

Next steps

The R Bootcamp
Twitter: [@therbootcamp](#)

September 2017

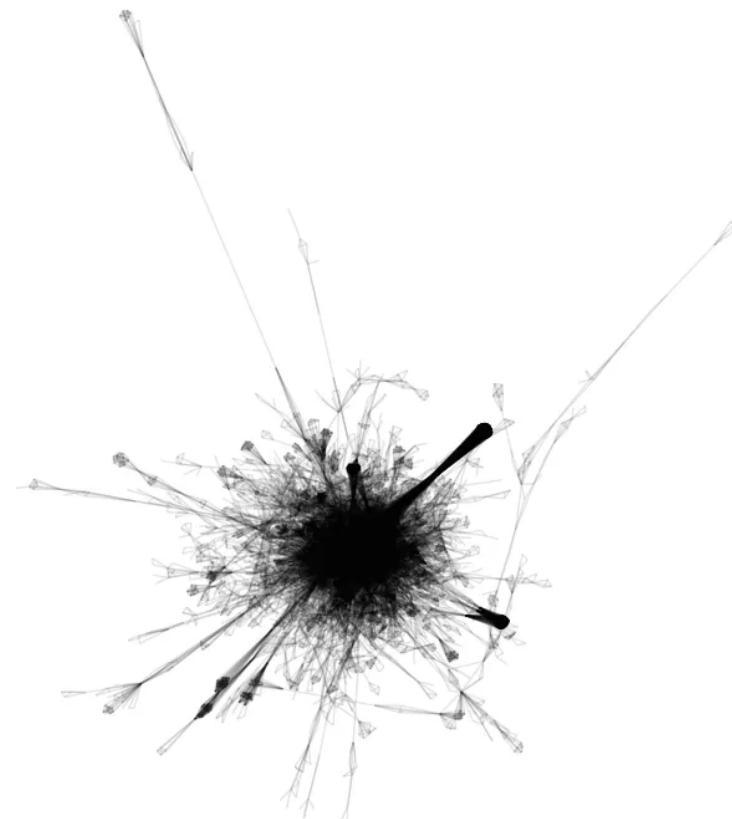
Next steps

What we would have liked to cover

1. Networks
2. Bayesian stats
3. Text analysis
4. Rcpp
5. Forms
6. Github
7. R on servers

How to continue

7. Books
8. Websites R
9. Groups

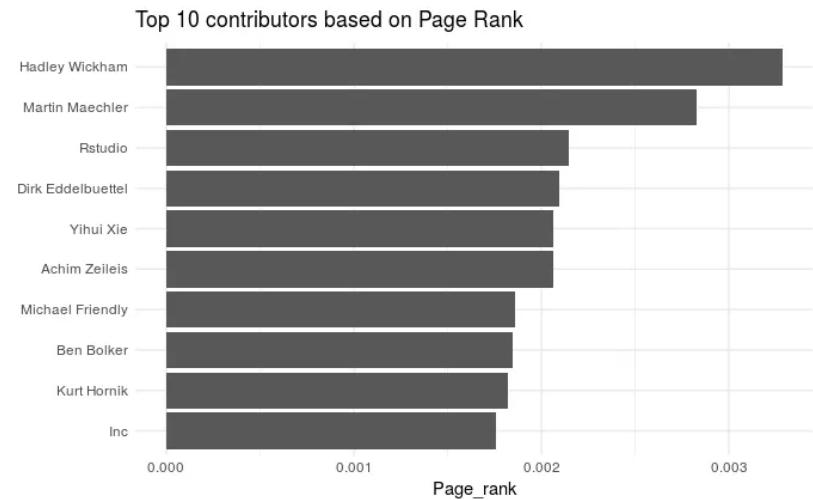
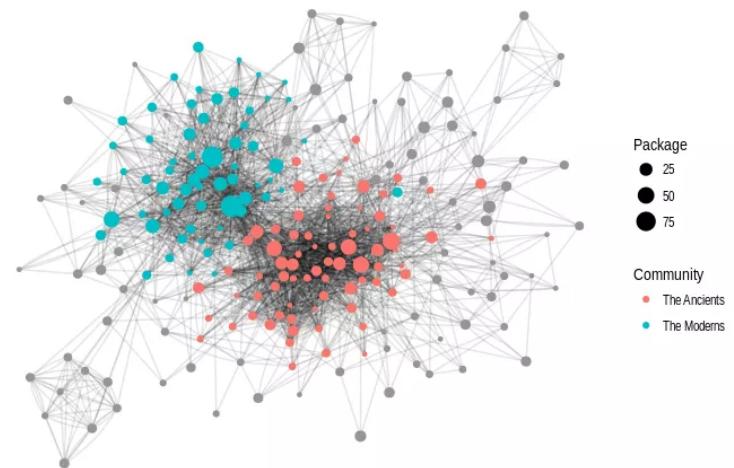


source R-bloggers.com

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Network analysis

A social graph of package Co-authors using tidyverse plus ggraph, an extension for ggplot2 for graphs (aka networks) and igraph, an extremely powerful network analysis library. Find the code and additional explanation [here](#).



source [R-bloggers.com](#)

source [R-bloggers.com](#)

Stats packages

"If there is a new statistical method, it is first implemented in R"
-- duw

Package	Description
stats	Many individual tests plus all the distributions in the world.
lme, glm	(Generalized) linear models.
lme4, afex	Mixed-mode, hierarchical regression.
caret, mlr, e1071, rpart, etc.	Machine learning.
BayesFactor, rstanarm	Bayesian linear models.
rjags, rstan	Bayesian graphical models.
forecast, mgm, timeSeries, etc.	Time series models.
cluster, fastcluster, cstab, etc.	Cluster analysis.

Bayesian statistics

Recent years several convenient and efficient packages for **Bayesian statistics** have been developed, facilitating a shift to a more informative and consistent statistical framework.

Using these packages is oftentimes **as easy as using their Frequentist counterparts**. See in particular the **BayesFactor** package.

$$P(H|E) = \frac{P(H|E) P(H)}{P(E)}$$

The Posterior The Evidence The Prior
The probability that the hypothesis (H) is true given the evidence (E)
The probability of getting this evidence if this hypothesis were true
The probability of H being true, before gathering evidence
The marginal probability of the evidence (Prob of E over all possibilities)

source labtimes.org

```
# load package
library(BayesFactor)

# define data
x <- rnorm(100, 0, 1)
y <- rnorm(100, 1, 1)

# run Frequentist analysis
t.test(x, y)

# run Bayesian analysis
ttestBF(x, y)

## Bayes factor analysis
## -----
## [1] Alt., r=0.707 : 1.313e+11 ±0%
## 
## Against denominator:
##   Null, mu1-mu2 = 0
## ---
```

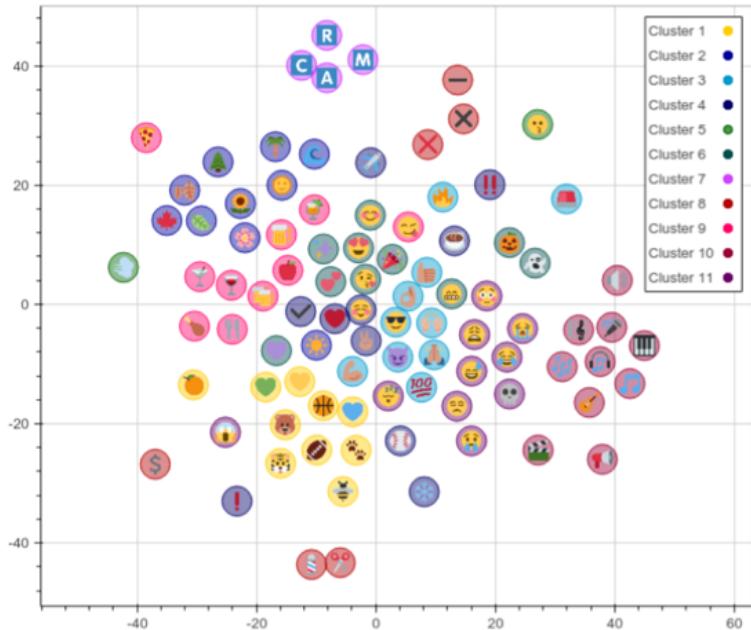
Bayes factor type: BFindepSample, JZS

Text analysis

Another area where R has seen much development is **text analysis**. New packages provide access to lightning fast C++ **string libraries**, 'new' data formats such as **html**, **xml**, and **json**, and also to the API of social platforms, such as **facebook.com** and **twitter.com**.

Package	Description
stringr, stringi	String operations and regular expressions.
rvest, XML	Scraping content of the internet
lsa, fast.svd	Singular value decomposition and latent semantic analysis.
SentimentAnalysis	Sentiment analysis.
twitteR, streamR, jsonlite	Streaming and parsing tweets.
Rfacebook	Accessing the Facebook API.

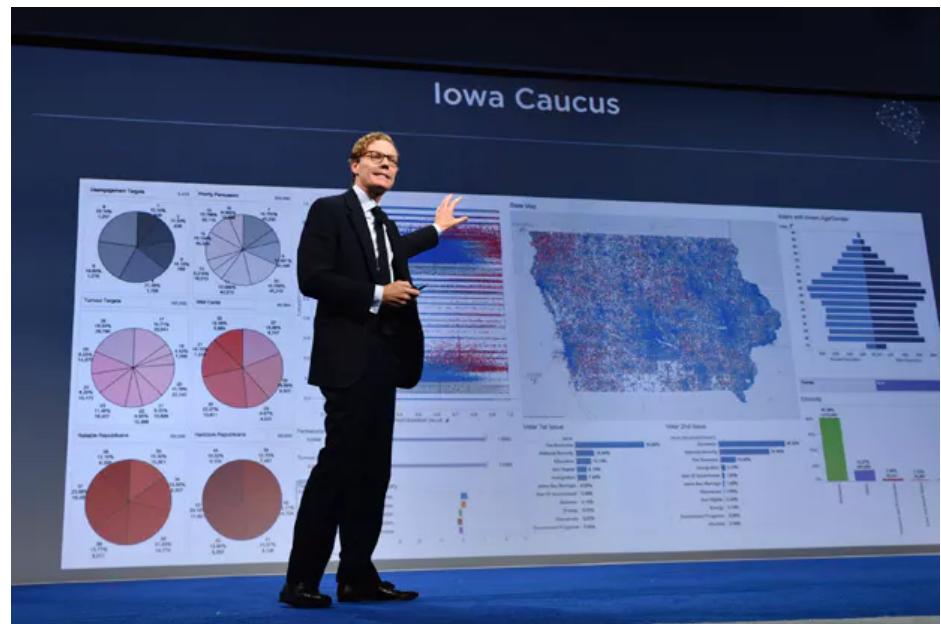
Text analysis: Applications



source Barbieri, F., Ronzano, F., & Saggion, H. (2016, May). What does this Emoji

Mean? A Vector Space Skip-Gram Model for Twitter Emojis. In LREC.

See also my [natural language course page](#).



Alexander Nix, Cambridge Analytica

source spectator.imgix.net

Rcpp

By now one of the most referenced R packages is Rcpp - R's **interface to C++**. With often relatively little effort due to **Rcpp sugar**, Rcpp can provide vast speed improvements, which many packages today rely on Rcpp in the background for **swift code execution**. Rcpp becomes particularly powerful, when supplemented with BH, which makes available a collection **free, peer-reviewed C++ libraries**, and RcppArmadillo, which available the high-performance *Armadillo* library for linear algebra methods.



source classic105.com

```
#include <Rcpp.h>
using namespace Rcpp;
// The cppFunction will automatically add this.

// Or, prefix Rcpp objects with the Rcpp namespace e.g.:
Rcpp::NumericVector xx(10);
```

```
Create simple vectors
SEXP x; std::vector<double> y(10);

// from SEXP
NumericVector xx(x);

// of a given size (filled with 0)
NumericVector xx(10);
// ... with a default for all values
NumericVector xx(10, 2.0);

// range constructor
NumericVector xx( y.begin(), y.end() );

// using create
NumericVector xx = NumericVector::create(
  1.0, 2.0, 3.0, 4.0 );
```

```
// Matrix of 4 rows & 5 columns (filled with 0)
NumericMatrix xx(4, 5);

// Fill with value
int xsize = xx.nrow() * xx.ncol();
for (int i = 0; i < xsize; i++) {
  xx[i] = 7;
}

// Same as above, using STL fill
std::fill(xx.begin(), xx.end(), 8);

// Assign this value to single element
// (1st row, 2nd col)
xx(0,1) = 4;

// Reference the second column
// Changes propagate to xx (same applies for Row)
NumericMatrix::Column zzcol = xx( _, 1 );
zzcol = zzcol * 2;

// Copy the second column into new object
NumericVector zz1 = xx( _, 1 );
// Copy the submatrix (top left 3x3) into new object
NumericMatrix zz2 = xx( Range(0,2),
Range(0,2));
```

Quick Reference Guide

Google Forms & Maps

New packages also allow you to interact with **Google Maps** and **Google Forms**. Use `ggmap` to access Google Maps and `googlesheets` to access Google Forms.

```
library(ggmap)  
ggmap(get_map(c(7.588576, 47.559601), zoom=16))
```

Basel R Bootcamp - Follow-up questionnaire

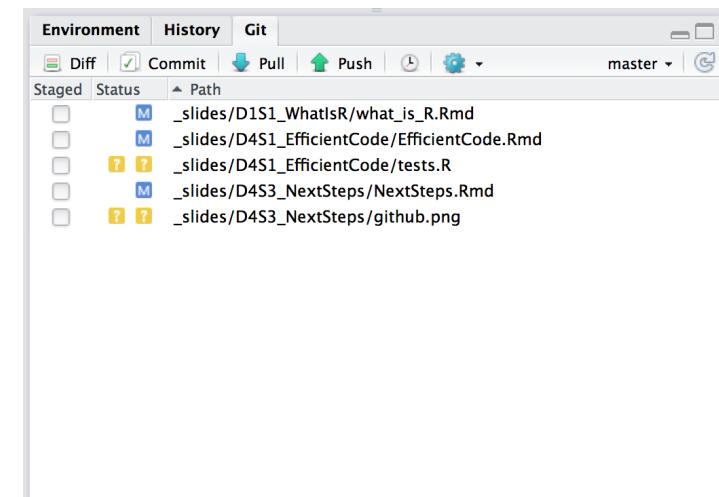
Please be so kind to take a few minutes and provide us with feedback for the Basel R Bootcamp on 9, 10, 16, 17 September 2017. In the first part you will have the chance to tell us what you think about the workshop in general. In the second part you can indicate which sessions you liked/disliked and why.

How did you hear about the Basel R Bootcamp?

- Advanced Studies Center website
- LinkedIn
- Friends and colleagues
- Other:

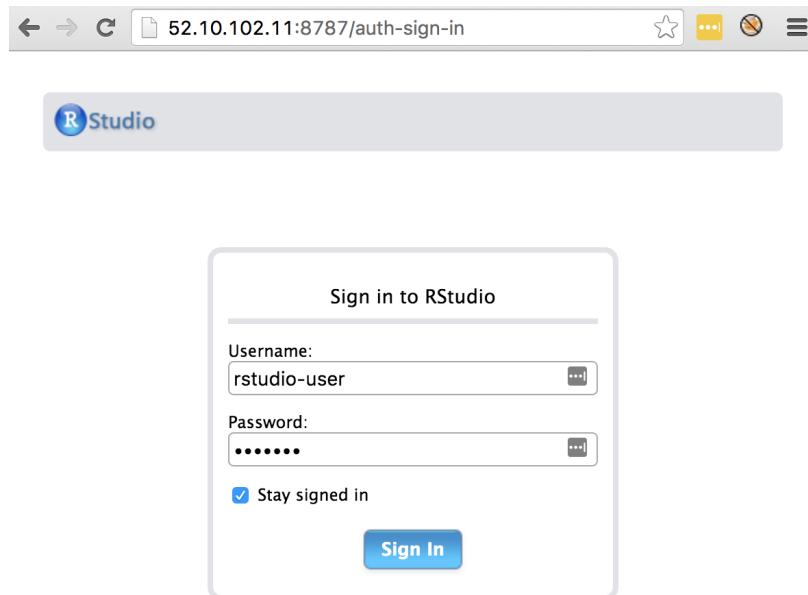
Github & Dropbox

An important part of programming is to **keep track of the progress** to potential be able to go back to an earlier version of the code. To achieve this, many programmers rely on version-control software such as **GitHub**. R and, in particular, RStudio work have inbuilt software that allow you to **sync your project** with an **GitHub repository**. Via the package called `rdrop2`, R also interfaces with the popular cloud service **Dropbox**, which also allows for rudimentary version control.



R on servers

With the need for more computing power for, e.g., machine learning, R is also moving more and more to the **server and cluster sphere**. RStudio offers a convenient (and free) solution to access **RStudio** sessions on a **remote linux server** via a browser. RStudio also offers the `sparklyr` package integrating the **Spark** architecture for efficient cluster computing with `dplyr`. Other packages exist to interface with **Hadoop** (RHadoop) and **SQL** (RSQLite).



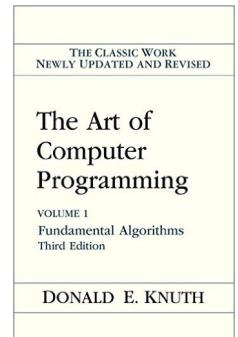
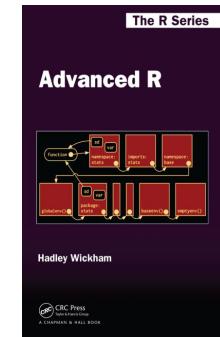
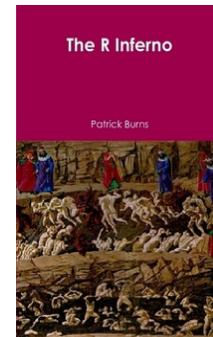
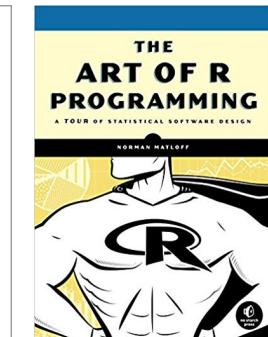
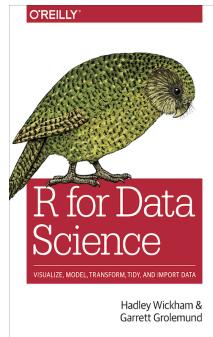
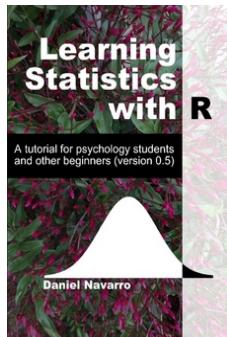
How to continue

1. *Practice*
2. *Read books*
3. *Consult websites*
4. *Attend R group*
5. *Get consulting*



Books

Here is a very incomplete series of good books. They are ordered by complexity, beginning with user-friendly books on **learning statistics** in R and ending with books focusing on the more **advanced topics of the R language**.



Websites

The web is a great place to learn about R.

Best begin your journey with:

Google or **Rseek**, which is a wrapper around google to maximize hits related to R. However, most of the time Google works just fine. Just be sure to add `r` to the search query.

Then you will most likely be redirected to one of two pages

R-bloggers is a website on which R users inform each other on the newest developments. See, e.g., Nathaniel's [entry](#).

Stackoverflow is a website on which R users exchange problems and solutions to problems. Try post something yourself. You will be amazed by the turnaround.



R meetup groups

Great place to meet other **R enthusiast** in and outside of industry and see interesting presentations on **R's latest developments**.

BaselR

Startseite Mitglieder Sponsoren Fotos Seiten Diskussionen Mehr [Mitglied werden!](#)



Basel, Schweiz
Gegründet 13. Apr 2010

Members 257
Vergangene Meetups 16
Unser Kalender 

Organisatoren:
 **Liz Matthews, Karis Bouher**
[Kontakt](#)

Es geht bei uns um:

Similar to the well-known LondonR - www.londonr.org, this informal meeting is intended to serve as a platform for all local (and regional) R users to present and exchange their experiences and ideas around the usage of R.

Mango Solutions aims to host such meetings about every quarter. A typical BaselR meeting will consist of 3-4 talks of about 20-25 min to give plenty of room for sharing your R experiences, discussions and exchange of ideas.

For more information please visit www.baselr.org

[Mach' mit](#) [Wen kenne ich hier?](#)

Mache mit und sei der Erste, der von neuen Meetups erfährt
Melde dich via Facebook an, um es herauszufinden
Du stimmt den Benutzerbedingungen zu, indem du ein Meetup Konto eröffnest

Vergangene Meetups

7. März · 18:30
BaselR Meeting
 28 Members | 

Neueste Aktivitäten

NEUES MITGLIED **eugene.orlov** macht mit Vor 4 Tagen
NEUES MITGLIED **Muriel Buri, Dorothea Hug Peter, Heidi Seibold, Johannes Bracher**

Zurich R User Group

Startseite Mitglieder Sponsoren Fotos Seiten Diskussionen Mehr [Mitglied werden!](#)



Zürich, Schweiz
Gegründet 18. Nov 2015

UseR 822
Gruppenreview 12
Vergangene Meetups 13
Unser Kalender 

Organisatoren:
 **Muriel Buri, Dorothea Hug Peter, Heidi Seibold, Johannes Bracher**

This meetup is for everyone that loves working with R and wants to learn more. Check out the [website](#).

[Mach' mit](#) [Wen kenne ich hier?](#)

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Vergangene Meetups

4. September · 18:30
Zurich R User meetup: September edition at Sanitas
 55 UseR | 

Schedule: 6:30 - 6:45 Welcome 6:45 - 7:45 Talks (see below) 7:45 - end Drinks, snacks and socializing This meetup is hosted and sponsored by Sanitas. We are looking... [MEHR ERFAHREN](#)

Neueste Aktivitäten


 9. August · 18:30

Consulting

Feel free to contact us. Being in the R community means helping each other out. And if it's about actually working on a job for you, we can figure something out.

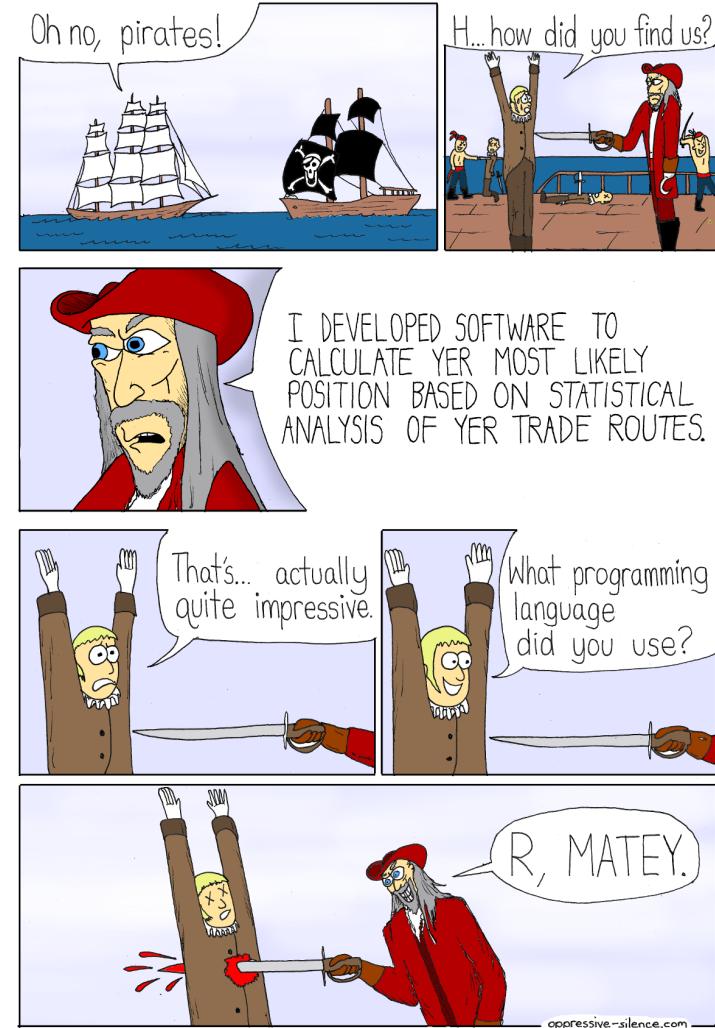


[website](#)
[GitHub](#)
packages: [cstab](#),
[mousedowntrap](#), [choicepp](#)



[website](#)
[GitHub](#)
packages: [yarrr](#),
[FFTrees](#), [ShinyPsych](#)

Thank you



source [reddit.com](#)