

Sociospatial Data Science

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2017-09-21

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Preface



This text is a companion text for both of my research methods courses at Saint Louis University:

- SOC 4650/5650 - Introduction to Geographic Information Science
- SOC 4930/5050 - Quantitative Analysis: Applied Inferential Statistics

The goal of the text is to create a reference for the intangible, subtle or disparate skills and ideas that contribute to being a successful *computational* social scientist. In writing this text, I draw inspiration from the work of Donald Knuth.¹ Knuth has discussed his experiences in designing new software languages, nothing that the developer of a new language

...must not only be the implementer and the first large-scale user; the designer should also write the first user manual... If I had not participated fully in all these activities, literally hundreds of improvements would never have been made, because I would never have thought of them or perceived why they were important...

While there is nothing particularly new about what I am writing here, and I am certainly not developing a new language for computing, the goal of this text remains similar to Knuth's experience. By distilling some of key elements for making a successful transition to being a *professional developer* of knowledge rather than a *casual consumer*, I hope to both improve the course experience itself and also create an environment that fosters a successful learning experience for you.

In both classes, the course names are deceptive. We are not only concerned with statistical work or mapping. Rather, we are more fundamentally concerned with research methods. In particular, we are concerned with *high quality* research methods and the *process* of conducting research. We therefore focus on a combination of mental habits and technical practices that make you a successful researcher. Some of the skills and techniques

¹Donald Knuth is the developer of TeX, a computer typesetting system that is widely used today for scientific publishing in the form of LaTeX. He also established the concept of literate programming, which forms the basis of some of the practices we follow with R.

that we will discuss this semester are not taught as often in graduate programs, let alone undergraduate program. Instead, they are often the products of “learning the hard way”. These “habits of mind and habits of method” are broadly applicable across methodologies and disciplines.

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Chapter 1

Introduction

You can label chapter and section titles using `{#label}` after them, e.g., we can reference Chapter 1. If you do not manually label them, there will be automatic labels anyway, e.g., Chapter ??.

Figures and tables with captions will be placed in `figure` and `table` environments, respectively.

```
par(mar = c(4, 4, .1, .1))
plot(pressure, type = 'b', pch = 19)
```

Reference a figure by its code chunk label with the `fig:` prefix, e.g., see Figure 1.1. Similarly, you can reference tables generated from `knitr::kable()`, e.g., see Table 1.1.

```
knitr::kable(
  head(iris, 20), caption = 'Here is a nice table!',
  booktabs = TRUE
)
```

You can write citations, too. For example, we are using the **bookdown** package (Xie, 2017) in this sample book, which was built on top of R Markdown and **knitr** (Xie, 2015).



Figure 1.1: Here is a nice figure!

Table 1.1: Here is a nice table!

Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
5.1	3.5	1.4	0.2	setosa
4.9	3.0	1.4	0.2	setosa
4.7	3.2	1.3	0.2	setosa
4.6	3.1	1.5	0.2	setosa
5.0	3.6	1.4	0.2	setosa
5.4	3.9	1.7	0.4	setosa
4.6	3.4	1.4	0.3	setosa
5.0	3.4	1.5	0.2	setosa
4.4	2.9	1.4	0.2	setosa
4.9	3.1	1.5	0.1	setosa
5.4	3.7	1.5	0.2	setosa
4.8	3.4	1.6	0.2	setosa
4.8	3.0	1.4	0.1	setosa
4.3	3.0	1.1	0.1	setosa
5.8	4.0	1.2	0.2	setosa
5.7	4.4	1.5	0.4	setosa
5.4	3.9	1.3	0.4	setosa
5.1	3.5	1.4	0.3	setosa
5.7	3.8	1.7	0.3	setosa
5.1	3.8	1.5	0.3	setosa

Bibliography

Xie, Y. (2015). *Dynamic Documents with R and knitr*. Chapman and Hall/CRC, Boca Raton, Florida, 2nd edition. ISBN 978-1498716963.

Xie, Y. (2017). *bookdown: Authoring Books and Technical Documents with R Markdown*. R package version 0.5.