

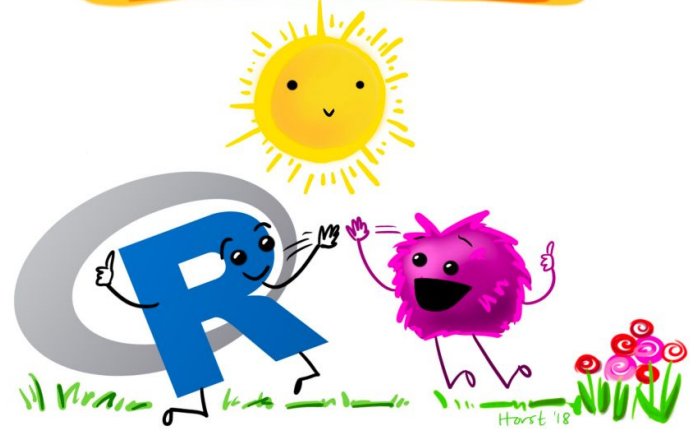
# لغة الآر من الصفر إلى الإحتراف

at first I was like...

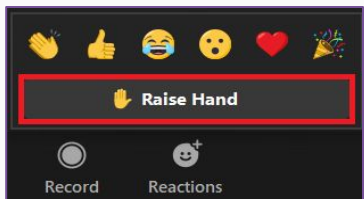


Credit: Allison Horst

...but now it's like...



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# قواعد الدورة

● كتابة الاسم في Google Doc

○ الإجابة على Icebreaker question

● إطفاء الجوال

● يُفضل فتح الكاميرا

● لا تتردد في طرح أي سؤال خلال الجلسة

● Slack

مرحبا في كورس "لغة الأَر (R) من الصفر إلي الإحتراف"

المدرية: د بتول المزوق

الأسبوع: الأول

التاريخ: ٢٢ يونيو ٢٠٢٢

وصف الجلسة:

في هذه الجلسة سنتعرف على الخطة التعليمية مع بيان أهمية استخدام لغة آر (R) وإبراز دورها المميز في علم البيانات. لغة آر (R) هي لغة مفتوحة المصدر تُستخدم في التمثيل المرئي للبيانات وتعدديتها، بالإضافة إلى النمذجة. وقد احتلت أعلى المراتب في تصنيفات لغات البرمجة المستخدمة في علوم البيانات على مدار عدة سنوات، مما أدى إلى تزايد استخدامها.

تسجيل الأسماء

الاسم / المدينة / حسابات وسائل التواصل الاجتماعي لمن يرغب (twitter و GitHub وما إلى ذلك)

- 
- 
- 
- 
- 
- 
- 



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BY

## خطة الدورة التدريبية

الأسبوع	نوع المحاضرة	اليوم	التاريخ	الساعة (بتوقيت السعودية)	المدة بالساعات
الرابع	محاضرة مباشرة	الخميس	28 يوليو 2022	من ١١:٣٠ إلى ١٣:٣٠ مساءً	1
الخامس	محاضرة مباشرة	الثلاثاء	2 أغسطس 2022	من ١٣:٣٠ إلى ٥:٣٠ مساءً	2
	محاضرة مباشرة	الأربعاء	3 أغسطس 2022	من ٢:٣٠ إلى ٤:٣٠ مساءً	2
	ساعة مكتبية	الثلاثاء	2 أغسطس 2022	من ٢:٣٠ إلى ٣:٣٠ مساءً	1
السادس	محاضرة مباشرة	الثلاثاء	9 أغسطس 2022	من ١٣:٣٠ إلى ٥:٣٠ مساءً	2
	محاضرة مباشرة	الأربعاء	10 أغسطس 2022	من ٢:٣٠ إلى ٤:٣٠ مساءً	2
	ساعة مكتبية	الأربعاء	10 أغسطس 2022	من ٥:٣٠ إلى ٤:٣٠ مساءً	1
السابع	عرض المشروعات النهائية	الأربعاء	17 أغسطس 2022	من ٢:٣٠ إلى ٤:٣٠ مساءً	2
	عرض المشروعات النهائية	الخميس	18 أغسطس 2022	من ١٢:٣٠ إلى ٢:٣٠ مساءً	2

One-to-one Sessions this Thursday  
And optional Terminal Session



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One-to-one Sessions this Thursday  
And optional Terminal Session



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## What we will learn this week?

- Going deeper with R Markdown
- Publishing R Markdown
- Creating a blog with R Markdown
- SQL and R
- Joining datasets
- Saving plots and data
- Encapsulating computational environment with `renv`
- Reshaping data with `pivot\_longer` and `pivot\_wider`
- Creating custom functions and loops
- `reprex` and filing issues in GH
- Datetimes and factors
- Modelling
- The difference between lists/dataframes/tibble



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- The difference between lists/dataframes/tibble



# مراجعة



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# كيفية قراءة البيانات في R

```
read_csv("path")
```

In relative to the working directory using `setwd()`

```
read_csv(here("folder", "file"))
```

```
read_csv(here("data", "data.csv"))
```



معنى هذا الرمز في لغة R

( و تُم ) = %>%

dataset %>%

select(**column**)



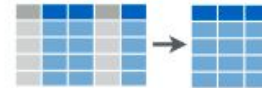
- `filter()` : pick observations by their values

### Subset Observations (Rows)



- `select()` : pick variables by their names

### Subset Variables (Columns)





- `mutate()` : create new variables with functions of existing variables

### Make New Variables



- `summarise()` : collapse many values down to a single summary

### Summarise Data

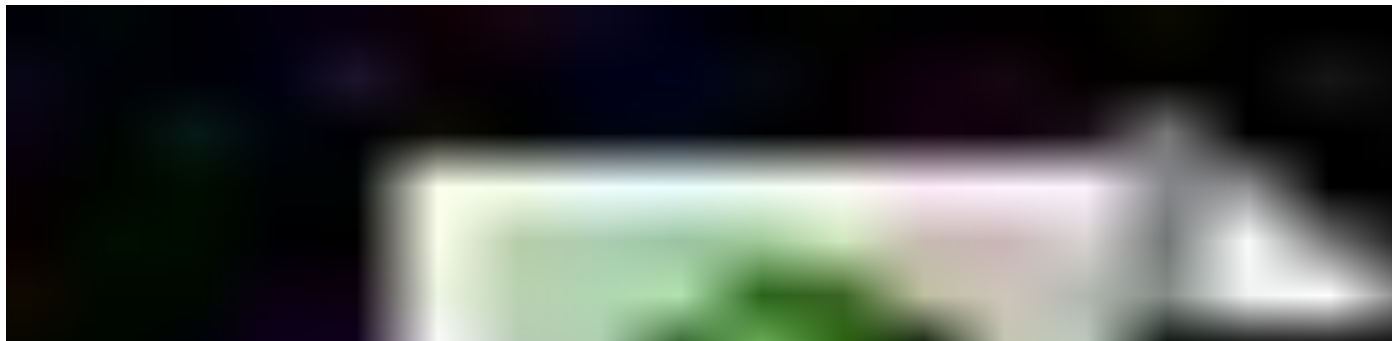




`df %>% filter() %>%`

`group_by() %>%`

`summarise(mean, median) %>% mutate (df, newx = x-mean1)`



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# Data transformation with dplyr : : CHEAT SHEET



dplyr functions work with pipes and expect tidy data. In tidy data:



Each variable is in its own column



Each observation, or case, is in its own row



x %>% f(y) becomes f(x, y)

## Summarise Cases

Apply **summary functions** to columns to create a new table of summary statistics. Summary functions take vectors as input and return one value (see back).

### summary function



**summarise(data, ...)**  
Compute table of summaries.  
summarise(mtcars, avg = mean(mpg))



**count(data, ..., wt = NULL, sort = FALSE, name = NULL)** Count number of rows in each group defined by the variables in ... Also **tally()**.  
count(mtcars, cyl)

## Group Cases

Use **group\_by(data, ..., add = FALSE, drop = TRUE)** to create a "grouped" copy of a table grouped by columns in ... dplyr functions will manipulate each "group" separately and combine the results.



mtcars %>%  
group\_by(cyl) %>%  
summarise(avg = mean(mpg))

Use **rowwise(data, ...)** to group data into individual rows. dplyr functions will compute results for each row. Also apply functions to list-columns. See tidy cheat sheet for list-column workflow.



starwars %>%  
rowwise() %>%  
mutate(film\_count = length(films))

**ungroup(x, ...)** Returns ungrouped copy of table.  
ungroup(mtcars)



## Manipulate Cases

### EXTRACT CASES

Row functions return a subset of rows as a new table.



**filter(data, ..., preserve = FALSE)** Extract rows that meet logical criteria.  
filter(mtcars, mpg > 20)



**distinct(data, ..., keep\_all = FALSE)** Remove rows with duplicate values.  
distinct(mtcars, gear)



**slice(data, ..., preserve = FALSE)** Select rows by position.  
slice(mtcars, 10:15)



**slice\_sample(data, ..., n, prop, weight, by = NULL, replace = FALSE)** Randomly select rows. Use n to select a number of rows and prop to select a fraction of rows.  
slice\_sample(mtcars, n = 5, replace = TRUE)



**slice\_min(data, order\_by, ..., n, prop, with\_ties = TRUE)** and **slice\_max()** Select rows with the lowest and highest values.  
slice\_min(mtcars, mpg, prop = 0.25)



**slice\_head(data, ..., n, prop)** and **slice\_tail()** Select the first or last rows.  
slice\_head(mtcars, n = 5)

### Logical and boolean operators to use with filter()

`==` `<` `<=` `is.na()` `%in%` `|` `xor()`  
`!=` `>` `>=` `is.na()` `!` `&`

See ?base::Logic and ?Comparison for help.

### ARRANGE CASES



**arrange(data, ..., by\_group = FALSE)** Order rows by values of a column or columns (low to high), use with **desc()** to order from high to low.  
arrange(mtcars, mpg)  
arrange(mtcars, desc(mpg))

### ADD CASES



**add\_row(data, ..., before = NULL, after = NULL)**  
Add one or more rows to a table.  
add\_row(cars, speed = 1, dist = 1)

## Manipulate Variables

### EXTRACT VARIABLES

Column functions return a set of columns as a new vector or table.



**pull(data, var = -1, name = NULL, ...)** Extract column values as a vector, by name or index.  
pull(mtcars, wt)



**select(data, ...)** Extract columns as a table.  
select(mtcars, mpg, wt)



**relocate(data, ..., before = NULL, after = NULL)**  
Move columns to new position.  
relocate(mtcars, mpg, cyl, after = last\_col())

### Use these helpers with select() and across()

e.g. select(mtcars, mpg:cyl)

**contains(match)** **num\_range(prefix, range)** **!**, e.g. mpg:cyl  
**ends\_with(match)** **all\_of(x)/any\_of(x, ..., vars)** **~**, e.g. gear  
**starts\_with(match)** **matches(match)** **everything()**

### MANIPULATE MULTIPLE VARIABLES AT ONCE



**across(cols, funs, ..., names = NULL)** Summarise or mutate multiple columns in the same way.  
summarise(mtcars, across(everything(), mean))



**c\_across(cols)** Compute across columns in row-wise data.  
transmute(rowwise(UKgas), total = sum(c\_across(1:2)))

### MAKE NEW VARIABLES

Apply **vectorized functions** to columns. Vectorized functions take vectors as input and return vectors of the same length as output (see back).

### vectorized function



**mutate(data, ..., keep = "all", before = NULL, after = NULL)** Compute new column(s). Also **add\_column()**, **add\_count()**, and **add\_tally()**.  
mutate(mtcars, gpm = 1 / mpg)



**transmute(data, ...)** Compute new column(s), drop others.  
transmute(mtcars, gpm = 1 / mpg)



**rename(data, ...)** Rename columns. Use **rename\_with()** to rename with a function.  
rename(cars, distance = dist)

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# ggplot2: Build a data MASTERPIECE



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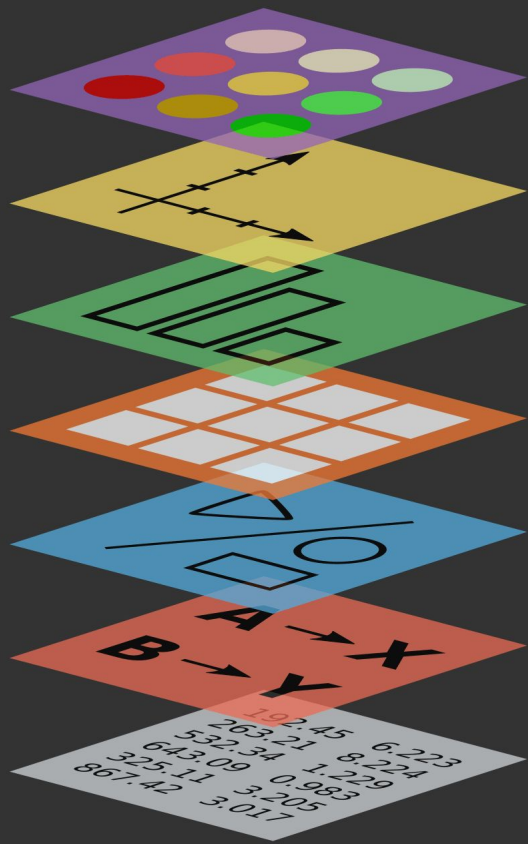


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**Theme**  
**Coordinates**  
**Statistics**  
**Facets**  
**Geometries**  
**Aesthetics**  
**Data**



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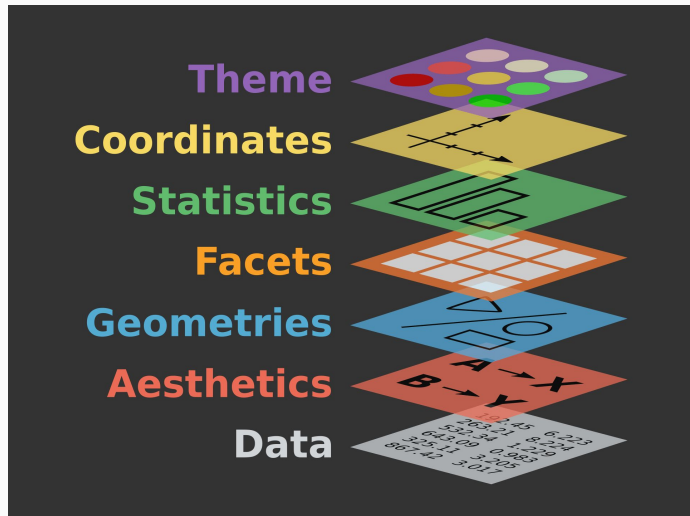
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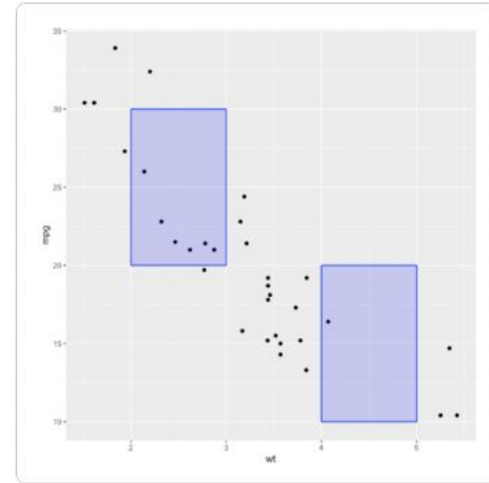
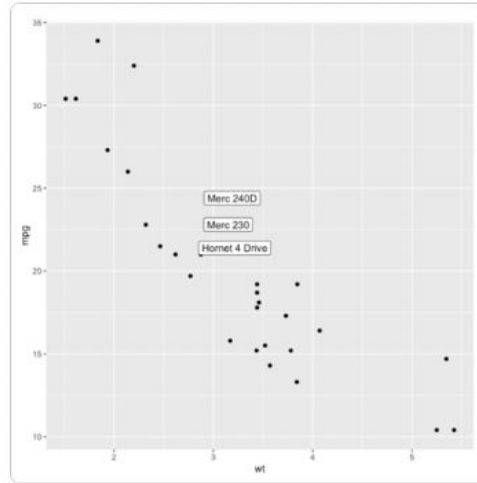
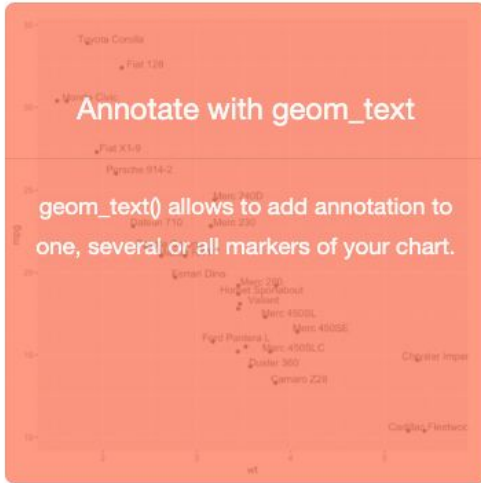


```
ggplot(data, aes(x=col1, y = col2)) +  
  geom_point(alpha = 0.5) +  
  geom_smooth() +  
  facet_wrap(~ col) +  
  coord_flip() +  
  theme_bw() +  
  theme(legend.position = "none")
```



## ANNOTATION WITH GGLOT2

Annotation is a **key step** in data visualization. It allows to highlight the main message of the chart, turning a messy figure in an insightful medium. `ggplot2` offers many function for this purpose, allowing to add all sorts of text and shapes.



[Link](#)



## حفظ التمثيل البياني في الجهاز

---

```
ggsave("name_of_file.png", my_plot, width = 15, height = 10)
```



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YAMIL

## YAML Header in R Markdown File

```
1 ---  
2 title: "Example"  
3 author: "Zachary M. Smith"  
4 date: "November 16, 2018"  
5 output: html_document  
6 ---
```



## Rendered YAML Header

Example

*Zachary M. Smith*

*November 16, 2018*



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### Mapping (key value pairs)

---

Kernel: Linux

CPU: AMD

RAM: 16 GB

### Mapping sequences (key with many values)

---

Linux:

- Fedora
- Slackware

FreeBSD:

- FreeBSD
- NetBSD

### Mapping of mapping (many keys and values)

---

Desktop:

CPU: AMD

RAM: '32 GB'

### Multi-line entries

---

- Linux: |  
A UNIX-like, open source  
operating system.

# YAML Header in R Markdown File

```
1 ---
2 title: "Example"
3 author: "Zachary M. Smith"
4 date: "November 16, 2018"
5 output:
6   html_document:
7     toc: true
8     number_sections: true
9 ---
```



# Rendered YAML Header

## Example

*Zachary M. Smith*

*November 16, 2018*

- 1 R Markdown
- 2 Including Plots

Ref



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# YAML Header in R Markdown File

```
1 ---  
2 title: "Example"  
3 author: "Zachary M. Smith"  
4 date: "November 16, 2018"  
5 output:  
6   html_document:  
7     toc: true  
8     number_sections: true  
9     toc_float: true  
10 ---
```



# Rendered YAML Header

1 R Markdown

2 Including Plots

## Example

*Zachary M. Smith*

*November 16, 2018*



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# YAML Header in R Markdown File

```
1 ---  
2 title: "Example"  
3 author: "Zachary M. Smith"  
4 date: "November 16, 2018"  
5 output:  
6   html_document:  
7     toc: true  
8     number_sections: true  
9     toc_float: true  
10    theme: cerulean  
11 ---
```



# Rendered YAML Header

1 R Markdown

2 Including Plots

## Example

Zachary M. Smith

November 16, 2018

1 R Markdown

2 Including Plots



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```
1 ---
2 title: "Example"
3 author: "Zachary M. Smith"
4 date: "`r Sys.Date()`"
5 output:
6   word_document: default
7   html_document: default
8 ---
```


```
1 ---
2 title: "Example"
3 author: "Zachary M. Smith"
4 date: "`r Sys.Date()`"
5 output:
6   word_document:
7     reference_docx: word_template.docx
8 ---
```



Publish

**Publish To**

 **RPubs**  
RPubs is a free service from RStudio for sharing documents on the web. >

 **RStudio Connect**  
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Cancel



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# RStudio تصميم مدونة من داخل

# Blog Your Educational Journey!

---



**Medium**



*Create Your Blog in R*



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# Conferences!

---



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<b>Learning curve</b>	harder	easier
<b>R dependencies</b>	rmarkdown + blogdown	rmarkdown + distill
<b>External dependencies</b>	hugo; hugo theme	none
<b>Supporting tools</b>	hugo templating; CSS	CSS; pandoc
<b>Style customization</b>	limitless	colors & fonts via themer
<b>Page layout</b>	depends on hugo theme	limited



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Providing  
Lessons &  
Materials

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## R Weekly

نشرة اسبوعية في كل ما هو جديد في لغة الآر و بودكاست

**دائما .. انشر مشاريعك أو مقالاتك الجديدة على المنصة!**



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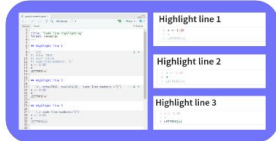
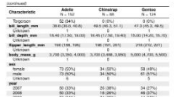
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The screenshot shows the Piping Hot Data website with a red header containing the site name, a search bar, and navigation links (Home, Blog, Talks, About, CV, GitHub, LinkedIn, Twitter, RSS). The main content area is titled 'Blog' and features three articles:

- June 2, 2022**  
Shannon Pileggi  
**Locating R and R Adjacent Software and Configuration Files**  
My personal R administration on Windows 10  

- May 12, 2022**  
Shannon Pileggi  
**Code line highlighting in Quarto reveals presentations**  
Three methods make your code lines stand out  

- Jan. 24, 2022**  
Shannon Pileggi  
**Report Ready PDF tables with rmarkdown, knitr, kableExtra, and LaTeX**  
Customized raw data tables and gtsuammary tables in PDF output  


On the right side of the blog page, there is a 'SUBSCRIBE' section with the text 'Enjoy this blog? Get notified of new posts via email:' and a 'Subscribe' button.

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Before I Sleep

Home micro.blog Talks Other writings About


## Posts

April 10, 2022  
Miles McBain

### Push the limits of interactive mapping in R with vector tiles

RSTATS VECTOR-TILES SPATIAL

A tutorial on mapping with vector tiles in R




June 20, 2021  
Miles McBain

### 60 Days with the ZSA Moonlander: Review

KEYBOARDS ERGONOMICS

I spent 60 days with the ZSA Moonlander Keyboard and ultimately returned it. I wanted to like it, but couldn't make the ergonomics work for me.




April 17, 2021  
Miles McBain

### A Public Service Data Science Stack: Collaboration

RSTATS COLLABORATION WORKFLOW REPRODUCIBILITY RUNAPP

git, GitHub, [targets], VSCode, and other tools that our data science team uses to collaborate.

#### The Stack



## CATEGORIES

- Articles (23)
- collaboration (1)
- data science (1)
- debugging (2)
- docker (1)
- ergonomics (1)
- ghost (1)
- GIS (1)
- hacks (1)
- keyboards (1)
- lisp (1)
- loops (2)
- open science (2)
- productivity (3)
- R2VR (3)
- regex (1)
- reproducibility (3)
- rOpenSci (2)
- rstats (18)
- rstudio (1)
- runapp (1)
- software development (2)
- spatial (1)
- tidyval (1)
- tidyverse (1)

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Studio AI Blog Search... Home Gallery About Contributing


## RStudio AI Blog

June 9, 2022  
Tomasz Kalinowski

### TensorFlow and Keras 2.9

TENSORFLOW/KERAS | PACKAGES/RELEASES

New TensorFlow and Keras releases bring improvements big and small.




May 31, 2022  
Tomasz Kalinowski

### Deep Learning with R, 2nd Edition

TENSORFLOW/KERAS

Announcing the release of "Deep Learning with R, 2nd Edition," a book that shows you how to get started with deep learning in R.

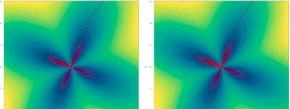


May 18, 2022  
Sigrid Keydana

### Community spotlight: Fun with torchopt

TORCH | PACKAGES/RELEASES

Today, we want to call attention to a highly useful package in the torch ecosystem: torchopt. It extends torch by providing a set of popular optimization algorithms not available in the base library. As this post will show, it is also fun to use!



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## R Studio AI Blog



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# Example websites

Source: [vignettes/examples.Rmd](#)



The examples below illustrate the use of Distill for making websites and blogs.



[RStudio AI Blog](#)



[The Mockup](#)



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أمثلة أخرى



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# distill for R Markdown



Distill for R Markdown is a web publishing format optimized for scientific and technical communication. Distill articles include:

- Reader-friendly typography that adapts well to mobile devices.
- Features essential to technical writing like LaTeX math, citations, and footnotes.
- Flexible figure layout options (e.g. displaying figures at a larger width than the article text).
- Attractively rendered tables with optional support for pagination.
- Support for a wide variety of diagramming tools for illustrating concepts.
- The ability to incorporate JavaScript and D3-based interactive visualizations.
- A variety of ways to publish articles, including support for publishing collections or articles as a Distill website.

Distill for R Markdown is based on the [Distill web framework](#), which was originally created for use in the Distill Machine Learning Journal. Distill for R Markdown combines the technical authoring features of Distill with [R Markdown](#), enabling a fully reproducible workflow based on literate programming.



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You will end up with these files in your project. The most critical files are the `index.Rmd` and the `_site.yml`, and we mention a little about them below.

```
.
├── .Rproj.user
├── .nojekyll
├── _site.yml
├── about.Rmd
├── docs
├── index.Rmd
└── mydistillsite.Rproj
```

Close RStudio and re-open your site by clicking on the project file ( `.Rproj` ).



When you re-open the project, you may notice the `.Rproj` file shows up in your Git pane, which means that the file has changed since your last commit. What happened? RStudio has detected that you have built a website, so a single line has been added to your `.Rproj` file:

```
BuildType: Website
```



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# يساعد في إعدادات الموقع `_site.yml`

```
name: "my-website"
navbar:
  title: "My Website"
  left:
    - text: "Home"
      href: index.html
    - text: "About"
      href: about.html
```

My Website Home About

## My Website

Hello, Website!

For more information about simple R Markdown websites, please see [site.html](#).

Please also note that simple R Markdown sites are *not* based on static documents. For larger-scale and more sophisticated websites (e.g. <https://github.com/rstudio/blogdown>).

مثال



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#### Citation

For attribution, please cite this work as

```
Almarzoug (2022, Aug. 3). I love R blog: How did I learn R. Retrieved from  
https://rstudio.github.io/distill
```

BibTeX citation

```
@misc{almarzoug2022how,  
  author = {Almarzoug, Batool},  
  title = { I love R blog: How did I learn R},  
  url = {https://rstudio.github.io/distill},  
  year = {2022}  
}
```



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Build your own blog and publish it in Netlify or  
**GitHub pages**



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## More Info:

<https://rstudio4edu.github.io/rstudio4edu-book/make-distill.html>



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## الواجب

- كتابة مقالة في موضوع تعلمته في لغة الآر
  - كتابة بالعربي أو الأنجلش
  - أمثلة هي باكيج جديدة أو عن رحلتك في التعلم أو عن الجيت هوب أو ...
  - أنشره في **R Weekly** وتويتر
- مشاهدة
- <https://www.youtube.com/watch?v=AADnslLpzI4>



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# Feedback



- ما هو **أفضل** شيء تعلمته اليوم؟
- ما هو **أصعب** مفهوم تعرضت له في هذه الجلسة؟
- ما هو الشيء الذي تحب ان **يتحسن** في الجلسات القادمة؟



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