Knitr and Friends …

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What is knitr?

- Idea: Produce **reproducible** reports
  - Have both **text** and **R-code** in the **same** document
  - Run R-code and include the output (plots, model summaries etc.) automatically in the report
  - Output format can be PDF (requires LaTeX installation), HTML, Word, …
- According to the knitr webpage (http://yihui.name/knitr/):
  - *"Elegant, flexible and fast dynamic report generation with R."*
  - *"The **knitr** package was designed to be a transparent engine for **dynamic report generation** with R, solve some long-standing problems in Sweave, and combine features in other add-on packages into one package."*
  - `knitr ≈ Sweave + cacheSweave + pgfSweave + weaver + animation::saveLatex + R2HTML::RweaveHTML + highlight::HighlightWeaveLatex + 0.2 * brew + 0.1 * SweaveListingUtils + more`
- We use knitr with R, but other programming languages (like Python, Perl, SAS etc.) are also possible, see http://yihui.name/knitr/demo/engines/.
- knitr (typically) works out of the box in RStudio.

Different Input Text Formats

- There are two input formats that define how we “format” our report text
  - `*.Rmd`: Markdown
  - `*.Rnw`: LaTeX
- Markdown is a **lightweight markup language** (plain text formatting), see https://en.wikipedia.org/wiki/Markdown
- LaTeX is mostly known for its good math support.
- Here, we consider Markdown.
- A useful **cheat sheet** and a **reference guide** can be found directly in RStudio under
  - Help / Cheatsheets / R Markdown Cheat Sheet
  - Help / Cheatsheets / R Markdown Reference Guide

Knitr and Markdown

- In R: File / New File / R Markdown …
- Have a close look at the created file!
- File can be “compiled” with “Knit PDF” button to create the output file.
- **Code chunks** look like the following

````
```{r myChunk, echo = FALSE}
set.seed(10)
x <- 1:10
y <- x + rnorm(length(x))
plot(x, y)
```
````

- **Inline R-code** is inserted as follows

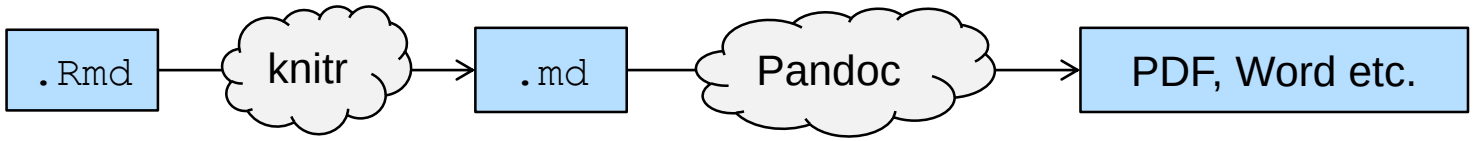
```
The data-set consists of `r nrow(data)` observations.
```

Chunk Options

- See http://yihui.name/knitr/options/ (“Chunk Options”) or in the RStudio GUI.
- Code evaluation
  - **eval**: logical or numeric vector which lines to evaluate
- Results
  - **echo**: logical or numeric vector whether to include R-code in the output
  - **include**: logical whether to include the chunk output in the output document
  - …
- Many more (like code decoration, plot options, …)
- Now let’s have a closer look at a small demo file, taken from http://yihui.name/knitr/demo/minimal/ and adapted.

Appendix: Understanding the knitr Workflow

- Workflow:



- That is, knitr runs all the R-code and creates a Markdown file with the resulting output and pictures.
- File conversion to final output file is done by **pandoc**.
- “If you need to convert files from one markup format into another, pandoc is your swiss-army knife”, see http://pandoc.org/.
- See pandoc “graph” on http://pandoc.org/.

Appendix: Links to Remember

- Some links to remember:
  - http://yihui.name/knitr/
  - http://yihui.name/knitr/demos/
  - http://yihui.name/knitr/demo/showcase/