Introducing Digital Behavioral Data

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cv

About Me

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Research: I write computer codes and crunch numbers to study online communities

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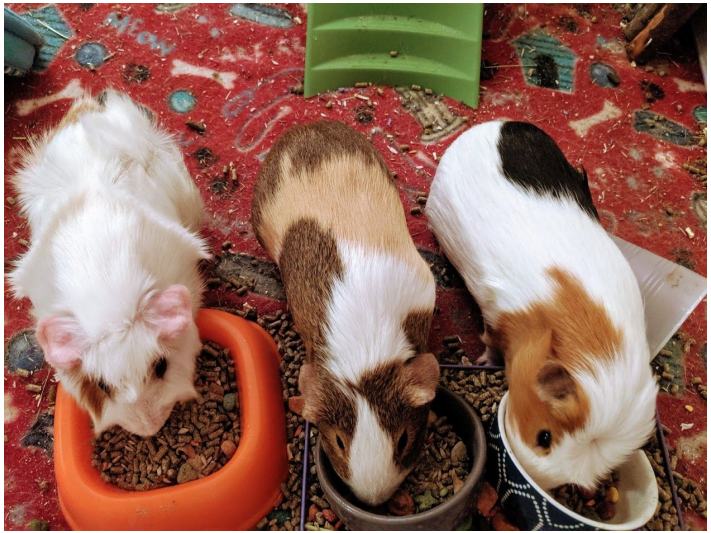


Two goals

Goal number one:

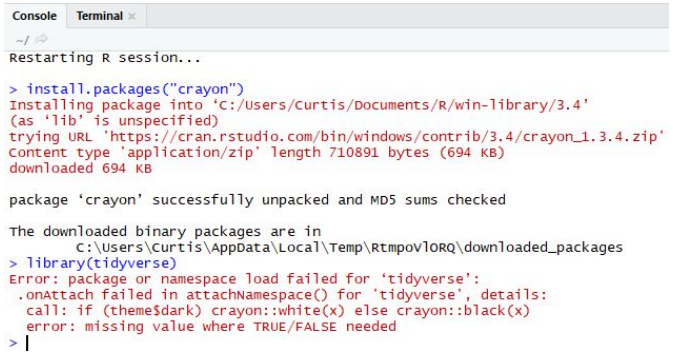
- **Practical data science & computer programming skills.** Use the R language for data mining, analytics, and building visualization apps.

Goal number one:

- **Be a critical user of algorithms and digital behavioral data.** Understand the biases and undesirable consequences they may have on the civil society.

This course does not assume prior knowledge of computer programming. But you will learn to apply R codes.

Coding is 10% intelligence and 90% endurance.



Turn every error message into a learning opportunity

Four modules

1. **Hands-on workshops**
2. **Online tutorials: https://curiositybits.cc/tutorial/**
3. **Peer-to-peer learning:** find a class partner. You two will discuss any error and difficulty that either of you has encountered. You will learn to debug code collaboratively
4. **In-class discussions (on topics related to the societal impacts of data and algorithms)**

Four modules

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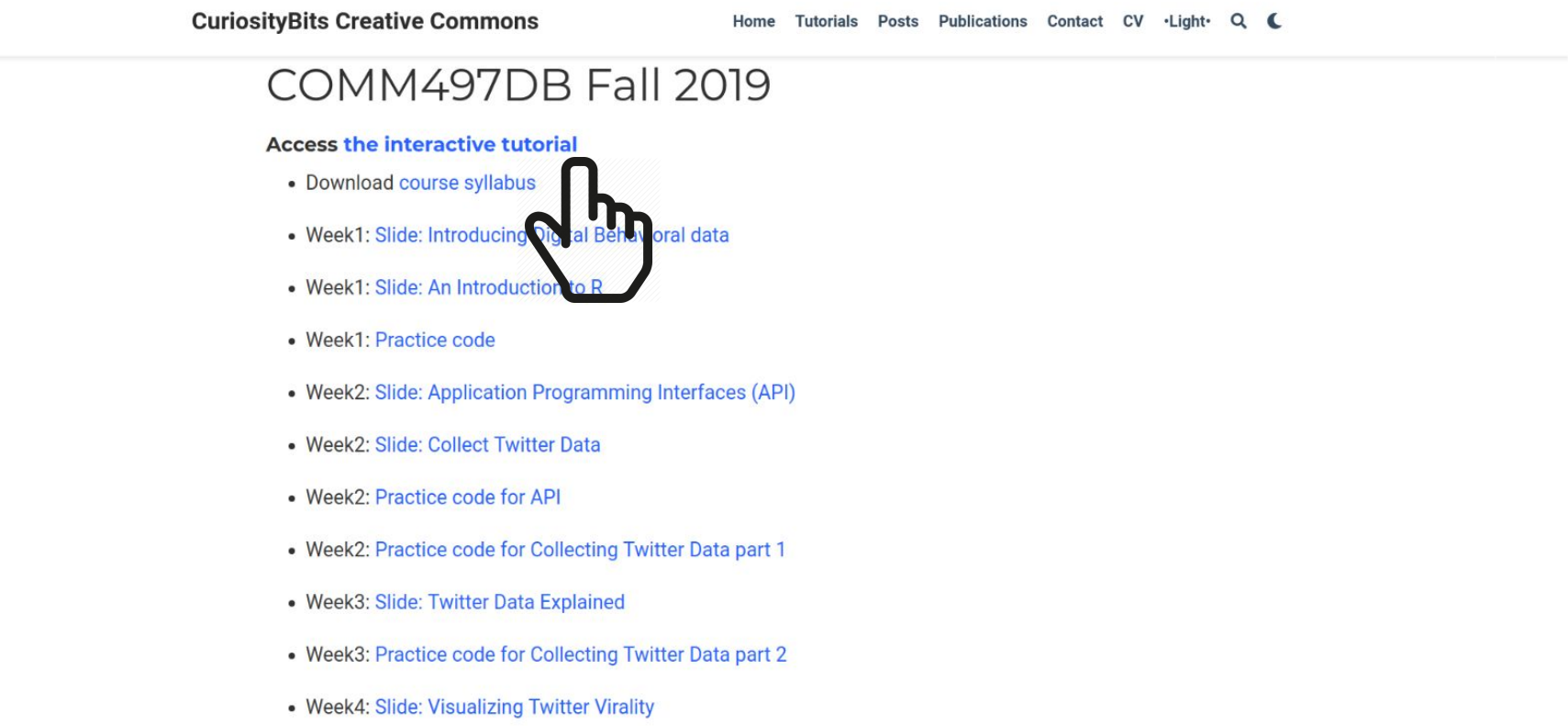


An interactive tutorial for COMM 497DB

Weiai Wayne Xu

Libraries/packages

Data frames

Connecting to the Twitter API

Collect tweets by keywords/hashtags

Collect Twitter user timeline

Collect Twitter user info

Make Wordclouds

Predict Ideology (in progress)

Start Over

Using R for Digital Behavior Analytics

Libraries/packages

What is a library/package? Think of R as an operating system (e.g., iOS, Windows) and a library/package as an app running on the system. Each library is designed to accomplish specific tasks. For example, the library *ggplot2*–which is a library we will use throughout the semester–is for visualizing data, and the library *rtweet* is used for collecting Twitter data.

Use **installed.packages()** to install libraries. Use **library()**, or **require()** to load an installed library.

Next, we will install a fun library called *cowsay*.

Code | Start Over | Run Code

```
1 installed.packages("cowsay") #make sure the library name is wrapped by quotation.
2
3 library(cowsay) #load the library, alternatively, you can use require(cowsay)
```

This tutorial is hosted on a cloud server, running the above code won't have an effect on your local machine. Put the code in RStudio and run it on your local machine. Keep an eye on what is happening in the Console.

Let's have some fun with *cowsay*.

Run the code and see what happens.

Code | Start Over | Run Code

```
1 library(cowsay)
2 say("Hello! Welcome to COMM 497DB")
3
```

https://curiositybits.cc/tutorial/

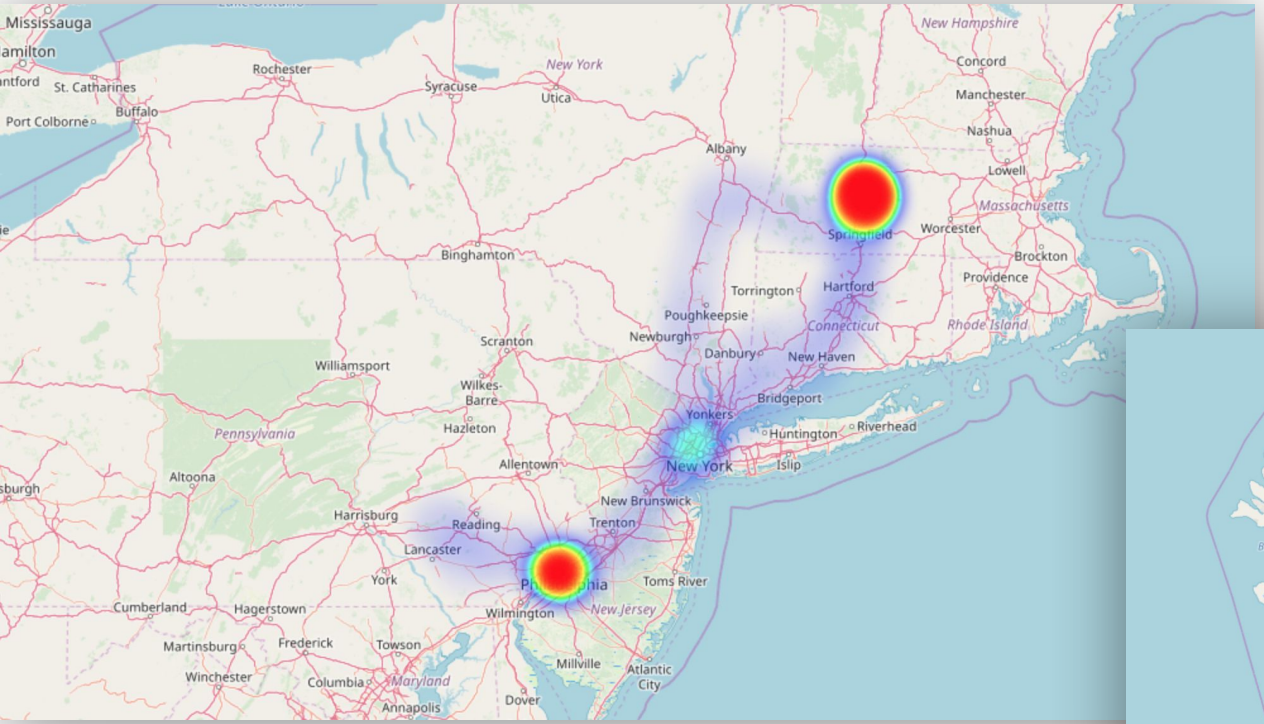
Evaluation

1. Preparation and debugging (15%)
2. Assignments (35%)
3. Final project (40%): an example https://carl-macdonald.shinyapps.io/2016RussianMeddlingABiggerPicture/
4. Participation (10%)

Digital behavioral data?

Take a look at your phone or laptop, what sort of digital behavioral data does your device have on you?

My digital footprint = my actual footprint



Digital footprints

At any second, a massive amount of user-generated content is being produced and recorded. They constitute our digital footprints that reveal how we think and live.

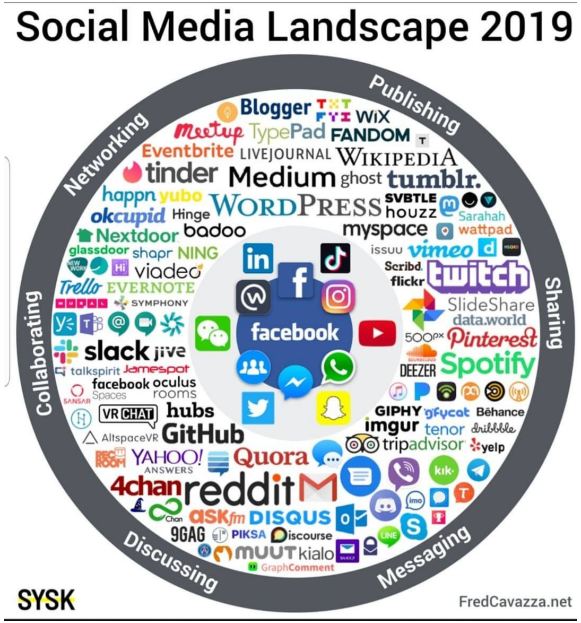
Three Vs

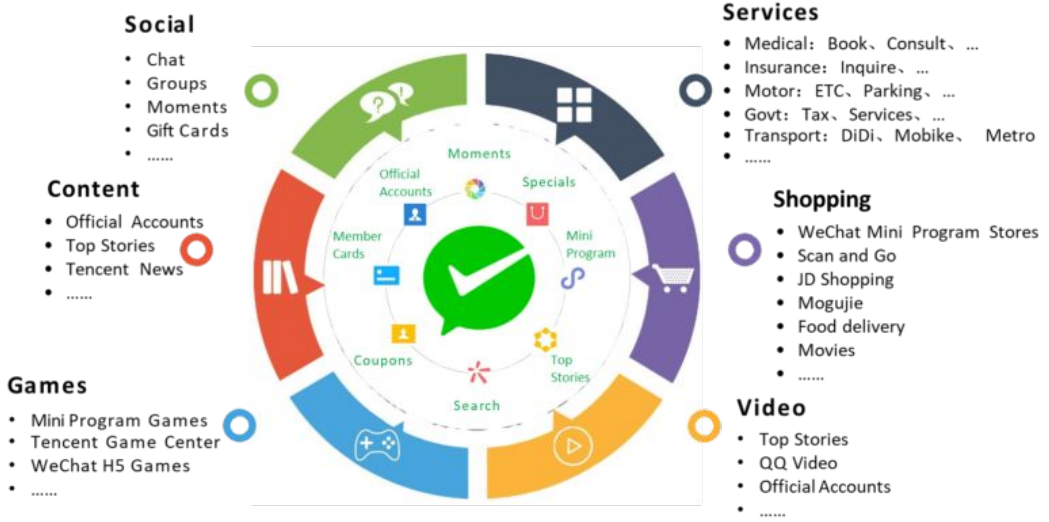
Volume, velocity, and variety

The first ever tweet

http://www.internetlivestats.com/one-second/#tweets-band

We will primarily rely on public Twitter data, but Twitter constitutes only a small fraction of the giant global social media landscape





~~Three Vs~~ Four Vs

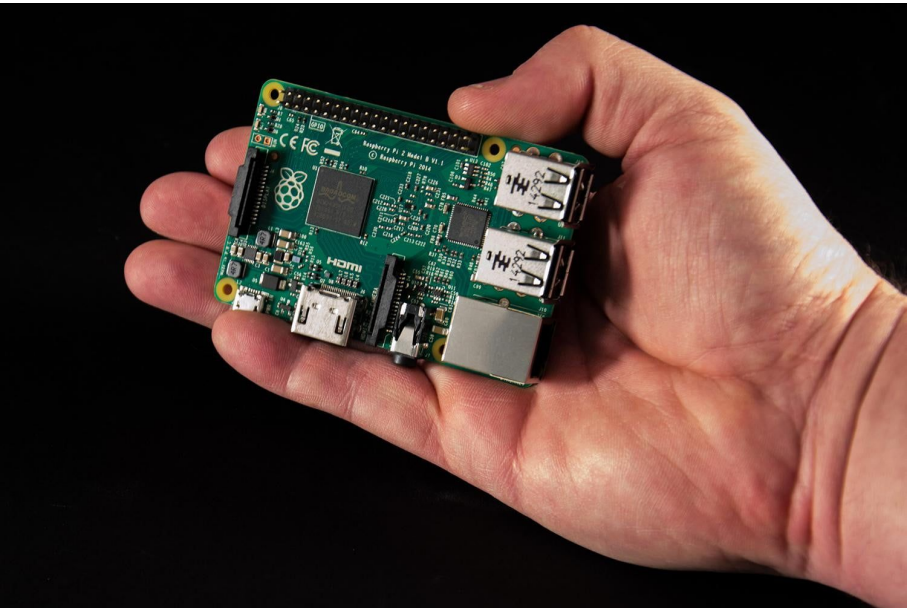
Volume, velocity, and variety + value

Business value: data vendors, business analytics

Political value: Cambridge Analytica, facial recognition for social control

Social value: predictive policing, data-driven humanitarian aids, smart city

More powerful and affordable computing resources



Micro-computers such as Raspberry Pi<$100

Cloud computing

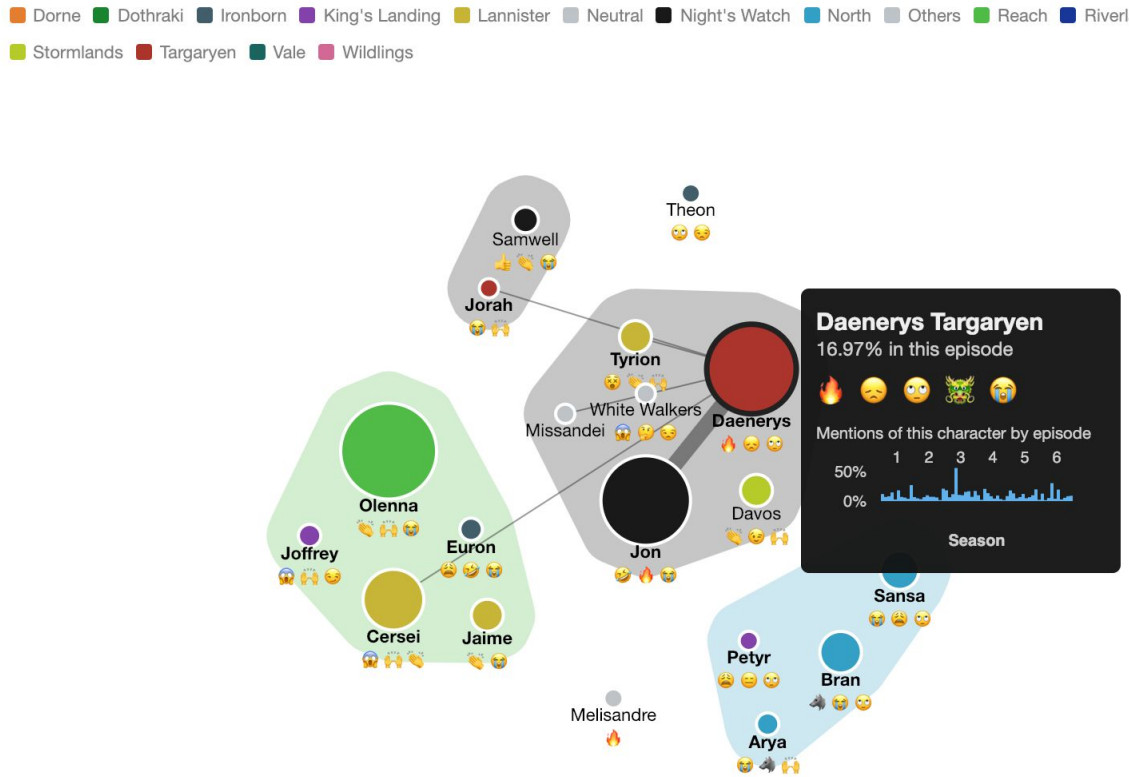
Digital footprints

Three examples

- How every #GameOfThrones episode has been discussed on Twitter
- How Latinos in the U.S. connect with Latin America on Twitter
- 3 Million Russian Troll Tweets
- .....

#GameOfThrones

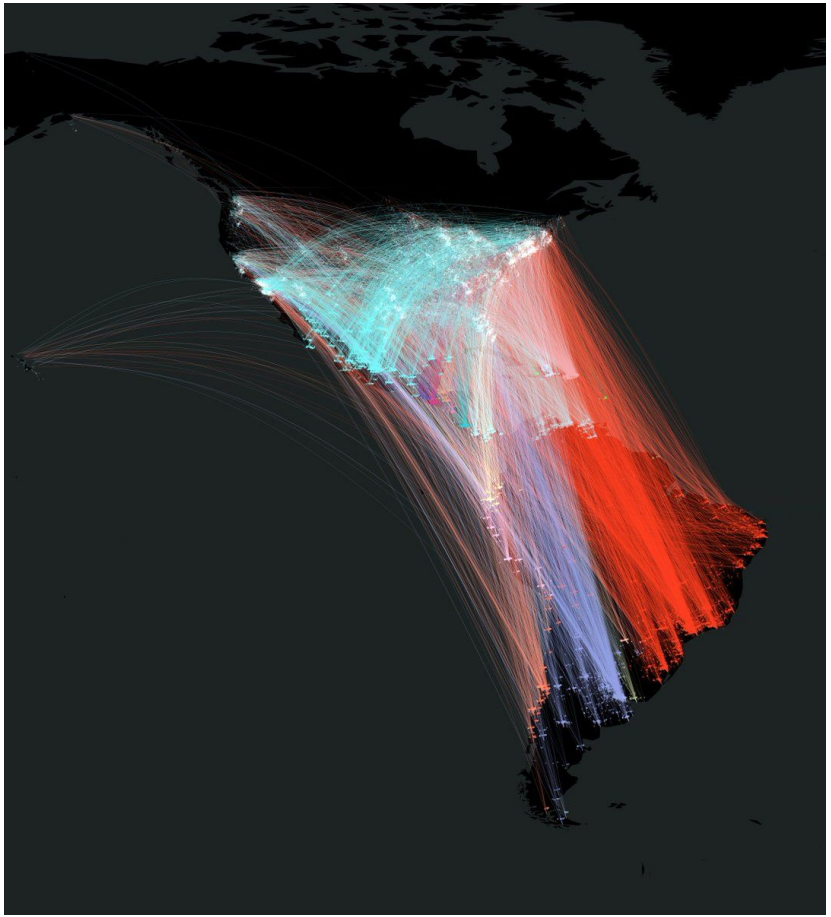
Q: How do characters relate to each other?



https://interactive.twitter.com/game-of-thrones/#?episode=63

Latinos on Twitter

Q: How do Twitter users relate to each other?

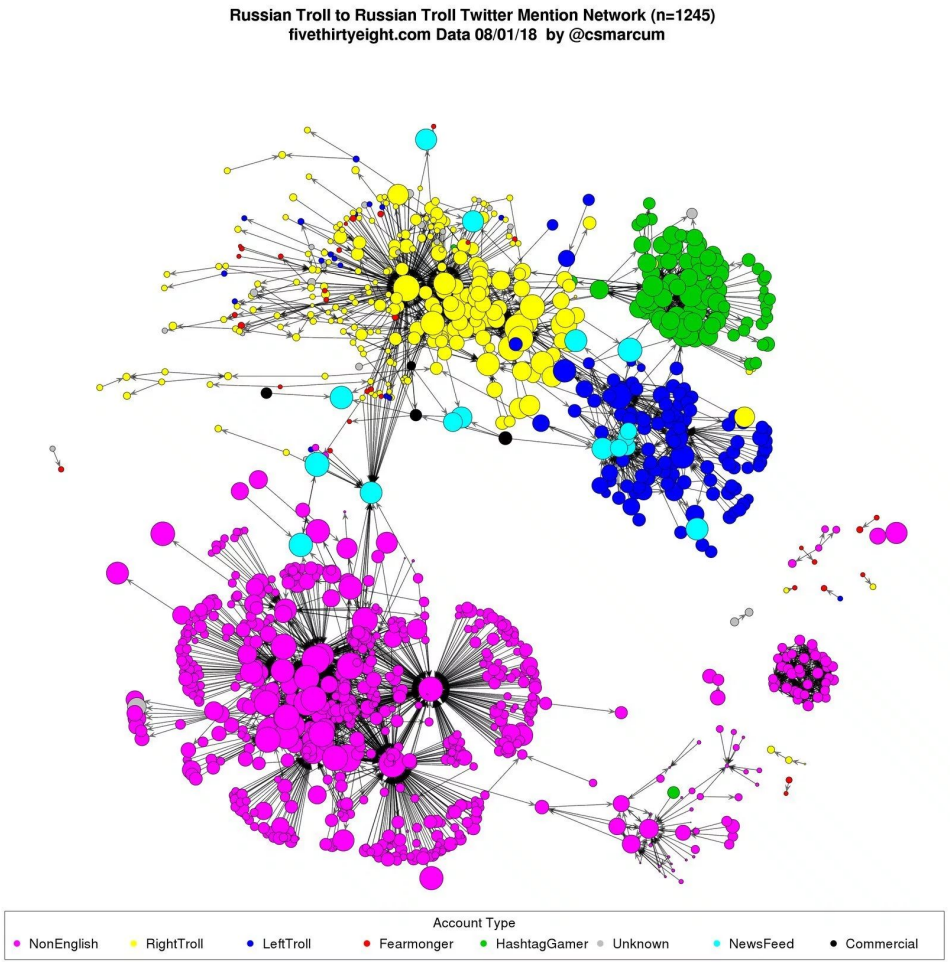


https://twitter.com/TwitterAlas/status/712058816041345024

Russian Trolls

Q: How do Twitter users relate to each other?

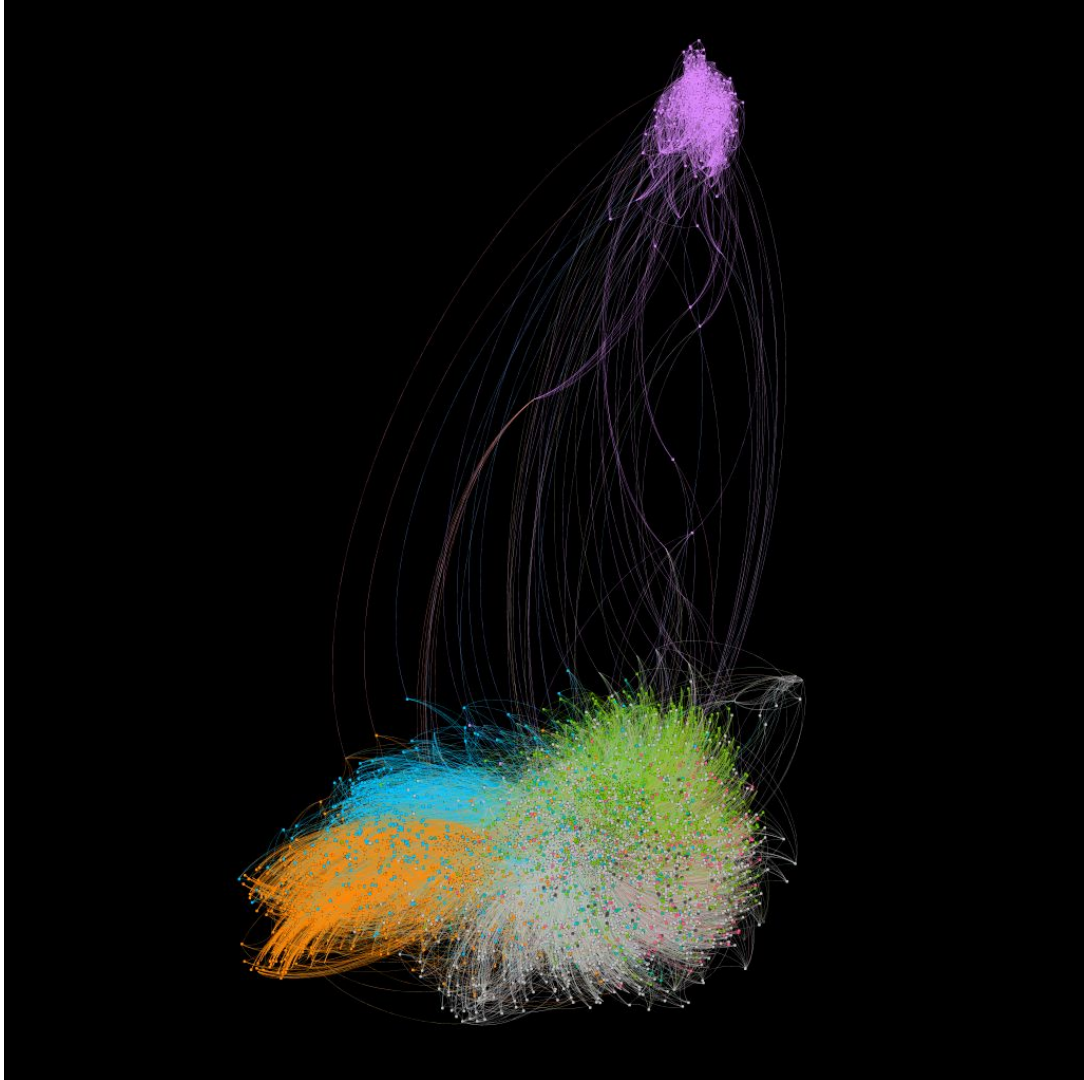
Q: What sort of patterns can you identify from this graph?



https://fivethirtyeight.com/features/what-you-found-in-3-million-russian-troll-tweets/

An example from my own project

Q: What sort of questions would you ask about this graph?



Two types of data

Content data: what we can see

The *what*

What's in digital behavioral data

Metadata: The data of data

The *where, when, who, how, and etc.*

Why metadata matters

NSA triples metadata collection numbers, sucking up over 500 million call records in 2017

Devin Coldewey @techcrunch / 9 months ago

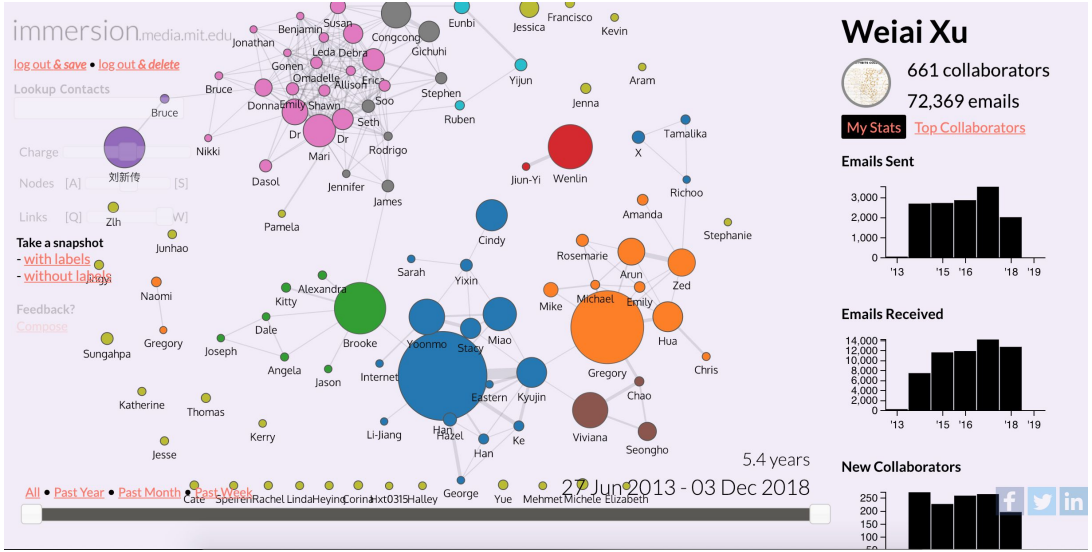
Comment

NSA is *not* tapping your phone calls. It is *not* collecting content data. But it does collect metadata, that is, which numbers were called and when, the duration of the call and so on.

Metadata can reveal a lot about our lives!

Metadata from your digital life
Try Immersion (immersion.media.mit.edu)

Q: What metadata do you think Immersion will collect from your Gmail account?



Try Immersion

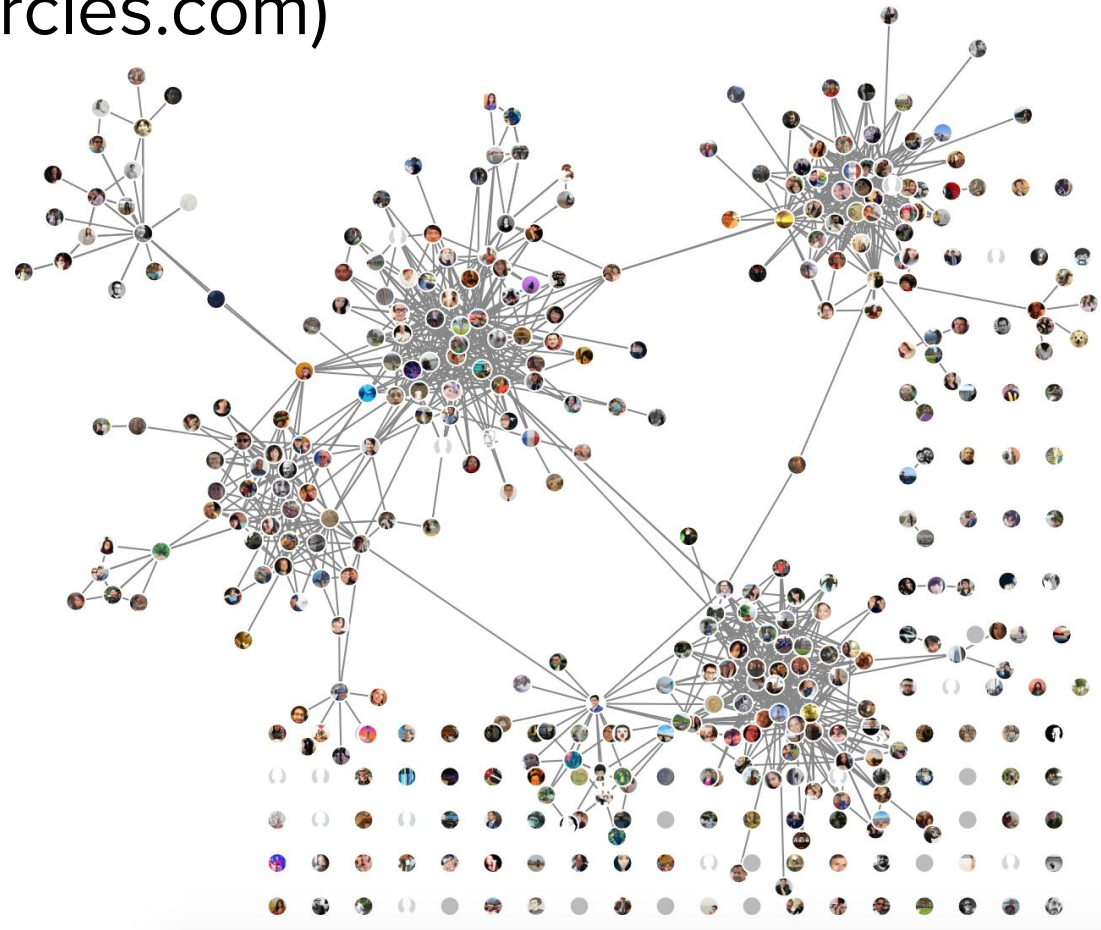
3. What information from my inbox does Immersion collect?

To create your visualization Immersion collects only the metadata (*From*, *To*, *Cc* and *Timestamp*) of emails. Immersion does not access the subject or body of any of your emails. Due to the architecture of the underlying protocol, technically Immersion could access any part of your email, but we chose not to. Once again, this is true of all email clients. Privacy, and users' ownership of their data, are very important to us, so we've designed Immersion to prioritize the privacy of users and their ability to control their own data.

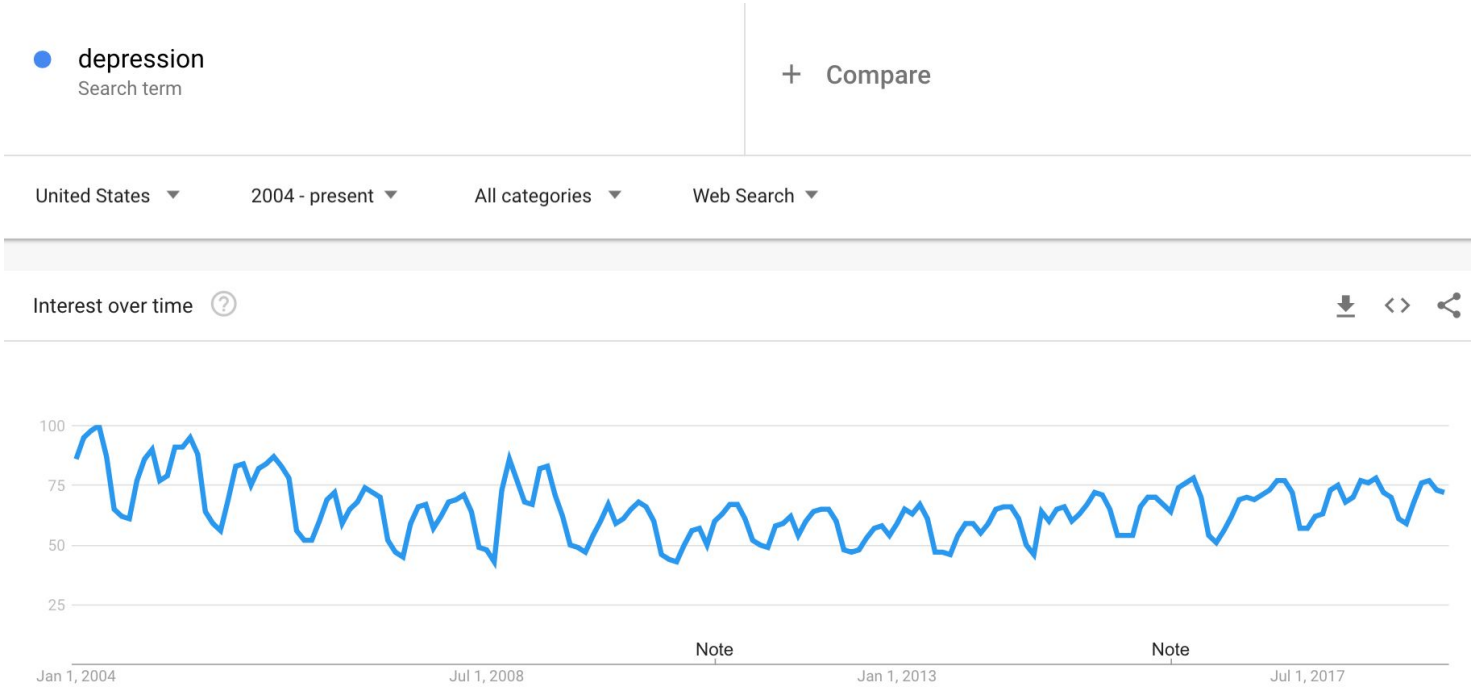
Q: Are you comfortable with Immersion's data collection?

Try Lost Circles (lostcircles.com)

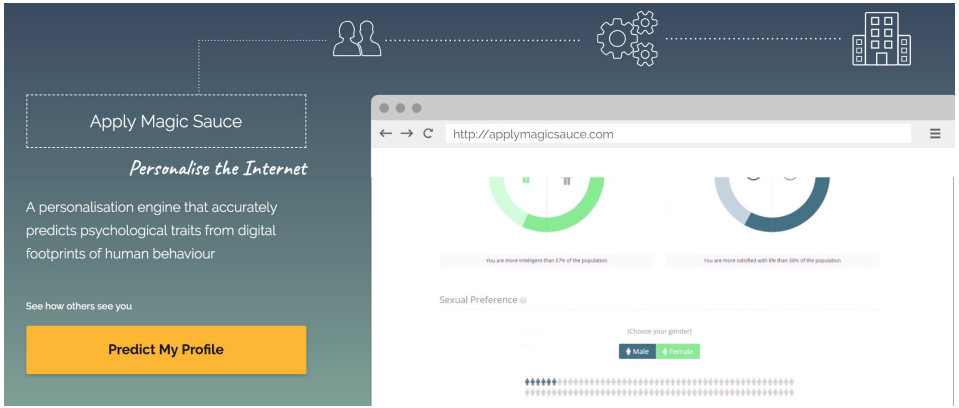
Q: This is my Facebook friendship network. What does the graph say about my life?

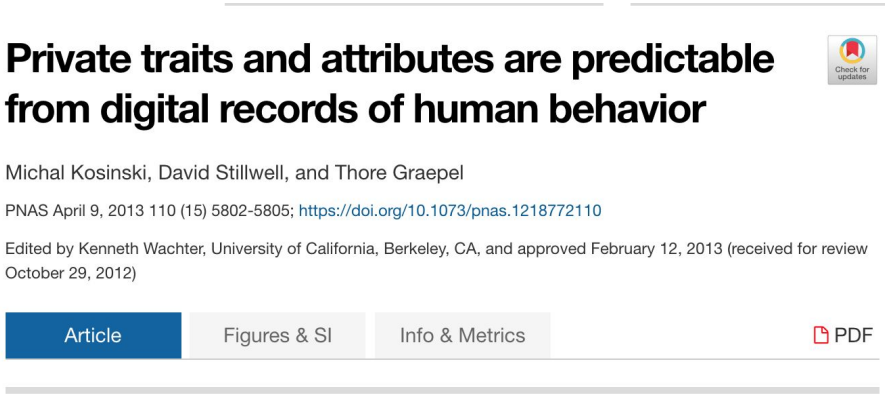


Try Google Trends (trends.google.com)



Try Magic Sauce (https://applymagicsauce.com/)





Private traits and attributes are predictable from digital records of human behavior

Michal Kosinski, David Stillwell, and Thore Graepel

PNAS April 9, 2013 110 (15) 5802-5805; https://doi.org/10.1073/pnas.1218772110

Edited by Kenneth Wachter, University of California, Berkeley, CA, and approved February 12, 2013 (received for review October 29, 2012)

Article | Figures & SI | Info & Metrics | PDF

Remember the Cambridge Analytic scandal? This app called *Magic Sauce*, developed by Cambridge University's Psychometrics Centre, is said to have laid the groundwork for Cambridge Analytic's use of Facebook data for political campaign.

Summarizing digital behavioral data

Based on your experience with the above visualization apps, what do you have to say about the three Vs about big data?

Volume*, *velocity*, and *variety + value

We should be concerned about

veracity, validity, etc

Toolkits for exploring digital behavioral data

According to thinkdigitalfirst.com

10 Free Twitter Analytics Tools For 2018

- Hootsuite. Hootsuite has been my favourite Social Media scheduling **tool** for a number of years. ...
- Buffer. Similar to Hootsuite in its ability to automate content, Buffer is a **great** option when looking at the **best** times to post your content on **Twitter**. ...
- Twitonomy. ...
- Socialert. ...
- Klear. ...
- Klout. ...
- ManageFlitter. ...
- Tweepi.

More items... • Jan 3, 2018

10 Free Twitter Analytics Tools For 2018 | Think Digital First
https://www.thinkdigitalfirst.com/2018/01/03/10-free-twitter-analytics-tools-2018/

There are plenty of web-based Twitter Analytics tools. The list keeps growing, underlying a market demand for data analytics.

See a list:

https://www.thinkdigitalfirst.com/2018/01/03/10-free-twitter-analytics-tools-2018/

Why we are NOT using them?

1. They are too basic;
2. They are limited to analyzing a small number of accounts; not designed for the big data era
3. They are NOT free;
4. They are foolproof tools, so using them won’t help your analytical thinking;
5. The algorithm used by the web-based analytics tools (if any) is opaque. You don’t know what sauce they use in cooking results.

There are more advanced data analytics softwares

About Our Text Data Science Software

Collaborative text analytics and Gnip PowerTrack Twitter data

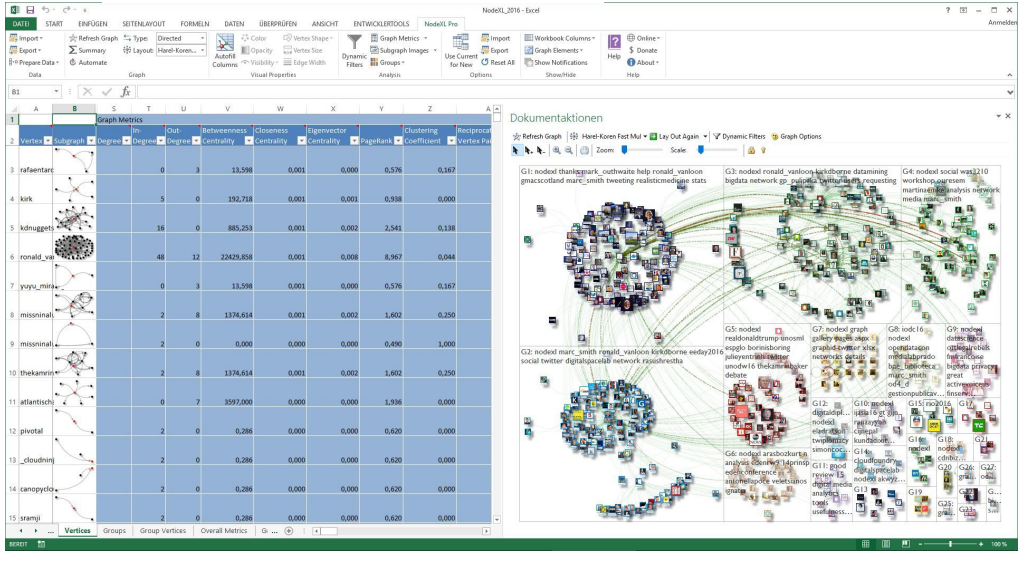
With dozens of powerful text analytics, data science, human coding, and machine-learning features, including instant access to the **Gnip PowerTrack 2.0 for Twitter** and the **free Twitter Search API**, DiscoverText provides cloud-based software tools to quickly evaluate large amounts of text, survey, and Twitter data.

Start a Free Trial

NODE XL

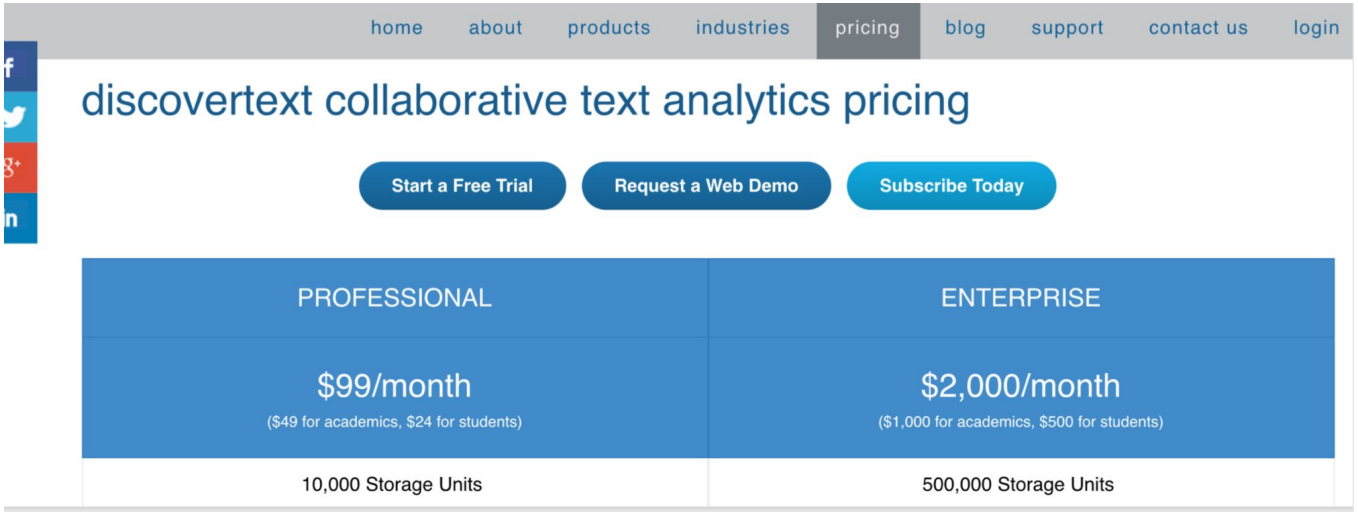
A project from the socialmedia RESEARCH FOUNDATION

netlytic



But, we won't use them either…

1. They provide advanced analytics;
2. But they require expensive software licenses or subscription
3. Most algorithms that drive the software are already open-source.



Why using R

1. Free, open-source
2. Versatile and powerful; the latest algorithms are always implemented first in R and/or Python (another programming language used in data science)
3. It is an ecosystem and a community
4. The de facto language of data science, along with Python
5. R and Python are like PC and Mac. Most data scientists use both but prefer one over another.

Why open-source coding can be fun

Coding is a lot like assembling furnitures, except you don't to purchase parts from IKEA. All parts are already made freely available through open-source platforms.

You can find a lot of open-source R codes on Github (https://github.com) and RPubs (https://rpubs.com). You can copy and adapt the codes to your own projects. For example, you can view the codes that produce the Russian trolls visualization here.

Install R in your machine

Download and install R:
https://www.r-project.org/
Download and install RStudio:
https://www.rstudio.com/

Task for Week 1

Week 1

Complete the ***Libraries/packages tutorial*** (https://curiositybits.shinyapps.io/R_social_data_analytics/#section-librariespackages) before the class on **9/5**.

Complete the ***Data frames*** (https://curiositybits.shinyapps.io/R_social_data_analytics/#section-data-frames) and ***Connecting to the Twitter API*** (https://curiositybits.shinyapps.io/R_social_data_analytics/#section-connecting-to-the-twitter-api) tutorials before the class on **9/10**

Don't forget to submit your completion reports (submission link is now live on Moodle)