

- The command line
- Version control (git)
- Authoring

THE TRENDING TOOLS IN DATA SCIENCE

R Markdown

Dynamic Documentation for R

Mengqian Lu

What R Markdown can do...

1. Various available output formats (HTML, PDF, MS Word)
2. Support presentation (Slides)
3. Include tables and bibliographies
4. Features for HTML and PDF (CSS, headers & footers)
5. Compatible with LaTex
6. Compile HTML/PDF/MS Word directly from R scripts
7. Custom templates design
8. Interactive output with R Shiny.

Getting started with R Markdown

```
install.packages('rmarkdown')
```

The screenshot shows the RStudio interface. On the left, the 'example.Rmd' file is open in the editor pane. It contains the following R Markdown code:

```
1 Header 1
2 -----
3 This is an R Markdown document. Markdown is a
| simple formatting syntax for authoring web pages.
4
5 Use an asterisk mark, to provide emphasis such as
| italics and bold.
6
7 Create lists with a dash:
8 - Item 1
9 - Item 2
10 - Item 3
11
12 You can write `in-line` code with a back-tick.
13
14 ...
15 Code blocks display
16 with fixed-width font
17 ...
18
19 > Blockquotes are offset
20
```

On the right, the 'Preview HTML' window shows the rendered output:

Header 1

This is an R Markdown document. Markdown is a simple formatting syntax for authoring web pages.

Use an asterisk mark, to provide emphasis such as *italics* and **bold**.

Create lists with a dash:

- Item 1
- Item 2
- Item 3

You can write `in-line` code with a back-tick.

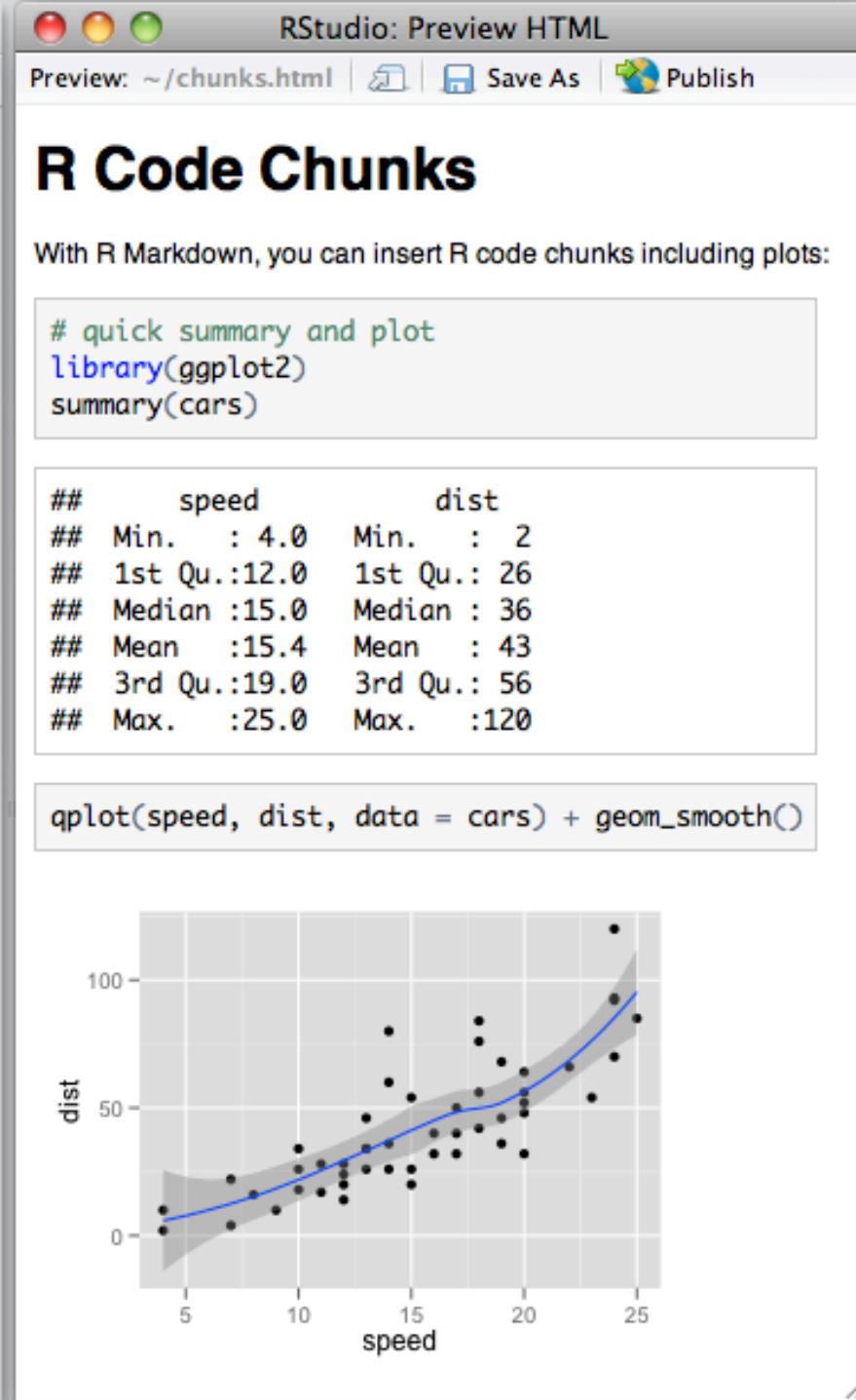
Code blocks display
with fixed-width font

Blockquotes are offset

chunks.Rmd x

ABC Knit HTML Chunks

```
1 R Code Chunks
2 =====
3
4 With R Markdown, you can insert R code
5 chunks including plots:
6
7 ```{r qplot, fig.width=4, fig.height=3,
8 message=FALSE}
9 # quick summary and plot
10 library(ggplot2)
11 summary(cars)
12 qplot(speed, dist, data=cars) +
13   geom_smooth()
14
15 |
```



Inline Details

R Code:

```
1 I counted `r 1 + 1` red trucks on the highway.  
2  
3
```

Equations:

Compatible with LaTex and MathML eqns

1. $\$equation\$$ for inline equations (note there must not be white space adjacent to the \$ delimiters)
2. $\$\$equation\$\$$ for display equations
3. $$$$ for MathML equations.
4. $\$\$X_{i,j}\$\$$ or $\$\$X_{\{i,j\}}\$\$$ and $\$\$X^2_{\{i,j\}}\$\$$

Inline Details (Cont'd)

Equations:

Square Roots $\sqrt{b^2 - 4ac}$

Fractions $\frac{4z^3}{16}$

Summation $\sum_{i=1}^n X^3_i$

Smart self-sizing parentheses

$$\sum_{i=1}^n \left(\frac{X_i}{Y_i} \right)$$

Greek letters (upper & lower case)

$$\alpha, \beta, \gamma, \Gamma$$

Special symbols (NOTE: use ~ for space, otherwise R will ignore)

$$a \pm b$$
$$x \geq 15$$
$$a_i \geq 0 \quad \forall i$$

Inline Details (Cont'd)

Special functions: sin, cos, integral

```
$$\int_0^{2\pi} \sin x dx$$
```

Matrices

```
$$\begin{array}{rrr}
1 & 2 & 3 \\
4 & 5 & 6 \\
7 & 8 & 9
\end{array}
$$
```

Put brackets around the matrix

```
$$\mathbf{X} = \left[ \begin{array}{rrr}
1 & 2 & 3 \\
4 & 5 & 6 \\
7 & 8 & 9
\end{array} \right]
```

More...

- ❑ Bibliographies & Citations

- Inline references
- Attach bibliography at the end
- Specify citation styles (.csl metadata)

- ❑ Shiny

- Fully interactive documents
- Allow readers to change the parameters

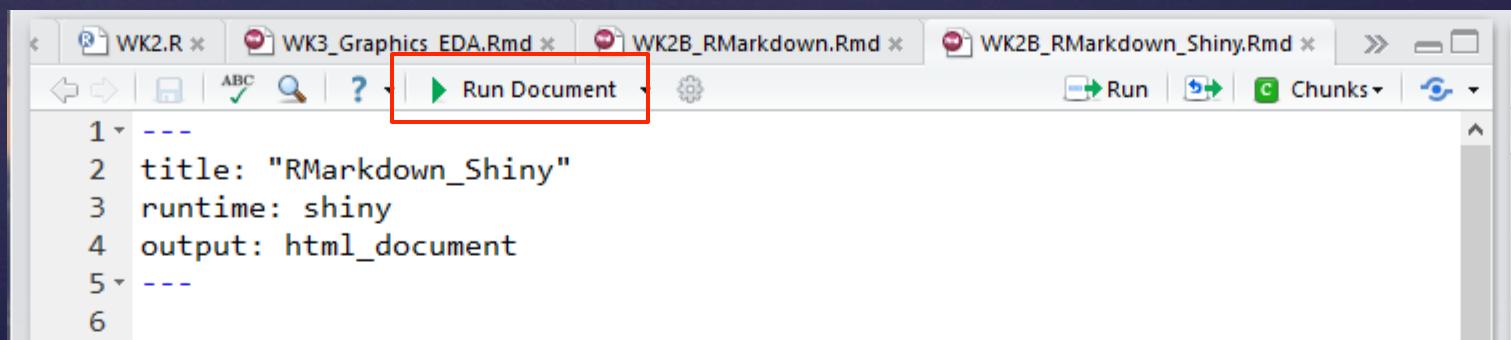
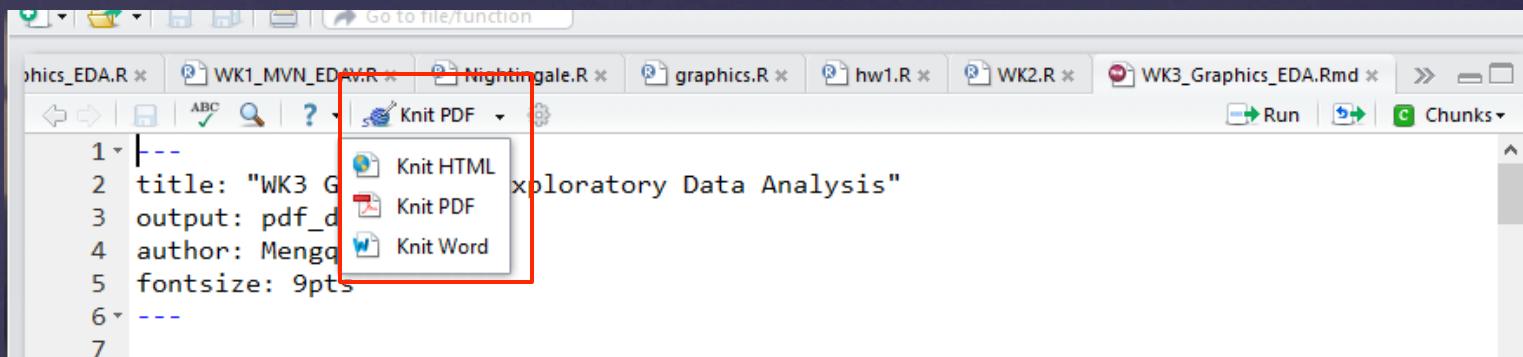
Output options:

Templates	Basic YAML	Template options	Latex options	Interactive Docs
html_document	---	---	---	---
pdf_document	title: "A Web Doc"	title: "Chapters"	title: "My PDF"	title: "Slides"
word_document	author: "John Doe"	output:	output: pdf_document	output:
md_document	date: "May 1, 2015"	html_document:	fontsize: 11pt	slidy_presentation:
ioslides_presentation	output: md_document	toc: true	geometry: margin=1in	incremental: true
slidy_presentation	---	toc_depth: 2	---	runtime: shiny
beamer_presentation	---	---	---	---

Example:

```
1 ---  
2 title: "RMardownExample"  
3 author: Mengqian LU  
4 output:  
5 html_document:  
6 toc: true  
7 theme: united  
8 pdf_document:  
9 toc: true  
10 highlight: zenburn  
11 fontsize: 9pts  
12 fig_width: 7  
13 fig_height: 6  
14 ---
```

'Knit' the output in RStudio



1. R Markdown Website: <http://rmarkdown.rstudio.com/>

2. R Markdown Cheat Sheet on RStudio: <https://www.rstudio.com/wp-content/uploads/2015/02/rmarkdown-cheatsheet.pdf>

3. R Markdown Reference Guide:
<https://www.rstudio.com/wp-content/uploads/2015/03/rmarkdown-reference.pdf>

More helps...