



中国矿业大学 (北京)

China University of Mining & Technology, Beijing

一份不太简短的 R 语言介绍

黄湘云

新浪 BIP

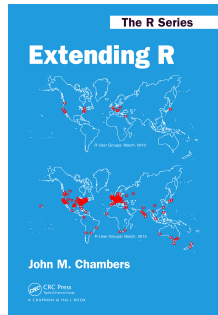
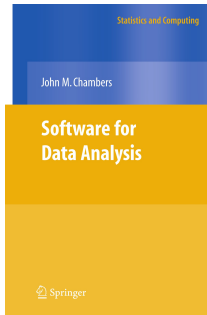
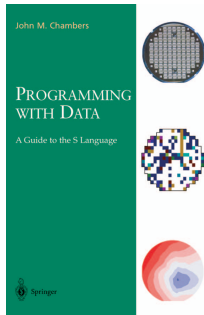
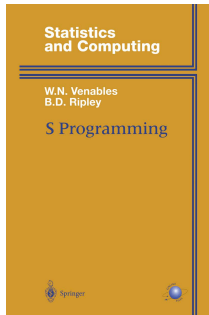
2017 年 10 月

1. 前世
2. 今生
3. 社区箴言
4. 社区领袖
5. 数据可视化
6. 数据报告
7. 学习 R

前世

来自何方

R was inspired by the S environment which has been principally developed by [John Chambers](#), with substantial input from Douglas Bates, [Rick Becker](#), Bill Cleveland, [Trevor Hastie](#)[1, 2], Daryl Pregibon and Allan Wilks.



今生

创世者

R was initially written by **Robert Gentleman** and **Ross Ihaka** also known as “**R & R**” of the Statistics Department of the University of Auckland.

- [Robert Gentleman](#) joined [23andMe](#) in 2015 as VP of computational biology

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- R Development Core Team (Since mid-1997):

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contributors()
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4. **Deepayan Sarkar** (lattice 包作者 [5])

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何去何从

1. 要到哪里去

R is **GNU S**, a freely available language and environment for statistical computing (统计计算) and graphics (统计图形)

R provides a wide variety of statistical and graphical techniques: linear and nonlinear modelling, statistical tests, time series analysis, classification, clustering, etc.

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- 可以看看 CRAN 的 [TaskViews](#) 栏
- 还可以看看 [Bioconductor](#) 官网

社区箴言

Paul Murrell

If you imagine that this pen is Trellis, then Lattice is not this pen.

-- Paul Murrell (on the difference of Lattice (which eventually was called grid) and Trellis)

DSC 2001, Wien (March 2001)

Have you ever wanted to write a book, but not known where to start? Now is a very good time to jump in, because there is currently a very simple recipe for success: just put R in the title and you will have to beat the publishers off with a stick!

-- Paul Murrell

ASA Statistical Computing & Graphics Newsletter 17(2) (November 2006)

Barry Rowlingson

I'd like to prefix all these solutions with 'Here's how to do it, but don't actually do it you crazy fool'. It's on a par with redefining `pi`, or redefining `+`. And then redefining `<-`. These techniques have their proper place, and that would be in the currently non-existent obfuscated R contest.

No, the R-ish (iRish?) way is to index vectors from 1. That's what the R gods intended!

- Barry Rowlingson (in a discussion how vectors in R could be indexed starting from 0)
R-help (March 2004)

Brian D. Ripley

To paraphrase provocatively, 'machine learning is statistics minus any checking of models and assumptions'.

- Brian D. Ripley (about the difference between machine learning and statistics)
useR! 2004, Vienna (May 2004)

Let's not kid ourselves: the most widely used piece of software for statistics is Excel.

- Brian D. Ripley ('Statistical Methods Need Software: A View of Statistical Computing')
Opening lecture RSS 2002, Plymouth (September 2002)

Peter Dalgaard

The documentation level of R is already much higher than average for open source software and even than some commercial packages (esp. SPSS is notorious for its attitude of "You want to do one of these things. If you don't understand what the output means, click help and we'll pop up five lines of mumbo-jumbo that you're not going to understand either.")

-- Peter Dalgaard

R-help (April 2002)

Douglas Bates

Zhu Wang: I am trying to create a library which uses some Fortran source files [...]

Douglas Bates: Someone named Martin Maechler will shortly be sending you email regarding the distinction between 'library' and 'package' :-)

-- Zhu Wang and Douglas Bates

R-help (May 2004)

最后的话

For the S system, which has forever altered the way people analyze, visualize, and manipulate data S is an elegant, widely accepted, and enduring software system, with conceptual integrity, thanks to the insight, taste, and effort of John Chambers.

-- Association for Computing Machinery
ACM/Software System Award citation (1998)

社区领袖

Roger Bivand

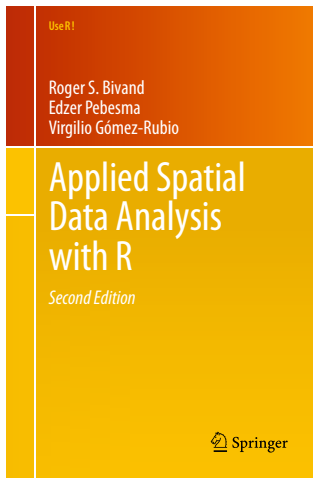
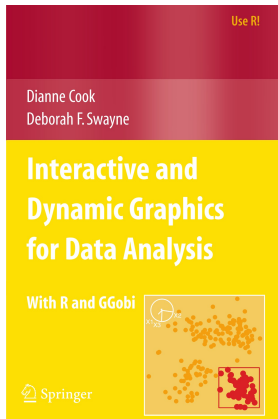


图 1: Applied spatial data analysis with R

Di Cook



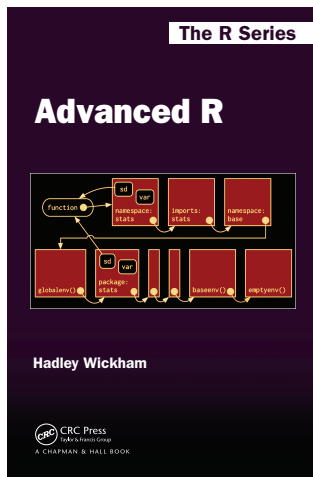
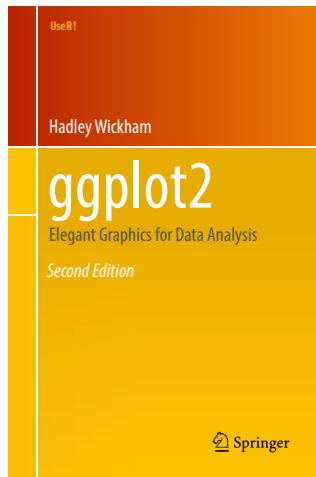
Hadley Wickham



图 2: Hadley Wickham

<http://hadley.nz/>

Hadley Wickham



John Chambers Award

- 2017, Carson Sievert [plotly](#)

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- 2016, Tong He (何通) , Tianqi Chen (陈天奇) and Yixuan Qiu (邱怡轩) [XGBoost](#)

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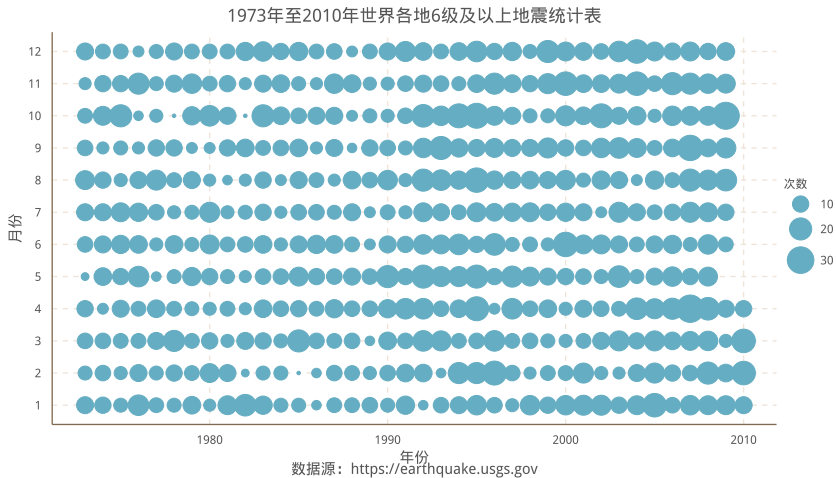
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- 2004, Deepayan Sarkar [lattice](#)
- 2003, Daniel Adler [rgl](#)

数据可视化

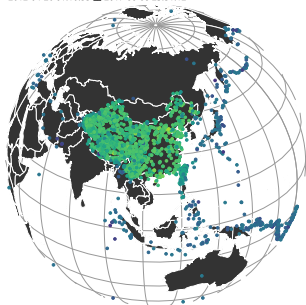
1973-2010 全球 6 级以上地震

1973-2010 全球 6 级以上地震



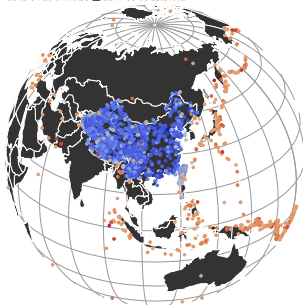
2012.4-2017.8 中国 5 级及以上地震

2012-04-26 01:10:55 至 2017-08-08 23:51:12



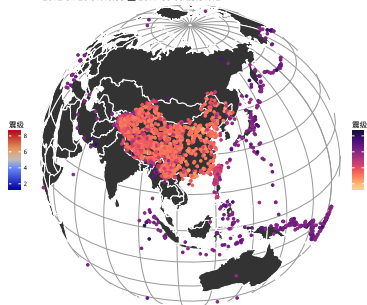
数据来源: <http://news.ceic.ac.cn/>

2012-04-26 01:10:55 至 2017-08-08 23:51:12



数据来源: <http://news.ceic.ac.cn/>

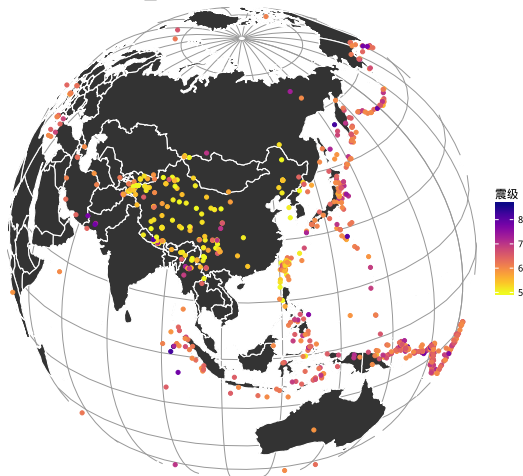
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数据源: <http://news.ceic.ac.cn/>

2015 年 11 月 28-30 日雾霾时空过程 @ 王江浩

Using R packages and education to scale Data Science at Airbnb



图 4: Ricardo Bion https://github.com/ricardo-bion/medium_visualization

R 包依赖关系网络

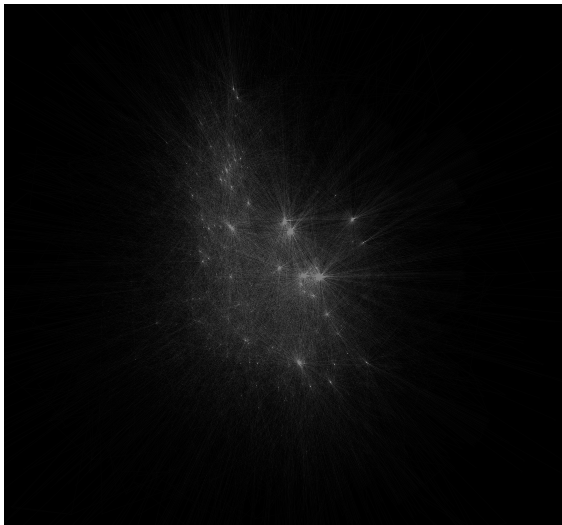
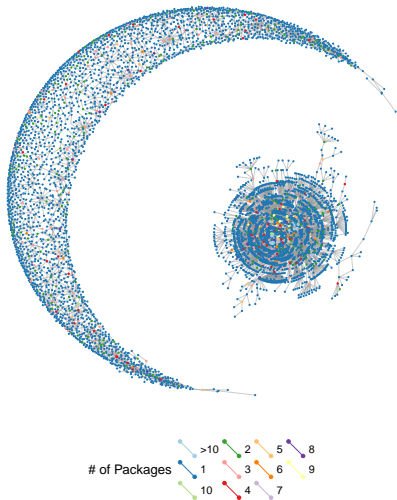
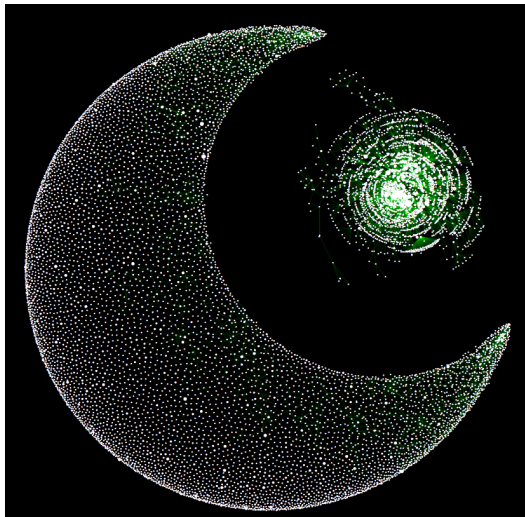


图 5 所有开发者

开发者协作关系网络



Flat map great circle animation example

敬请欣赏

- Matthew Leonawicz

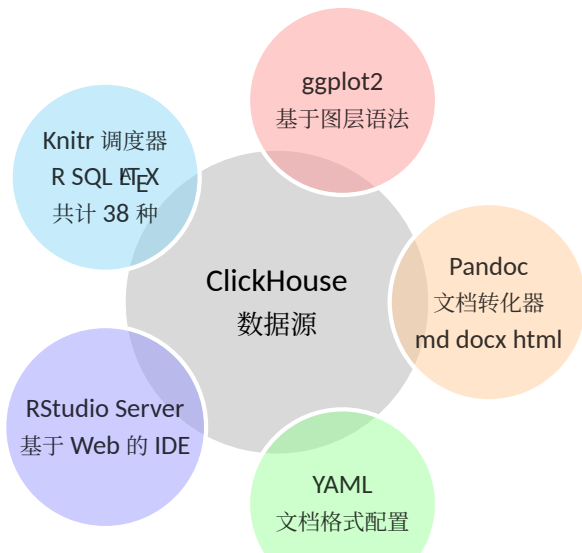
Flat map great circle animation example

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- <https://leonawicz.github.io/>

数据报告

基于 R Markdown 的分析报告



R Markdown 甩 Jupyter 几条街

- R + Markdown + Knitr + RStudio(IDE)

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- 处处学朕（RStudio），处处学得不像，朕是以宽仁治国，他（Rodeo）是以宽仁收买人心

ggplot2 画廊 I

[1] "ggalt"	"gganimate"	"ggbeeswarm"
[4] "ggbio"	"ggBrackets"	"ggChernoff"
[7] "ggCompNet"	"ggcorrplot"	"ggcyto"
[10] "ggdendro"	"ggdmc"	"gge"
[13] "ggedit"	"ggeffects"	"ggene"
[16] "ggenealogy"	"ggExtra"	"ggforce"
[19] "ggformula"	"ggfortify"	"ggghost"
[22] "ggguitar"	"gghalfnorm"	"ggimage"
[25] "ggiraph"	"ggiraphExtra"	"ggjoy"
[28] "gglasso"	"gglogo"	"ggloop"
[31] "ggm"	"ggmap"	"ggmcmc"
[34] "ggmosaic"	"ggnetwork"	"ggparallel"
[37] "ggplot2"	"ggplot2.SparkR"	"ggplot2movies"

ggplot2 画廊 II

[40]	"ggplotFL"	"ggplotgui"	"ggpmisc"
[43]	"ggpolypath"	"ggpubr"	"ggpval"
[46]	"ggQC"	"ggradar"	"ggRandomForests"
[49]	"ggraph"	"gggraptR"	"ggrepel"
[52]	"ggridges"	"ggROC"	"ggsci"
[55]	"ggseas"	"ggseqlogo"	"ggsignif"
[58]	"ggsn"	"ggspatial"	"ggspectra"
[61]	"ggstance"	"ggswissmaps"	"ggtech"
[64]	"ggtern"	"ggThemeAssist"	"ggthemes"
[67]	"ggthemr"	"ggtree"	"ggvis"


ggplot2

- 理论基础扎实 (ggvis) [6]

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 -  <http://www.sthda.com/english/>

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 -  <http://www.sthda.com/english/>
 -  <http://ggplot2.org/>
- 爆栈网 18,000+ 问题
 -  <https://stackoverflow.com/questions/tagged/ggplot2>

光说不练假把式

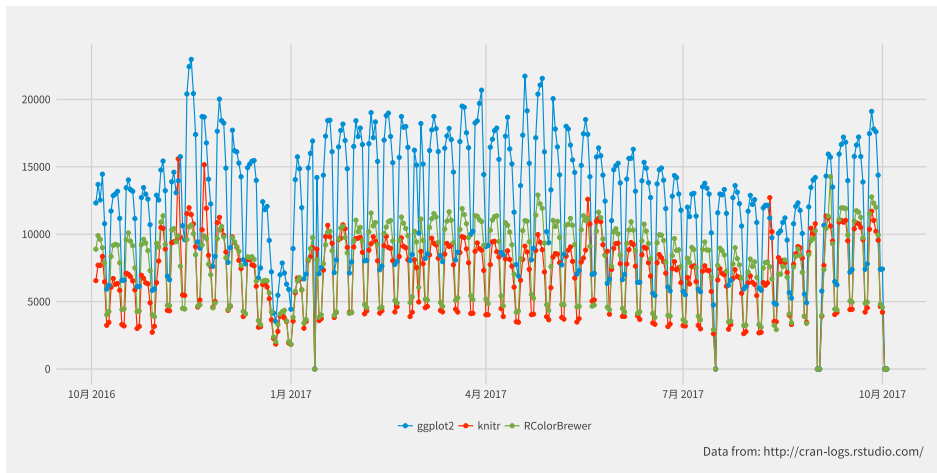


图 6: 每日下载量

饼图

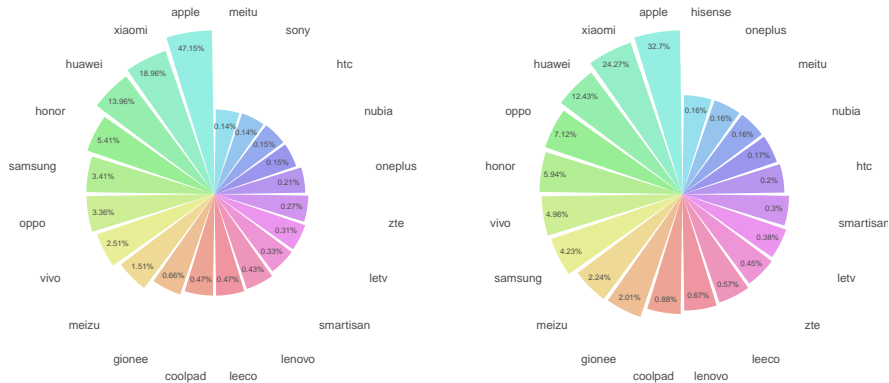
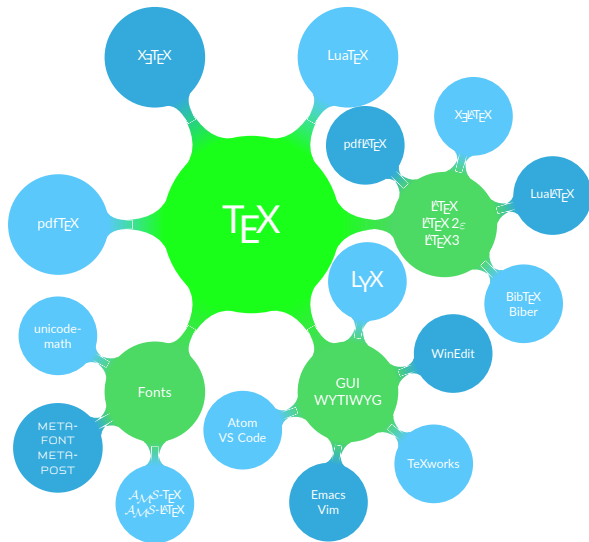


图 7: 一线和二三线各品牌手机份额对比

了解一点 \LaTeX



学习 R

自帶 R 包共 29 个

```
Pkgs <- sapply(list.files(R.home('library')), function(x)
  packageDescription(pkg = x, fields = "Priority"))
names(Pkgs[Pkgs == 'base' & !is.na(Pkgs)])
```

```
[1] "base"      "compiler"  "datasets"  "graphics"  "grDevices"
[6] "grid"      "methods"   "parallel"  "splines"   "stats"
[11] "stats4"    "tcltk"     "tools"     "utils"
```

```
names(Pkgs[Pkgs == 'recommended' & !is.na(Pkgs)])
```

```
[1] "boot"      "class"      "cluster"    "codetools"  "foreign"
[6] "KernSmooth" "lattice"    "MASS"       "Matrix"     "mgcv"
[11] "nlme"      "nnet"       "rpart"      "spatial"    "survival"
```

最好的学习资源，没有之一

入门

- R-admin.pdf 安装和管理 79

进阶

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英文

- <https://cran.r-project.org/other-docs.html>

中文

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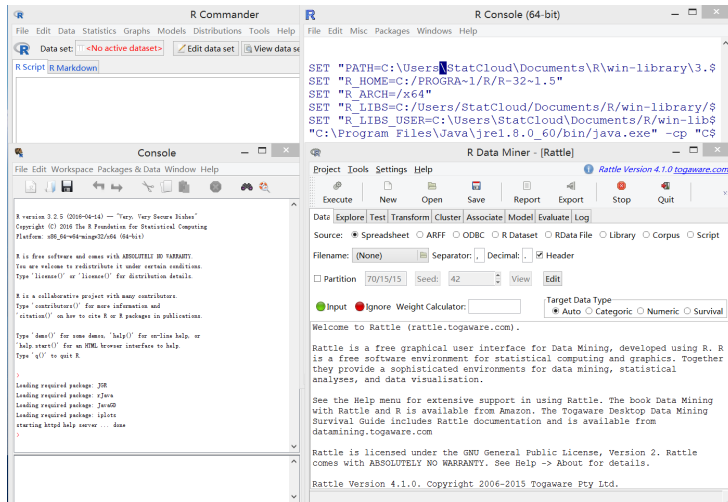
英文

- <https://cran.r-project.org/other-docs.html>

中文

- 常见问题解答（刘思喆等搜集于中文论坛）

称手的兵器



称手的兵器

The screenshot displays the RStudio IDE interface with the following components:

- Source Editor:** Contains R code for data manipulation and plotting. The code includes filtering, merging, summarizing, and creating tooltips for a map.
- R Plot:** Shows a map of Southeast Asia with a grid overlay, representing the spatial data being analyzed.
- R Package Manager:** Lists installed and available packages. The 'base' package is highlighted, showing its version (v3.2.4) and description.
- Variable Explorer:** Displays the contents of the 'airports' and 'airports_with_departures' objects, showing their structure and data types.

```
10 dplyr::filter(sourceAirportID != "\\N") %>%
11   group_by(sourceAirportID) %>%
12   summarize(departures = n())
13
14 # Merge the departures data set with the original data set that contains that latitude
15 # and longitude of airports
16
17 airports_with_departures <- merge(airports, departures, by.x = "ID", by.y = "sourceAirportID")
18
19 # Tooltip column contains tooltips for each airport that gives its name (code): departures
20
21 airports_with_departures$tooltip <- sprintf("%s (%s): %s",
22   airports_with_departures$name,
23   airports_with_departures$IATA_FAM,
24   airports_with_departures$departures)
25
26 # Radius column is the square root of the number of departures
27
```

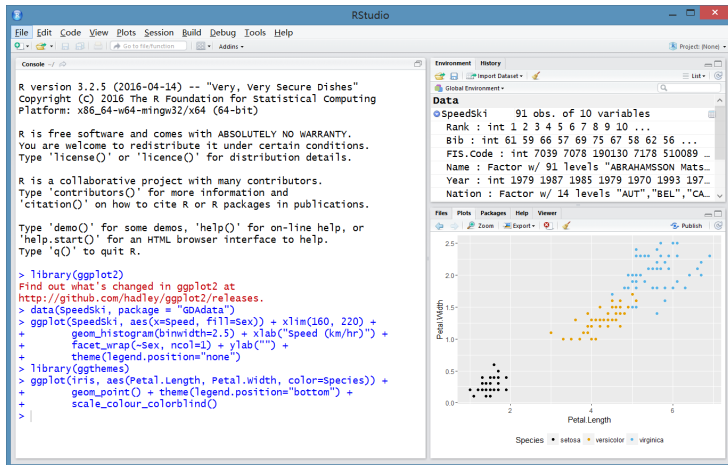
R Package Manager:

Package	Version	Status
abind	v1.4-3	Installed
assertthat	v0.1	Installed
base	v3.2.4	Installed
base64enc	v0.1-3	Installed
bdsmatrix	v1.3-2	Installed
bit	v1.1-12	Installed

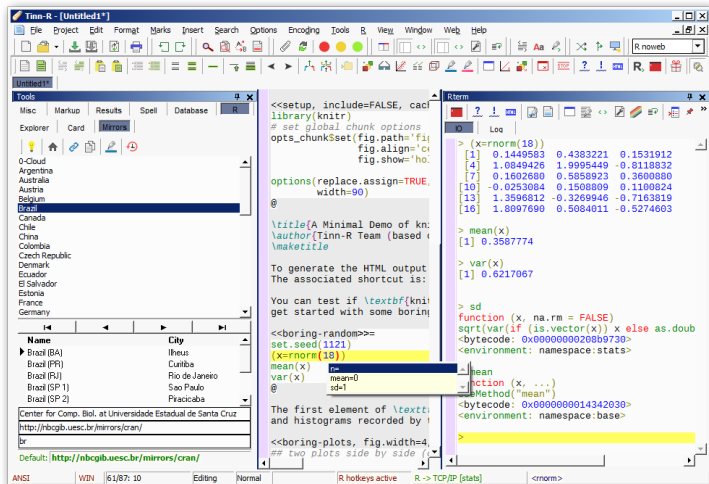
Variable Explorer:

Name	Value	Class	Type
airports	8107 obs. of 12 variables	data.frame	list
airports_with_departures	3270 obs. of 14 variables	data.frame	list
@ Data	List of 14	list	
[1]	int [1:3270] 1 2 3 4 5 6 7 8 9 10 ...	integer	integer
[2]	chr [1:3270] "Goroka", "Madang", "Mount Hagen", "Nadzab", "Port Moresby Jackson Int'l"	character	character

称手的兵器



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尽情探索吧

`help.start()`

Statistical Data Analysis



Manuals

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Material specific to the Windows port

[CHANGES up to R 2.15.0](#)

[Windows FAQ](#)

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- 知乎问答 <https://www.zhihu.com/question/19611094>

R 的若干基因及争论

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- 覃文峰 <https://github.com/qinwf/awesome-R>

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- [1] Material from the book's webpage, R port, and packaging by Kjetil B Halvorsen. *ElemStatLearn: Data Sets, Functions and Examples from the Book: "The Elements of Statistical Learning, Data Mining, Inference, and Prediction" by Trevor Hastie, Robert Tibshirani and Jerome Friedman*, 2015. R package version 2015.6.26.
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