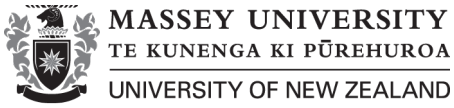
LaTeXand knitr template for confirmation reports and theses

thesis or report

Jiří Moravec

Supervisors: supervisor 1
supervisor 2



Institute of Fundamental Sciences,
Massey University, New Zealand

June, 2016

Contents

Contents iii

List of tables v

List of figures vii

Abstract ix

1. Introduction 1

2. Examples 3
2.1. Knitr . . . 3
2.1.1. Table and graph . . . 3
2.1.2. Code . . . 3
2.2. tikz . . . 6

Bibliography 7

List of Tables

2.1 Group sizes for simple and complex hunter-gatherers (Kelly, 1995). 4

List of Figures

2.1 Distribution of hunter-gatherers' diet according to its source 5
2.2 Example of two images made in tikz. 6

Abstract

This is abstract for report/thesis template. Provided source is well commented and if you want to know, what you are doing, it is suggested to take look inside. In following text, I will provide some examples of usage, not only of this template (as it is quite simple), but various usefull packages as well. If you are more experienced and you think that my code/advices are not worth it, ignore them. However, others may find some of them usefull.

1. Introduction

This is template for thesis. I created it for my own need when I had to write PhD confirmation thesis and searched for some default Massey LaTeXtemplate. To my surprise I have found that Massey do not support any LaTeXtemplate and even their instruction for how should thesis be written are sparse and weird. So I decided to improve life of other people that comes after me and also spread LaTeXa bit more and created this template. If you are experienced user, you might use it as starting point, it is your work and LaTeXenables great deal of personalization, so feel free to modify it, improve it and so on. If you are starting user of LaTeX, you might be grateful for a working template that looks good, is not overcombined with fancy stuff and provide good setting, from page layout (notably reduction of empty space), usage of good citation style for bibtex (APA is best) and also decent titlepage.

Additionally to this, this template is made with knitr on mind. If you don't like knitr or don't want to use knitr, just use `\include{chapter_folder/chapter.tex}` instead of

```
%% begin.rcode your_chapter, child="chapter_folder/chapter.Rtex"
% end.rcode
```

to include children LaTeXfiles, change ending to `.tex` instead of `.Rtex`, although this is just cosmetic change, and compile it directly with pdflatex instead of using first knitr engine.

I suggest you to at least try to use knitr. If you do, and you have linux or unix, you can use rcompile.r script to compile your Rtex document. I believe that together we can find solution for Windows as well. Finally, I suggest that you have a full installation of texlive, on which this template was build, and also three R packages:

- Knitr
- tikzDevice – transform R graphics to tikz, which nicely unifies look
- xtable – to create LaTeXtables directly in R

I have included some example of knitr usage. Also, feel free to look at source code. I tried to make it well-documented.

2. Examples

2.1. Knitr

Knitr is great tool how to increase the power of LaTeX. Although various functions are already provided by other LaTeXpackages, knitr allows easier usage, namely if you are already proficient in R. Knitr is R package that look at your LaTeXdocuments and finds so called "hooks". For Rtex, these hooks can look like this:

```
%% begin.rcode group-sizes-table, results="asis", echo=FALSE
% table_env = new.env()
% sys.source(file="scripts/group-size-table.R", env=table_env)
% table_env$make_table()
%% end.rcode
```

As you probably know, the percentage character `%` is signify comment in LaTeX. Thus this code would not be executed by LaTeX. However, if there is `begin.rcode` after `%`, it is hook that knitr detects and code chunk is starting there. Now you need to specify name of your chunk, here I wrote `hook_example` as the name of chunk. Then you can specify settings for your code chunk. On new line, you can write your R code and you finish chunk using line with comment character and `end.rcode`. Comment characters in body of code chunk are optional, as well as amount of comment characters at start and end. I like it this way as I can see different code highlighting of LaTeX and Knitr code. See `http://yihui.name/knitr/` for all possible setting and even more information.

2.1.1. Table and graph

Here are two examples of knitr usage, table 2.1 generated from `group-size.txt` data and histgram 2.1 generated from `subsistence.txt` data. Both datasets are from Kelly (1995). These objects are directly generated from data using R code. Code is in two scripts: `group-size-table.R` and `subsistence-hist.R`. You can put this R code directly into your file (if it is small enough) or, what is better, put your code into different file and than source it. If you want to source it, you can either use common `source`, but this will plague your current environment. If you however use `sys.source` and source this into separate environment, you will decrease chance that individual scripts will interfere between each other. This is more cleaner way to do that. You can also create new Rtex file and put your R code there in the same way as you did put this chapter. See code of this page for details.

2.1.2. Code

Of course, you do not have to use knitr only for pictures and tables. Knitr can be used for code highlighting:

Table 2.1: Group sizes for simple and complex hunter-gatherers (Kelly, 1995).

Ethnic group	group size	type
Athapaskans	47	simple
Tiwi	45	simple
Hadza	40	simple
Abdanab Uskabders	40	simple
Cree	37	simple
Iglulingmiut	35	simple
Cape York (Australia)	30	simple
Pai	28	simple
Birhor	27	simple
Juhoansi	25	simple
Semang	25	simple
Paliyan	24	simple
Guayaki	16	simple
Copper Inuit	15	simple
Mistassini	15	simple
Hill Pandaram	13	simple
Nootka	1500	complex
Haisla	650	complex
Haida	577	complex
S. Kwakiutl	420	complex
Tsimshian	389	complex
S. Tlingit	197	complex
Makah	164	complex
Chehalis	110	complex
Bella Coola	58	complex
Lower Chinook	50	complex
Yurok	46	complex
Tolowa	43	complex
Quinault	36	complex
Puyallup-Nisqually	35	complex
Wiyot	33	complex

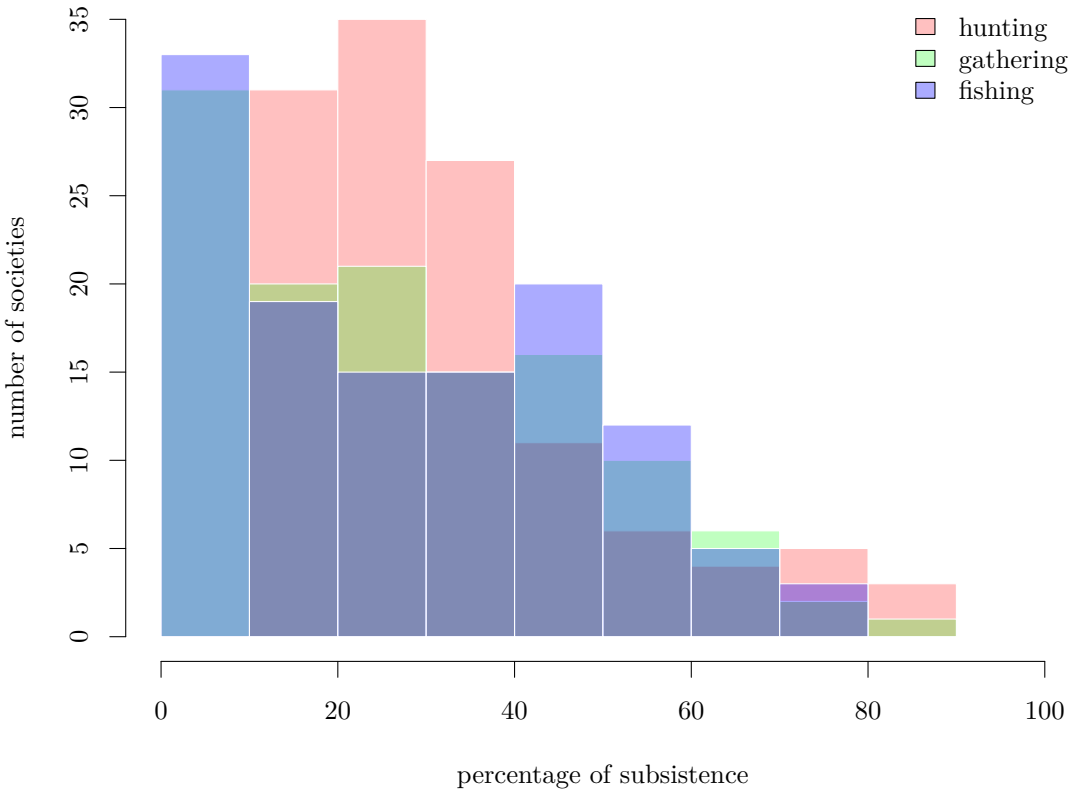


Figure 2.1: Distribution of hunter-gatherers' diet according to its source. Data are from Kelly (1995).

```
my_vec = 1:5
my_square = function(x){ x^2}
my_square(my_vec)
```

```
## [1]  1  4  9 16 25
```

and also you can inline these with `rinline{x}` command to show them in text. Like in this example, where the square of second item in our vector (2) is 4.

2.2. tikz

Tikz is awesome tool with which you can make, or write, to be precise, vector-based graphics. It is a bit hard to start, manual itself has 800 pages, but you have a whole library of examples which you can leverage, edit and then apply. See `http://www.texample.net/tikz/examples/`. It is still faster to make specific data-based graphs in R and transform them into tikz with tikzDevice package (easilly done with knitr), but for some graphs, this may be the way to go (namely if you are unable to work with standard graphical software like me and you expect to edit your graphs frequently).

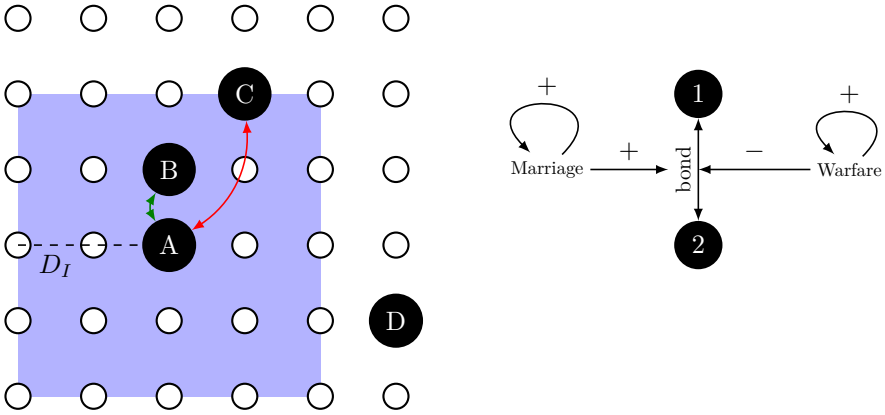


Figure 2.2: Example of two images made in tikz.

Bibliography

Kelly, R. L. (1995). *The Foraging Spectrum: Diversity in Hunter-Gatherer Lifeways*. Smithsonian Institution Press, Washington, DC.