



Central Statistical
Bureau of Latvia

Rmarkdown report in R Shiny

Oļesja Nikoluškina
Mathematical statistician
Central statistical bureau of Latvia

Presentation plan

- Introduction
 - Call and purpose for creating shiny app
 - Historical development of shiny app
- Functionalities Results
- Conclusions

Call for creating shiny app

- Constant requirements, regulations and agreements with cooperation partners
- Numerous surveys covering related topics, R code require no manual changes between period
- A lot of repetitive, manual tasks and data analysis
- Surveys that apply the same methods for mathematical tasks
- Collaboration and documentation tools:
 - excel (with coloring within conditional formatting),
 - emails (comments and other features),
 - reviews of Teams chats,
 - comments in R.

Development of shiny app

Figures
and
insights

Become acquainted with R shiny app in 2018 year,
result is interactive report,
real time link to data,
approximate 10 people have rights ,
installing app on user's computer,
2 possibilities: desktop or web app.

..periods→

Get started with R
Shiny app design
Collect user needs
Analyze surveys
methodologies

• 2018 reference year

Gradually Involving
Rmarkdown in
mastering reports

• 2020 reference
year

Building Package in
R Shiny framework
Includes
Rmarkdown report

• from 2021
reference year

Implementation of an R Shiny app

Integrated short term
business statistics
surveys into application

Retail (NACE G47)

Wholesale (NACE G45,46)

Services (H-N (excluding K;
M72; M75))

Poultrymeat

The carriage of goods by road

multiple calculations for
one period within a short
time period!!!!

R packages and functions

Internal packages

- ISDAVS package(data retrieval)
- vardpoor package(data quality) – published on github
- **Internal** functions for nonresponse rate calculation, calibration, creating structures.

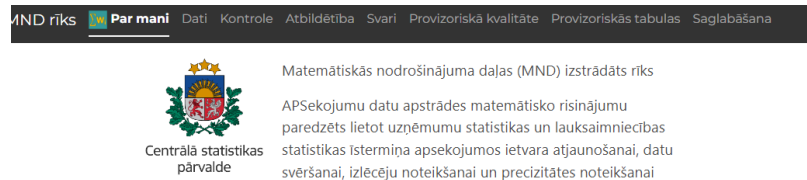
External:

- DT
- shiny
- kableExtra
- devtools
- tools
- Utils
- openxlsx

Functionalities of the app (1)

Appearance of the App(1) →

- Introduction and description of sections



Kā darbojās

Tā ir atvērta koda programmatūra, ko var brīvi lietot bez jebkādam programēšanas zināšanām

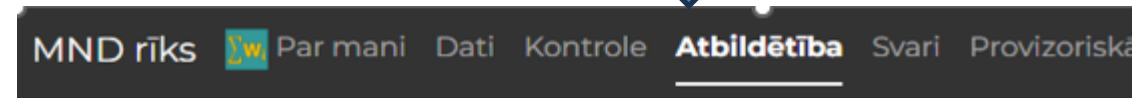
Funcionalitāte rīka iedarbināšanas brīdī:

- izmanto lietotājam piešķirtās pieejas tiesības, lai piekļūtu ISDAVS
- dinamiski tiešsaistē nolasa atbilstošā projekta aktuālus datus
- ielasa MND sagatavotas izlases datnes
- veic pirmatnējo datu apvienošanu, pārbaudi un apstrādi
- veic matemātiskus aprēķinus
- izvada aprēķinu un pārbaudes rezultātus
- saglabā aprēķinu rezultātus turpmākai lietošanai

Kā lietot

- izvēlies šķirslī **Dati**
- izvēlies apsekojumu, aprēķinu gadu/periodu un veic aprēķinu
- sagaidi rezultātus, seko līdzī progresā gaitas ziņojumiem
- nolasi brīdinājumus un norādījumus
- kritiski izvērtē visu izvadīto informāciju
- veic nepieciešamus labojumus atbilstoši norādījumiem un atkārtoti aprēķinu
- izmanto aprēķinus

user defines tabs based on previous interactions



Apjomi

Atbildētības tabula

[saite: European Statistical System handbook for quality and metadata reports](#)

Balstoties uz Eiropas statistikas sistēmas vadlīnijām, kuras rekomendē ieviest burtus, lai

R - atbildējušās derīgās vienības,

N - neatbildējušās derīgās vienības,

O - vienības, kas neatbilst mērķa populācijai,

NA - vienības, kas neietilpst izlasē,

izlase - izlases vienību skaits,

diz_sv (svars_plan) - izlases vienību dizaina (plānojuma) svaru summa.

Functionalities of the app(2)

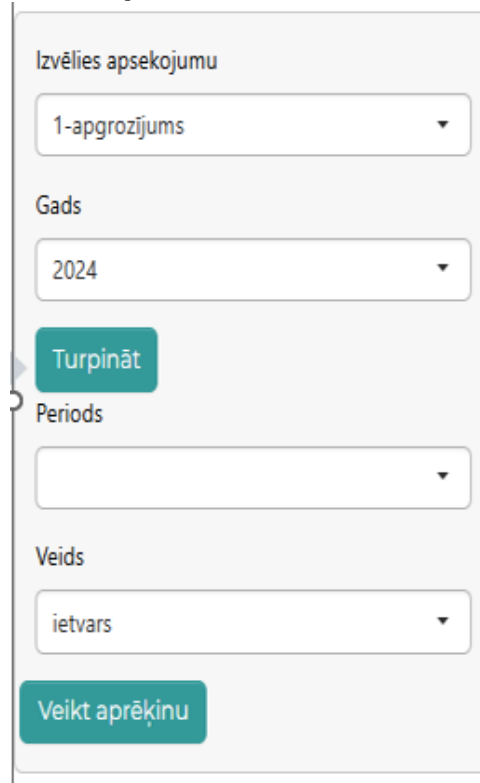
Appearance of the app(2)

Connect to SQL data base management or download micro data from local directory

- Previously, a different system was used with different field and variable names.
- A challenging task of associating each table with its survey

Provides the option to select a reference(also prior periods), process(weights calculation or frame renewalment)

The user's survey access is limited:
Use **observeEvent** in server.R
(trigger actions only on specific events)



The screenshot shows a web form with the following elements:

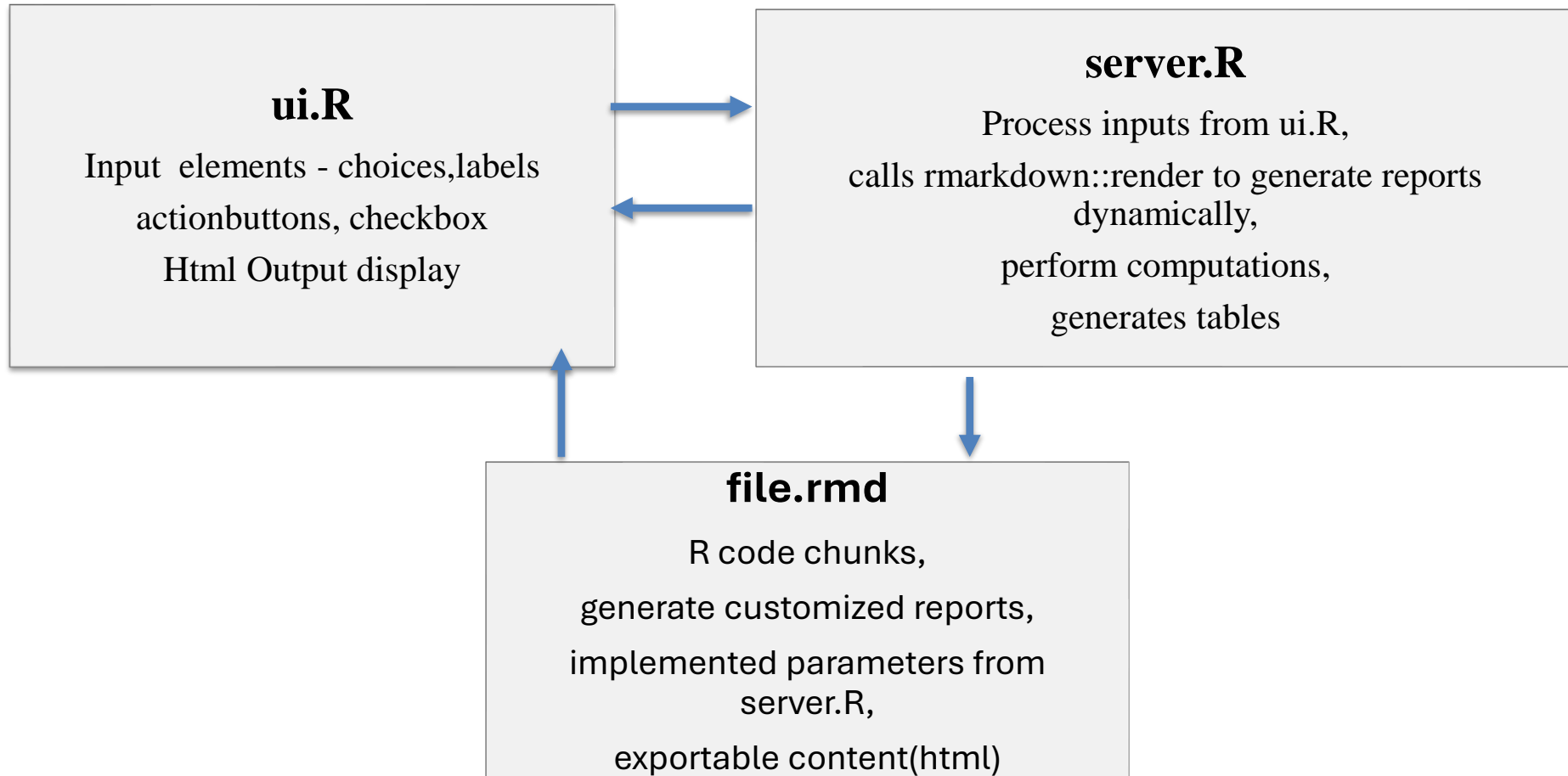
- A label "Izvēlies apsekojumu" above a dropdown menu showing "1-apgrozījums".
- A label "Gads" above a dropdown menu showing "2024".
- A teal button labeled "Turpināt" below the "Gads" dropdown.
- A label "Periods" above an empty dropdown menu.
- A label "Veids" above a dropdown menu showing "ietvars".
- A teal button labeled "Veikt aprēķinu" at the bottom.

survey from available options

a reference(also prior periods)

choose specific processes from the provided process

Rshiny and Rmarkdown workflow



Functionalities of the R shiny app(3)

Html output

server.R

```
output$markdown <- renderUI( {  
  withProgress(message = '0.no 4.posmiem.Tika uzsākta aplikācijas darbība',detail="(...šobrīd tiek ielādēti dati",{  
    includeHTML(rmarkdown::render(input = file.path(system.file("extdata", package = "CSPsvari"),"Svari_1apgrozijums.rmd"),  
      params = list(apsek = values$apsek, gads = input$gads,gadscet2 = input$gadscet2,  
        izleceji = input$izleceji,  
        uuk = input$uuk,  
        period = values$period,sistema = values$sistema,  
        datums = values$datums,  
        sar = values$sar,  
        apmain = values$apmain),  
      output_dir=xxx,quiet=F,output_file=paste0("1_apgrozijums_", input$gadscet2,  
        Sys.Date(),".html"))))  
  },
```

Functionalities of the app(4)

Rendering a Second Rmd File

- In R Markdown is reference to another rmd file (for building history)
- Generate separate report from both rmd files
- Save data and report in local directory with versioning.

```
```{r echo = FALSE, error = TRUE}
rmarkdown::render(input = file.path(system.file("extdata", package = "CSPsvari"),
"Svari_1apgrozijums_vestures_atskaite.rmd"), output_dir=paste0(ifelse(.Platform$OS.type == "windows", "T:", "~/T"),
"/SMKD/MND/ApsUzn/1_apgrozijums/!Apmaina/",
input$gads,"/2_svari/" , tolower(substr(input$gadscet2,5,7))),
prakssts"),quiet=T,output_file=paste0("1_apgrozijums_", input$gadscet2, "_svaru_vestures_atskaite",format(Sys.time(), "%d-%m-%Y"))
```

- naming chunk
- comments for easy to read code

```
```{r, Aktuālo nace_gr piekārtošana, echo = TRUE}
#####
# Izleceju noteiksana #
#####
# Izleceju noteikšanas metode daleji ir aizguta no Mark Last un Ab
# "Automated Detection of Outliers in Real-World Data"
# atrodama, piemeram: "T:\SMKD\MND\Users\!Arhivs\GintersBuss\outli
# Piekarto aktualos NACE domenus kvalitates aprekinem.

ietv_sv[, nace_3z_pirmd := substr(nace_pirmd, 1, 3)]
```

↓

- 2_apgrozijums_m08_svari_2024-10-22.html
- 2_apgrozijums_m08_svari_2024-10-24.html
- 2_apgrozijums_m08_svaru_vestures_atskaite18-10-2024_21_51.html
- 2_apgrozijums_m08_svaru_vestures_atskaite18-10-2024_22_01.html
- 2_apgrozijums_m08_svaru_vestures_atskaite18-10-2024_22_17.html
- 2_apgrozijums_m08_svaru_vestures_atskaite22-10-2024_10_52.html

Functionalities of the app(5)

Alerts, interaction

- Pop-up notifications
- Error or warning messages
- Information messages
- Implemented progress line - give feedback on what the app is doing without requiring manual updates or interactions.

```
if (nrow(dublikati[N>1])>0) {  
  showNotification("Parbaudiet papildinājuma failu uuk dublikātiem!  
Ietvara atjaunošana ir pārtraukta", type = c("warning"))  
  stop("Parbaudiet papildinājuma failu uuk dublikātiem! Aprēķins pārtraukts")  
  
output$markdown <- renderUI( {  
  withProgress(message = '0.no 4.posmiem.Tika uzsākta aplikācijas darbība',detail="(...šobrīd tiek ielādēti dati",{
```

Functionalities of the app(6)

Results

- Perform mathematical tasks (weighting, data quality asesment)

Setting in R Markdown
runtime: shinyrmd

- Convenient to handle results
- Builds the foundation for better methodological practices
- Enhances the planning of future sampling techniques

Vēstures svaru un kvalitātes aprēķinu atskaite pa periodiem

Apsekojums: 2-apgrozījums
Skripta izpildītājs: IKatkovska
Datums: 2024-10-24 12:37:04
Svaru aprēķina atskaites periods: 2024m08

INFORMĀCIJA PAR VISIEM APRĒĶINĀTAJIEM ATSKAITES GADA PERIODIEM (MND vajadzībām)

1. Kvalitātes aprēķini pa periodiem.

Show entries Search:

gr	cv_kriterijs	cv_m08	cv_m07	cv_m06	cv_m06_t30	cv_m05	cv_m04	cv_m03	cv_m03_t30
5		2.8	2.89	2.37	2.78	2.66	2.02	2.67	
5		3.24	2.85	2.64	3.85	3.66	2.51	2.66	2.
2		2.48	2.21	2.06	3	2.31	2.08	2.21	3
nav noteikts		2.84	3.75	2.87	4.38	3.49	2.64	3.18	3.
						4.03	3.72	3.54	3.
						3.7	3.19	3.15	3.

Showing 1 to 100 of 572 entries Previous 1 2 3 4 5 6 Next

2. DVV skaits izlasē, pievienoto(jauno) DVV skaits izlasē, skaits lsdavs pirmdatos, lielo(resp_liel) DVV skaits un apvienotajā ietvarā.

periodi	sk_izlase	sk_jaunie_izlase	sk_pirmdati	sk_lieli	sk_atjietv
m01	3520	3	3520	2128	40050
m02	3520	0	3520	2120	40050
m03	3527	7	3527	2133	40320
m04	3530	3	3530	2135	40480

3. Piederības(pieder), responses(resp), gala svaru(kops_sv) pazīmju skaits.

periodi	resp_sum	pieder_sum	kops_sum
m01	3369	3489	3321
m02	3387	3484	3331

Use GitLab(1)

- Version control
- Collaboration tools
- Code management
- Issues creating

The screenshot shows the GitLab web interface for a project named 'CSPsvari'. The top navigation bar includes the GitLab logo, 'Projects', 'Groups', and 'More' menus, along with a search bar and notification icons. The left sidebar contains a navigation menu with options like 'Project overview', 'Details', 'Activity', 'Releases', 'Repository', 'Issues' (with 10 items), 'Merge Requests' (with 0 items), 'CI / CD', and 'Operations'. The main content area displays the project details for 'CSPsvari', including its Project ID (101), a 'Leave project' link, and statistics: 193 Commits, 21 Branches, 8 Tags, 1 MB Files, 1.1 MB Storage, and 2 Releases. Below this, there's a section for the 'master' branch, showing the '2.2.0 pakotnes versija' commit by Jelena Voronova, authored 5 months ago. The commit hash 'cc5d2019' is also visible. At the bottom, there's a table listing the project's structure.

Name	Last commit	Last update
CSPsvari	2.2.0 pakotnes versija	5 months ago
doc	labojuums	4 years ago

Roles and responsibilities

presently

- Renew R app, rmd files yearly
- verify the user's access to data and newest R versions, packages
- prepare manuals (outlier's methodology, functionality of app)
- communication with users regarding R app work
- automated dynamic report
- refresh Gitlab(local)
- keep CRAN (local) store package up-to-date versions

previously

- renew R code yearly
- use newest R versions, packages
- communication with responsible person relating to data collection, processing, outlier identification
- informative writing, manually writing

Conclusions

- Every survey running independently in app
- Running Shiny app at any data collection phase
- Output data loss prevention, since every output is saved separately
- Data cleaning(user can correct empty cells, response status, status of survey)
- Data monitoring with real time data
- Less time-consuming.

Way forward

- Add choices of data formats for user
- New validations regarding survey characteristics
- Adding validation to interact with other surveys
- Expand graphical interaction
- Supplement with new surveys
- Improve UI design
- To improve publishing.



Central Statistical
Bureau of Latvia

 @CSB_Latvia

 csplatvija

www.csp.gov.lv/en

