',input$whatV,'of Cook Islands'))
} else {
ggplot(inter,aes(x=year,y=value))+
   geom_bar(stat='identity',width=0.5,fill='#8EEBEC')+
   theme_bw()+
   scale_x_continuous(breaks=inter$year)+
   labs(x='Year',y=input$whatV,title=paste('Time chart of ',input$whatV,'of Cook Islands'))
}


})


###
###
output$plot2OUT<-renderPlot({
inter2<-resu[what==input$whatV2]
zu<-resu[,CJ(unique(year),unique(country))]
names(zu)<-c('year','country')
inter2[zu,on=c('year','country')]->inter2


if(input$plot2type=='Scatter')
{
ggplot(inter2,aes(x=year,y=value,group=country,colour=country))+
   geom_point()+
   geom_line()+
```

```r
    theme_bw()+
    scale_x_continuous(breaks=unique(inter2$year))+
    labs(x='Year',y=input$whatV,colour='Islands')+
    scale_y_continuous(trans='log10')
} else {
ggplot(inter2,aes(x=year,y=value,fill=country))+
    geom_bar(stat='identity',position='dodge')+
    theme_bw()+
    scale_x_continuous(breaks=unique(inter2$year))+
    labs(x='Year',y=input$whatV,fill='Islands')+
    scale_y_continuous(trans='log10')
}


})
}
```

5 run shiny app

```r
shinyApp(ui, server)
```