R Markdown

25 Apr 2020

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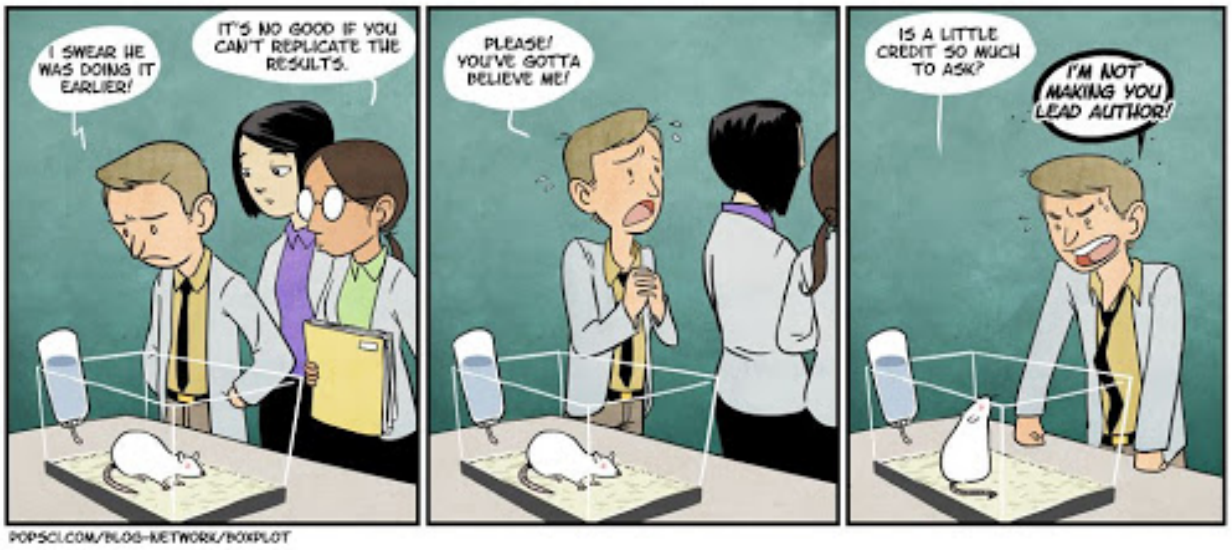
Installation

Before you start, make sure you have installed the R Markdown package

install.package("rmarkdown")

Introduction



What is R Markdown?

Markdown = Language for text formatting

- an easy to write plain text format for creatin dynamic documents and reports
- contains "normal" text and code chunks (e.g. R, but Python, SQL, and more also possible)
- RMD -> MD -> html, Docx or PDF
- Formatting documents outside the analysis

Creating a document that can contain both text and code:

- When creating ("knitting"), the code is executed and displayed together with the description.
- Only a document with out warnings/errors can be knitted!
- Possible to export a Word, HTML or PDF file.

Advantages

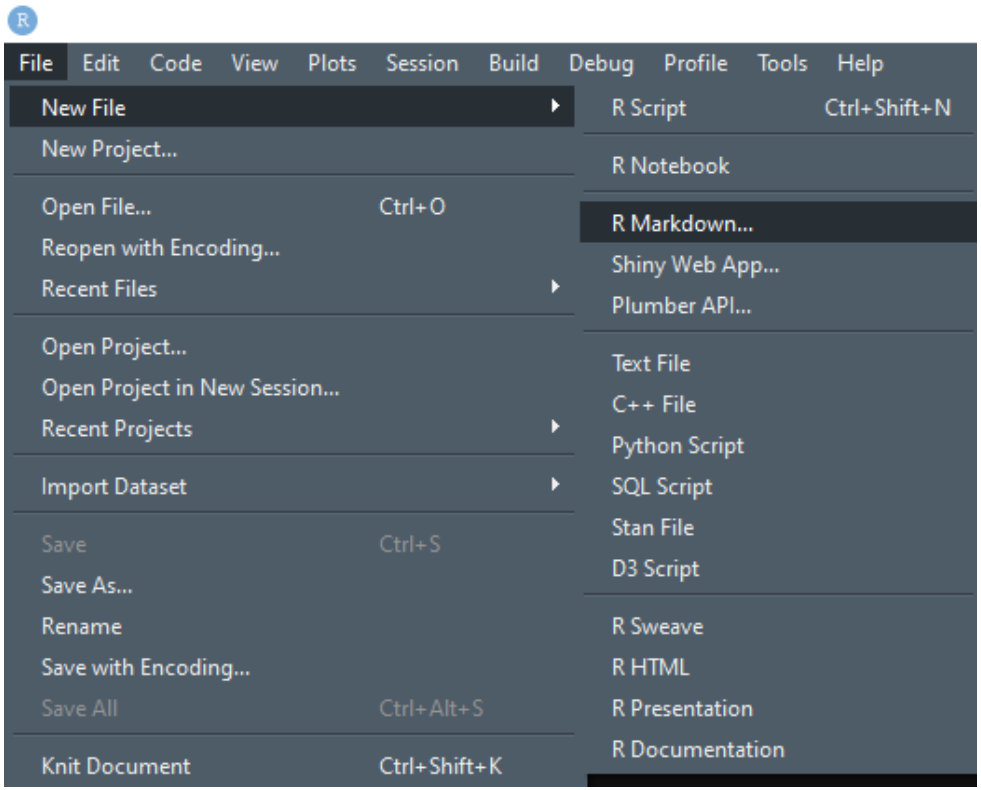
Why should you use R Markdown

- Research becomes reproducible
- Share your analysis (results and associated documentation)
- Consolidate your and document into a single file
- Easy for version Control (e.g. Git/GitHub)
- Your output file will look great with harldy any effort on your part

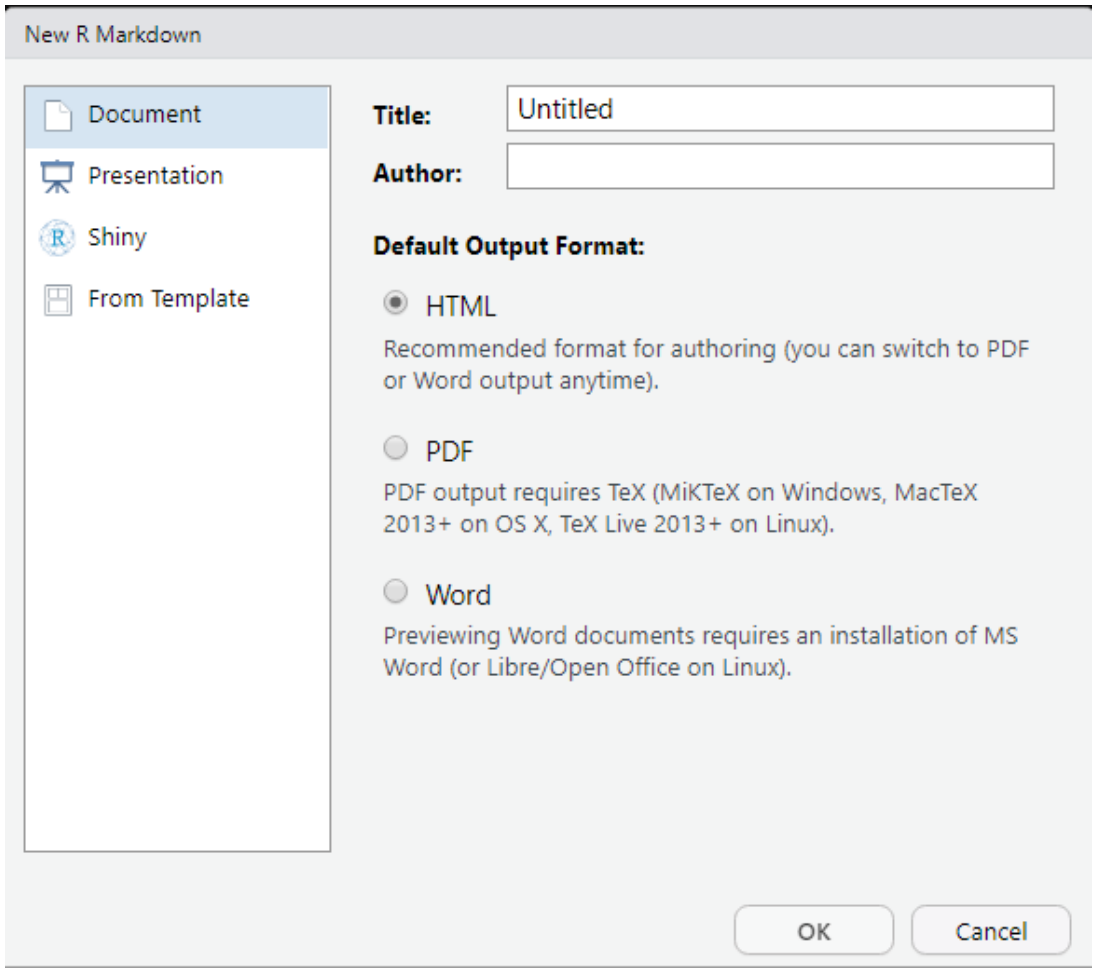
Approach

1. Open RStudio -> File -> New File -> R Markdown
2. Enter a title for the document (optionally enter an author)
3. Choose an output format
4. YAML Headline: Final choice of your output format
5. Write the markdown
6. Embed Code
7. Rendering Output
    - RStudio: "Knit" (Ctrl+Shift+K)
    - Command line: rmarkdown:: render("input.Rmd")

Open new Markdown file



Give your file a title



Exercices

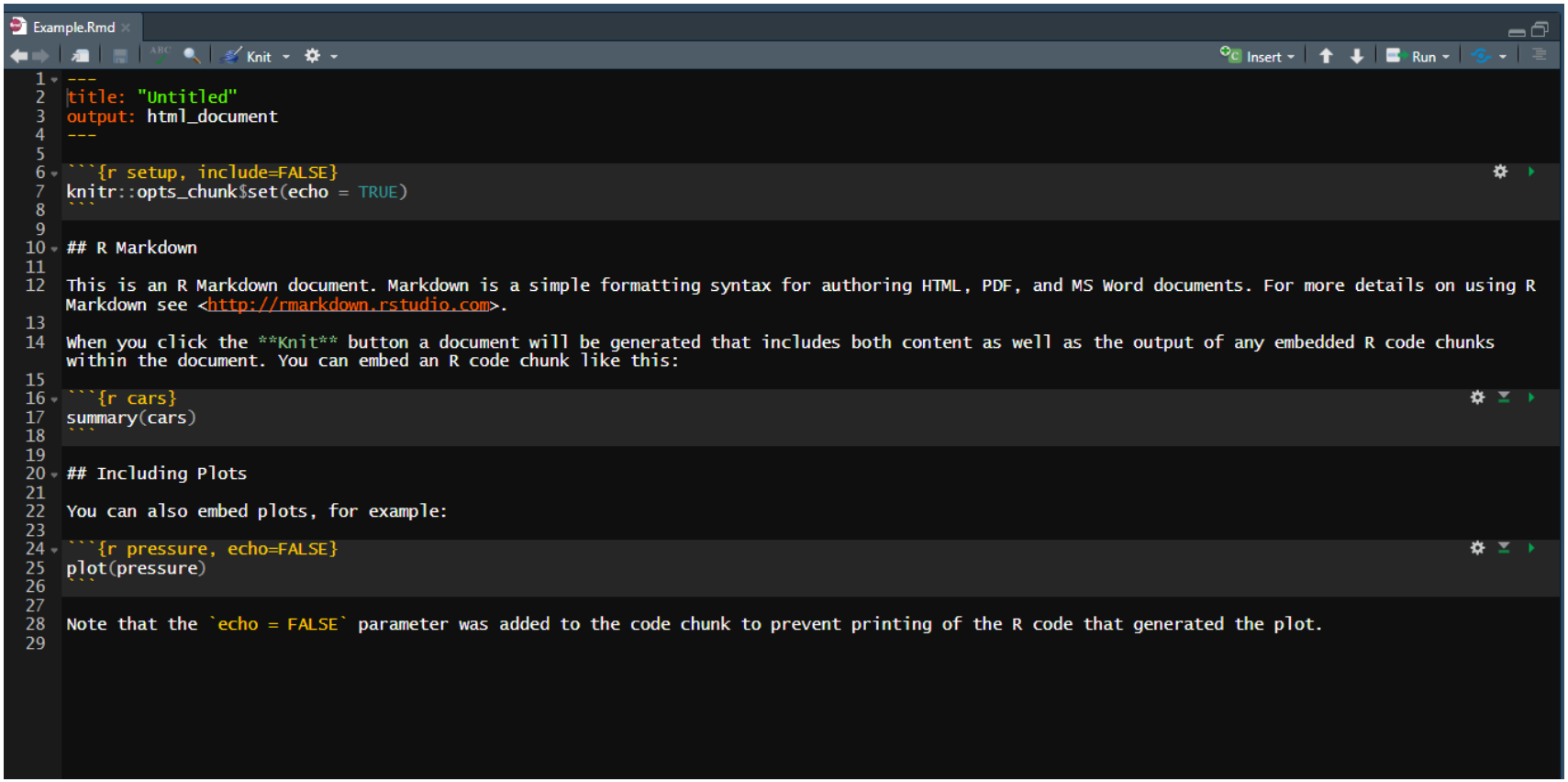
You are going to present your work on the “Bike Rental” dataset.

- Title: “Analysis of the bike rental dataset”
- Subtitle: Your name

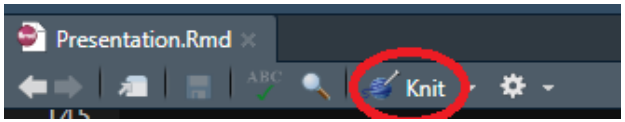
Choose the output format

- You can shoose between HTML, PDF and Docx(Word)
  - **HTML** is recommeneded, since everybody can read it
- You can always change your output format, in the YAML header

Starting Point



Rendering output



- Press **"Knit"** in Rstudio
- Press **Ctrl+Shift+K** (Windows)
- Procedure[1]

[1] https://d33wubrfki0l68.cloudfront.net/61d189fd9cdf955058415d3e1b28dd60e1bd7c9b/b739c/lesson-images/rmarkdownflow.png

YAML Header

Example

```yaml
---
title: "R Markdown"
date: "`r format(Sys.Date(), '%d %b %Y')`"
output: beamer_presentation
urlcolor: blue
---
```

Output types

Type	Format	Option in YAML Header
Website	HTML	output: html_document
Document	PDF	output: pdf_document
Document (Word)	RTF	output: word_document
Presentation (beamer)	PDF	output: beamer_presentation
Presentation (ioslides)	HTML	output: ioslides_presentation

YAML Header

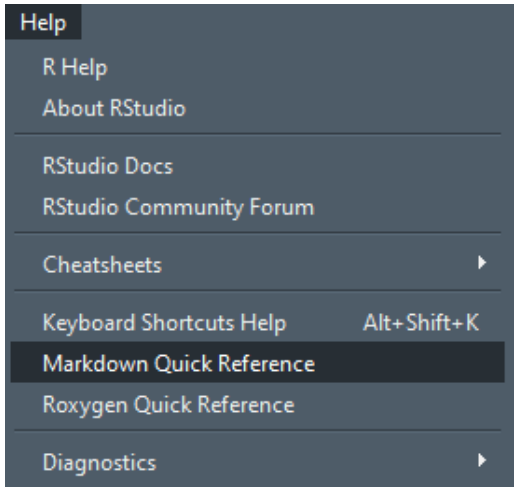
Additional YAML sesstings

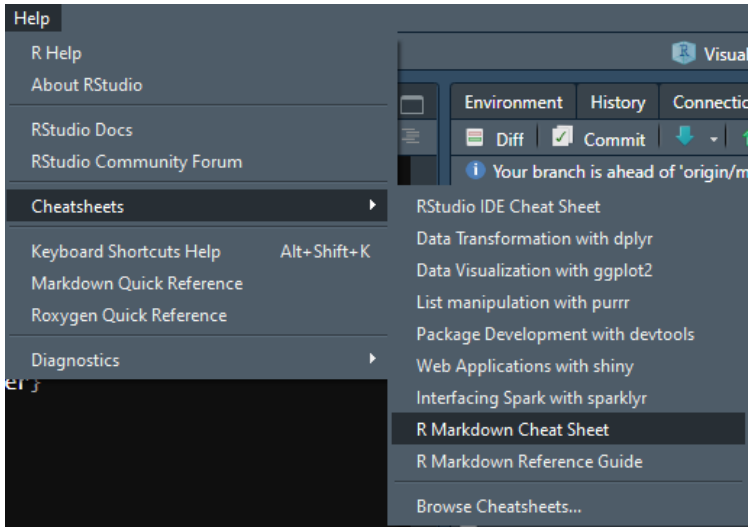
- toc: table of content
- bibliography: biblioraphy.bib file with your references
- csl: custom citation style
- abstract: Space to write an abstract
- css: use custom css [HTML]
- fig_width, fig_height, fig_caption: figure options
- include: include other .tex files [PDF]

vielleicht eher als screenshot

Write markdown

You can use the Quick Reference or the Cheatsheet
Both can be found by opening the **Help** dropdown menu which is positioned in the top bar





Syntax Examples

Text formatting	
Text	Text
`*italic*` or `_italic_`	*italic*
`**bold**` or `__bold__`	**bold**
`[link](www.sbg.ac.at)`	link

Starting your own R Markdown Document

Exercise

1. Set a header: "Part I: Summary statistics"
2. Write a plain text introduction using empahsis and lists according to Reference Guide and reproduce the following:
3. Create some sub headers
4. Load Image
5. Knit
6. Setup a table of content using the YAML header
7. Knit again

Embed your code

Inline Code

```
The mean speed of cars is `r mean(cars$speed)`.
```

The mean speed of cars is 15.4.

Code Chunk

````
```{r cars_example, echo=TRUE}
summary(cars)
```
````

```
summary(cars)
```

```
##      speed           dist
##  Min.   : 4.0   Min.   :  2.00
##  1st Qu.:12.0   1st Qu.: 26.00
##  Median :15.0   Median : 36.00
##  Mean   :15.4   Mean   : 42.98
##  3rd Qu.:19.0   3rd Qu.: 56.00
##  Max.   :25.0   Max.   :120.00
```

How to get this " ‘ " symbol

Press Shift + ‘ (twice or followed by Space)

Embed your code

Option	Description
eval(logical, TRUE)	Evalue chunk
echo(logical, TRUE)	Hides R-Code
results(char, "markup")	Formatting R output: e.g. "markup", "asis"

Importing the dataset

Exercise

Now lets import our dataset while hiding our code.
To import the dataset you will want to use read.csv()

Hint

```
If you are using a project or set your working directory,
you can use "./dataset/day.csv"
```

Create a stastical overview

Exercise

Now lets use some basic statiscal commands using the following commands on the count variabel in the bike rental dataset:

Commands

`summary()`
`mean()`
`sd()`

Embed your code

You can also use other languges like Python, SQL, Javascript and more while using *R Markdown*

Example

```
x = 'hello, python world!'
print(x.split(' '))
```

```
## ['hello,', 'python', 'world!']
```

Creating a table

Create the following output:

Command	Result
`mean()`	15.4
`sd()`	5.29

Write Inline and Plotting

Exercise

1. Automatically write the Minimum in the output of the sentence
   - `The smallest value of count is [inline code].`
2. Add a horizontal line
3. Set a header: “Part II: Visualization”
4. Use the command `plot()` to gernerate a scatterplot. Do not print the code!
5. Add some plain text, divided into two lines:
   - "Figure I:
   - Correlation of count and day"

Create Hyperlinks

Exercise

1. Write *"You can learn more about R Markdown here."*, with `here` beeing the the following link:
   - https://rmarkdown.rstudio.com/
2. Add *"Stay Healthy"* as blockquote

How it should look

You can learn more about R Markdown here.

> *"Stay Health!"*

References

- https://rmarkdown.rstudio.com/lesson-1.html
- https://www.is.uni-freiburg.de/resources/computational-economics/R_Markdown.pdf
- https://www.youtube.com/watch?v=u4ZdvYXjsIo
- https://bookdown.org/yihui/rmarkdown/