Simple Markdown Example

PDF/LaTex version

Jenny Rieck
Derek Beaton

May 12, 2019

Introduction

For reference, see RMarkdown Driven Development by Emily Riederer for a comprehensive overview of how to best structure RMarkdown for projects, packages, and other development-driven tasks.

In general for this RMarkdown file we follow Emily's fourth example with a directory structure, minimized redundancies, and heavy-duty code elsewhere. This RMarkdown, generally, serves as place to describe, analyze, and visualize our data. Thus, this text is shown at the top of the output, but actually appears after several `R` code chunks, which exist between the `Introduction` heading and YAML header information (which you see as title, authors, dates, etc. . .).

Most of the RMarkdown files in this directory will show generally the same content, but help highlight the different ways you can use RMarkdown, `knitr`, `pandoc`, `LateX`, and various package built for those, such as `beamer` (`LateX`) for presentations, and `papaja` & `rticles` (R/RMarkdown) for writing manuscripts that export to `LaTeX` or MS Word. If you decide to write MS Word documents through RMarkdown, you should also use the `redoc` package.

R chunks: A word of caution

It is good practice to name your `R` chunks. If you do not, then the `R` chunks will still produce the intended material. However, when you do name them, you should ensure they have unique names (else, you will likely see some cryptic and not always informative error messages).

Tables

There are multiple approaches and packages to help visualize tables or tabular information. Let's start by looking at a simple summary of all the continuous variables. First, we will visualize the summary table through two methods within R: `knitr::kable` and the `kablExtra` package, followed by `grid` and `gridExtra`. Next, we will use the same data and illustrate what happens when we pass it to Python through `reticulate`.

In this section we wil also show the code chunks that generate these tables and visuals, which are embedded in the RMarkdown document.

knitr and kableExtra

To make HTML and LaTeX tables in RMarkdown, one of the easiest and most common options is through `knitr`. The `knitr` package is, effectively, the tool to make RMarkdown documents go from R & RMarkdown (plus other code and LaTeX) into PDFs or HTML pages. We'll start with the `knitr::kable()`.

```
example_table <- amerge_subset[, c("AGE", "MOCA", "CDRSB", "WholeBrain",
    "Hippocampus", "MidTemp")]
example_table_Dx <- amerge_subset[, c("DX", "AGE", "MOCA", "CDRSB",
    "WholeBrain", "Hippocampus", "MidTemp")]
```

```
kable(summary(example_table))
```

	AGE	MOCA	CDRSB	WholeBrain	Hippocampus	MidTemp
	Min. :55.00	Min. :16.00	Min. :0.000	Min. : 817421	Min. : 3731	Min. :12213
	1st Qu.:67.20	1st Qu.:22.00	1st Qu.:0.000	1st Qu.: 984410	1st Qu.: 6510	1st Qu.:18535
	Median :71.90	Median :24.00	Median :1.000	Median :1051621	Median : 7223	Median :20186
	Mean :71.92	Mean :23.89	Mean :1.202	Mean :1057026	Mean : 7150	Mean :20302
	3rd Qu.:76.60	3rd Qu.:26.00	3rd Qu.:2.000	3rd Qu.:1120570	3rd Qu.: 7834	3rd Qu.:22088
	Max. :89.60	Max. :30.00	Max. :5.500	Max. :1486036	Max. :10602	Max. :32189

But that is not particularly nice looking. So we can use some parameters to make this table look better (which depend on having LaTeX).

```
kable(summary(example_table), format = "latex", booktabs = T)
```

AGE	MOCA	CDRSB	WholeBrain	Hippocampus	MidTemp
Min. :55.00	Min. :16.00	Min. :0.000	Min. : 817421	Min. : 3731	Min. :12213
1st Qu.:67.20	1st Qu.:22.00	1st Qu.:0.000	1st Qu.: 984410	1st Qu.: 6510	1st Qu.:18535
Median :71.90	Median :24.00	Median :1.000	Median :1051621	Median : 7223	Median :20186
Mean :71.92	Mean :23.89	Mean :1.202	Mean :1057026	Mean : 7150	Mean :20302
3rd Qu.:76.60	3rd Qu.:26.00	3rd Qu.:2.000	3rd Qu.:1120570	3rd Qu.: 7834	3rd Qu.:22088
Max. :89.60	Max. :30.00	Max. :5.500	Max. :1486036	Max. :10602	Max. :32189

With `booktabs` and `latex` format, we've made the table look a little better. But can we make it look even better than that? We can with `kableExtra`.

```
kable(summary(example_table), format = "latex", booktabs = T) %>%
    kable_styling(font_size = 10, position = "center")
```

AGE	MOCA	CDRSB	WholeBrain	Hippocampus	MidTemp
Min. :55.00	Min. :16.00	Min. :0.000	Min. : 817421	Min. : 3731	Min. :12213
1st Qu.:67.20	1st Qu.:22.00	1st Qu.:0.000	1st Qu.: 984410	1st Qu.: 6510	1st Qu.:18535
Median :71.90	Median :24.00	Median :1.000	Median :1051621	Median : 7223	Median :20186
Mean :71.92	Mean :23.89	Mean :1.202	Mean :1057026	Mean : 7150	Mean :20302
3rd Qu.:76.60	3rd Qu.:26.00	3rd Qu.:2.000	3rd Qu.:1120570	3rd Qu.: 7834	3rd Qu.:22088
Max. :89.60	Max. :30.00	Max. :5.500	Max. :1486036	Max. :10602	Max. :32189

We can take the table look even further with additional options, like "stripes".

```
kable(summary(example_table), format = "latex", booktabs = T) %>%
    kable_styling(font_size = 10, position = "center", latex_options = "striped")
```

AGE	MOCA	CDRSB	WholeBrain	Hippocampus	MidTemp
Min. :55.00	Min. :16.00	Min. :0.000	Min. : 817421	Min. : 3731	Min. :12213
1st Qu.:67.20	1st Qu.:22.00	1st Qu.:0.000	1st Qu.: 984410	1st Qu.: 6510	1st Qu.:18535
Median :71.90	Median :24.00	Median :1.000	Median :1051621	Median : 7223	Median :20186
Mean :71.92	Mean :23.89	Mean :1.202	Mean :1057026	Mean : 7150	Mean :20302
3rd Qu.:76.60	3rd Qu.:26.00	3rd Qu.:2.000	3rd Qu.:1120570	3rd Qu.: 7834	3rd Qu.:22088
Max. :89.60	Max. :30.00	Max. :5.500	Max. :1486036	Max. :10602	Max. :32189

Given that we have redundant information in the table (min/max, etc...) we can do a better job and make an even nicer table with an `apply()`, and then use multiple `kable` and `kableExtra` features to make a really nice table.

```
better_example_table <- apply(example_table, 2, summary)

kable(better_example_table, format = "latex", booktabs = T, digits = 2) %>%
    kableExtra::add_header_above(c(Statistic = 1, Demographic = 1,
        Clinical = 2, Brain = 3)) %>% kable_styling(font_size = 10,
    position = "center", latex_options = "striped") %>% row_spec(0,
    angle = 15, bold = T)
```

Statistic	Demographic	Clinical		Brain		
	AGE	**MOCA**	**CDRSB**	**WholeBrain**	**Hippocampus**	**MidTemp**
Min.	55.00	16.00	0.0	817421.2	3731.00	12213.00
1st Qu.	67.20	22.00	0.0	984409.9	6510.00	18535.00
Median	71.90	24.00	1.0	1051621.3	7223.00	20186.00
Mean	71.92	23.89	1.2	1057025.6	7149.61	20301.93
3rd Qu.	76.60	26.00	2.0	1120569.5	7834.00	22088.00
Max.	89.60	30.00	5.5	1486035.6	10602.00	32189.00

grid and gridExtra

Python via reticulate