R markdown basics

Yuanyuan Li

Introduction

Why use R markdown?

1. Markdown is a simple formatting syntax for authoring **HTML, PDF, and MS Word** documents.
2. Markdown can combine R codes, results, graph with words in a neat way.
3. Markdown can create beautiful mathmatical symbols and equations using LaTeX Language (r package: *TinyTeX*), create tables (r package: *knitr*).

Create a R markdown file

1. Make sure you already have *rmarkdown* package (check discussion1.pdf for installing it).
2. In RStudio, click the green "+" in the top left> R markdown > write a title and choose output file format > OK
3. Type text in the white space for your report, and only write R code in the grey R chunck, which can be created by click Insert>R or type ```` ```{r} ```` at the begining and ```` ``` ```` at the end.
4. When you click the **Knit** button, a document will be generated that includes both content as well as the output of any embedded R code chunks within the document.

Links

This is a link for introducing R Markdown Basics: https://rmarkdown.rstudio.com/authoring_basics.html

A R Markdown Cookbook: https://bookdown.org/yihui/rmarkdown-cookbook/r-code.html

R Code Chunks

You can embed an R code chunk like this:

```
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
```

Recommend: If you want to hide the R code chunk, and only show the results, you can use `echo = FALSE` parameter in the R code chunk:

```
##      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
```

Inline R code

There were 50 cars studied.

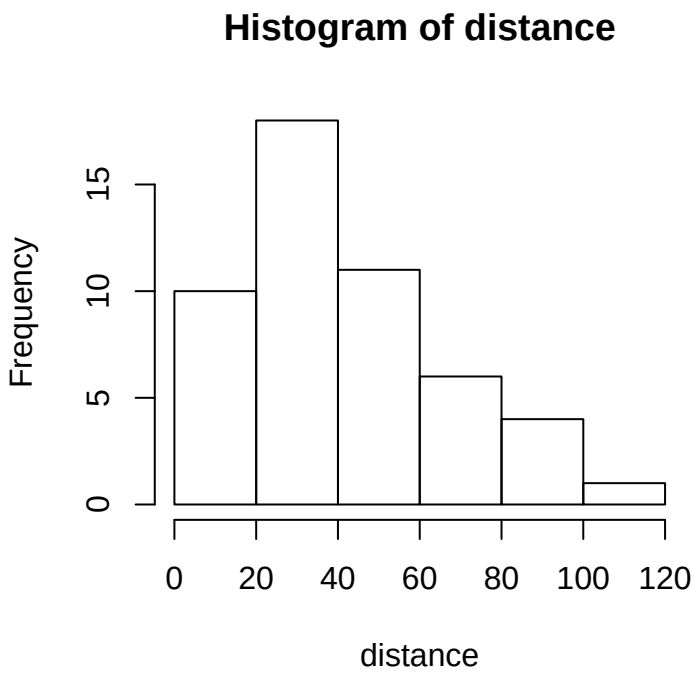
Size of plots/images

1. Set the size of plots globally

Copy the R chunk below and paste at the begining of your RMD file, use ```` ```{r, include=FALSE}``` ```` to hide this chunk:

```r
knitr::opts_chunk$set(fig.width=4, fig.height=4)
```

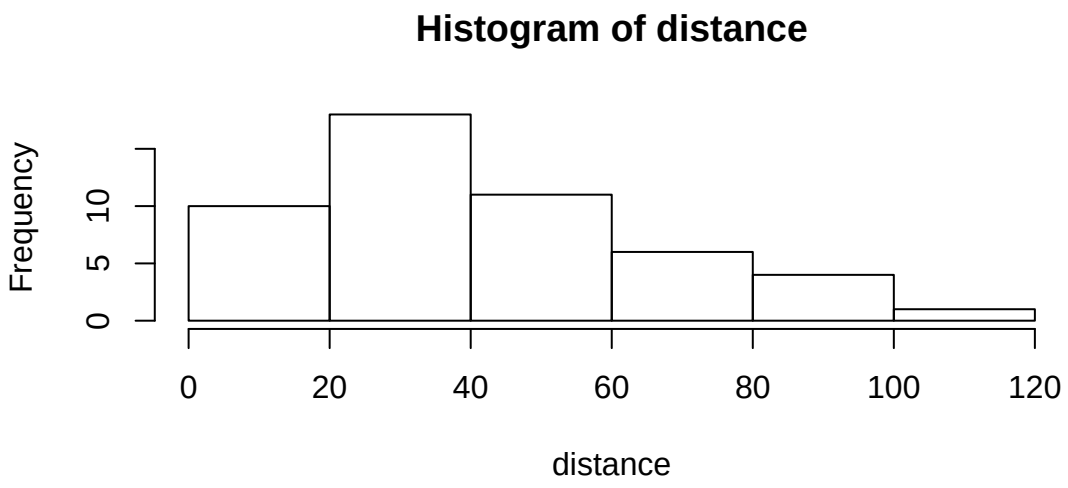
```r
hist(cars$dist,main="Histogram of distance",xlab="distance")
```



2. Set the size of plot for one chunk

We can set the chunk options for each chunk too. Use `{r, fig.height = 3, fig.width = 5}` as in below chunk:

```
hist(cars$dist,main="Histogram of distance",xlab="distance")
```



Create tables

Use `knitr::kable` function on an R object, which is typically a matrix or data frame. Type "?kable" in R console to get its help document.

```
mydata=head(mtcars)
knitr::kable(mydata)
```

	mpg	cyl	disp	hp	drat	wt	qsec	vs	am	gear	carb
Mazda RX4	21.0	6	160	110	3.90	2.620	16.46	0	1	4	4
Mazda RX4 Wag	21.0	6	160	110	3.90	2.875	17.02	0	1	4	4
Datsun 710	22.8	4	108	93	3.85	2.320	18.61	1	1	4	1
Hornet 4 Drive	21.4	6	258	110	3.08	3.215	19.44	1	0	3	1
Hornet Sportabout	18.7	8	360	175	3.15	3.440	17.02	0	0	3	2
Valiant	18.1	6	225	105	2.76	3.460	20.22	1	0	3	1

Section titles

Section titles

Section titles

Section titles

Section titles

Section titles

Lists

Unordered lists

- Item 1
- Item 2
  - Item 2a
  - Item 2b

Ordered List:

1. Item 1
2. Item 2
3. Item 3
   - Item 3a
   - Item 3b

LaTeX Equations

$2 + 4\ \alpha$

The formula for mean is $\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i$. Display the formula in a new line:

$$\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i$$

Appendix

```
summary(cars)
summary(cars)
knitr::opts_chunk$set(fig.width=4, fig.height=4)
hist(cars$dist,main="Histogram of distance",xlab="distance")
hist(cars$dist,main="Histogram of distance",xlab="distance")
mydata=head(mtcars)
knitr::kable(mydata)
```