rtweet

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Introduction

Presentation and code composed in

```
## [1] "R version 4.2.0 (2022-04-22 ucrt)"
```

Packages used in addition to base `R`:

- `rtweet`: Core package
- `pacman`: Package manager to install/load libraries
- `httpuv`: Web-scraping capabilities (just needs to be installed)

Resources

Package Documentation

- R OpenSci
- CRAN
- RDocumentation
- Github

Usage Tutorials

- Slides by Author of `rtweet`
- Searching Twitter with rtweet

Twitter

- Developer Platform API Reference Index
- Guides & Reference for Developer Platform

Vignettes

- Intro to rtweet
  - `vignette("rtweet")`
- Access tokens and authentication
  - `vignette("auth", package = "rtweet")`
- Live streaming tweets
  - `vignette("stream", package = "rtweet")`
- Troubleshooting common problems
  - `vignette("FAQ", package = "rtweet")`

> ***Be sure to check which version of documention being used***

Basic Arguments

`q`

- Character string used to define search parameters
- Can use `" "` to enclose string
- Also recognizes boolean `AND` and `OR` operators; Search exact phrases with double-quotes
- *Ex:*
  - `q = "data science"` tweets containing both "data" and "science" in any order
  - `q = "data OR science"` tweets containing "data" or "science"
  - `q = ' "data science" '` tweets containing the exact phrase "data science"

`n`

- Number of tweets to return
- Low values suggested for sandbox development)
- Defaults at `n = 100` for `search_tweets()`

`type`

- Type of tweets to include (defaults to `"recent"`)
- Can also include `"mixed"` or `"popular"`

`include_rts`

- Takes `TRUE`/`FALSE` value (defaults to `T`)

`geo_code`

- Define geographical area for searches
- Template following = sign is "*latitude, longitude, radius*"
- *Ex:*
  - `geocode = "44.043905,-123.07494,0.5mi"` would be an approximation for the Twittersphere of the University of Oregon campus

`max_id`

- Returns results with ID less than (or equal to) specified value
- *i.e.* Additional layer of filtering results by time

`parse`

- Logical indicator to determine whether to return parsed data.frame
- Setting `parse = TRUE` saves time/effort of manually navigating return lists
- Setting `parse = FALSE` ensures the maximum amount of possible information is returned

`token`

- Set equal to `NULL` by default
- Allows specification of user app; often stored as environmental variable
- See `?tokens` and `vignettes("auth","rtweet")` for more

`retryonratelimit`

- Takes `TRUE`/`FALSE` value
- Automatically pauses search when results reach cap for time interval and resumes search at interval refresh

`verbose`

- Takes `TRUE`/`FALSE` value (defaults to `T`)
- Defines if to include output processing/retrieval messages (i.e. estimations for time between searches)

Other Useful Arguments

`timeout`

- Value in seconds to define when to stop searching

`lang/langs()`

- Argument to define language parameters
  - `lang = en` for English
- Also can used to call database of languages from the Library of Congress

`lookup_coords()`

- Gets latitude/longitude coordinates for a specified location
- Able to be used as an independent function

`next_cursor`

- Goes to next pages of results/items when manually selecting next would otherwise be required

`media`

- Specify file path for media to be included in tweets, posts, and etc.

What is `rtweet`?

A technical definition:

> "An implementation of calls designed to collect and organize Twitter data *via Twitter's REST and stream Application Program Interfaces (API)"*

- Recall that **APIs** are sets of protocols that govern interactions between sites and users
- Web browsers *render content* while APIs *manage & organize data*

Simply put,

> `rtweet` allows use to retrieve real-time information from all publicly available data in the Twitterverse and provides options for interacting with Twitter via an authorized account

A Quick Lesson in Twitter

Defining and redefining some words according to the Twitter Glossary of Terms

- **Twitterverse**: the collective reference to all things relating to Twitter
- **Retweet**:
  - *(n.)* A non-original tweet that was shared on your timeline;
  - *(v.)* Sharing another account's Tweet to followers; a *tweet* is the post itself or the act of posting
- **Likes**: previously referred to as *favorites*, changed as of 2015; terms are synonymous
- **Hashtag**: text following a # symbol; denotes keywords, topics, and/or trends associated
- **Timeline**: a real-time stream of Tweets; your home timeline displays all tweets those you follow
- **Trend**: a topic/hashtag algorithmically determined by Twitter to be "popular" at the moment
- **Friends**: Accounts/users that a specific user follows

Why use `rtweet`?

Contains greater functionality compared to other R packages for accessing and interacting with Twitter's APIs

Other similar packages include:

- `twitteR`
- `streamR`
- `RTwitterAPI`

Much of the functionality of alternative packages are outdated, so plan to use `rtweet` whenever interacting with Twitter through `R`

`rtweet` vs other Packages

Task	rtweet	twitteR	streamR	RTwitterAPI
Available on CRAN	✅	✅	✅	❌
Updated since 2016	✅	❌	✅	❌
Non-'developer' access	✅	❌	❌	❌
Extended tweets (280 chars)	✅	❌	✅	❌
Parses JSON data	✅	✅	✅	❌
Converts to data frames	✅	✅	✅	❌
Automated pagination	✅	❌	❌	❌
Search tweets	✅	✅	❌	❓
Search users	✅	❌	❌	❓
Stream sample	✅	❌	✅	❌
Stream keywords	✅	❌	✅	❌
Stream users	✅	❌	✅	❌
Get friends	✅	✅	❌	✅
Get timelines	✅	✅	❌	❓
Get mentions	✅	✅	❌	❓
Get favorites	✅	✅	❌	❓
Get trends	✅	✅	❌	❓
Get list members	✅	❌	❌	❓
Get list memberships	✅	❌	❌	❓

Terms of Use

Use in accordance with Twitter's developer terms and conditions of use

Likely won't matter in the classroom, but would be important to consider if working with or sharing large amounts of data, using in a professional environment, using as a developer, or planning to program automation

Examples of term violations include:

- Use, storage, and/or sharing of sensitive information
- Certain unauthorized redistribution of content
- Creating spam or certain automated interactions with Twitter
- Surveillance or other forms of privacy invasion

User Authentication

In order to interact with Twitter APIs via `rtweet`, you need to first become an authenticated user. **You will need to have a Twitter account**. If you do not have an account, you can sign up for one here

There are two methods to become an authorized user

1. Authentication through package-app called `rstats2twitter`
2. Creating your own application (done via the Twitter Developer Portal)

> Authentication must happen prior to being able to run any package commands

Functionality of Authentication Methods Compared

Task	rstats2twitter	user-app
Work interactively	✅	✅
Search/lookup tweets/users	✅	✅
Get friends/followers	✅	✅
Get timelines/favorites	✅	✅
Get lists/collections	✅	✅
Post tweets	❌	✅
Run package tests	❌	✅
Use Bearer token	❌	✅
Read/Write Direct Messages	❌	✅

Read more about *current* Twitter API interaction limitations and access levels here

The Setup

First, **Install packages**

```
pacman::p_load(rtweet) # Install and load rtweet
```

If you try to run package functions prior to receiving authentication

```
search_tweets("#rstats", n = 10, include_rts = FALSE)
```

Your `R` session will paused after running the initial command with the following message:

```
# Requesting token on behalf of user...
# Waiting for authentication in browser...
# Press Esc/Ctrl + C to abort
```

You should be automatically redirected to Twitter with a request to authorize the `rstats2twitter` app

Congratulations! You are now set up to use `rtweet`

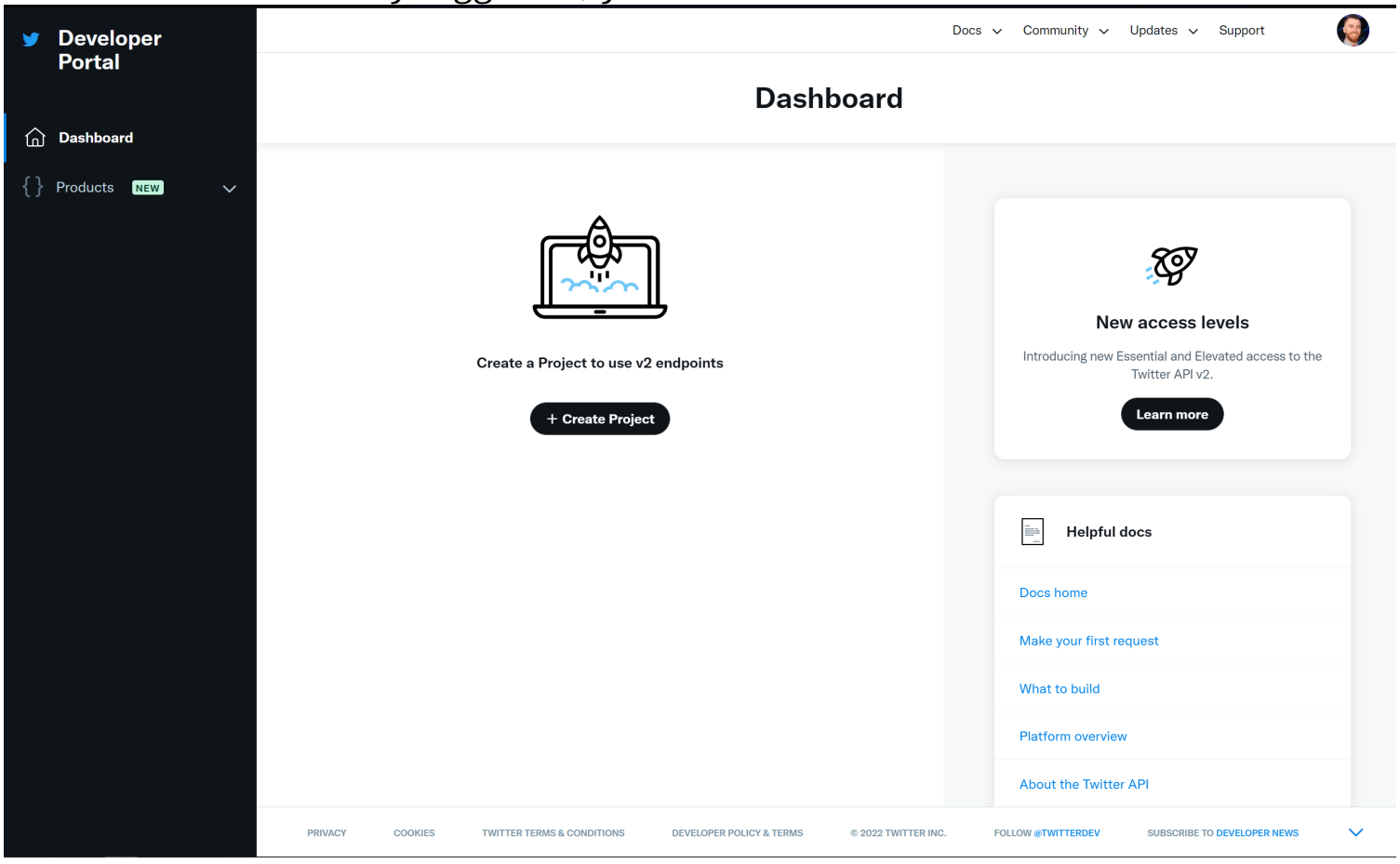
Creating a User App

Creating a user-app to authenticate as a user requires a few additional setup steps, but provides better functionality and less oversight as a script

The ***Twitter Developer Portal*** is where you can configure apps for interacting with Twitter's APIs

- https://developer.twitter.com/apps
- *Note:* Can only create three (3) user applications per 24-hour period per account

Once verified and fully logged in, you should arrive at the dashboard



Click on <Create Project> and fill the required text-fields

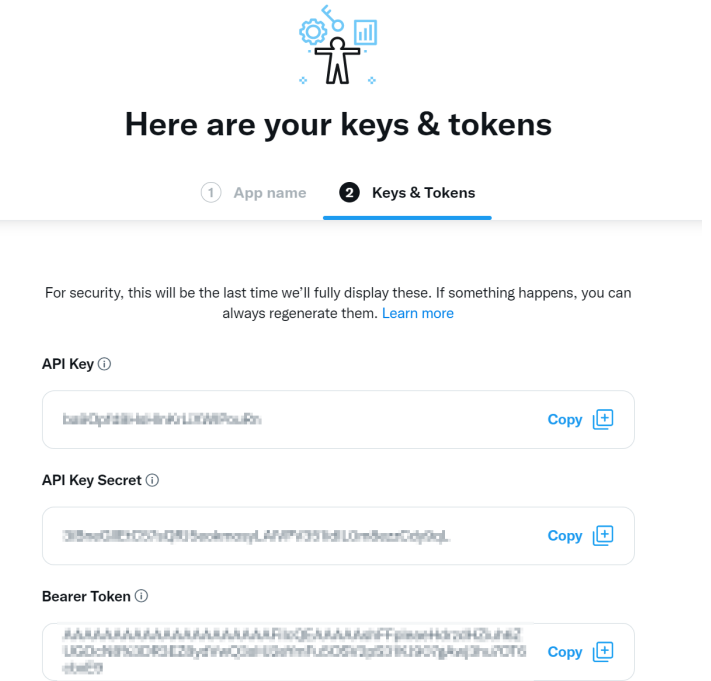
- Assign a name, describe intent for use, provide project description

You will be automatically taken to a section to create an application under your new project

- Could also open existing project from Twitter Developer Dashboard home

Select <Add App> from desired project

- Give your app a unique name
  - *Suggested:* `{{initials}}_twitter_app`
  - Keep note of the keys

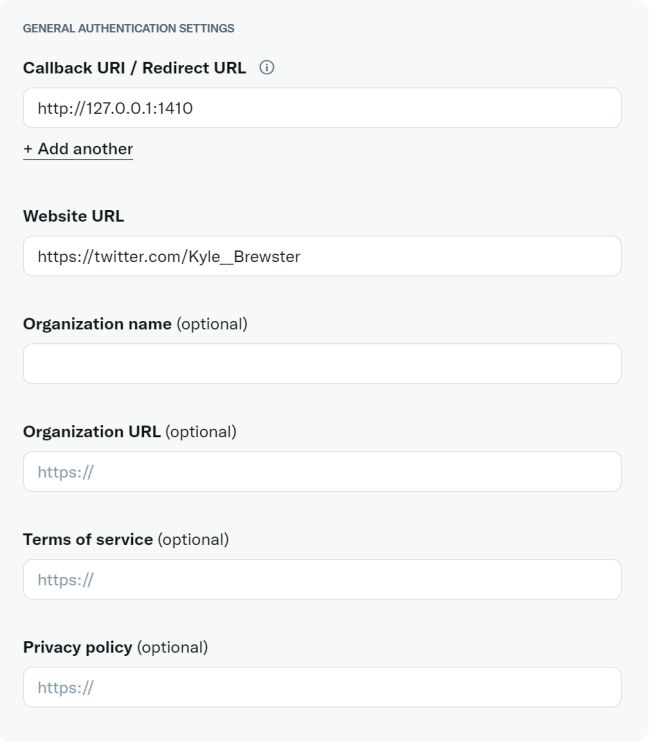


> This will be the last time you are able to see *all* of this information (unless you regenerate new keys or create a new app)

After creating the app, open the app settings and select `<Set up>` under ***'User authentication settings'***

- Will be given option to select `OAuth 1.0a` and `OAuth 2.0`
- Select `Read and write and Direct message` to enable full package functionality

- For now we only care about two fields
  - `Website URL`
    - https://twitter.com/{{your_sc
  - `Callback URL`
    - http://127.0.0.1:1410



> The callback URL ***MUST BE EXACT*** for your user-app to work

Back to the Console

Store the name of app as `app_name` in `R` script

```
# Assigning app name to variable
app_name = "kb_rtweet_demo"
```

Assign API Key and Key Secret

```
# Assigning keys to variables
consumer_key = "your-key-here"
consumer_secret = "your-key-here"
```

Then pass the variables to `create_token()` to create your own token

```
# Creating token
token = create_token(app_name, consumer_key, consumer_secret)
```

You can save yourself some future effort by storing your token as an environmental variable

Otherwise will need to be manually specified for each function if intended to authenticate via user-app since `token = NULL` by default

```
# Save token to home directory
path_to_token <- file.path(path.expand("~"), ".twitter_token.rds")
saveRDS(token, path_to_token)
# Create env variable TWITTER_PAT (with path to saved token)
env_var <- paste0("TWITTER_PAT=", path_to_token)
# save as .Renviron file (or append if the file already exists)
cat(env_var, file = file.path(path.expand("~"), ".Renviron"),
  fill = TRUE, append = TRUE)
```

Since the `.Renviron` is typically processed at session start up, refresh again

```
# Refresh .Renviron variables
readRenviron("~/.Renviron")
```

Congratulations (again)! You are now ready to use `rtweet` with a user-app

See R Workshop Presentation from package creator for more details

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Functions & Functionality

`search_tweets()`

- Search for tweets containing a specific hashtag up to a defined value

```
# Searches for up to 40 tweets (excluding retweets) with
# the hashtag 'rstats'
search_tweets("#rstats", n = 40, include_rts = FALSE)
```

`search_users()`

- Basic search for users given specified criteria
- Results limited to 1,000 by Twitter API

```
# Searches up to 20 users with the hashtag 'rstats' in their bio
search_users("#rstats", n = 20)
```

`stream_tweets()`

- Streams public statues to a file
- Will occupy `R` session until specified time has elapsed
  - Streaming itself takes little memory if running in a second `R` session, but the parsing may result in computational strain
  - *Solution:* Set `parse = FALSE` to deal with later in workflow
- `timeout = 30` by default, to stream indefinitely set to `timeout = Inf`
- Set `append = TRUE` to attach stream to end `file_name`
  - Setting to `FALSE` will overwrite `file_name`

```
# Sample randomly from all tweets, set to be parsed later
stream_tweets("",
              file_name = "all_tweets_stream.json",
              parse = FALSE)

# Stream tweets in the US mentioning 'election' for 5 minutes,
# and attach results to the end of an existing file
stream_tweets("election",
              timeout = 300,
              location = lookup_coords("usa"),
              file_name = "usa.json",
              append = TRUE)
```

`get_friends()` and `get_followers()`

- Generate list of friends/followers for a specified account

```
# Looking at who RStudio follows
get_friends("@rstudio")

# and 100 users who follow RStudio
get_followers("@rstudio", n=100)
```

`get_favorites()`

- Obtain lists of likes (a.k.a. favorites) for an account

```
# Gets 10 most recently liked tweets by RStudio
get_favorites("rstudio", n = 10)
```

`get_timeline()`

- Returns timeline of a user (i.e. what they have tweeted)

```
# Get 100 most recent tweets from RStudio
get_timeline("@rstudio", n = 100)
```

Account Actions via the R Console

Updates have allowed `rstats2twitter` authenticated users to utilize additional functionality with the need to create a user-app with a Twitter Developer account

- Some online documentation may be incorrect/outdated

`post_tweet()`

- Posts status update to user's Twitter account

```
# Posting tweet to account
post_tweet(status = "Messing around in R #rtweet #rstudio")
```

`direct_messages()`

- View message inbox up to a specified number of messages
- Can also use `direct_messages_sent` and `direct_messages_received` for filtering messages

```
# Obtain last 50 messages for account
direct_messages(n=50)

# Messages recived since the posting of a specific tweet
direct_messages_received(
   n=50,
   max_id = last_status_id) ## include actual tweet ID number
```

`post_message()`

- Send a direct message (DM) to a specified recipient

```
# Setting path for media attachment
tmp = "./images/msg_img.gif"

post_message(text  = "Here's a gif to brighten your day -past Kyle",
             user  = "Kyle__Brewster",
             media = tmp)
```

Significane for Economics?

On average:

- 200 billion tweets shared in a year
  - 500 million tweets every day
    - 350,000 tweets per minute
      - 6,000 tweets per second
- Well over 1 million tweets have been posted since beginning this presentation

...That's a lot of data!

Final Thoughts

- Remember you must have an internet connection
  - Getting *all* followers for a popular account could take several days
- `rtweet` allows use to derive interesting analysis from the Twitterverse
  - Helpful in understanding public opinion
  - Tracking specific trends/hashtags
  - Script over swiping gives us more options and and improved *scalability*
- Any API data usage restrictions are likely set by Twitter, don't blame `R`
  - Keep usage in in mind if encountering issues
- Keep an eye out for platform changes and package updates (or new packages)
- Some existing guides and resources contain inaccurate information since
  - Broken hyperlinks
  - Updates to `R`, the Twitter APIs, and/or the Twitter platform will inevitably change functionality over time
- Use ethically - ***"With great powers, comes great responsibility"***