Current status and propsects of R-packages for the design of experiments

by Emi Tanaka

Abstract The critical role of data collection is well captured in the expression "garbage in, garbage out'' – in other words, if the collected data is rubbish then no analysis, however complex it may be, can make something out of it. The gold standard for data collection is through well-designed experiments. Re-running an experiment is generally expensive and in some cases difficult due to limited resources, The design of experiment is important in getting a good value out of the collected data. In this article I describe the current state of the R-packages for the design of experiments through textual analysis and download trends. I discuss also the software design of widely utilised R packages in the field and conclude with discussion of some future prospects for the field.

Introduction

Explorative Analysis

What are the common types of experimental designs?

How do packages interplay with each other?

Which packages are widely utilised?

Software Design

Propsects and Discussion

Table 1: The bigram of the R-package titles as provided in the DESCRIPTION file in CRAN.

Bigram	Count
optimal design	10
experimental design	8
clinical trial	5
dose finding	5
sequential design	5
block design	4
microarray experiment	4
response surface	4

Table 2: The bigram of the R-package descriptions as provided in the DESCRIPTION file in CRAN.

Bigram	Count
experimental design	11
optimal design	10
package provide	7
response surface	7
factorial design	6
graphical user	6
user interface	6
block design	5
contour plot	5
design based	5
effect model	5
fractional factorial	5
microarray experiment	5
mixed effect	5
provide function	5
sample size	5
sequential design	5
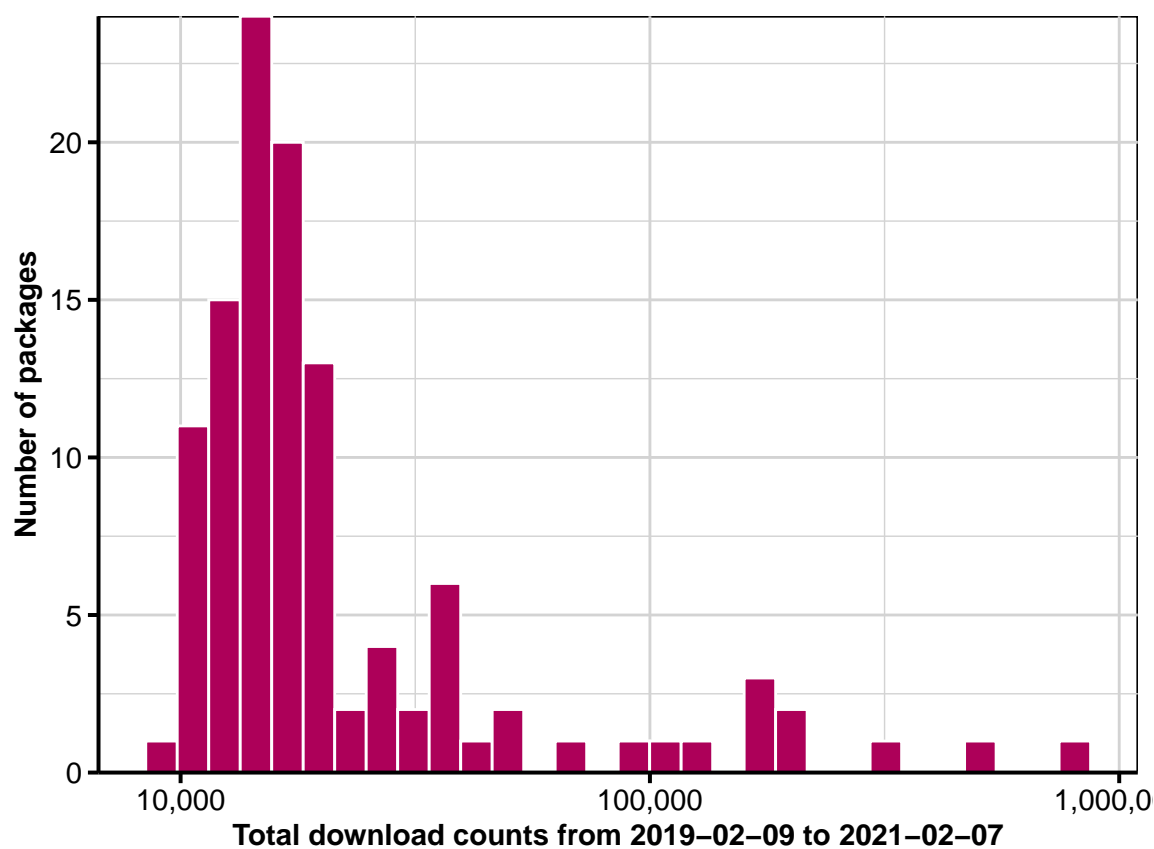
```
#> [1] "agricolae"   "AlgDesign"   "conf.design" "DiceDesign"  "DiceKriging"
#> [6] "DoE.base"    "ez"          "FrF2"        "lhs"         "rsm"
```
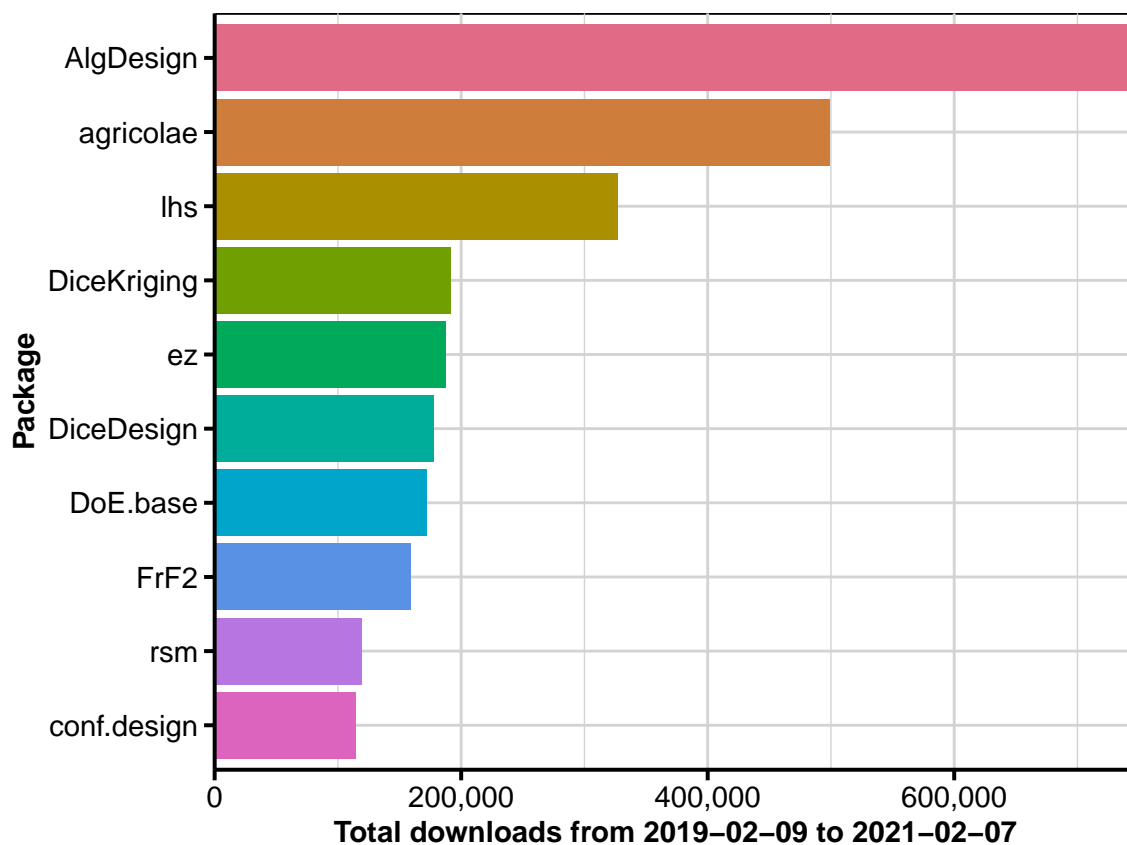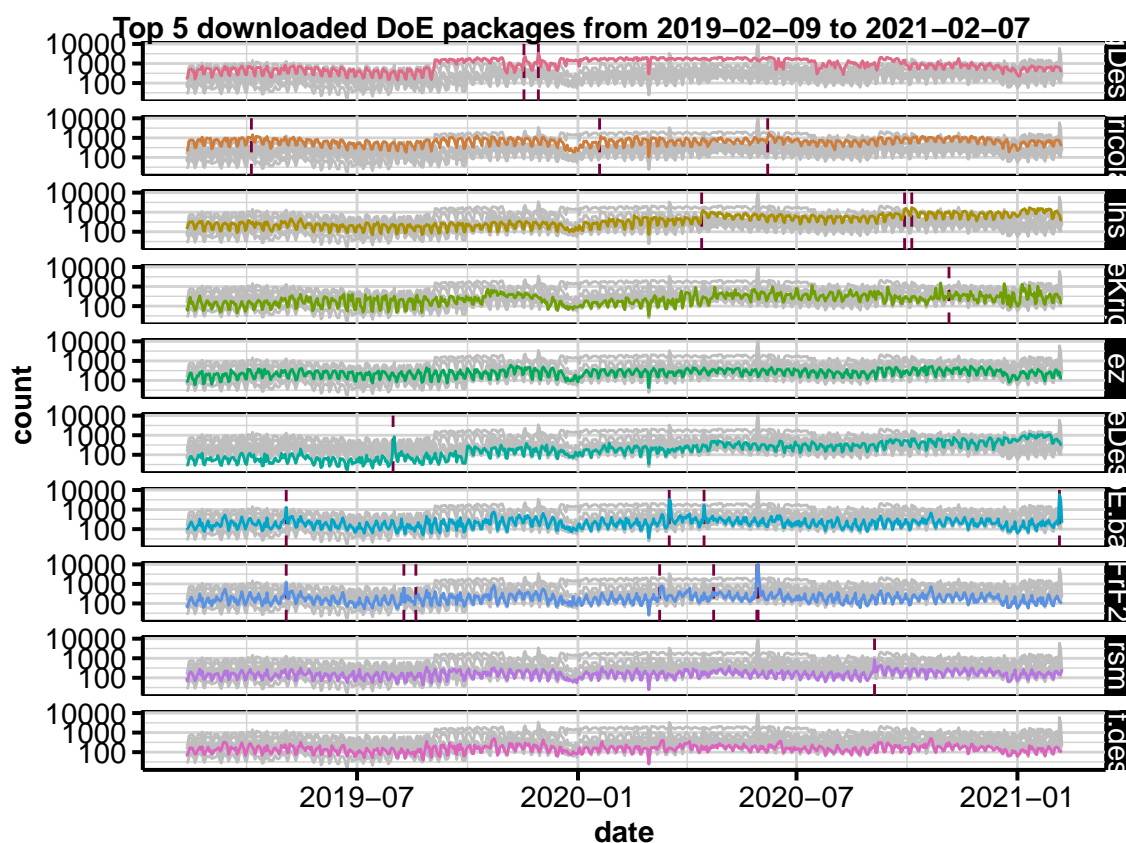
Introduction

```
test test
```

agricolae
ExperimentalDesign
OfficialStatistics

Helping info to get started

Introductory section which may include references in parentheses (R Core Team, 2012), or cite a reference such as R Core Team (2012) in the text.

Section title in sentence case

Let's check fi this works Figure @ref(fig:Rlogo).

This section may contain a figure such as Figure 1.

Figure 1: The logo of R.

Summary

This file is only a basic article template. For full details of *The R Journal* style and information on how to prepare your article for submission, see the Instructions for Authors.

About this format and the R Journal requirements

`rticles::rjournal_article` will help you build the correct files requirements:

- A R file will be generated automatically using `knitr::purl` - see https://bookdown.org/yihui/rmarkdown-cookbook/purl.html for more information.
- A tex file will be generated from this Rmd file and correctly included in `RJwapper.tex` as expected to build `RJwrapper.pdf`.
- All figure files will be kept in the default rmarkdown `*_files` folder. This happens because `keep_tex = TRUE` by default in `rticles::rjournal_article`
- Only the bib filename is to modifed. An example bib file is included in the template (`RJreferences.bib`) and you will have to name your bib file as the tex, R, and pdf files.

Bibliography

R Core Team. *R: A Language and Environment for Statistical Computing*. R Foundation for Statistical Computing, Vienna, Austria, 2012. URL http://www.R-project.org/. ISBN 3-900051-07-0. [p4]

Emi Tanaka
Monash University
Monash University
Clayton campus, VIC 3800, Australia
http://emitanaka.org/
ORCiD: *0000-0002-1455-259X*
emi.tanaka@monash.edu