Workshop: Creating Dynamic Documents in R (by Gaston Sanchez)

A key component of any data analysis project is **communication**. We all need to communicate the results and findings of our work, and we typically do that by writing a variety of documents—reports, papers, books, slides, blog posts, etc. In this workshop we will talk about general aspects for writing so-called **dynamic documents** in R. The main conceptual idea behind these documents is: to effectively combine—and link—the narrative and the code, while letting the computer and programs do the manual, tedious, labor intensive, time consuming, and boring jobs that humans tend to do: clicking and dragging, copy-pasting, manual tweaks, constant adjustment of visual aspect, etc.

Description

In this workshop we will start with a quick introduction of the Markdown syntax. Then we will describe how to create textual reports with the ecosystem of authoring tools in R (e.g. knitr, rmarkdown, shiny).

Goals

- Learn how to create dynamic documents in R
- Become familiar with the Markdown syntax
- Produce documents in a variety of output formats
- Think about how to organize medium-size projects
- Introduction to the Open Science Framework (OSF)

Requirements

- You just need to have some experience with R (and RStudio).
- No previous knitr or markdown knowledge is required to attend.
- Nice to have:
  - knowledge of LaTeX
  - familiarity with HTML
  - understanding of the file system structure
  - some programming experience

Make sure you have installed the following software:

- **R**
  - for Windows: https://cran.r-project.org/bin/windows/
  - for Mac: https://cran.r-project.org/bin/macosx/
- **RStudio** (desktop version)
  - https://www.rstudio.com/products/rstudio/download/
- **LaTeX** system
  - Windows *MiKTeX*: http://miktex.org/download
  - Mac *MacTeX*: https://tug.org/mactex/mactex-download.html
- **pandoc** (choose the latest release)

  - https://github.com/jgm/pandoc/releases/tag/1.17.0.2
- **Open Science Framework**:
  - create an OSF account (it's free): https://osf.io/

Tentative Schedule

Time	Tuesday	Wednesday	Thursday	Friday
08:00 - 09:00		session 2	session 4	session 6
09:00 - 10:00		session 2	session 4	session 6
10:00 - 11:00		break	break	
11:00 - 12:00		session 3	session 5	
12:00 - 13:00	session 1	session 3	session 5	
13:00 - 14:00	session 1			

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Session 1

- **Houston we have a problem:** What's wrong with the traditional way of creating documents.
- Introduction to Markdown
  - Basics of Markdown syntax
  - Markdown Online editor: http://markdownlivepreview.com/
- Getting to know `Rmd` files (and the R package "rmarkdown")

Session 2

- Introduction to the R package "knitr"
- Code chunks
- Inline code
- Graphics
- Tables
- From `.Rmd` to html, pdf, word

Session 3

- Creating Slides
- HTML slides: ioslides, slidy, revealjs
- Beamer slides
- `Rpres` files

Session 4

- Rnw files and LaTeX
- Working with multiple files
- Code externalization
- knitr `children`
- Modularizing a project

Session 5

- Interactive documents with shiny
- Reactive objects
- Widgets

Session 6

- Where to go from here?
- Introduction to Open Science Framework https://osf.io/
- Create your first project in OSF
- Wrapping up
- Closing remarks
- Certificates
- Workshop Ends

About the Instructor

Gaston Sanchez is adjunct professor in the Department of Statistics at the University of California Berkeley, as well as adjunct faculty in the Math Department at Berkeley City College.

Currently he teaches an array of courses about Computing with Data, Reproducible and Collaborative Statistical Data Science, and Computational Statistics. He is the author of various R packages; has written extensively about the history of Partial Least Squares; and he is an advocate of the Open Science movement.

Read more: gastonsanchez.com/about