

Shiny Module

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강의의 진행

이번 강의는 live coding으로 진행되므로 및 RStudio가 설치된 노트북이 필요하다

패키지 설치

이번 강의를 위해 다음 패키지의 설치가 필요하다.

- `install.packages(c("editData","ggplotAssist"))`
- `devtools::install_github("cardiomoon/webr")`

예제 소스 파일

이번 강의에 사용되는 예제 소스 파일들은 다음 `github`에서 다운로드 받을수 있다.

<https://github.com/cardiomoon/shinyLecture2>

- `tower_of_hanoi.R` # 하노이의 탑
- `/inst/` 폴더의 모든 파일들

Scoping Rule(1)

```
x <- 1
y <- 2

sum=function(x,y){
  x<-x+y
  x
}
sum(x,y)
x
```

sum(x,y) 및 x의 출력은?

Scoping Rule(1-1)

```
x <- 1  
y <- 2  
  
sum=function(x,y){  
  x<-x+y  
  x  
}  
sum(x,y)
```

```
[1] 3
```

```
x
```

```
[1] 1
```

Scoping Rule(2)

```
x <- 1
y <- 2

sum=function(x,y){
  x<-x+y
  x
}
sum(x,y)
x
```

sum(x,y) 및 x의 출력은?

Scoping Rule(2-1)

```
x <- 1  
y <- 2  
  
sum=function(x,y){  
  x<-x+y  
  x  
}  
sum(x,y)
```

```
[1] 1
```

```
x
```

```
[1] 3
```

Scoping Rule(2-2)

```
x <- 1
y <- 2

sum=function(a,b){
  x<-a+b
  x
}
sum(x,y)
x
```

Scoping Rule(2-3)

```
x <- 1  
y <- 2  
  
sum=function(a,b){  
  x<-a+b  
  x  
}  
sum(x,y)
```

[1] 3

```
x
```

[1] 3

Scoping rules for Shiny apps(1)

```
library(shiny)

### objects(1)

ui=fluidPage(
  verbatimTextOutput("text")
)
server=function(input,output,session){
  ### objects(2)

  output$text=renderPrint({
    ### objects(3)
    ...
  })
}
shinyApp(ui,server)
```

Scoping rules for Shiny apps(2)

```
library(shiny)

### objects(1) ; are shared across all sessions in the same R process

ui=fluidPage(
  verbatimTextOutput("text")
)
server=function(input,output,session){
  ### objects(2) ; Objects here are defined in each session

  output$text=renderPrint({
    ### objects(3) ; are defined each time this function is called
    ...
  })
}
shinyApp(ui,server)
```

Exercise

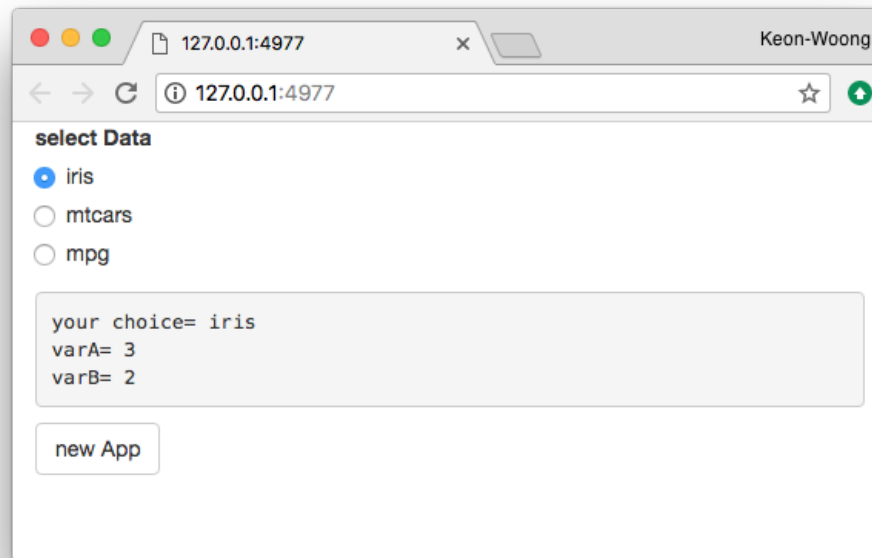
```
varA <- 1
varB <- 1

ui=fluidPage(
  radioButtons("select","select Data",choices=c("iris","mtcars","mpg"),
  verbatimTextOutput("text"),
  actionButton("newApp","new App")
)
server=function(input,output,session){

  varA <- varA + 1
  varB <- varB + 1

  output$text=renderPrint({
    cat("your choice=",input$select,"\n")
    varA <- varA+1
    cat("varA=",varA,"\n")
    cat("varB=",varB,"\n")
  })
}
```

Exercise : Scoping Rule



```
shiny::runGitHub('shinyLecture2', 'cardiomoon', subdir='inst/app21')
```

Modularizing Shiny App Code

- shiny app의 규모가 점점 커짐에 따라 namespace 문제가 발생
- shiny app의 input과 output의 ID는 global namespace를 share하고 있다.
- server function에서 input과 output을 만들 때 ID가 서로 충돌하면 안됨
- 이를 해결하기 위해 shiny app의 일부를 shiny module로 제작

모듈화의 장점

- 재사용이 쉽다.
- 재귀호출이 가능하다
- 유지보수가 쉽다
- 협업이 가능하다.

shiny module 의 제작 : editData 패키지의 예

- UI 제작 :

```
editableDTUI(id)
```

- Server function의 제작

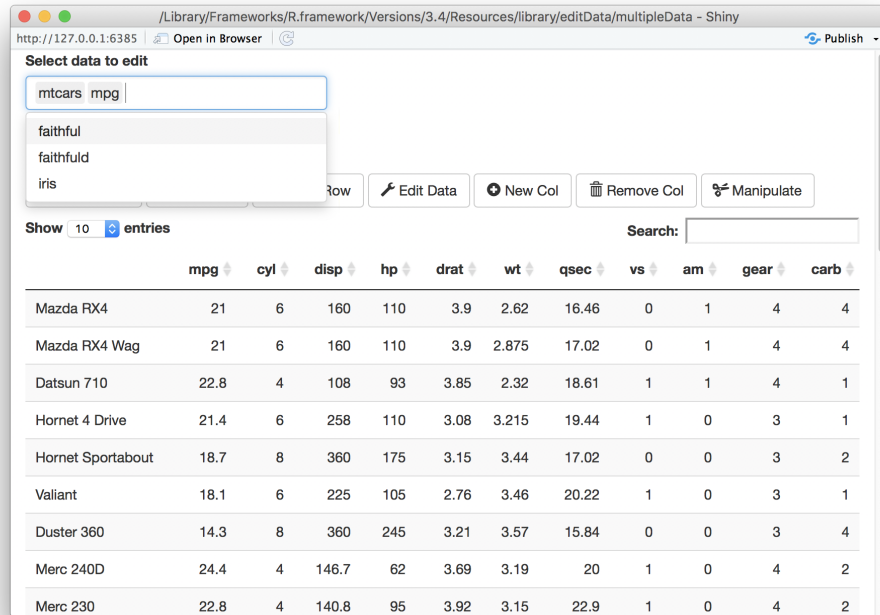
```
editableDT(input, output, session, dataname = reactive(""),  
  data = reactive(NULL), inputwidth = reactive(100))
```

editableDTUI

```
editableDTUI <- function(id){  
  ns=NS(id)  
  fluidPage(  
    fluidRow(  
      actionButton(ns("delRow"),"Delete Row",icon=icon("remove",1  
      actionButton(ns("addRow"),"Add New",icon=icon("plus",lib="{  
      actionButton(ns("insertRow"),"Insert Row",icon=icon("hand-u  
      actionButton(ns("editData"),"Edit Data",icon=icon("wrench"  
      actionButton(ns("newCol"),"New Col",icon=icon("plus-sign",1  
      actionButton(ns("removeCol"),"Remove Col",icon=icon("trash"  
      radioButton3(ns("selection"),"Data Selection",choices=c("s  
        inline=TRUE,labelwidth=130,align="center"),  
      p(""),  
      DT::dataTableOutput(ns("origTable")),  
      conditionalPanel(condition="true==false",  
        numericInput(ns("width2"),"width2",value=100  
        textInput(ns("result"),"result",value=""),  
        numericInput(ns("no"),"no",value=1))  
    )  
  )  
}
```


Shiny Module의 장점 : 재사용

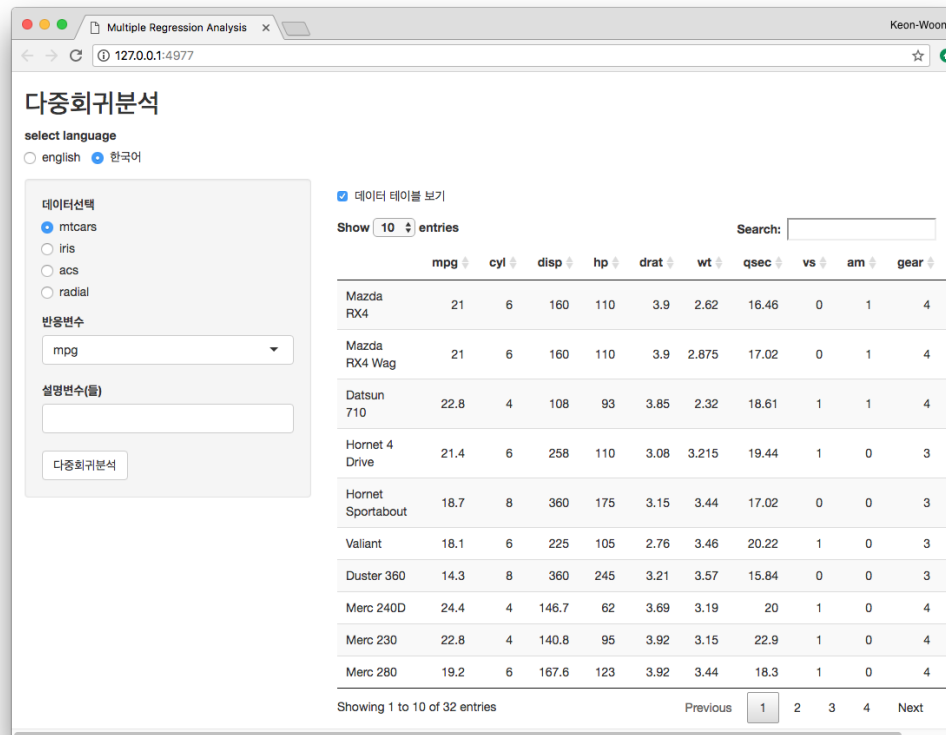
- multiple editData() function



```
shiny::runApp(system.file('multipleData', package='editData'))
```

샤이니 모듈의 시작 : uiOutput

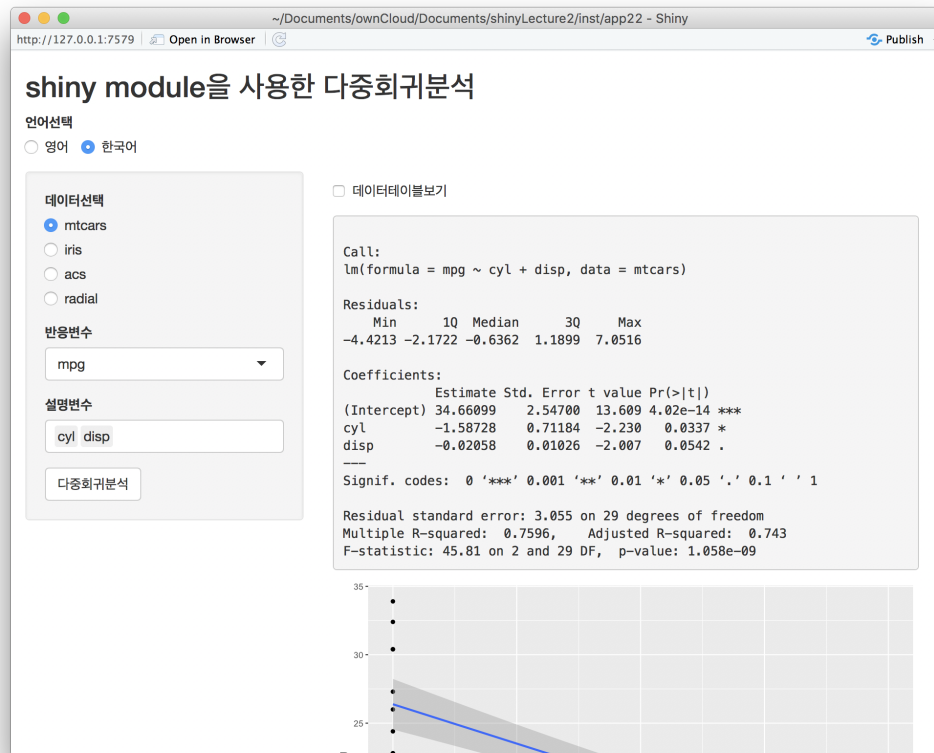
지난 시간 만들었던 다중회귀분석 앱을 한국어/영어를 지원하는 앱으로 바꾸어 본다.



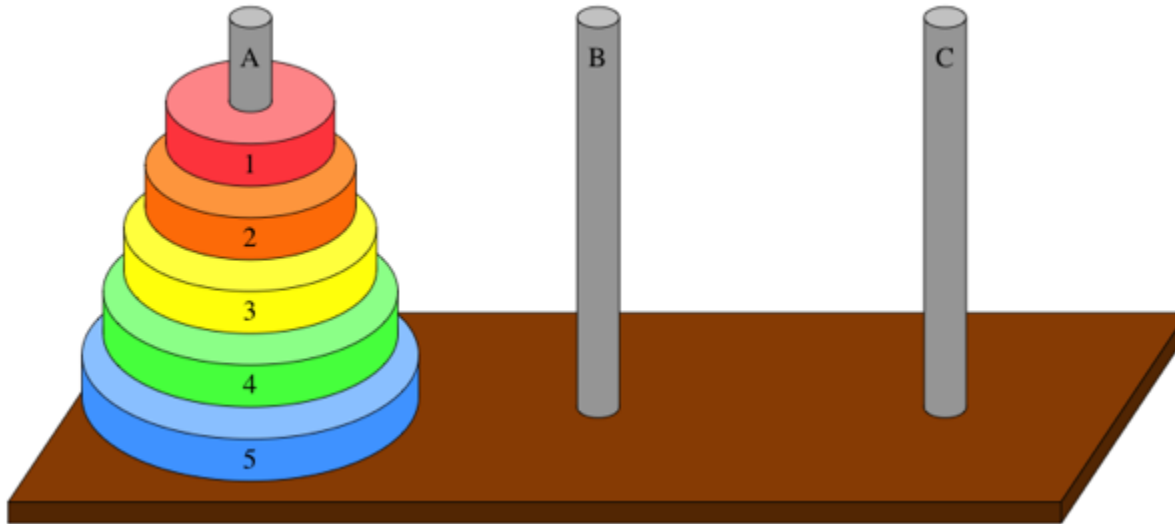
```
shiny::runGitHub('shinyLecture2', 'cardiomoon', subdir='inst/app20')
```

uiOutput을 샤이니 모듈로

바로 전에 만들었던 다중회귀분석 앱의 uiOutput을 샤이니 모듈로 바꾸어 본다.



재귀호출 : Recursive Call



하노이의 탑 https://en.wikipedia.org/wiki/Tower_of_Hanoi

R을 이용한 하노이의 탑 문제 해결

https://github.com/cardiomoon/shinyLecture2/blob/master/tower_of_hanoi.R

tower_of_hanoi.R

```
tower_of_hanoi <- function(n = 7) {  
  ...  
  move.hanoi <- function(k, from, to, via) {  
    if (k > 1) {  
      move.hanoi(k - 1, from, via, to)  
      move.hanoi(1, from, to, via)  
      move.hanoi(k - 1, via, to, from)  
    }  
    else {  
      cat("Move ", tower[[from]][1], " from ", LETTERS[from],  
          " to ", LETTERS[to], "\n")  
      tower[[to]] <- c(tower[[from]][1], tower[[to]])  
      tower[[from]] <- tower[[from]][-1]  
      draw.hanoi()  
      Sys.sleep(0.5)  
    }  
  }  
  draw.hanoi()  
  move.hanoi(n, 1, 2, 3)  
  par(mfrow = c(1, 1))  
}
```

ggplotAssist 개발시 문제점

```
?ggplot2::geom_point
```

비교적 간단한 함수의 경우 shiny app을 통한 구현이 쉽다.

```
geom_point(mapping = NULL, data = NULL, stat = "identity",  
  position = "identity", ..., na.rm = FALSE, show.legend = NA,  
  inherit.aes = TRUE)
```

ggplotAssist 개발시 문제점

```
?ggplot2::guide_colourbar
```

어떤 함수는 함수의 인수로 함수가 들어가고 또 그 함수의 인수로 함수가 들어간다.

```
guide_colourbar(title = waiver(), title.position = NULL,  
  title.theme = NULL, title.hjust = NULL, title.vjust = NULL,  
  label = TRUE, label.position = NULL, label.theme = NULL,  
  label.hjust = NULL, label.vjust = NULL, barwidth = NULL,  
  barheight = NULL, nbin = 20, raster = TRUE, ticks = TRUE,  
  draw.ulim = TRUE, draw.llim = TRUE, direction = NULL,  
  default.unit = "line", reverse = FALSE, order = 0, ...)
```

해결방법: Recursive Shiny Module(1)

Recursive Shiny Module for Functionals

There are many functions that takes a function as an input : `Functionals` . To handle a functional in a shiny app, you have to make a shiny module that allows `recursive` call. I have included an recursive shiny module `textFunction` in my package `ggplotAssist`. The UI of `textFunction` shiny module is `textFunctionInput` and the server function is `textFunction` . Please try to enter the `element_text()` in the following textInput.

textFunctionInput

`element_text()`

family **face** **colour** **size** **hjust** **vjust**

`NULL` `NULL` `NULL` `NULL` `NULL` `NULL`

angle **lineheight** **margin** ☐ **debug**

`NULL` `NULL` `margin()`

`element_text()`

```
shiny::runApp(system.file('textFunctionExample',  
                           package='ggplotAssist'))
```


해결방법: Recursive Shiny Module(1)

Recursive Shiny Module for Functionals

There are many functions that takes a function as an input : `Functionals` . To handle a functional in a shiny app, you have to make a shiny module that allows `recursive` call. I have included an recursive shiny module `textFunction` in my package `ggplotAssist`. The UI of `textFunction` shiny module is `textFunctionInput` and the server function is `textFunction` . Please try to select one of the functions in the following selectInput.

Select function

`guide_colorbar()`

title: `waiver()`, title.position: `element_text()`, title.theme: `element_text()`, title.hjust: `label`, title.vjust: `label`, label.position: `label`, label.theme: `element_text()`, label.hjust: `label`, label.vjust: `label`, direction: `line`, default.unit: `reverse`, order: `0`, barwidth: `A numeric or a unit() object`, barheight: `A numeric or a unit() object`, nbin: `20`, raster: `draw.ulim`, ticks: `draw.ulim`, draw.ulim: `draw.ulim`

```
shiny::runApp(system.file('textFunctionExample2',  
                           package='ggplotAssist'))
```

자동차 생산의 모듈화

자동차 생산 모듈화 - 네이버 블로그

"웹에서 하는 R 통계분석" 개발시 문제점

The screenshot shows the Web-R.org web application interface. The browser address bar indicates the URL: workshop-elb-365021347.ap-northeast-2.elb.amazonaws.com/betam3/. The page title is "Web-based analysis with R v3.1".

Below the title, a paragraph explains the app's functionality: "With this app, you can perform analysis **without** R in your computer. You can **analyze** data, make **tables** and **plots** and download the report as a **powerpoint** file. You can also download the high-quality plots with desired size and resolution."

A "Select Language" section shows "English" selected (indicated by a blue dot) and "한국어(Korean)" as an option. Below this is a checkbox for "make table as vanilla table".

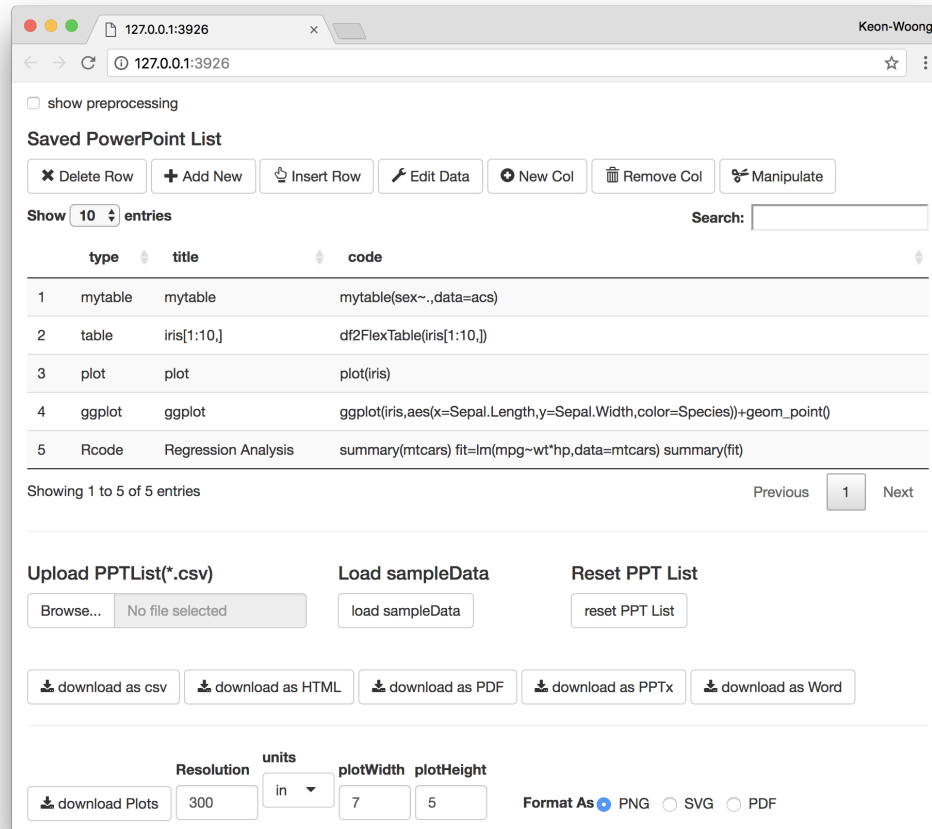
A red navigation bar contains the following menu items: Data, Table, Descriptive, ExploPlots, Compare, Categorical, Multiple Group, Regression, survival, Tree Analysis, Diagnosis, ROC curve. Below this bar, a secondary row of links includes: R command, Report/Plot Options, Pubmed Wordcloud, Propensity Score Matching, Principal component, Validation, citation Information, and PPT List.

A paragraph instructs the user: "Please **select** one of sample data or **upload** your own. You can upload data as a **csv**, **xlsx** (Microsoft Excel), **dbf** (dbase 3+), **sav** (SPSS), **dta** (STATA), **sas7bdat** (SAS) format. If you have any error, please upload as a **csv** format."

The interface is divided into two main sections for data handling:

- Upload data(*.csv preferred):** This section includes a "Browse..." button (which shows "No file selected") and a list of sample datasets to choose from: acs (selected), radial, colon, GBSG2, iris, lalonde, decathlon2, CO2, breslow.dat, UScereal, Salaries, and dirty. There is also a "show help for data" checkbox and a "Data files in Server" button.
- Preprocessing:** This section has a checkbox for "Do preprocessing" (which is currently unchecked) and a "Reset preprocessing" button. Below the checkbox is a text area for entering R commands, with a note: "You can preprocess the data by entering the R command(s) here. Please uncheck the checkbox before enter/change the R command(s) and recheck the checkbox." At the bottom of this section is a text input field for "Enter the data name", which currently contains the value "acs".

샤이니 모듈: pptxList



샤이니 모듈: pptxList 소스파일

```
library(shiny)
library(webR)

ui=fluidPage(
  pptxListInput("pptxlist")
)
server=function(input,output,session){
  mydf<-callModule(pptxList,"pptxlist")
}
shinyApp(ui,server)
```

데이터 입력, 전처리, 출력 모듈화

The screenshot shows a web browser window with the URL `workshop-elb-365021347.ap-northeast-2.elb.amazonaws.com/rio/`. The page title is "웹에서 하는 R 통계분석 3.6". Below the title, there is a paragraph explaining that users can perform R statistical analysis without installing R on their computer by using the Web-R.org service. It mentions that users can select from various datasets and save the results as PDF, DOCX, or PowerPoint files. A "Select Language" section shows "한국어(Korean)" selected. Below this is a navigation bar with "Web-R.org", "DataSelect", "dataWrangling", and "PPTxList". A note about file formats follows, listing supported formats like CSV, XLSX, DBF, SAV, DTA, and SAS7BDAT. The main interface is divided into two columns. The left column, titled "파일 업로드" (File Upload), has a "Browse..." button and a "No file selected" status. Below it, the "데이터선택" (Data Selection) section lists several datasets: "acs" (selected), "radial", "colon", "iris", "dirty", and "band_members", along with a "데이터 도움말 보기" (View Data Help) link. The right column, titled "데이터 전처리하기" (Data Preprocessing), has a "전처리하기" (Preprocess) button and a "전처리 초기화" (Reset Preprocessing) button. It contains a text box with instructions on how to preprocess data by selecting R packages. Below this, the "데이터이름" (Data Name) field is filled with "mtcars". At the bottom left, there is a "Data files in Server" button.

웹에서 하는 R 통계분석 3.6

자신의 컴퓨터에 R을 설치할 필요 없이 R을 이용한 통계분석을 할 수 있습니다. 그뿐만 아니라 행변수와 행변수를 선택하여 쉽게 표를 만들 수 있으며 그래프를 통한 자료 탐색과 여러가지 통계분석이 가능합니다. 자신의 데이터를 csv 형식으로 업로드하여 분석을 할 수 있을 뿐 아니라 그 결과를 pdf, docx, powerpoint 파일로 다운로드할 수 있습니다. 또한 Plot을 원하는 크기로 저장할 수 있습니다. 표가 보일 때까지 잠시만 기다려주세요.

Select Language
☐ English ☒ 한국어(Korean)

Web-R.org DataSelect dataWrangling PPTxList

샘플 데이터를 선택 하시거나 자료를 업로드 하세요. 현재 지원하는 파일 형식은 csv, xlsx (Microsoft Excel), dbf (dbase 3+), sav (SPSS), dta (STATA), sas7bdat (SAS) 파일 등이나 예러가 있을 경우 csv 형식으로 바꾸어 업로드할 것을 권장합니다.

파일 업로드
Browse... No file selected

데이터선택
☒ acs
☐ radial
☐ colon
☐ iris
☐ dirty
☐ band_members
☐ 데이터 도움말 보기

데이터 전처리하기
☐ 전처리하기 전처리 초기화

여기에 R명령어를 입력하면 데이터를 전처리할 수 있습니다. R 명령어를 입력/수정하기 전에 체크박스를 해제하고 입력후 다시 체크박스를 선택하시기 바랍니다.

데이터이름
mtcars

Data files in Server

ui.R

```
ui=fluidPage(  
  uiOutput("title"),  
  radioButtons(inputId = "language", label = "Select Language",  
               choices = list("English" = "en", "한국어(Korean)" =  
                 selected = "en",inline=TRUE),  
  
  navbarPage( "Web-R.org",  
    tabPanel("DataSelect",  
             dataSelectInput("data"),  
             tableOutput("table3")  
    ),  
    tabPanel("dataWrangling",  
             prepInput("pre")),  
    tabPanel("PPTxList",  
             pptxListInput("List1")),  
    id='main',  
    theme=shinytheme("united"))  
)
```

server.R

```
server=function(input,output,session){

  dataEx=c("acs", "radial", "colon","iris","dirty","band_members")

  langchoice=function(en,kor){
    ifelse(input$language=="en",en,kor)
  }
  result=callModule(dataSelect,"data",
                    dataEx=reactive(dataEx),
                    lang=reactive(input$language))

  df=callModule(prepare,"pre",dataname=reactive(result())$name),
    preprocessing=reactive(result())$preprocessing),
    lang=reactive(input$language))
  callModule(pptxList,"List1")

  output$table3=renderTable({head(df(),10)})
}
```


web-R.org

웹R에서 샤이니업을 공동개발할 개발팀/학술팀을 모집합니다.

The screenshot shows the web-R.org website. The main heading is "웹에서 하는 R 통계" (R Statistics on the Web). Below it, there's a navigation bar with links: Home, 웹에서 하는 R 통계, 책 게시판, 게시판, Servers, and 정회원대뉴. The main content area features a large welcome message: "Web-R.org 에 오신 것을 환영합니다." (Welcome to Web-R.org). The message explains that the website is a project for R users to share and develop R packages and Shiny apps. It mentions that the website is currently in a beta phase and that users can join as members. The message also mentions that the website is currently in a beta phase and that users can join as members. Below the welcome message, there's a section titled "cardiomoon 로그아웃" (cardiomoon Logout) with a list of links: 회원정보 보기, 로그인 보기, 비밀번호 찾기, 회원가입 보기, and 관리자. To the right of this section, there's a table with columns: 현재 접속중 (Currently Online), 접속통계 (Access Statistics), 글작성 (Post Writing), 댓글작성 (Reply Writing), and 이번주 조회수 (This Week's Views). The table lists the names of the users and their respective statistics.

현재 접속중	접속통계	글작성	댓글작성	이번주 조회수
cardiomoon	오늘: 246 어제: 350 전체: 224,162	1. cardiomoon ³ 2. 통계장님 ² 3. 스튜던트 ¹ 4. schjoo ¹ 5. suein ¹ 6. 김기욱 ¹ 7. 설승환 ¹	1. cardiomoon ³⁰ 2. 박만영 ¹ 3. 스튜던트 ¹ 4. suein ¹ 2018-03-12 ~ 2018-03-18	1. 스튜던트 ¹⁹ 2. cardiomoon ⁹ 3. suein ⁹ 4. 통계장님 ⁶ 5. schjoo ⁵ 6. 김기욱 ² 7. 설승환 ² 2018-03-12 ~ 2018-03-18