

Creació d'Aplicacions Interactives amb servidor Shiny

Curs R Avançat Equips - Sessió 5

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Avui

Creació d'Aplicacions Interactives amb servidor Shiny, i conèixer l'existència d'algunes les altres opcions en R també.

1. Introducció a R Shiny

Aplicacions dinàmiques i interactives, amb components reactius, que requereixen de servidor shiny on col.locar les aplicacions.

- Shiny: <https://www.rstudio.com/products/shiny/>^[1]

Veure alguna aplicació feta amb Shiny (requereix servidor de R i de Shiny), del tipus:

- Exemple senzill: <https://dades.ajuntament.barcelona.cat/estadistiques-cens-comercial/>^[2]
- Exemple avançat: <https://dades.ajuntament.barcelona.cat/la-ciutat-al-dia/>^[3]

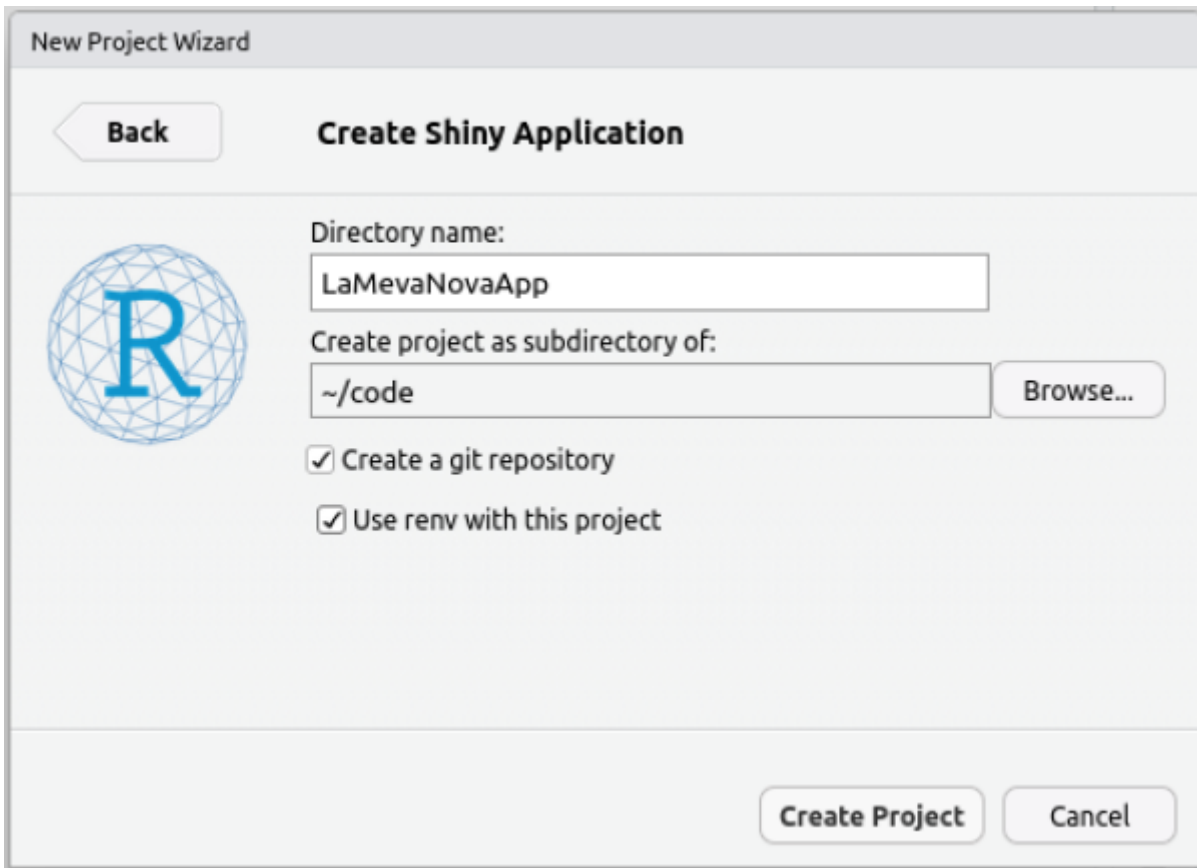
Treball pràctic de creació d'un dashboard amb Shiny i modificació.

Es pot aprendre com fer-ne apps Shiny, a poc a poc, a través de:

<https://mastering-shiny.org/basic-app.html>^[4]

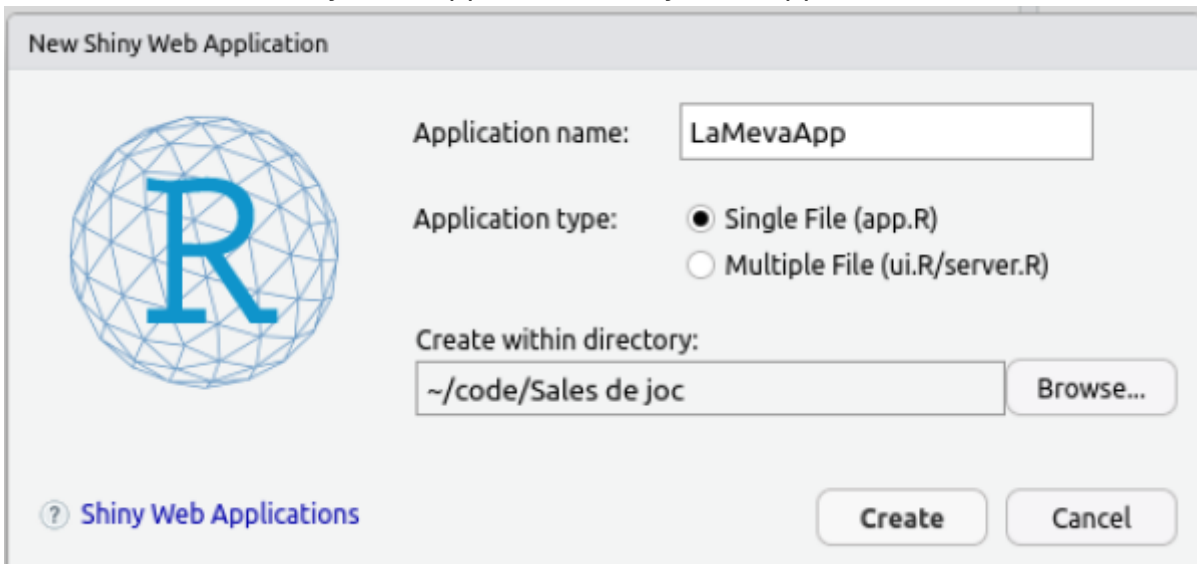
Es pot començar emprant una plantilla base que proporciona RStudio en fer un projecte nou de tipus Shiny App:

- File > New Project > New Directory > Shiny Web Application



O si es vol afegir dins un projecte de RStudio pre-existent:

- File > New File > Shiny Web App > New Shiny Web Application.



O es pot emprar una plantilla base a través del **ShinyUIEditor**, que empra a la seva vegada una disposició versàtil de tipus gridlayout

Build Shiny application UIs by dragging-and-dropping. Generates clean and proper code as you build.

1.1. Estructura d'una app shiny

En crear una app shiny a partir d'un arxiu nou dins un projecte de Rstudio pre-existent, se'ns crea aquest arxiu `app.R`:

Contingut de l'arxiu app.R



```
#
# This is a Shiny web application. You can run the application by clicking
# the 'Run App' button above.
#
# Find out more about building applications with Shiny here:
#
#   http://shiny.rstudio.com/
#

library(shiny)

# Define UI for application that draws a histogram
ui <- fluidPage(

  # Application title
  titlePanel("Old Faithful Geyser Data"),

  # Sidebar with a slider input for number of bins
  sidebarLayout(
    sidebarPanel(
      sliderInput("bins",
                  "Number of bins:",
                  min = 1,
                  max = 50,
                  value = 30)
    ),

    # Show a plot of the generated distribution
    mainPanel(
      plotOutput("distPlot")
    )
  )
)

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

  output$distPlot <- renderPlot({
    # generate bins based on input$bins from ui.R
    x <- faithful[, 2]
```

```

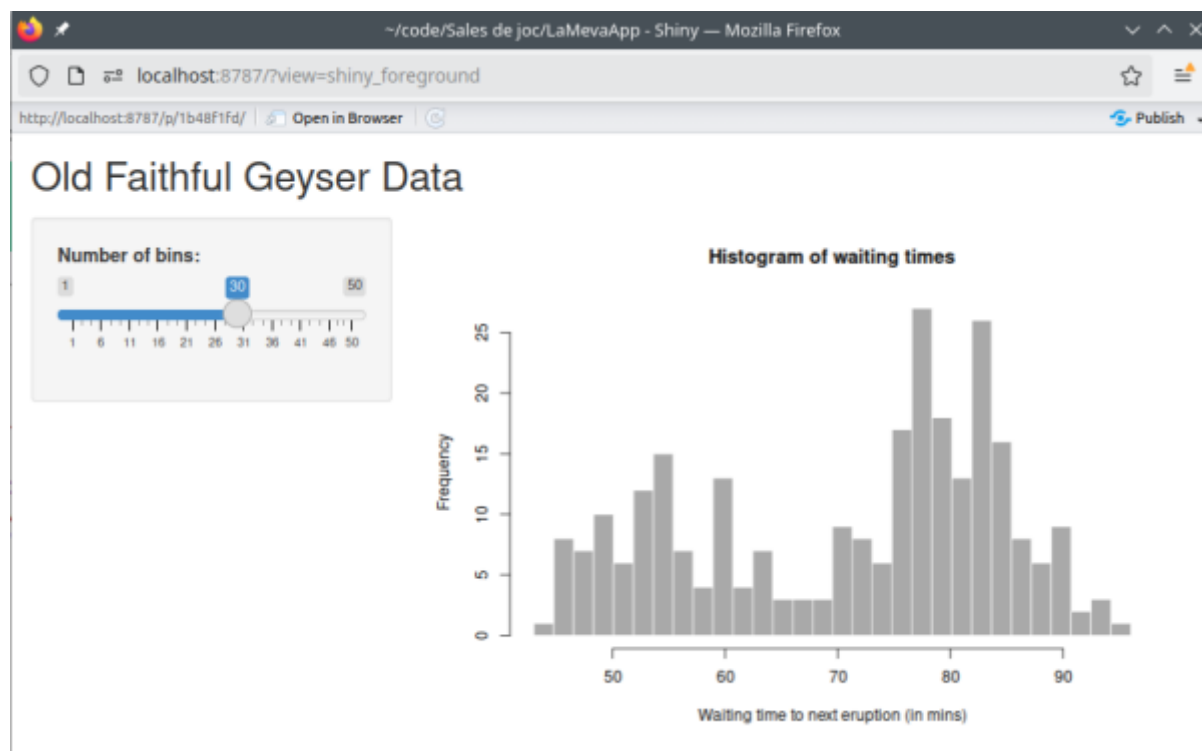
bins <- seq(min(x), max(x), length.out = input$bins + 1)

# draw the histogram with the specified number of bins
hist(x, breaks = bins, col = 'darkgray', border = 'white',
     xlab = 'Waiting time to next eruption (in mins)',
     main = 'Histogram of waiting times')
})
}

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

```

En clicar al botó de "RunApp" se'ns aixeca una finestra emergent amb aquest contingut:



A partir d'aquí, podríem anar retocant el codi de l'app.R per fer evolucionar la app.

O bé, podem començar a partir del [shinyuieditor](#), que ens permetrà començar ja amb una interfícies shiny molt més avançada per ajustar-se al que volíem per a la nostra app Shiny.

1.2. ShinyUIEditor

<https://rstudio.github.io/shinyuieditor/>^[5]

1.3. App demo shiny-sales-de-joc

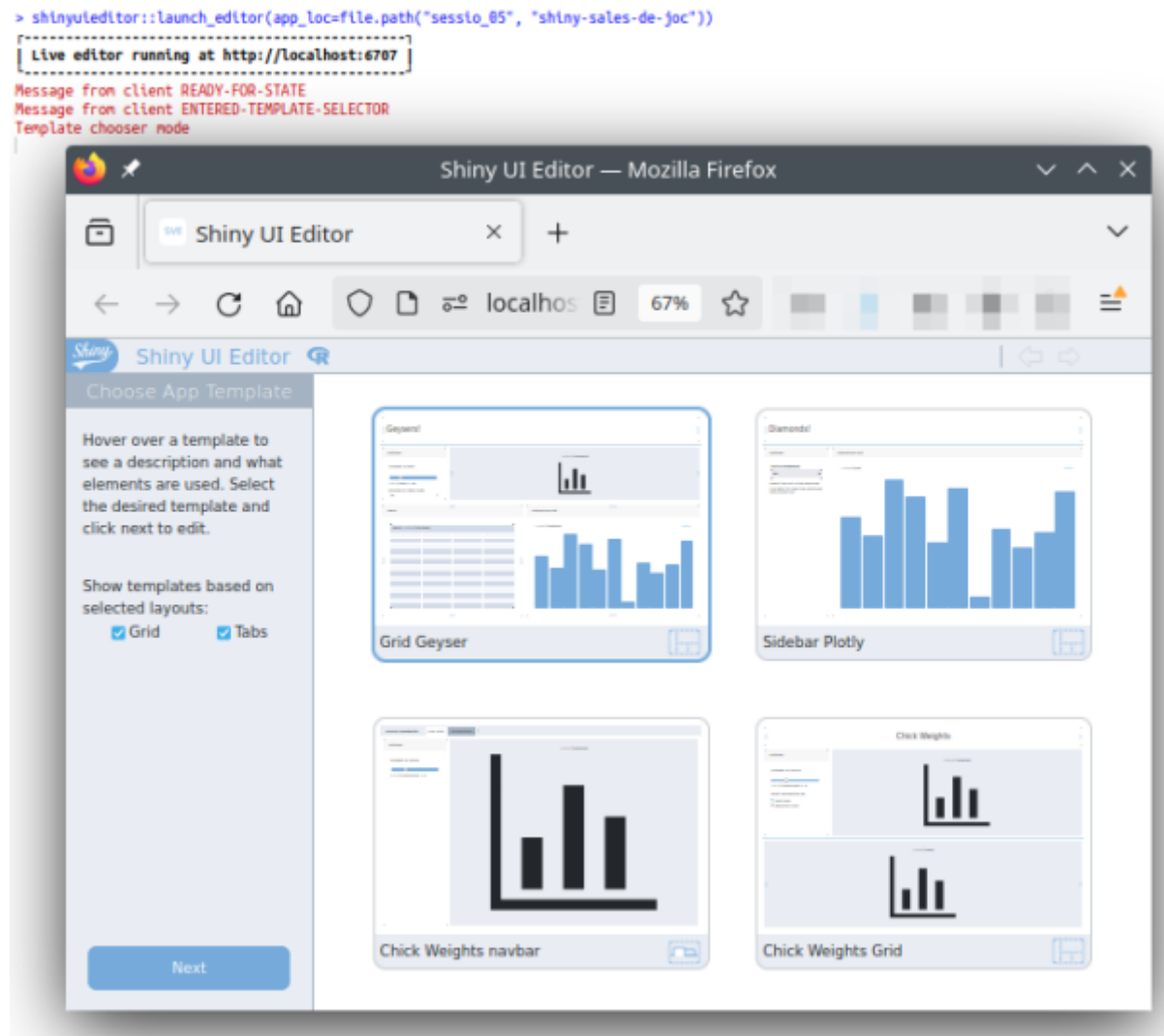
S'ha creat una app demo de shiny, emprant les plantilles de shinyuieditor.

Per crear-ho des de zero, executem aquest tipus de comanda primera vegada:



```
shinyuieditor::launch_editor(app_loc=file.path("sessio_05", "shiny-sales-de-joc"))
```

Això ens obrirà una finestra del navegador en que hi haurà l'aplicació d'edició gràfica d'interfícies d'usuari d'aplicacions shiny (shinyuieditor)



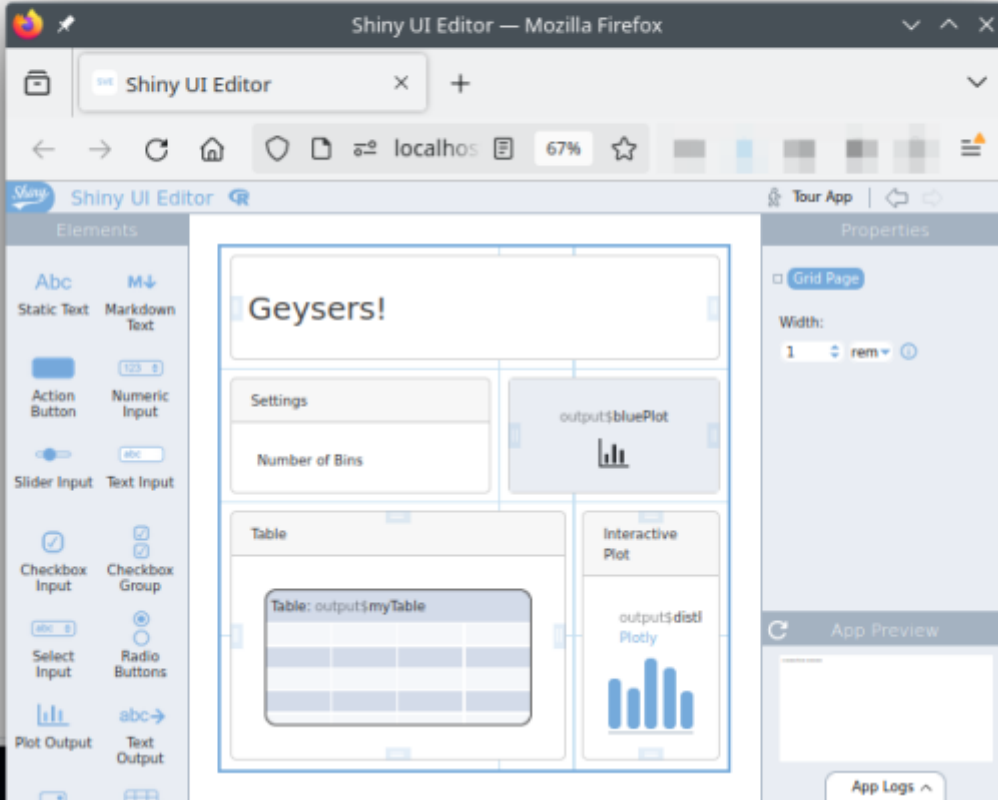
Escollim quina plantilla volem agafar de partida (per exemple, "Grid Geyser"), i cliquem al botó "Next" de sota a l'esquerra.

Llavors ja podem fer els canvis que necessitem a la nostra interfície.

```
> shinyuieditor::launch_editor(app_loc=file.path("sessio_05", "shiny-sales-de-joc"))
```

```
Live editor running at http://localhost:6707
```

```
Message from client READY-FOR-STATE  
Message from client ENTERED-TEMPLATE-SELECTOR  
Template chooser mode  
Message from client UPDATED-APP  
=> Loading app ui and sending to ui editor  
=> Starting Shiny preview app...  
Started Shiny preview app - App PID: 733631  
Message from client APP-PREVIEW-REQUEST  
Message from client UPDATED-APP  
----App Ready-----
```



En quant tanquem la finestra del navegador on hi havia el shinyuieditor, ens trobarem que tenim actualitzat l'arxiu "app.R" a la carpeta que havíem indicat inicialment, amb el codi actualitzat necessari per produir aquesta interfície d'usuari de Shiny.

The screenshot displays the RStudio environment. The top-left pane shows the R script editor with the following code:

```
1 library(shiny)
2 library(plotly)
3 library(gridlayout)
4 library(bslib)
5 library(DT)
6
7
8 ui <- grid_page(
9   layout = c(
10    "header header header",
11    "sidebar bluePlot bluePlot",
12    "table table plotly",
13    "table table plotly"
14   ),
15   row_sizes = c(
16     "100px",
17     "1fr",
18   )
19 )
```

The bottom-left pane shows the console with the following output:

```
> shiny::launch_editor(app_loc, file.path("sessio_05", "shiny-sales-de-joc"))
[ Live editor running at http://localhost:47564 ]
Message from client READY-FOR-STATE
=> Loading app ui and sending to ui editor
=> Starting Shiny preview app...
Started Shiny preview app - App PID: 733922
Message from client APP-PREVIEW-REQUEST
Message from client UPDATED-APP
----App Ready-----
Message from client UPDATED-APP
Message from client UPDATED-APP
Message from client UPDATED-APP
Message from client UPDATED-APP
Message from client UPDATED-APP
Message from client UPDATED-APP
Message from client UPDATED-APP
Message from client UPDATED-APP
Message from client UPDATED-APP
Message from client UPDATED-APP
Editor window closed, stopping server
Error: invoke_wrapped: throwing std::runtime_error
Stopping app preview process
=> Shutting down running shiny app...
>
```

The bottom-right pane shows a file browser with the following table:

Name	Size	Modified
app.R	2 KB	Apr 21, 2023

A red arrow points from the console output to the code editor, indicating the connection between the command and the code being executed.

Ara podem continuar canviant els conjunts de dades que venen per omisió sobre geishers (dataframe "**faithful**" al codi), i les columnes/variables d'interès, per les nostres.

I associar els elements nous de dades (dins la funció `server()`) als controls de la interfície que calgui, per adaptar la nostra nova aplicació shiny a les nostres necessitats.

~/code/Sales de joc/shiny-sales-de-joc - Shiny - Mozilla Firefox

localhost:8787/?view=shiny_foreground

Sales de joc de Catalunya

Registres: 89

Provincia: BCN

Mida dels punts al mapa: 10

Nombre de files de la taula: 25

Sales per municipi

Municipi	Sales (Z)
Albany	1
Arrens de Mar	1
Badalona	1
Santa Bàrbara de Mar	1
Barcelona	35
Castell de Villos	1
Castelldefels	1
Cornebà de Llobregat	1
Granollers	1
Hospitalet de Llobregat	1
Maia	1
Marquès	1
Mataró	1
Planes de Mar	1
Ripoll	1
Sabadell	1
Sant Adrià de Riús	1
Sant Cugat del Valès	1
Sant Joan de Vilatorrada	1
Santa Coloma de Gramenet	1
Sigüe	1
Torre de Claveries	1
Torre de Roda	1
Vic	1
Viladecans	1
Vilanova del Comenyal	1
Vilanova del Hell	1

Table

Search: _____

num_autoritzacio	adreca	cp	nom_municipi	empresa_titular	nom_provincia
1 B-6	Pelai, 1	08001	Barcelona	C-1867	Barcelona
2 B-14	Av. dels Banys, 10	08860	Castelldefels	C-11121	Barcelona
3 B-30	Sant Joan, 1 bis	08840	Viladecans	C-1915	Barcelona
4 B-35	Pl. Torras i Bages, 1 baixos	08402	Granollers	C-1915	Barcelona
5 B-37	Meridiana, 363-365	08016	Barcelona	C-1369	Barcelona

Showing 1 to 5 of 25 entries

Previous 1 2 3 4 5 Next

Contingut de app.R

```

library(shiny)
library(plotly)
library(gridlayout)
library(bslib)
library(DT)
library(sf)
library(readxl)
library(dplyr)
library(stringr)
library(janitor)
library(leaflet)
library(leaflet.providers)

ui <- grid_page(
  layout = c(
    "header header indicator ",
    "sidebar sidebar plotly ",
    "table table mymap ",
    "table table mymap "
  ),
  row_sizes = c(
    "120px",
    "1.5fr",
    "1fr",
    "1fr"
  )
)

```



```

),
col_sizes = c(
  "290px",
  "0.59fr",
  "1.41fr"
),
gap_size = "1rem",
grid_card(
  area = "sidebar",
#   card_header("Paràmetres"),
  card_body(
    selectInput(
      inputId = "myProvincies",
      label = "Província",
      choices = list(
        "BCN" = "Barcelona",
        "GRN" = "Girona",
        "LLD" = "Lleida",
        "TCN" = "Tarragona"
      ),
      selected = "Barcelona"
    ),
    sliderInput(
      inputId = "myradius",
      label = "Mida dels punts al mapa",
      min = 1,
      max = 10,
      value = 3,
      width = "100%"
    ),
    numericInput(
      inputId = "numRows",
      label = "Nombre de files de la taula",
      value = 5,
      min = 1,
      step = 1,
      width = "100%"
    )
  )
),
grid_card_text(
  area = "header",
  content = "Sales de joc de Catalunya",
  alignment = "start",
  is_title = FALSE
),
grid_card(
  area = "table",
  card_header("Table"),

```

```

    card_body(DTOutput(outputId = "myTable", width = "100%"))
  ),
  grid_card(
    area = "mymap",
    card_body(leafletOutput("mymap"))
  ),
  grid_card(
    area = "indicator",
#   card_header("Nombre de Sales de Joc"),
    card_body(
      value_box(
        title = "Registres",
        value = textOutput(outputId = "indicator"),
        showcase = bsicons::bs_icon("database")
      )
    )
  ),
  grid_card(
    area = "plotly",
    card_header("Sales per municipi"),
    card_body(
      plotlyOutput(
        outputId = "distPlot",
        width = "100%",
        height = "100%"
      )
    )
  )
)

server <- function(input, output) {
  # Carreguem les dades dins una expressió reactiva (només s'executa una vegada,
  fins que canviïn les dades)
  # Importa les dades
  dataset <- reactive({
    muni_cat <- rio::import(file.path("../", "muni_cat.csv"))
    st_as_sf(
      read_xlsx(file.path("../", "..", "curs-r-avancat-equips", "sessio_02",
"salons_de_joc_en_la_web.xlsx")),
      coords = c("longitud", "latitud"), crs = 4326, agr = "constant"
    ) %>% # Retoquem noms per a que encaixin tots al join de sota
    mutate(
      nom_municipi = case_when(
        cp == "08904" ~ "Cornellà de Llobregat",
        TRUE ~ nom_municipi),
      nom_municipi = str_replace_all(nom_municipi, fixed("La Jonquera"),
"Jonquera, la"),
      nom_municipi = str_replace_all(nom_municipi, fixed("L'Hospitalet de

```

```

Llobregat"), "Hospitalet de Llobregat, l'"),
  nom_municipi = str_replace_all(nom_municipi, fixed("El Prat de Llobregat"),
"Prat de Llobregat, el"),
  nom_municipi = str_replace_all(nom_municipi, fixed("Sant Vicenç del
Horts"), "Sant Vicenç dels Horts"),
  nom_municipi = str_replace_all(nom_municipi, fixed("Castelló d'Empúries"),
"Castelló d'Empúries"),
  nom_municipi = str_replace_all(nom_municipi, fixed("Castell-Platja d'Aro"),
"Castell d'Aro, Platja d'Aro i s'Agaró"),
  nom_municipi = str_replace_all(nom_municipi, fixed("El Vendrell"),
"Vendrell, el")
) %>%
left_join(
  muni_cat %>% select(nom, nom_provincia),
  by=c("nom_municipi"="nom")
)
})

output$distPlot <- renderPlotly({
  # generate bins based on input$bins from ui.R
  plot_ly(x = ~ dataset() %>% filter(nom_provincia %in% input$myProvincies) %>%
pull(nom_municipi), type = "histogram") %>%
  layout(xaxis = list(title = 'Municipi'),
    yaxis = list(title = 'N'))
})

output$mymap <- renderLeaflet({
  leaflet(width="100%", height="100%") %>%

  # OS map layer
  addProviderTiles(providers$Esri.WorldImagery, group="ESRI Satellite",
    options=leafletOptions(maxNativeZoom=19,maxZoom=100)) %>%
  addProviderTiles("OpenStreetMap",
    options=leafletOptions(maxNativeZoom=19,maxZoom=100)) %>%

  # Sample points
  # generate radius based on input$myradius from ui.R
  addCircleMarkers(data=dataset() %>% filter(nom_provincia %in%
input$myProvincies),
    radius=input$myradius, weight=2, color="red") %>%

  # Add layer control elements
  addLayersControl(baseGroups = c("OpenStreetMap", "ESRI Satellite"),
    options = layersControlOptions(collapsed = TRUE,
      autoZIndex = F))
})

output$myTable <- renderDT({
  head(dataset() %>% tibble() %>%
    filter(nom_provincia %in% input$myProvincies) %>%

```



```
- Installing packrat ... OK [linked from cache]
- Installing rsconnect ... OK [linked from cache]
Successfully installed 3 packages in 39 milliseconds.
> rsconnect::setAccountInfo(name='myshinyiointernalusername', token='mytokenXXX',
secret='mysecretXXX')
> library(rsconnect)
```

Em faltaven els arxius de dades que s'agafaven de carpetes germanes del projecte de RStudio, fora de la carpeta de l'app shiny. Els he copiat els 2 arxius dins de una nova carpeta filla "dades/", i he tornat a fer "Deploy":



```
> rsconnect::deployApp('sessio_05/shiny-sales-de-joc')
— Preparing for deployment



---


✓ Re-deploying "shiny-sales-de-joc" using "server: shinyapps.io / username: onuka7-xavier-de0pedro0puente"
□ Looking up application with id "11822654"...
✓ Found application
<https://onuka7-xavier-de0pedro0puente.shinyapps.io/shiny-sales-de-joc/>
□ Bundling 3 files: app.R, dades/muni_cat.csv, and
dades/salons_de_joc_en_la_web.xlsx
□ Capturing R dependencies with renv
✓ Found 122 dependencies
✓ Created 98,363b bundle
□ Uploading bundle...
✓ Uploaded bundle with id 8522558
— Deploying to server



---


Waiting for task: 1408200276
  building: Processing bundle: 8522558
  building: Building image: 10366677
  building: Installing system dependencies
  building: Fetching packages
  building: Installing packages
  building: Installing files
  building: Pushing image: 10366677
  deploying: Starting instances
  terminating: Stopping old instances
— Deployment complete



---


✓ Successfully deployed to
<https://onuka7-xavier-de0pedro0puente.shinyapps.io/shiny-sales-de-joc/>
```

The screenshot shows the RStudio Server interface in a Mozilla Firefox browser. The terminal window displays the following R session output:

```

R 4.3.2 ~/code/curs-r-avancat-equip...
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

- Project '~/code/curs-r-avancat-equip...' loaded. [renv 1.0.3]
[Workspace loaded from ~/code/curs-r-avancat-equip/..RData]

> install.packages("rsconnect")
The following package(s) will be installed:
- packrat [0.9.2]
- PKI [0.1-12]
- rsconnect [1.2.2]
These packages will be installed into "~/code/curs-r-avancat-equip/renv/library/R-4.
Do you want to proceed? [Y/n]: Y

# Installing packages -----
- Installing PKI ... OK [linked from cache]
- Installing packrat ... OK [linked from cache]
- Installing rsconnect ... OK [linked from cache]
Successfully installed 3 packages in 39 milliseconds.
> rsconnect::setAccountInfo(name='onuka7-xa...te', token='99...17
0u1...yuh')
> library(rsconnect)
> rsconnect::deployApp('sessio_05/shiny-sales-de-joc')
— Preparing for deployment

Found multiple accounts.
Which one do you want to use?
1: server: posit.cloud / username: onuka7-xavier-de0pedro0puente
2: server: shinyapps.io / username: onuka7-xavier-de0pedro0puente
Selection: 2
✓ Deploying "shiny-sales-de-joc" using "server: shinyapps.io / username: onuka7-xavie
i Creating application on server...
✓ Created application with id 11822654
i Bundling 1 file: app.R
i Capturing R dependencies with renv
✓ Found 122 dependencies
✓ Created 69,197b bundle
i Uploading bundle...
✓ Uploaded bundle with id 8522539
— Deploying to server

Waiting for task: 1408198922
building: Processing bundle: 8522539
building: Building image: 10366643
building: Installing system dependencies
building: Fetching packages
building: Building package: lazyeval
building: Installing packages

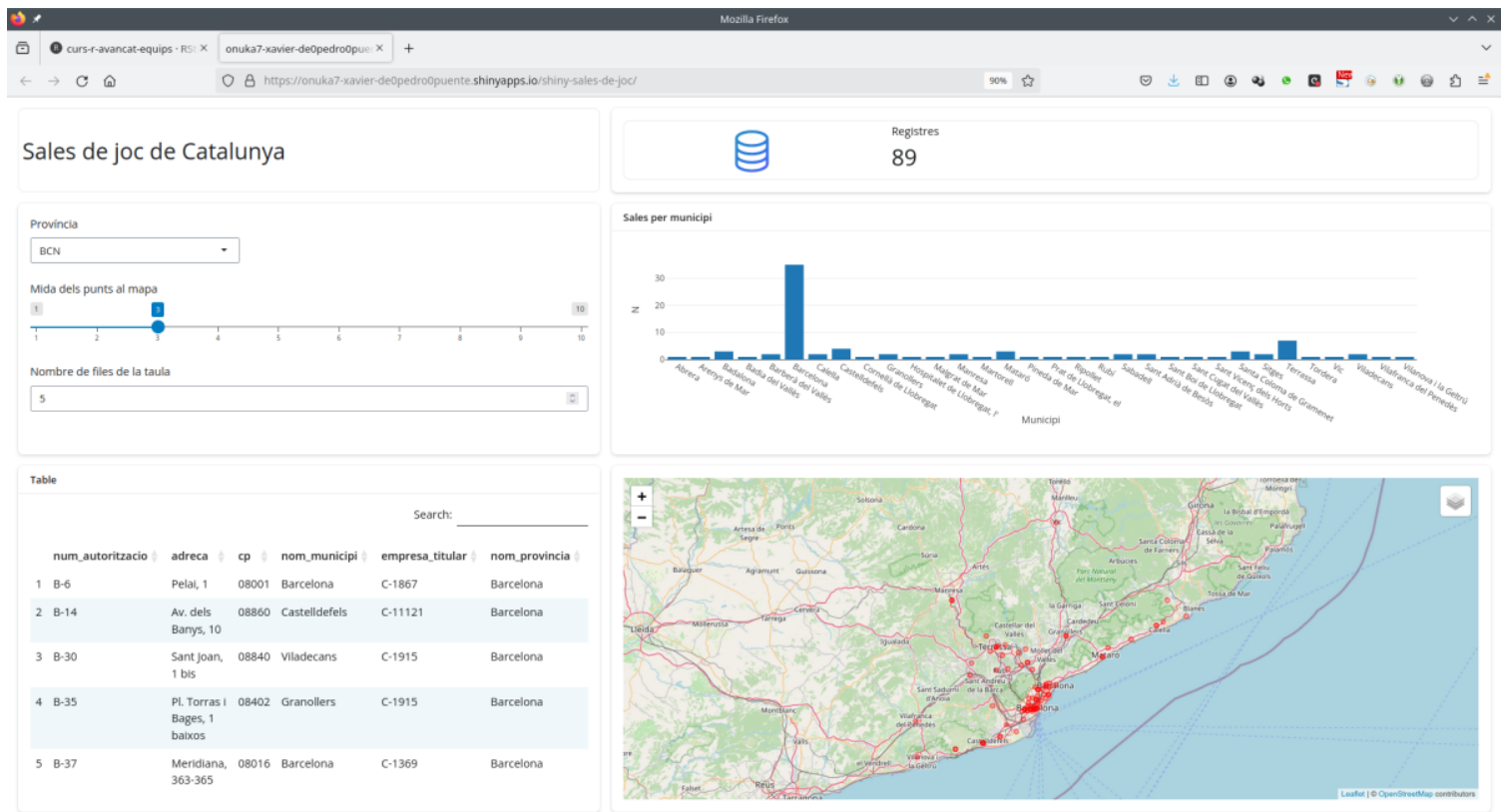
```

The Environment pane on the right shows an empty environment. The Files pane shows the project structure:

Name	Size	Modified
..		
app.R	5.2 KB	Apr 21, 2024
rsconnect		

URL a la app:

<https://onuka7-xavier-de0pedro0puente.shinyapps.io/shiny-sales-de-joc/>^[9]



1.5. ShinyLive

ShinyLive (per exportar apps shiny per a que funcionin sense requerir servidor, sino tot en navegador):

<https://cloud.r-project.org/web/packages/shinylive/index.html>^[10]

Explicació recent dels autors a Posit (2023-10):

R Shiny without a server: webR and ShinyLive by George Stagg at the Shiny in Production 2023 conference.

<https://www.youtube.com/watch?v=GlZKReTx8GA>^[11]

2. Altres: Dash per a R

Dash per a R: Create beautiful, analytic web applications in R.

<https://github.com/plotly/dashR>^[12]

Dash Enterprise App Gallery

<https://dash.gallery/Portal/>^[13]

3. Mostrar progrés projecte

Avançar la feina que hem estat fent del projecte per equips, i mostrar-ho als altres equips.

Noms alias d'aquest pàgina: CursRAvancatEquipsS5

^[1] <https://www.rstudio.com/products/shiny/>

^[2] <https://dades.ajuntament.barcelona.cat/estadistiques-cens-comercial/>

^[3] <https://dades.ajuntament.barcelona.cat/la-ciutat-al-dia/>

^[4] <https://mastering-shiny.org/basic-app.html>

^[5] <https://rstudio.github.io/shinyuieditor/>

^[6] <https://www.shinyapps.io/>

^[7] <https://statsandr.com/blog/how-to-publish-shiny-app-example-with-shinyapps-io/>

^[8] <https://shiny.posit.co/r/articles/share/shinyapps/>

^[9] <https://onuka7-xavier-de0pedro0puente.shinyapps.io/shiny-sales-de-joc/>

^[10] <https://cloud.r-project.org/web/packages/shinylive/index.html>

^[11] <https://www.youtube.com/watch?v=GIZKReTx8GA>

^[12] <https://github.com/plotly/dashR>

^[13] <https://dash.gallery/Portal/>