

A FIERY APPROACH TO R WEB SERVICES

Exposing your models as web services in R...



@quintindk



<https://github.com/quintindk>



<https://linkedin.com/in/quintindk>

ABOUT ME...



Quinton de Kock



South African cricketer

Quinton de Kock is a South African professional cricketer who plays for the Titans at the domestic level and the South African national team. He also plays for Mumbai Indians in Indian Premier League. He was named the Cricketer of the Year at Cricket South Africa's 2017 Annual Awards. [Wikipedia](#)

Born: 17 December 1992 (age 26 years), [Johannesburg](#)

ODI debut (cap 105): 19 January 2013 v [New Zealand](#)

Last ODI: 16 March 2019 v [Sri Lanka](#)

Test debut (cap 317): 20 February 2014 v [Australia](#)

T20I debut (cap 54): 21 December 2012 v [New Zealand](#)

Spouse: [Sasha Hurly](#) (m. 2016)

Stats

Wicketkeeper

[View all](#)

ABOUT ME...



ABOUT ME...

- I'm a proud father and husband.
- I've been in the technology industry for 20 years.
- Of that 20 years, almost 11 years have been at Netstar.
- My background is software development; .NET, JS, Python, R, Scala, Java.
- My interests outside of Technology are reading of which I enjoy mostly psychology, philosophy and anthropology.





Fiery Web Services

- ProjectTemplate - <http://projecttemplate.net/>
- Fiery - <https://github.com/thomasp85/fiery>
- Docker - <https://www.docker.com>



ProjectTemplate

is a system for automating the thoughtless parts of a data analysis project...

- Organizing the files in your project.
- Loading all the R packages you'll use.
- Loading all of your data sets into memory.
- Munging and preprocessing your data into a form that's suitable for analysis.

<http://projecttemplate.net>

ProjectTemplate

```
Console Terminal x
~/Repos/
Platform: x86_64-pc-linux-gnu (64-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.

Natural language support but running in an English locale

R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

> setwd("~/Repos")
> install.packages("ProjectTemplate")
Installing package into '/home/quintindk/R/x86_64-pc-linux-gnu-library/3.4'
(as 'lib' is unspecified)
trying URL 'https://cloud.r-project.org/src/contrib/ProjectTemplate_0.9.0.tar.gz'
Content type 'application/x-gzip' length 234224 bytes (228 KB)
=====
downloaded 228 KB

* installing *source* package 'ProjectTemplate' ...
** package 'ProjectTemplate' successfully unpacked and MD5 sums checked
** R
** inst
** preparing package for lazy loading
** help
*** installing help indices
** building package indices
** testing if installed package can be loaded
* DONE (ProjectTemplate)

The downloaded source packages are in
  '/tmp/RtmpDbZY1s/downloaded_packages'
> |
```

Environment History Connections

Import Dataset

Global Environment

Environment is empty

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home > Repos

	Name	Size	Modified
↑	..		
📁	demo2		


```

Console Terminal
~/Repos/

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(as 'lib' is unspecified)
trying URL 'https://cloud.r-project.org/src/contrib/ProjectTemplate_0.9.0.tar.gz'
Content type 'application/x-gzip' length 234224 bytes (228 KB)
=====
downloaded 228 KB

* installing *source* package 'ProjectTemplate' ...
** package 'ProjectTemplate' successfully unpacked and MD5 sums checked
** R
** inst
** preparing package for lazy loading
** help
*** installing help indices
** building package indices
** testing if installed package can be loaded
* DONE (ProjectTemplate)

The downloaded source packages are in
  '/tmp/RtmpDbZY1s/downloaded_packages'
> library(ProjectTemplate)
> ?create.project()
>

```

Environment History Connections

Import Dataset

List

Global Environment

Environment is empty

Files Plots Packages Help Viewer

Find in Topic

R: Create a new project.

create.project {ProjectTemplate}

R Documentation

Create a new project.

Description

This function will create all of the scaffolding for a new project. It will set up all of the relevant directories and their initial contents. For those who only want the minimal functionality, the template argument can be set to minimal to create a subset of ProjectTemplate's default directories. For those who want to dump all of ProjectTemplate's functionality into a directory for extensive customization, the dump argument can be set to TRUE.

Usage

```
create.project(project.name = "new-project", template = "full",
  dump = FALSE, merge.strategy = c("require.empty",
    "allow.non.conflict"), rstudio.project = FALSE)
```



```
Console Terminal x
~/Repos/

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Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

> setwd("~/Repos")
> install.packages("ProjectTemplate")
Installing package into '/home/quintindk/R/x86_64-pc-linux-gnu-library/3.4'
(as 'lib' is unspecified)
trying URL 'https://cloud.r-project.org/src/contrib/ProjectTemplate_0.9.0.tar.gz'
Content type 'application/x-gzip' length 234224 bytes (228 KB)
=====
downloaded 228 KB

* installing *source* package 'ProjectTemplate' ...
** package 'ProjectTemplate' successfully unpacked and MD5 sums checked
** R
** inst
** preparing package for lazy loading
** help
*** installing help indices
** building package indices
** testing if installed package can be loaded
* DONE (ProjectTemplate)

The downloaded source packages are in
      '/tmp/RtmpDbZY1s/downloaded_packages'
> library(ProjectTemplate)
> ?create.project()
> create.project(project.name = "demo1", template = "minimal", rstudio.project = TRUE)
> |
```

EnvironmentHistoryConnections

FilesPlotsPackagesHelpViewer

New FolderDeleteRenameMore

Home > Repos > demo1

	Name	Size	Modified
	..		
	cache		
	config		
	data		
	demo1.Rproj	235 B	Apr 5, 2019, 6:36 PM
	munge		
	README.md	1.5 KB	Apr 5, 2019, 6:36 PM
	src		

```
global.dcf*
1 version: 0.9.0
2 data_loading: TRUE
3 data_loading_header: TRUE
4 data_ignore:
5 cache_loading: TRUE
6 recursive_loading: FALSE
7 munging: TRUE
8 logging: FALSE
9 logging_level: INFO
10 load_libraries: TRUE
11 libraries: dplyr, ggvis, caret, jsonlite, fiery, routr
12 as_factors: TRUE
13 tables_type: data.frame
14 attach_internal_libraries: FALSE
15 cache_loaded_data: TRUE
16 sticky_variables: NONE
17
```

13:24 DCF

Console Terminal

~/Repos/demo1/

R is free software and comes with absolutely no warranty.
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Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

> |

Environment History Connections

Import Dataset

Global Environment

Environment is empty

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home > Repos > demo1 > config

	Name	Size	Modified
	..		
	global.dcf	364 B	Apr 5, 2019, 6:36 PM
	README.md	122 B	Apr 5, 2019, 6:36 PM

Console Terminal

~/Repos/demo2/

R version 3.4.4 (2018-03-15) -- "Someone to Lean On"
 Copyright (C) 2018 The R Foundation for Statistical Computing
 Platform: x86_64-pc-linux-gnu (64-bit)

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 You are welcome to redistribute it under certain conditions.
 Type 'license()' or 'licence()' for distribution details.

Natural language support but running in an English locale

R is a collaborative project with many contributors.
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 'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or
 'help.start()' for an HTML browser interface to help.
 Type 'q()' to quit R.

```
> library(ProjectTemplate)
> load.project()
Project name: demo2
Loading project configuration
Autoloading packages
Loading package: dplyr
Loading required package: dplyr
Installing package into '/home/quintindk/R/x86_64-pc-linux-gnu-library/3.4'
(as 'lib' is unspecified)
also installing the dependencies 'utf8', 'cli', 'crayon', 'fansi', 'pillar', 'purrr', 'assertthat', 'glue', 'magrittr', 'pkgconfig', 'R6', 'Rcpp', 'rlang', 'tibble', 'tidyselect', 'BH', 'plogr'

trying URL 'https://cloud.r-project.org/src/contrib/utf8_1.1.4.tar.gz'
```

Environment History Connections

Import Dataset

Global Environment

Environment is empty

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home > Repos > demo2

	Name	Size	Modified
..	..		
cache	cache		
config	config		
data	data		
demo2.Rproj	demo2.Rproj	205 B	Apr 5, 2019, 6:38 PM
docker	docker		
lib	lib		
munge	munge		
README.md	README.md	2.1 KB	Apr 3, 2019, 5:31 PM
src	src		
test	test		

```

Console Terminal
~/Repos/demo2/

Attaching package: 'dplyr'

The following objects are masked from 'package:stats':

  filter, lag

The following objects are masked from 'package:base':

  intersect, setdiff, setequal, union

Loading package: ggvis
Loading required package: ggvis
Loading package: caret
Loading required package: caret
Loading required package: lattice
Loading required package: ggplot2

Attaching package: 'ggplot2'

The following object is masked from 'package:ggvis':

  resolution

Loading package: jsonlite
Loading required package: jsonlite
Loading package: fiery
Loading required package: fiery
Loading package: routr
Loading required package: routr
Autoloading helper functions
Running helper script: fallback_handler.R
Running helper script: formatting_handler.R
Running helper script: predict_handler.R
Autoloading data
Loading cached data set: iris
Munging data
Running preprocessing script: 01-colnames.R
>

```

Environment History Connections		
Global Environment		
Data		
config	List of 16	
iris	149 obs. of 5 variables	
project_info	List of 4	
Functions		
fallback_handler	function (request, response, keys, ...)	
formatting_handler	function (request, response, keys, ...)	
predict_handler	function (request, response, keys, ...)	

Files Plots Packages Help Viewer			
New Folder Delete Rename More			
Home > Repos > demo2 > src			
	Name	Size	Modified
	..		
	app.R	594 B	Apr 3, 2019, 5:31 PM
	demo.R	1.4 KB	Apr 3, 2019, 5:31 PM
	fiery.R	679 B	Apr 5, 2019, 7:25 PM
	routr.R	567 B	Apr 3, 2019, 5:31 PM

Fiery

- This package maintained by the infamous Thomas Lin Pedersen @thomasp85 (think gganimate) is a framework for web servers in R.

Fiery is a flexible and lightweight framework for building web servers in R. It is relatively unopinionated about how you chose to build your server logic and supports many use cases, from serving static files to being used as a base for a model-view-controller based setup.

<https://github.com/thomasp85/fiery>



```
fiery.R x
Source on Save
Run Source
1 library(fiery)
2
3 # Create a New App
4 app <- Fire$new()
5
6 app$on('request', function(server, request, ...) {
7   response <- request$respond()
8   response$status <- 200L
9   response$body <- paste0('<h1>Hello World</h1>')
10  response$type <- 'html'
11 })
12
13 # Assign ports
14 app$port = 8090
15
16 # Start
17 app$ignite()
18
```

18:1 (Top Level)

R Script

```
Console Terminal x
~/Repos/demo2/
> app$on('request', function(server, request, ...) {
+   response <- request$respond()
+   response$status <- 200L
+   response$body <- paste0('<h1>Hello World</h1>')
+   response$type <- 'html'
+ })
>
> # Assign ports
> app$port = 8090
>
> # Start
> app$ignite()
Fire started at 127.0.0.1:8090
|
```

Environment History Connections

Import Dataset

Global Environment

Values

app <Object containing active binding>

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home > Repos > demo2 > src

	Name	Size	Modified
	..		
	app.R	594 B	Apr 3, 2019, 5:31 PM
	demo.R	1.4 KB	Apr 3, 2019, 5:31 PM
	fiery.R	296 B	Apr 5, 2019, 7:43 PM
	fiery_routr.R	679 B	Apr 5, 2019, 7:25 PM
	routr.R	567 B	Apr 3, 2019, 5:31 PM


```
fiery.R x
Source on
1 library(fiery)
2
3 # Create a New App
4 app <- Fire$new()
5
6 app$on('request', function() {
7   response <- request$resp
8   response$status <- 200L
9   response$body <- paste0(
10    response$type <- 'html'
11  })
12
13 # Assign ports
14 app$port = 8090
15
16 # Start
17 app$ignite()
18
```

18:1 (Top Level)

Console Terminal

~/Repos/demo2/

```
> app$on('request', function() {
+   response <- request$resp
+   response$status <- 200L
+   response$body <- paste0(
+   response$type <- 'html'
+ })
>
> # Assign ports
> app$port = 8090
>
> # Start
> app$ignite()
Fire started at 127.0.0.1:8090
```

Mozilla Firefox

127.0.0.1:8090/



127.0.0.1:8090



Hello World

routr...

- Middleware that delegates the HTTP request to the handler function
- Delegation is URL based.

```
1 library(routr)
2 route <- Route$new()
3
4 ▾ fallback <- function(request, response, keys, ...) {
5     response$status <- 200L
6     response$type <- 'html'
7     response$body <- '<h1>I\'m not saying hello to you</h1>'
8     return(FALSE)
9 }
10 route$add_handler('get', '/*', fallback)
11
12 ▾ hellow <- function(request, response, keys, ...) {
13     response$status <- 200L
14     response$type <- 'html'
15     response$body <- paste0('<h1>Hello ', keys$who, '</h1>')
16     return(FALSE)
17 }
18 route$add_handler('get', '/hello/:who/', hellow)
19
20 router <- RouteStack$new()
21 router$add_route(route, 'test')
22 |
```

```

1 library(fiery)
2 library(routr)
3
4 # Create a New App
5 app <- Fire$new()
6 route <- Route$new()
7
8 fallback <- function(request, response, keys, ...) {
9   response$status <- 200L
10  response$type <- 'html'
11  response$body <- '<h1>I\'m not saying hello to you</h1>'
12  return(FALSE)
13 }
14 route$add_handler('get', '/*', fallback)
15
16 hellow <- function(request, response, keys, ...) {
17   response$status <- 200L
18   response$type <- 'html'
19   response$body <- paste0('<h1>Hello ', keys$who, '!</h1>')
20   return(FALSE)
21 }
22 route$add_handler('get', '/hello/:who/', hellow)
23
24 router <- RouteStack$new()
25 router$add_route(route, 'test')
26
27 app$attach(router)
28
29 # Assign ports
30 app$port = 8090
31
32 # Start
33 app$ignite()
34

```

30:16 (Top Level) R Script

Environment

History

Connections

Import Dataset

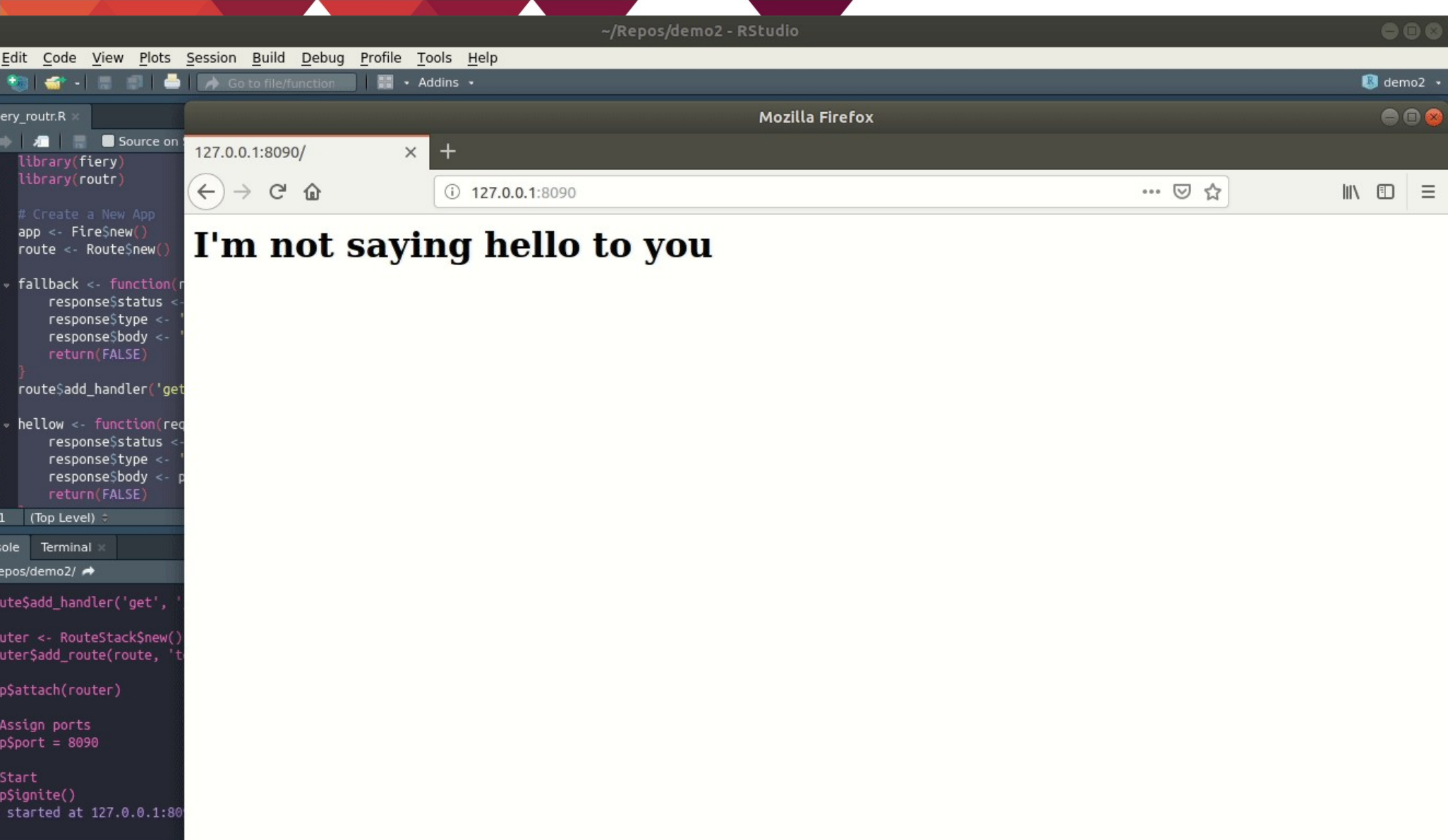
List

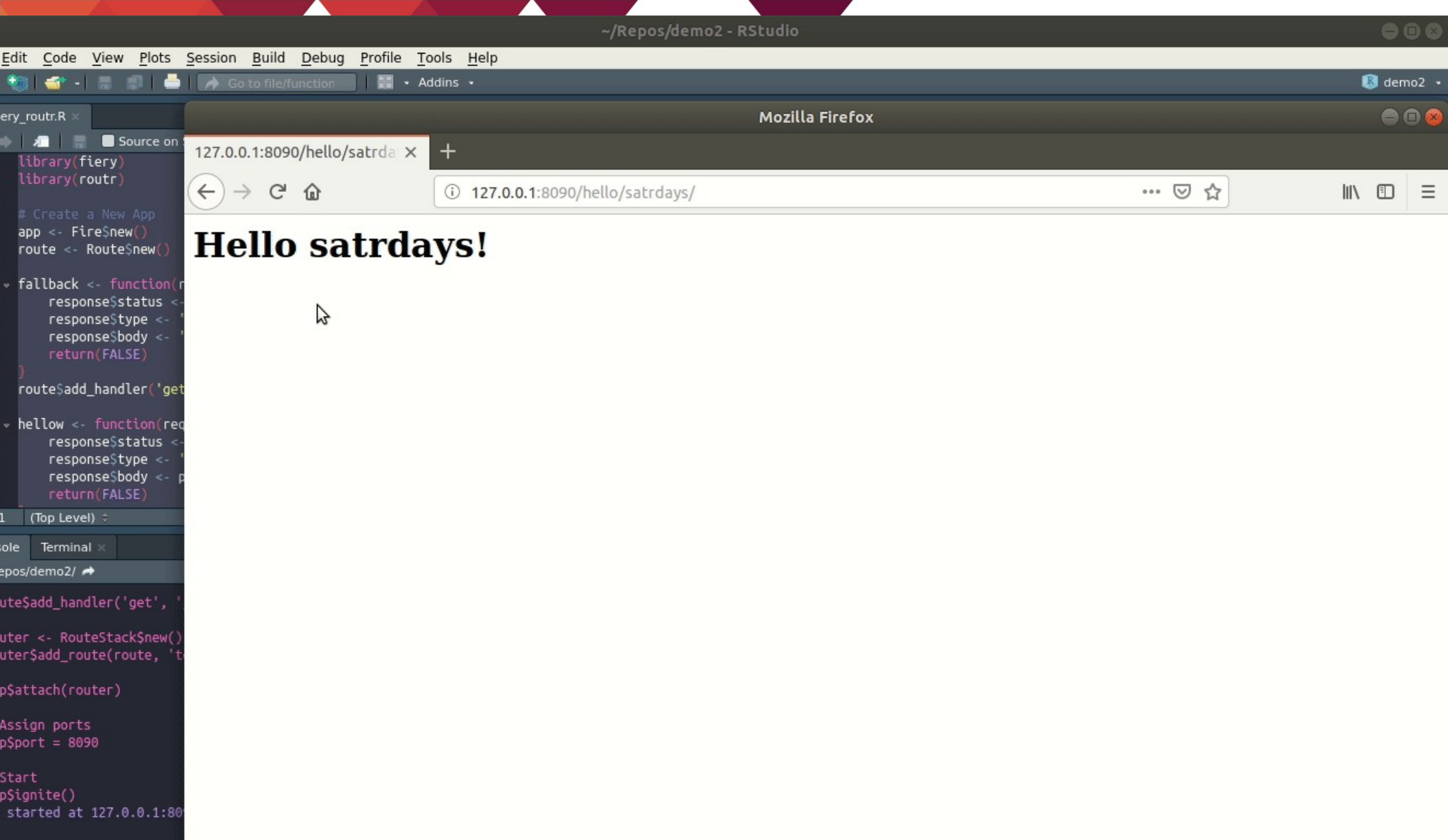
Global Environment

Data

route	Environment	
Values		
app	<Object containing active binding>	
router	<Object containing active binding>	
Functions		
fallback	function (request, response, keys, ...)	
hellow	function (request, response, keys, ...)	

Files		Plots	Packages	Help	Viewer
New Folder		Delete	Rename	More	
Home > Repos > demo2 > docker > app > src					
Name		Size	Modified		
..					
app.R		626 B	Apr 5, 2019, 9:47 PM		
demo.R		1.4 KB	Apr 5, 2019, 9:47 PM		
fiery.R		296 B	Apr 5, 2019, 9:47 PM		
fiery_routr.R		694 B	Apr 5, 2019, 9:47 PM		
routr.R		567 B	Apr 5, 2019, 9:47 PM		





ProjectTemplate and Fiery

- Model View Controller pattern...

ProjectTemplate




```

app.R x
1 if (!require(ProjectTemplate)) {
2   install.packages("ProjectTemplate")
3   library(ProjectTemplate)
4 }
5 load.project()
6
7 router <- RouteStack$new()
8 fallback <- Route$new()
9 prediction <- Route$new()
10 formatting <- Route$new()
11
12 fallback$add_handler("get", "/*", fallback_handler)
13 formatting$add_handler("post", "/*", formatting_handler)
14 prediction$add_handler("post", "/predict/", predict_handler)
15
16 router$add_route(fallback, "fallback")
17 router$add_route(formatting, "formatting")
18 router$add_route(prediction, "prediction")
19
20 app <- Fire$new(port = 8090)
6:1 (Top Level) R Script

```

```

Console Terminal x
~/Repos/demo2/
Loading required package: jsonlite
Loading package: fiery
Loading required package: fiery
Loading package: routr
Loading required package: routr
Autoloading helper functions
Running helper script: fallback_handler.R
Running helper script: formatting_handler.R
Running helper script: predict_handler.R
Autoloading data
Loading cached data set: iris
Loading cached data set: model.knn
Munging data
Running preprocessing script: 01-colnames.R
> |

```

Environment History Connections

Import Dataset

Global Environment

Data

Object	Class	Size
config	List of 16	
iris	149 obs. of 5 variables	
model.knn	List of 20	
project.info	List of 4	

Functions

Function	Definition
fallback_handler	function (request, response, keys, ...)
formatting_handler	function (request, response, keys, ...)
predict_handler	function (request, response, keys, ...)

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home > Repos > demo2

Name	Size	Modified
..		
cache		
config		
data		
demo2.Rproj	205 B	Apr 5, 2019, 7:54 PM
docker		
lib		
munge		
README.md	2.3 KB	Apr 5, 2019, 7:02 PM
src		
test		

```

4 }
5 load.project()
6
7 router <- RouteStack$new()
8 fallback <- Route$new()
9 prediction <- Route$new()
10 formatting <- Route$new()
11
12 fallback$add_handler("get", "/*", fallback_handler)
13 formatting$add_handler("post", "/*", formatting_handler)
14 prediction$add_handler("post", "/predict/", predict_handler)
15
16 router$add_route(fallback, "fallback")
17 router$add_route(formatting, "formatting")
18 router$add_route(prediction, "prediction")
19
20 app <- Fire$new(port = 8090)
21 app$attach(router)
22 app$ignite(block = TRUE)
23
23:1 (Top Level) R Script

```

```

~/Repos/demo2/
> formatting <- Route$new()
>
> fallback$add_handler("get", "/*", fallback_handler)
> formatting$add_handler("post", "/*", formatting_handler)
> prediction$add_handler("post", "/predict/", predict_handler)
>
> router$add_route(fallback, "fallback")
> router$add_route(formatting, "formatting")
> router$add_route(prediction, "prediction")
>
> app <- Fire$new(port = 8090)
> app$attach(router)
> app$ignite(block = TRUE)
Fire started at 127.0.0.1:8090

```

Environment History Connections

Global Environment

Data

Object	Class	Size
config	List of 16	
iris	149 obs. of 5 variables	
model.knn	List of 20	
project.info	List of 4	

Functions

Function	Definition
fallback_handler	function (request, response, keys, ...)
formatting_handler	function (request, response, keys, ...)
predict_handler	function (request, response, keys, ...)

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home > Repos > demo2

Name	Size	Modified
..		
cache		
config		
data		
demo2.Rproj	205 B	Apr 5, 2019, 7:54 PM
docker		
lib		
munge		
README.md	2.3 KB	Apr 5, 2019, 7:02 PM
src		
test		

```
app.R x
Source on
4 }
5 load.project()
6
7 router <- RouteStack$
8 fallback <- Route$ne
9 prediction <- Route$ne
10 formatting <- Route$ne
11
12 fallback$add_handler("
13 formatting$add_handler
14 prediction$add_handler
15
16 router$add_route(fallb
17 router$add_route(forma
18 router$add_route(predi
19
20 app <- Fire$new(port =
21 app$attach(router)
22 app$ignite(block = TRU
23
```

23:1 (Top Level)

```
Console Terminal x
~/Repos/demo2/
> formatting <- Route$new()
>
> fallback$add_handler("get"
> formatting$add_handler("po
> prediction$add_handler("po
>
> router$add_route(fallback,
> router$add_route(formatin
> router$add_route(predictio
>
> app <- Fire$new(port = 809
> app$attach(router)
> app$ignite(block = TRUE)
Fire started at 127.0.0.1:80
```

127.0.0.1:8090/ x +



127.0.0.1:8090



Bad request. Please ensure you use the correct method and path.

```

app.R x
4 }
5 load.project()
6
7 router <- RouteStack$new()
8 fallback <- Route$new()
9 prediction <- Route$new()
10 formatting <- Route$new()
11
12 fallback$add_handler("get", "/*", fallback_handler)
13 formatting$add_handler("post", "/*", formatting_handler)
14 prediction$add_handler("post", "/predict/", predict_handler)
15
16 router$add_route(fallback, "fallback")
17 router$add_route(formatting, "formatting")
18 router$add_route(prediction, "prediction")
19
20 app <- Fire$new(port = 8090)
21 app$attach(router)
22 app$signite(block = TRUE)
23
23:1 (Top Level) R Script

```

```

Console Terminal
Terminal 1 quintindk@quintindk-VirtualBox: ~/Repos/demo2/test
quintindk@quintindk-VirtualBox:~/Repos/demo2/test$ curl --header "Content-Type: application/json" --r
quest POST --data 'hello satRdays' http://localhost:8090/predict/
<h1>I expected well formatted JSON, you sent me hello satRdays</h1>quintindk@quintindk-VirtualBox:~/
Repos/demo2/test$

```

Environment History Connections

Global Environment

Data

Variable	Value	Icon
config	List of 16	🔍
iris	149 obs. of 5 variables	📄
model.knn	List of 20	🔍
project.info	List of 4	🔍

Functions

Function	Definition	Icon
fallback_handler	function (request, response, keys, ...)	📄
formatting_handler	function (request, response, keys, ...)	📄
predict_handler	function (request, response, keys, ...)	📄

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home > Repos > demo2

Name	Size	Modified
..		
cache		
config		
data		
demo2.Rproj	205 B	Apr 5, 2019, 7:54 PM
docker		
lib		
munge		
README.md	2.3 KB	Apr 5, 2019, 7:02 PM
src		
test		

```

4 }
5 load.project()
6
7 router <- RouteStack$new()
8 fallback <- Route$new()
9 prediction <- Route$new()
10 formatting <- Route$new()
11
12 fallback$add_handler("get", "/*", fallback_handler)
13 formatting$add_handler("post", "/*", formatting_handler)
14 prediction$add_handler("post", "/predict/", predict_handler)
15
16 router$add_route(fallback, "fallback")
17 router$add_route(formatting, "formatting")
18 router$add_route(prediction, "prediction")
19
20 app <- Fire$new(port = 8090)
21 app$attach(router)
22 app$ignite(block = TRUE)
23
23:1 (Top Level) R Script

```

```

Terminal 1
quintindk@quintindk-VirtualBox: ~/Repos/demo2/test

quintindk@quintindk-VirtualBox:~/Repos/demo2/test$ curl --header "Content-Type: application/json" --r
equest POST --data 'hello satRdays' http://localhost:8090/predict/
<h1>I expected well formatted JSON, you sent me hello satRdays</h1>quintindk@quintindk-VirtualBox:~/
Repos/demo2/test$ cd .
quintindk@quintindk-VirtualBox:~/Repos/demo2/test$ curl --header "Content-Type: application/json" --r
equest POST --data @test.json http://localhost:8090/predict/
["Iris-setosa","Iris-setosa","Iris-setosa","Iris-setosa","Iris-setosa","Iris-setosa","Iris-setosa","I
ris-setosa","Iris-setosa","Iris-setosa","Iris-setosa","Iris-setosa","Iris-versicolor","Iris-versicolo
r","Iris-versicolor","Iris-versicolor","Iris-versicolor","Iris-versicolor","Iris-versicolor","Iris-ve
rsicolor","Iris-versicolor","Iris-versicolor","Iris-versicolor","Iris-versicolor","Iris-versicolor","I
ris-virginica","Iris-virginica","Iris-virginica","Iris-virginica","Iris-virginica","Iris-virginica","I
ris-virginica","Iris-virginica","Iris-virginica","Iris-virginica","Iris-virginica"]quintindk@quintin
dk-VirtualBox:~/Repos/demo2/test$

```

Environment History Connections

Global Environment

Data

config	List of 16	
iris	149 obs. of 5 variables	
model.knn	List of 20	
project.info	List of 4	

Functions

fallback_handler	function (request, response, keys, ...)	
formatting_handler	function (request, response, keys, ...)	
predict_handler	function (request, response, keys, ...)	

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home > Repos > demo2

	Name	Size	Modified
	..		
	cache		
	config		
	data		
	demo2.Rproj	205 B	Apr 5, 2019, 7:54 PM
	docker		
	lib		
	munge		
	README.md	2.3 KB	Apr 5, 2019, 7:02 PM
	src		
	test		

[illegible]

```

quintindk@quintindk-VirtualBox: ~/Repos/demo2/test
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dk-VirtualBox:~/Repos/demo2/test$

```

The screenshot shows the RStudio interface. The top bar has tabs for Environment, History, and Connections. Below the top bar is a toolbar with icons for creating a new file, opening a file, saving a file, and importing a dataset. The Environment pane is open, showing a list of objects in the Global Environment. The objects are: config (List of 16), iris (149 obs. of 5 variables), model.knn (List of 20), and project.info (List of 4). The iris object is highlighted. Below the Environment pane is the Functions pane, which shows a list of functions: fallback_handler, formatting_handler, and predict_handler. The predict_handler function is highlighted.

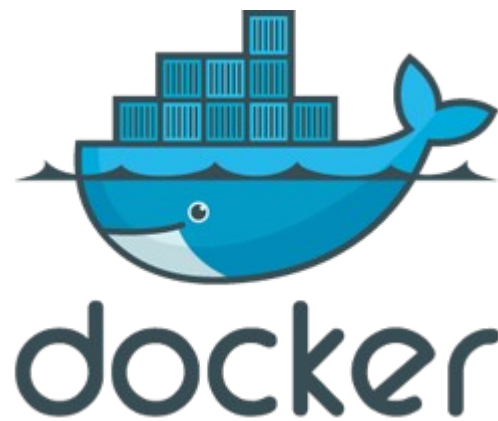
A screenshot of the Visual Studio Code interface. The top menu bar includes 'Files', 'Plots', 'Packages', 'Help', and 'Viewer'. Below the menu is a toolbar with icons for 'New Folder', 'Delete', 'Rename', and 'More'. The breadcrumb navigation shows 'Home > Repos > demo2 > test'. The file explorer pane displays a table with columns 'Name', 'Size', and 'Modified'. It lists '..' (parent directory) and 'test.json' (3.6 KB, modified Apr 5, 2019, 7:38 PM).

Docker

is a system for virtualizing software at an OS level...

- Docker was open sourced in 2014
- Containers take away the complexity of installation at scale
- Stephan Fabel (Product Manager at Canonical) is quoted as saying “The containerization craze shows no signs of abating”

<https://www.docker.com/>



Dockerfile

```
1 FROM r-base:3.5.3
2
3 LABEL maintainer="Quintin de Kok quitnindk@netstar.co.za"
4
5 RUN apt-get update
6 RUN apt-get install -y libcurl4-openssl-dev libxml2-dev libssl-dev libgeos-dev
7
8 RUN mkdir -p app/cache
9 RUN mkdir -p app/data
10 RUN mkdir -p app/lib
11 RUN mkdir -p app/src
12 COPY app/config app/config
13 COPY install.R tmp/
14 RUN Rscript /tmp/install.R
15
16 COPY app app
17
18 EXPOSE 8090
19 WORKDIR /app
20 CMD ["Rscript", "src/app.R"]
```

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19 WORKDIR /app
20 CMD ["Rscript", "src/app.R"]
```

Install.R

```
1 ▾ if (!require(ProjectTemplate)) {  
2   install.packages("ProjectTemplate")  
3   library(ProjectTemplate)  
4 }  
5 setwd("/app/")  
6 load.project()
```


Console Terminal

Terminal 1 (busy) quintindk@quintindk-VirtualBox: ~/Repos/demo2/docker

```
quintindk@quintindk-VirtualBox:~/Repos/demo2$ cd docker/
quintindk@quintindk-VirtualBox:~/Repos/demo2/docker$ mkdir app
quintindk@quintindk-VirtualBox:~/Repos/demo2/docker$ rm -r app/*
rm: cannot remove 'app/*': No such file or directory
quintindk@quintindk-VirtualBox:~/Repos/demo2/docker$ cp -r ../cache app
quintindk@quintindk-VirtualBox:~/Repos/demo2/docker$ cp -r ../config app
quintindk@quintindk-VirtualBox:~/Repos/demo2/docker$ cp -r ../data app
quintindk@quintindk-VirtualBox:~/Repos/demo2/docker$ cp -r ../lib app
quintindk@quintindk-VirtualBox:~/Repos/demo2/docker$ cp -r ../munge app
quintindk@quintindk-VirtualBox:~/Repos/demo2/docker$ cp -r ../src app
quintindk@quintindk-VirtualBox:~/Repos/demo2/docker$ docker build -t r-prediction-api:0.0.1 .
Sending build context to Docker daemon 65.02kB
Step 1/15 : FROM r-base:3.5.3
3.5.3: Pulling from library/r-base
```

Environment History Connections

Import Dataset

Global Environment

Environment is empty

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home Repos demo2 docker

	Name	Size	Modified
↑	..		
📁	app		
📄	Dockerfile	406 B	Apr 3, 2019, 5:31 PM
📄	install.R	133 B	Apr 3, 2019, 5:31 PM

Console Terminal

Terminal 1 (busy) quintindk@quintindk-VirtualBox: ~/Repos/demo2/docker

```

quintindk@quintindk-VirtualBox:~/Repos/demo2$ cd docker/
quintindk@quintindk-VirtualBox:~/Repos/demo2/docker$ mkdir app
quintindk@quintindk-VirtualBox:~/Repos/demo2/docker$ rm -r app/*
rm: cannot remove 'app/*': No such file or directory
quintindk@quintindk-VirtualBox:~/Repos/demo2/docker$ cp -r ../cache app
quintindk@quintindk-VirtualBox:~/Repos/demo2/docker$ cp -r ../config app
quintindk@quintindk-VirtualBox:~/Repos/demo2/docker$ cp -r ../data app
quintindk@quintindk-VirtualBox:~/Repos/demo2/docker$ cp -r ../lib app
quintindk@quintindk-VirtualBox:~/Repos/demo2/docker$ cp -r ../munge app
quintindk@quintindk-VirtualBox:~/Repos/demo2/docker$ cp -r ../src app
quintindk@quintindk-VirtualBox:~/Repos/demo2/docker$ docker build -t r-prediction-api:0.0.1 .
Sending build context to Docker daemon 65.02kB
Step 1/15 : FROM r-base:3.5.3
3.5.3: Pulling from library/r-base
2666d10a4f80: Pull complete
368c9265f897: Pull complete
6f87d56509ae: Pull complete
a959851a7386: Pull complete
b996468f4c35: Pull complete
7534b13feebb: Pull complete
Digest: sha256:452d2ca0fd9a76314dfaba4681d0b2189d3966b64fabbb41cc071c805ff1f430
Status: Downloaded newer image for r-base:3.5.3
--> 62c848eeb175
Step 2/15 : LABEL maintainer="Quintin de Kok quitnindk@netstar.co.za"
--> Running in 292ead562ac4
Removing intermediate container 292ead562ac4
--> ad016cd7d2b8
Step 3/15 : RUN apt-get update
--> Running in 14afa11c800a
Get:1 http://cdn-fastly.deb.debian.org/debian testing InRelease [158 kB]
Get:2 http://cdn-fastly.deb.debian.org/debian sid InRelease [242 kB]
Get:3 http://cdn-fastly.deb.debian.org/debian testing/main amd64 Packages [7,887 kB]
Get:4 http://cdn-fastly.deb.debian.org/debian sid/main amd64 Packages [8,277 kB]

```

Environment History Connections

Import Dataset

Global Environment

Environment is empty

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home > Repos > demo2 > docker

	Name	Size	Modified
	..		
	app		
	Dockerfile	406 B	Apr 3, 2019, 5:31 PM
	install.R	133 B	Apr 3, 2019, 5:31 PM

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

demo2

Console Terminal

Terminal 1 (busy) quintindk@quintindk-VirtualBox: ~/Repos/demo2/docker

```
Setting up libssl-dev:amd64 (1.1.1b-1) ...
Setting up libgeos-c1v5:amd64 (3.7.1-1) ...
Setting up libxml2:amd64 (2.9.4+dfsg1-7+b3) ...
Setting up libxml2-dev:amd64 (2.9.4+dfsg1-7+b3) ...
Setting up libgeos-dev (3.7.1-1) ...
Processing triggers for libc-bin (2.28-8) ...
Removing intermediate container e7db1a54db9e
----> 9ee9fb8dbb83
Step 5/15 : RUN mkdir -p app/cache
----> Running in 33df3df16c11
Removing intermediate container 33df3df16c11
----> 07292d81218e
Step 6/15 : RUN mkdir -p app/data
----> Running in c80b30bf7133
Removing intermediate container c80b30bf7133
----> dbac19b81d10
Step 7/15 : RUN mkdir -p app/lib
----> Running in 03725955a592
Removing intermediate container 03725955a592
----> 364f4a7b480d
Step 8/15 : RUN mkdir -p app/src
----> Running in 50418744c68b
Removing intermediate container 50418744c68b
----> ea29a99bcea5
Step 9/15 : COPY app/config app/config
----> 3bb8754d0523
Step 10/15 : COPY install.R tmp/
----> 4e31c416a27f
Step 11/15 : RUN Rscript /tmp/install.R
----> Running in 5d2d21a87ea1
Loading required package: ProjectTemplate
Installing package into '/usr/local/lib/R/site-library'
(as 'lib' is unspecified)
trying URL 'https://cloud.r-project.org/src/contrib/ProjectTemplate_0.1.0.tar.gz'
Content type 'application/x-gzip' length 234224 bytes (228 KB)
=====
downloaded 228 KB
```

Environment History Connections

Global Environment

Environment is empty

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home > Repos > demo2 > docker

	Name	Size	Modified
..	..		
app	app		
Dockerfile	Dockerfile	406 B	Apr 3, 2019, 5:31 PM
install.R	install.R	133 B	Apr 3, 2019, 5:31 PM

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

demo2

```

Console Terminal
Terminal 1 (busy) | quintindk@quintindk-VirtualBox: ~/Repos/demo2/test
quintindk@quintindk-VirtualBox:~/Repos/demo2/test$ docker run --name=r-prediction --publish 0.0.0.0:8
090:8090 --rm r-prediction-api:0.0.1
Loading required package: ProjectTemplate
Project name: app
Loading project configuration
Autoloading packages
Loading package: dplyr
Loading required package: dplyr

Attaching package: 'dplyr'

The following objects are masked from 'package:stats':

  filter, lag

The following objects are masked from 'package:base':

  intersect, setdiff, setequal, union

Loading package: ggvis
Loading required package: ggvis
Loading package: caret
Loading required package: caret
Loading required package: lattice
Loading required package: ggplot2

Attaching package: 'ggplot2'

The following object is masked from 'package:ggvis':

  resolution
  
```

Environment History Connections

Import Dataset

List

Global Environment

prediction	Environment
project.info	List of 3

Values

app	<Object containing active binding>
router	<Object containing active binding>

Functions

fallback_handler	function (request, response, keys, ...)
formatting_handler	function (request, response, keys, ...)
predict_handler	function (request, response, keys, ...)

Files Plots Packages Help Viewer

New Folder
 Delete
 Rename
 More

Home > Repos > demo2 > docker > app

Name	Size	Modified
..		
cache		
config		
data		
lib		
munge		
src		

```
quintindk@quintindk-VirtualBox: ~/Repos/demo2$ cd test
quintindk@quintindk-VirtualBox: ~/Repos/demo2/test$ curl --header "Content-Type: application/json" --r
equest POST --data @test.json http://localhost:8090/predict/
["Iris-setosa","Iris-setosa","Iris-setosa","Iris-setosa","Iris-setosa","Iris-setosa","Iris-setosa","I
ris-setosa","Iris-setosa","Iris-setosa","Iris-setosa","Iris-setosa","Iris-versicolor","Iris-versicolo
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dk-VirtualBox:~/Repos/demo2/test$
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Environment History Connections

Import Dataset

Global Environment

prediction	Environment	
project.info	List of 3	

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app	<Object containing active binding>	
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Files Plots Packages Help Viewer

New Folder Delete Rename More

Home > Repos > demo2 > docker > app

	Name	Size	Modified
	..		
	cache		
	config		
	data		
	lib		
	munge		
	src		

THANK YOU



@quintindk



<https://github.com/quintindk>



<https://linkedin.com/in/quintindk>

<https://www.rstudio.com/>
<http://projecttemplate.net/>
<https://github.com/thomasp85/fiery>
<https://github.com/thomasp85/routr>
<https://www.datacamp.com/community/tutorials/machine-learning-in-r>

<https://github.com/quintindk/satRday-demo-2019>



@quintindk



<https://github.com/quintindk>



<https://linkedin.com/in/quintindk>