

DISCOVER19 SHINYAPP: PROJECT AND TEAM WORKFLOW

Andrea Ierardi

Data Science intern at the University of Milan

28 October 2020

 ierardiandrea.com

 [linkedin.com/in/andreaierardi](https://www.linkedin.com/in/andreaierardi)

 github.com/andreaierardi



OVERVIEW OF THE APP

Authors

- Andrea Ierardi
- Fabio Caironi
- Federico Matteucci
- Gregorio Saporito
- Marzio De Corato

Objective

Design a dashboard to inspect, analyse and plot data of Covid19 pandemic for the Italian region



Link to the app:

<https://andreaierardi.shinyapps.io/disCOVIDer19/>



Link to the Github repository:

https://github.com/marzione00/COVID_19_HACK

Main R packages and tools:

Shiny App

- Build interactive web apps in R

Shiny Dashboard

- UI for dashboard pages

Shinyapp.io

- Share your Shiny Applications Online

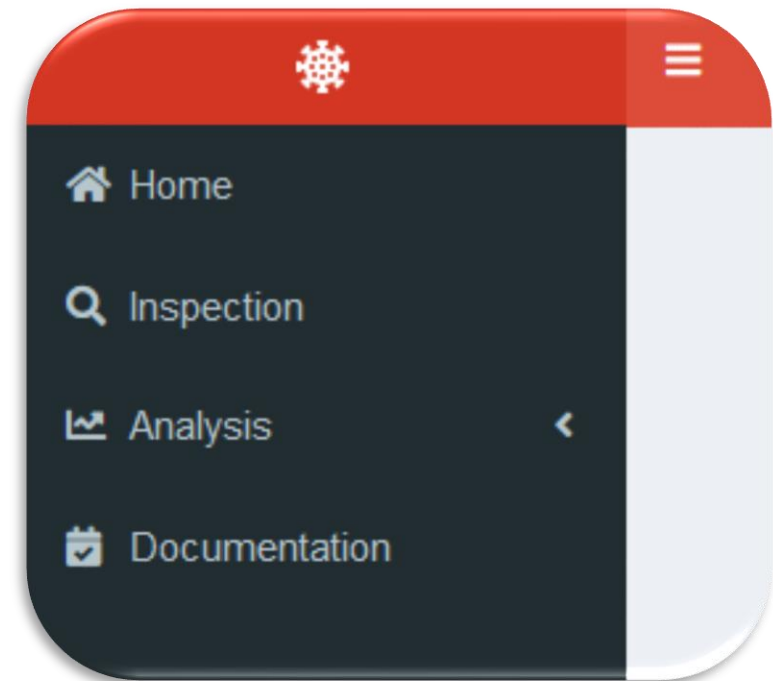
Highcharter

- Interactive Charts

SECTIONS OF THE APP

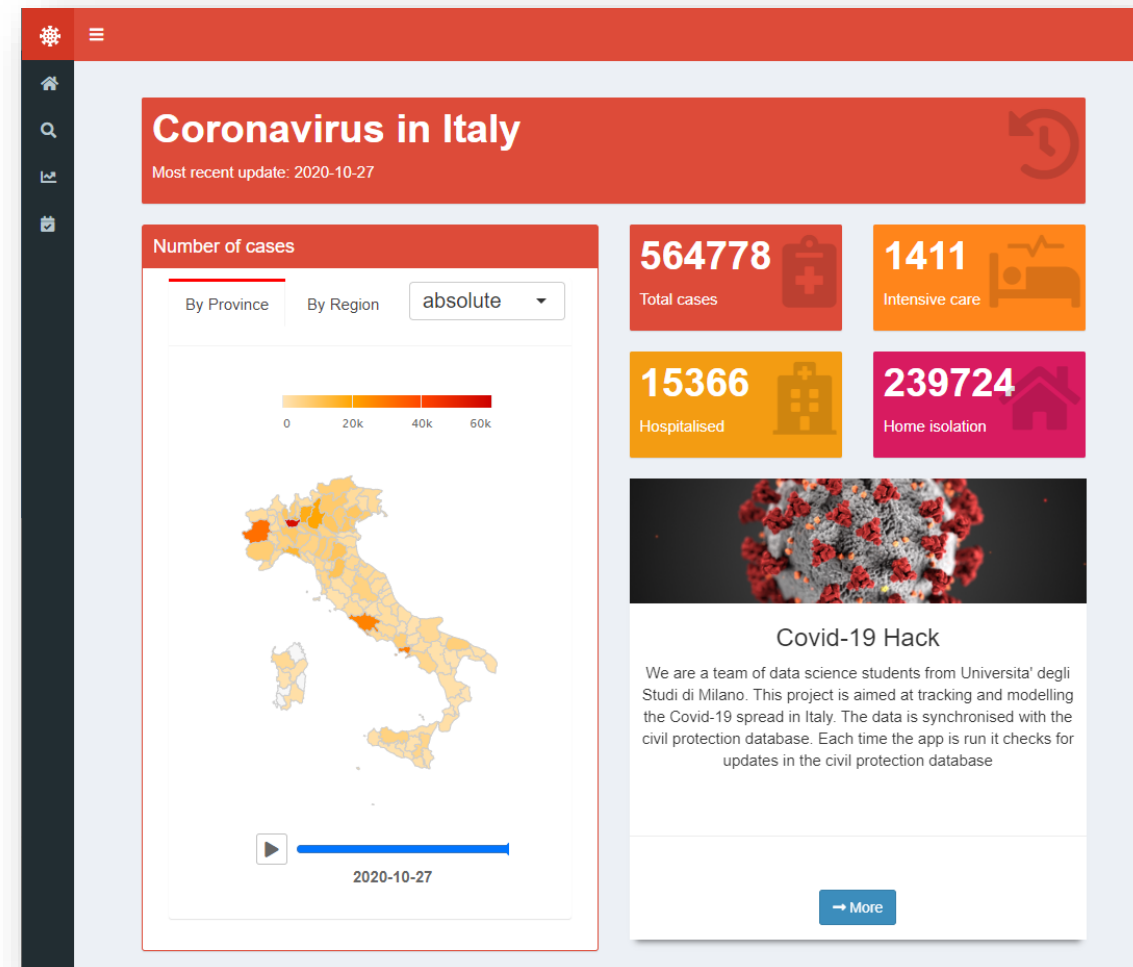
- **Home:** general information
- **Inspection:** data exploration
- **Analysis:** models
- **Documentation:** documentation and authors

Sections



HOME

- Map of Italian cases
- General information
- Project aim

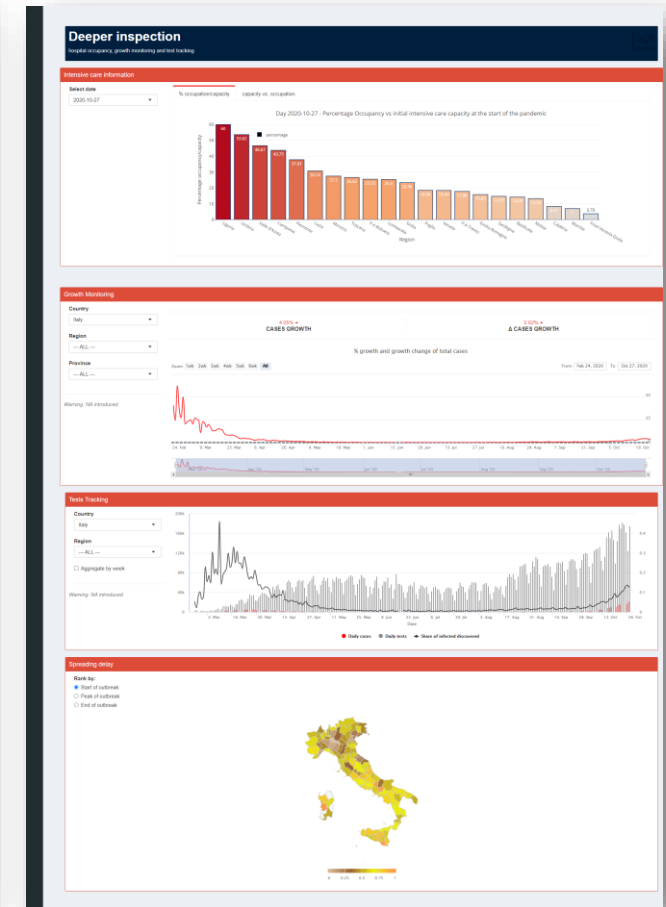
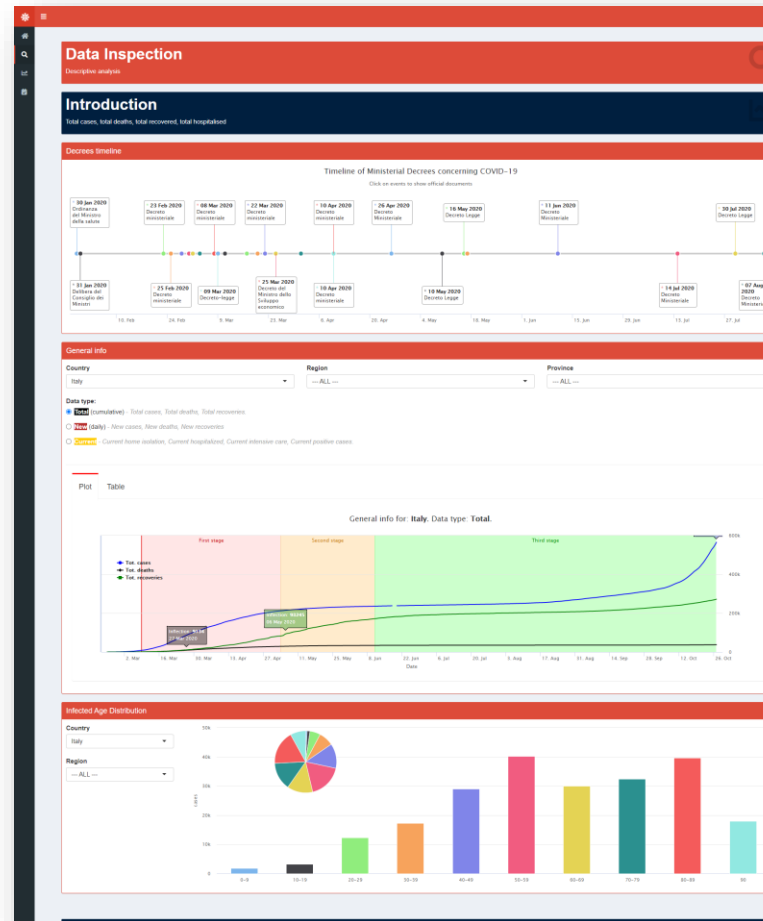


INSPECTION

- Decrees timeline
- General information: cases, deaths, recoveries
- Infected age distribution
- Intensive care information
- Growth monitoring
- Tests tracking
- Spreading map

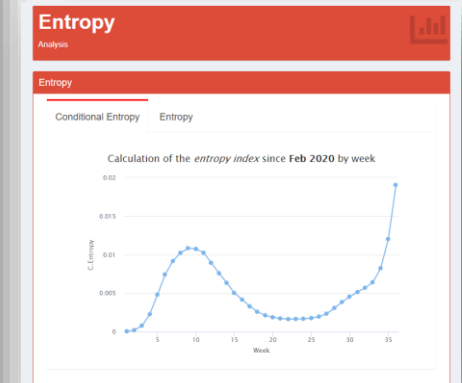
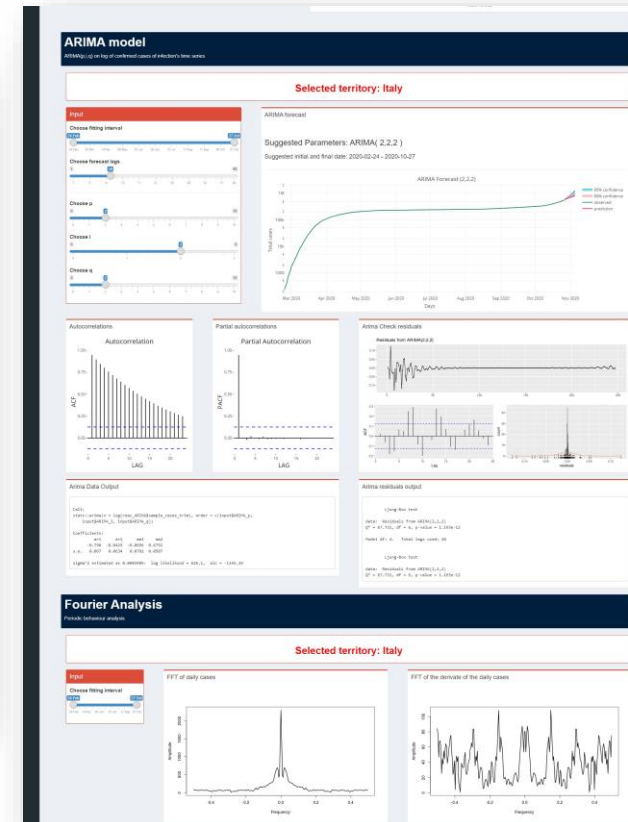
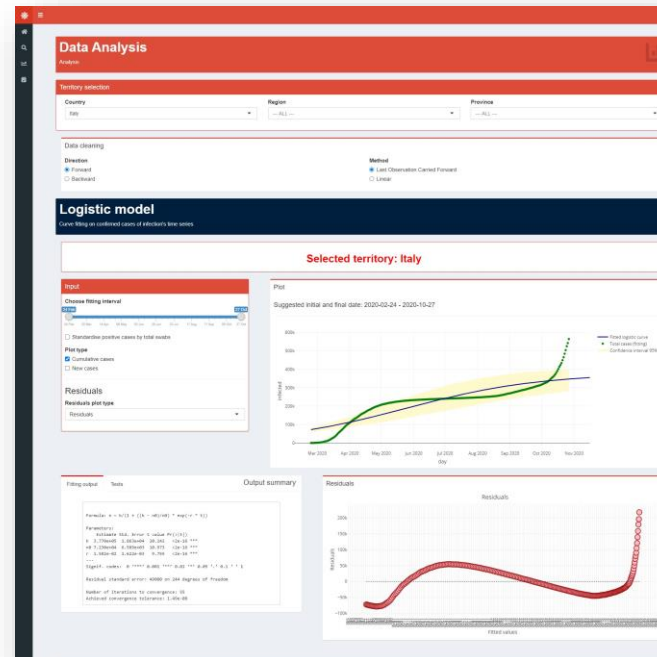
Highcharts

<https://www.highcharts.com/blog/posts/frameworks/r-stat/>



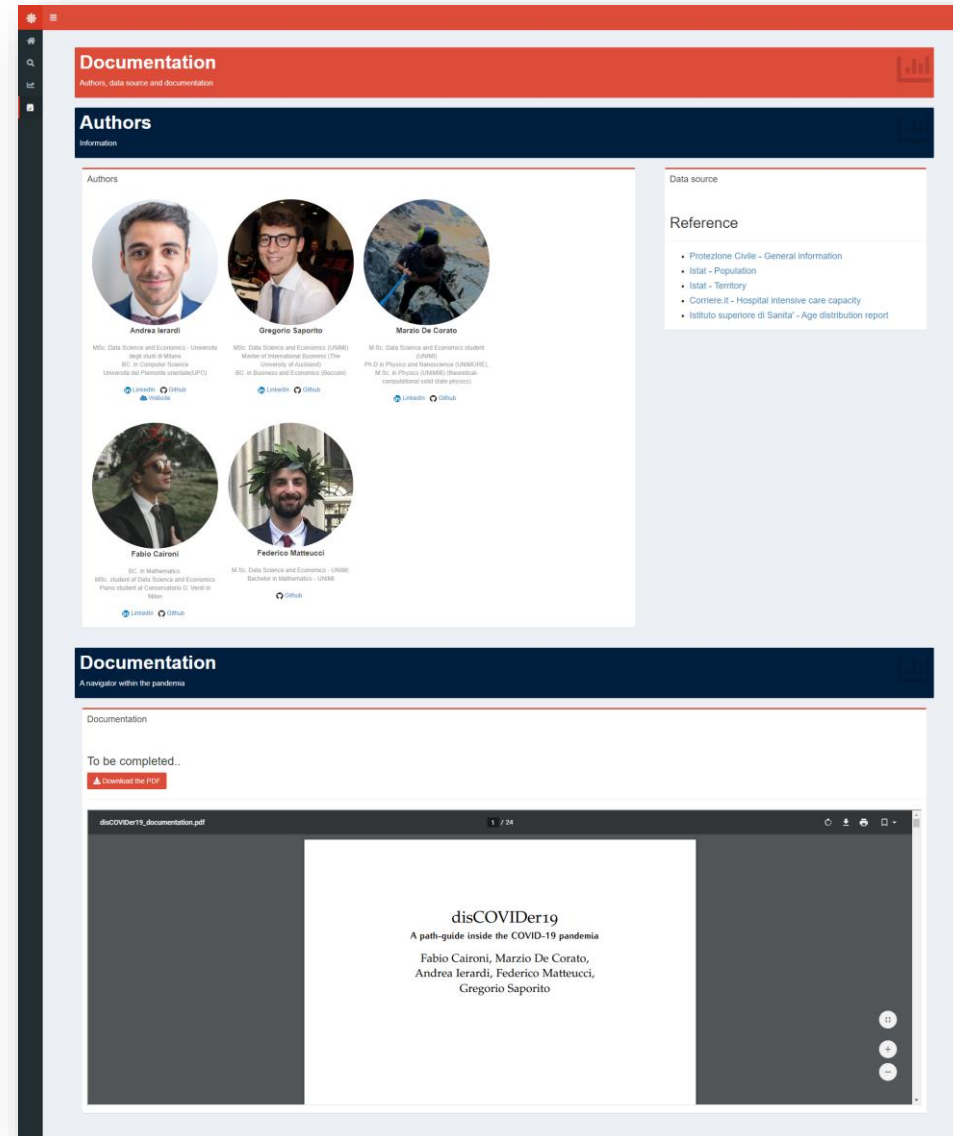
ANALYSIS

- Logistic model
- ARIMA model
- Fourier Analysis
- Entropy

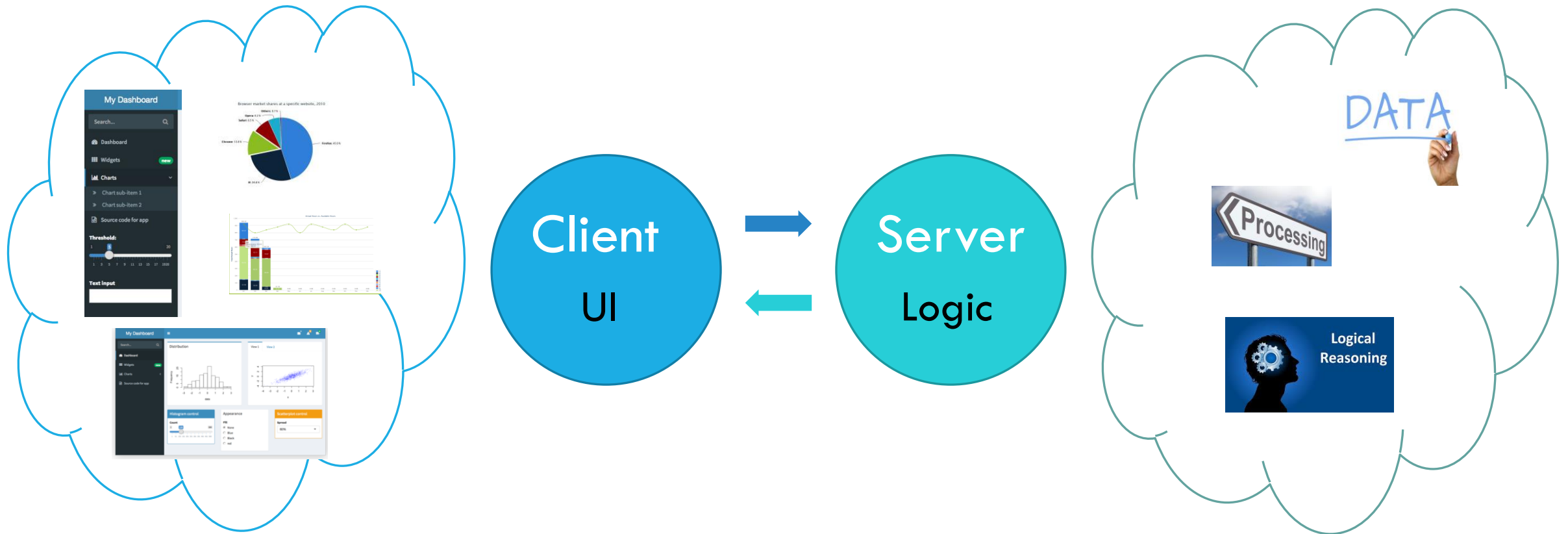


DOCUMENTATION

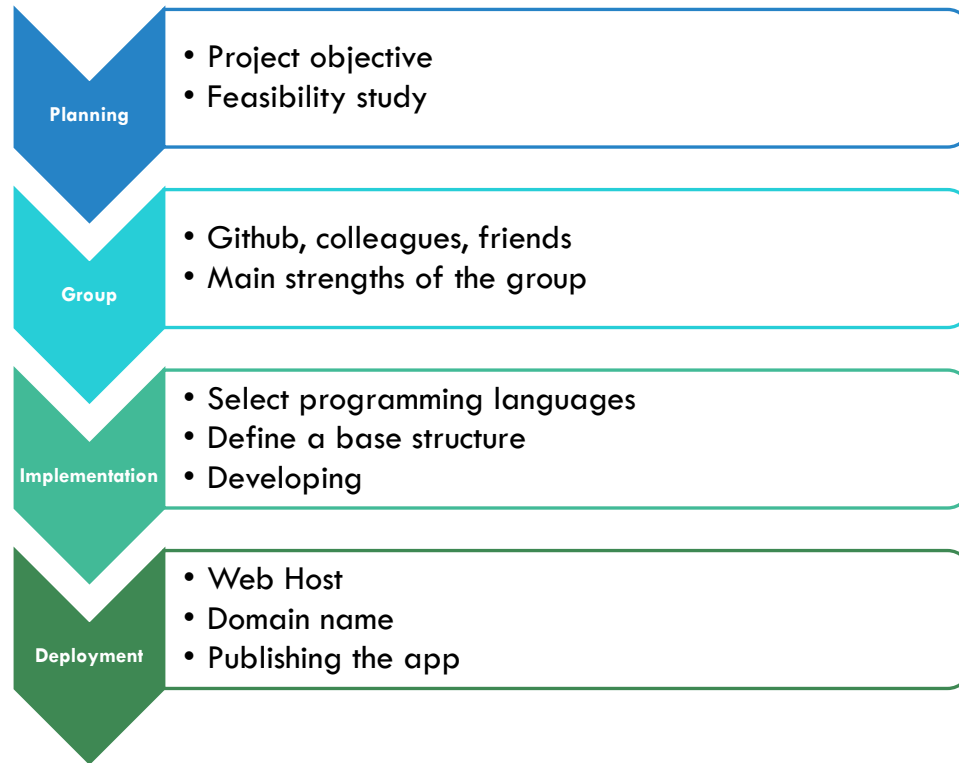
- Authors list
- References
- Documentation (to be finished)



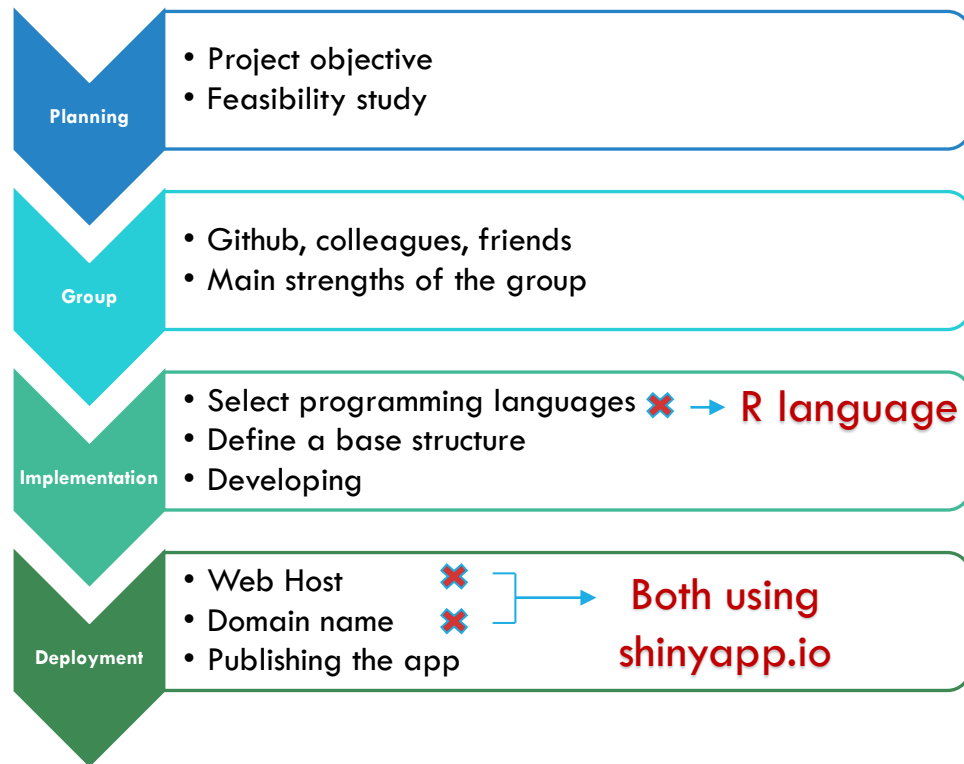
SHINY APP



WEB APPLICATION PROJECT



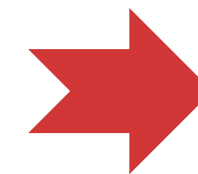
PROJECT WITH SHINYAPP



N.B.

Web hosting: rented file space on a hosting company's web server. You put website files on the web server. The web server provides website content to website visitors.

A domain name: is the unique address where people find your website, such as <https://www.unimi.it>



**Easier
with
Shiny App!**

SHINYAPP.IO

<https://www.shinyapps.io/>

Easy to Use

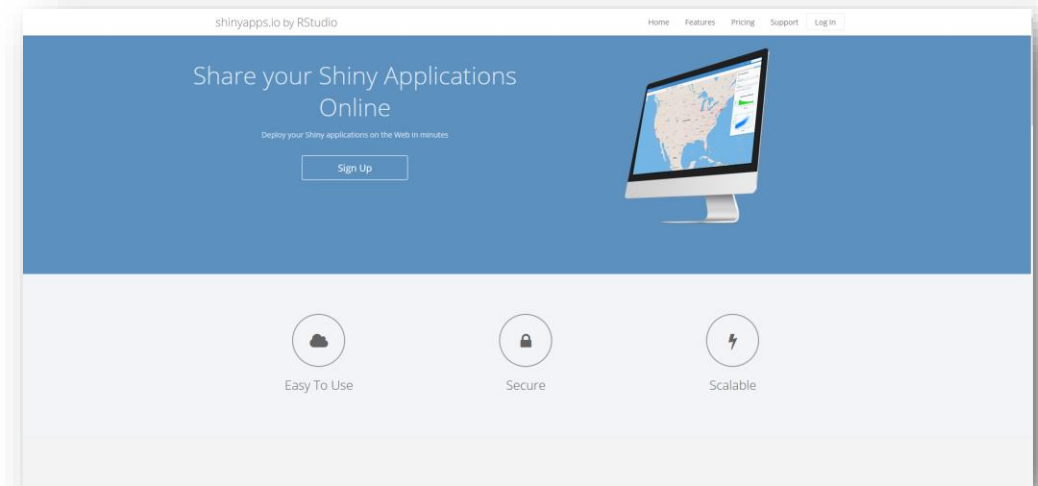
Deploying your Shiny applications could not be easier. You don't need to own a server or know how to configure a firewall to deploy and manage your applications in the cloud. No hardware, installation, or annual purchase contract required.

Secure

shinyapps.io is secure-by-design. Each Shiny application runs in its own protected environment and access is always SSL encrypted. Standard and Professional plans offer user authentication, preventing anonymous visitors from being able to access your applications.

Scalable

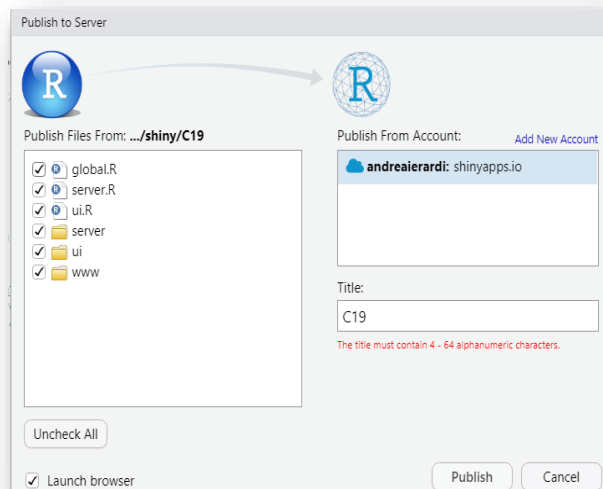
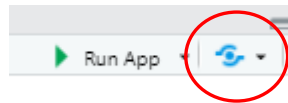
They bring their IT team so you won't have to bring yours. Be confident your compute resources will scale effortlessly as your Shiny applications and users increase.



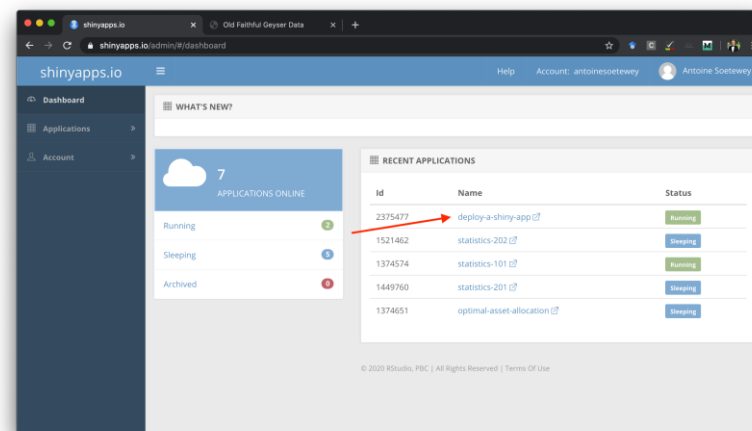
Prices

FREE	STARTER	BASIC	STANDARD	PROFESSIONAL
\$0 /month	\$9 /month (or \$100/year)	\$39 /month (or \$440/year)	\$99 /month (or \$1,100/year)	\$299 /month (or \$3,300/year)
New to Shiny? Deploy your applications for FREE.	More applications. More active hours!	Take your users to the next level!	Password protection? Authenticate your users!	Professional has it all! Personalize your domains.
9 Applications	25 Applications	Unlimited Applications	Unlimited Applications	Unlimited Applications
25 Active Hours	100 Active Hours	500 Active Hours	2,000 Active Hours	10,000 Active Hours
Community Support	Premium Email Support	Performance Boost	Authentication	Authentication
RStudio Branding		Premium Email Support	Performance Boost	Account Sharing
			Premium Email Support	Performance Boost
				Custom Domains
				Premium Email Support
Sign Up Now	Sign Up Now	Sign Up Now	Sign Up Now	Sign Up Now

HOW TO PUBLISH THE APP



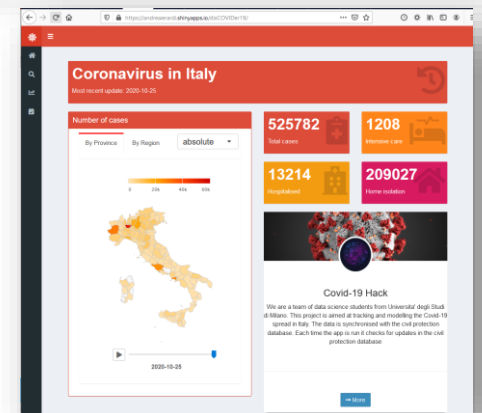
Deploy



Publish

URL

<https://andreaierardi.shinyapps.io/disCOVIDer19/>



MANAGE A LARGE SHINY APP PROJECT

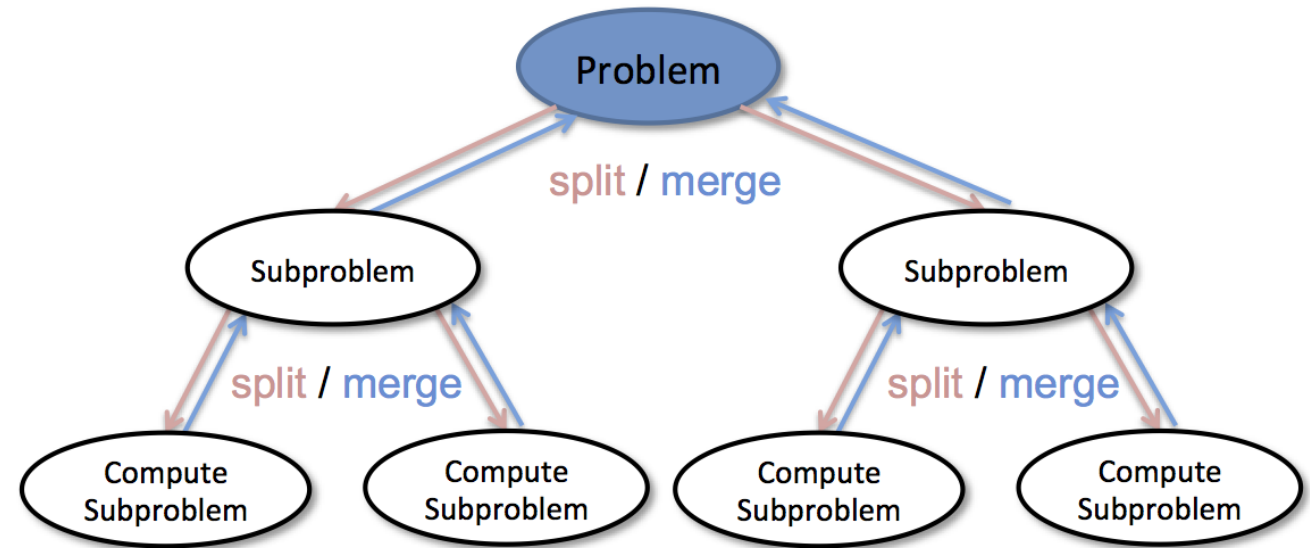
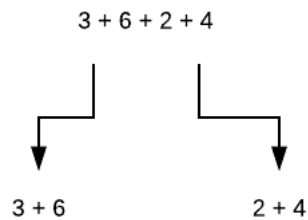
- **Divide and conquer** paradigm (Latin: *divide et impera*) for files and code
- **Workflow advices**
- **Comments** in the code



DIVIDE AND CONQUER

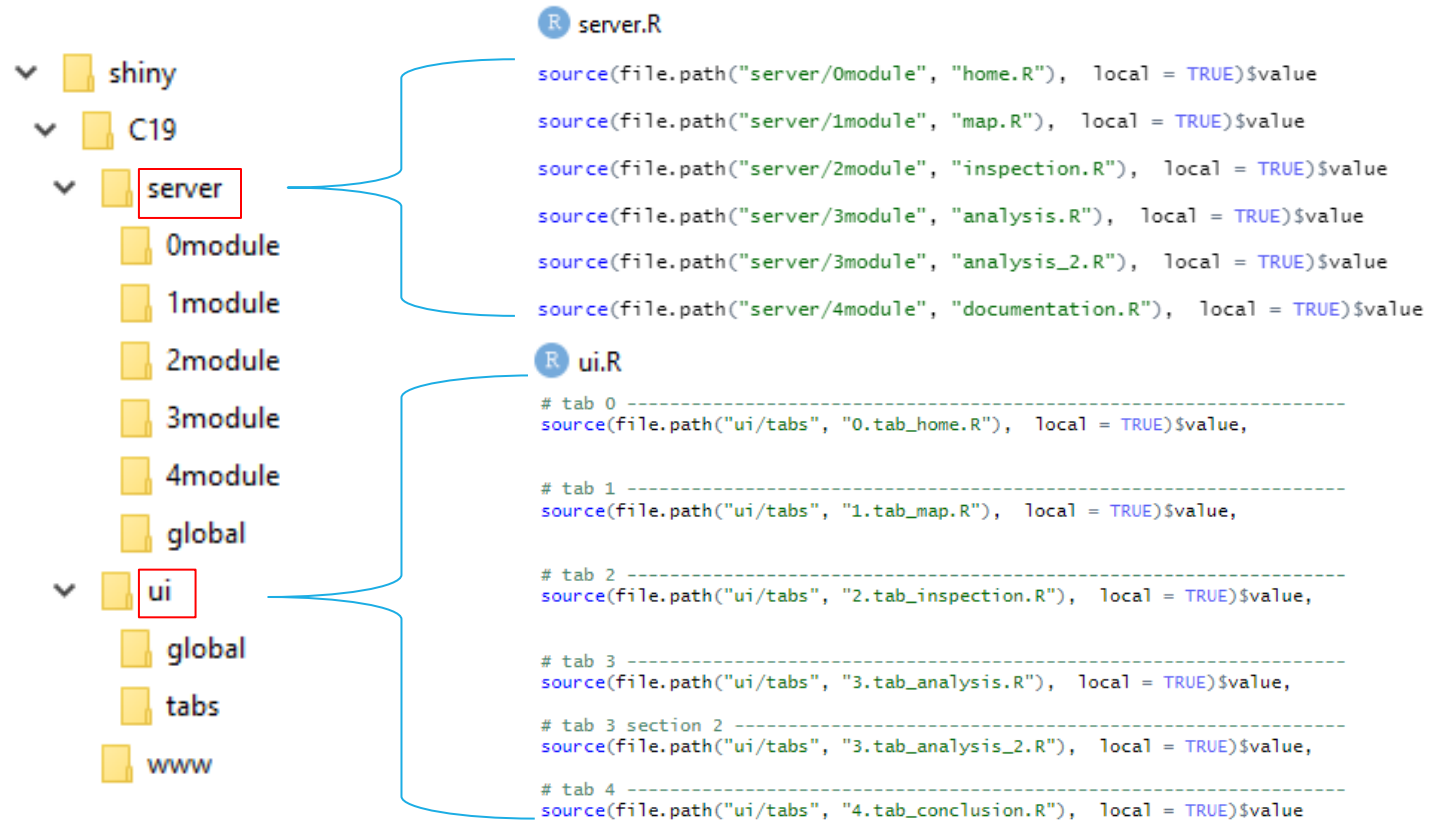
- Divide a large problem into many smaller, much easier to solve problems.

- Simple example:



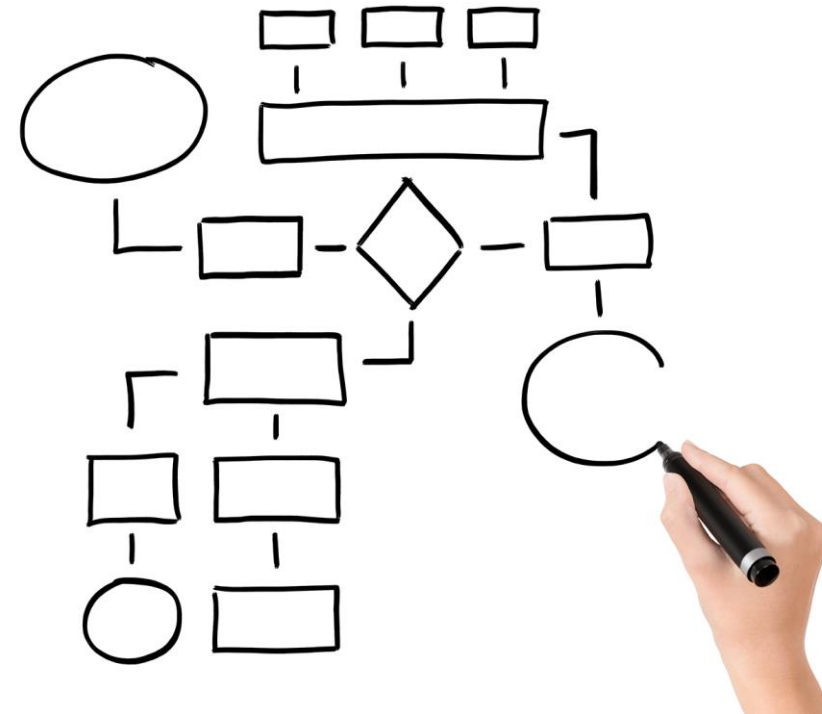
FILES AND FOLDERS ORGANIZATION

- Using Divide and conquer paradigm
- Also applicable in the code and algorithms!
- Utility
 - Files and code more well organised
 - Code more readable
 - Code in separate containers
 - Easier to find errors



WORKFLOW MANAGEMENT

- Divide the work taking into consideration the strengths of each member
- It is desirable to assign to each member one section of the app to mainly work on
- GitHub
- Example of DisCOVIDer19:
 - Group: two Mathematicians, one Physicist, one Computer Scientist and one Economist
 - Each person/two people worked mainly on a specific section



COMMENTS

- A **comment** is a programmer-readable explanation or *annotation* in the source code of a computer program.
- Utility:
 - **Planning and reviewing**
 - **Code description**
 - **Algorithmic description**
 - **Debugging**

It is possible to comment a line of code with **#** symbol

```
#EXAMPLE of comment  
x = 10
```

```
# This is the description of the variable  
y = 3  
  
# This is the description of the function  
walk <- function(arg_1, arg_2, ...) {  
  # Function body  
}
```

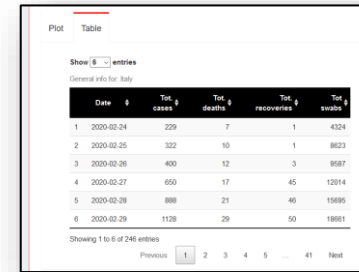
```
# ===== Part1 =====  
work = function()  
{  
  #body  
}
```

```
# ===== Part2 =====  
eat = function()  
{  
  #body  
}
```

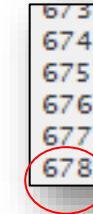
```
# ===== Part3 =====  
sleep = function()  
{  
  #body  
}
```

COMMENTS: EXAMPLE

- You want to find the code of a table in my app.
- 678 lines of code only for inspection section of the server. How do you find the table code quickly?
- Comments may help finding the code of the table even if you didn't code it!



	Date	Tot. cases	Tot. deaths	Tot. recoveries	Tot. tests
1	2020-02-24	229	7	1	4324
2	2020-02-25	322	10	1	8023
3	2020-02-26	400	12	3	9587
4	2020-02-27	650	17	45	12014
5	2020-02-28	888	21	46	15895
6	2020-02-29	1128	29	50	18861

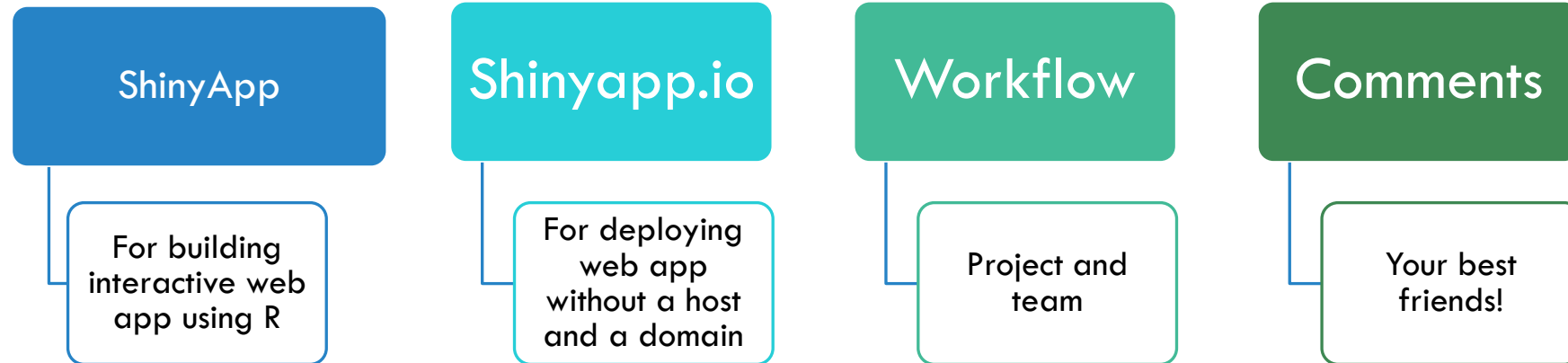


673
674
675
676
677
678

Using
comments!

```
296 - #===== TABLE =====
297
298 # General info table
299
300 - output$geninfo_table <- DT::renderDataTable({
301
302
303   # Check if input is given
304   if(is_ready(reac_dataset$table_plot)) {
305
306     # Concatenate strings and name for plot title
307     newnam <- paste(stringr::str_to_title(input$geninfo_type), "swabs")
308
309     # Create a new column in the table
310     newcol <- switch(input$geninfo_type,
311                       "tot" = eval(reac_dataset$data)[[reac_dataset$name]]$tamponi,
312                       "new" = c(NA, diff(eval(reac_dataset$data)[[reac_dataset$name]]$tamponi)),
313                       "cur" = NULL)
314
315     # Add the column to the table
316     dt <- reac_dataset$table_plot
317     dt[,newnam] <- newcol
318
319     # Refresh Table with new column
320     DT::datatable(
321       dt,
322       caption = paste0("General info for: ",reac_dataset$name),
323       options = list(
324         searching = FALSE,
325         pageLength = 6, lengthMenu = c(6,10,14), scrollX = T,
326         initComplete = reac_dataset$headercol)
327     )
328   }
329
330 })
331
332
```

CONCLUSIONS



THANK YOU FOR YOUR ATTENTION!

Questions?



 Website: ierardiandrea.com

 [linkedin.com/in/andreaierardi](https://www.linkedin.com/in/andreaierardi)

 github.com/andreaierardi