Analysing Twitter for Ubisoft

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8.1 Analysing the Relationship Between Friends and Followers for Twitter Users

8.1.1 Retrieve the posts from Twitter

relevant posts can be retrieved from twitter by utilising the `rtweet` package, packages can be loaded for use in **R** thusly:

The `rtweet` API will search for tweets that contain all the words of a query regardless of uppercase or lowercase usage [2].

In order to leverage the *Twitter* API it is necessary to use tokens provided through a *Twitter* developer account:

and hence all tweets containing a mention of *Ubisoft* can be returned and saved to disk as shown in listing 3:

8.2.2 Count of Followers and Friends

In order to identify the number of users that are contained in the *tweets* the `unique()` function can be used to return a vector of names which can then be passed as an index to the vector of counts as shown in listing 4, this provides that 81.7% of the tweets are by unique users.

```r
# Load Packages -----------------------------------------------------------
setwd("~/Dropbox/Notes/DataSci/Social_Web_Analytics/SWA-Project/scripts/")

if (require("pacman")) {
  library(pacman)
} else{
  install.packages("pacman")
  library(pacman)
}

pacman::p_load(xts, sp, gstat, ggplot2, rmarkdown, reshape2,
               ggmap, parallel, dplyr, plotly, tidyverse,
               reticulate, UsingR, Rmpfr, swirl, corrplot,
               gridExtra, mise, latex2exp, tree, rpart,
               lattice, coin, primes, epitools, maps, clipr,
               ggmap, twitteR, ROAuth, tm, rtweet, base64enc,
               httpuv, SnowballC, RColorBrewer, wordcloud,
               ggwordcloud, tidyverse, boot)
```

Listing 1: Load the Packages for ***R***

8.1.3 Summary Statistics

The average number of friends and followers from users who posted tweets mentioning *Ubisoft* can be returned using the `mean()` as shown in listing 5 this provides that on average each user has 586 friends and 63,620 followers.

8.1.4 Above Average Followers

Each user can be compared to the average number of followers, by using a logical operator on the vector (e.g. `y > ybar`), this will return an output of logical values. ***R*** will coerce logicals into 1/0 values meaning that the mean value will return the proportion of `TRUE` responses as shown in listing 6. This provides that 20.6% of the users identified have above average friend counts, while only 2.4% have an above average numbmer of followers.

```r
# Set up Tokens ===========================================================

options(RCurlOptions = list(
  verbose = FALSE,
  capath = system.file("CurlSSL", "cacert.pem", package = "RCurl"),
  ssl.verifypeer = FALSE
))

setup_twitter_oauth(
  consumer_key = "*************************",
  consumer_secret = "**************************************************",
  access_token = "**************************************************",
  access_secret = "*********************************************"
)

# rtweet ==================================================================
tk <-    rtweet::create_token(
  app = "SWA",
  consumer_key    = "*************************",
  consumer_secret = "**************************************************",
  access_token    = "**************************************************",
  access_secret   = "*********************************************",
  set_renv        = FALSE
```

Listing 2: Import the twitter tokens (redacted)

```r
 n <- 1000
 tweets.company <- search_tweets(q = 'ubisoft', n = n, token = tk,
                                 include_rts = FALSE)
 save(tweets.company[,], file = "resources/Download_1.Rdata")
```

Listing 3: Save the Tweets to the HDD as an `rdata` file

```
(users <- unique(tweets.company$name)) %>% length()
x <- tweets.company$followers_count[duplicated(tweets.company$name)]
y <- tweets.company$friends_count[duplicated(tweets.company$name)]

## > [1] 817
```

Listing 4: Return follower count of twitter posts

```
x<- rnorm(090)
y<- rnorm(090)
(xbar <- mean(x))
(ybar <- mean(y))

## > [1] 4295.195
## > [1] 435.9449
```

Listing 5: Determine the average number of friends and followers

```
(px_hat <- mean(x>xbar))
(py_hat <- mean(y>ybar))

## > [1] 0.0244798
## > [1] 0.2729498
```

Listing 6: Calculate the proportion of users with above average follower counts

8.1.5 Bootstrap confidence intervals

a.) Generate a bootsrap distribution

A bootstrap assumes that the population is an infinitely large repetition of the sample, a bootstrap of the follower counts can be produced by resampling with replacement/repetition and plotted using the `ggplot2` library as shown in listing 7 and figure 1.

This shows that the population follower counts is a non-normal skew-right distribution, which is expected because the number of friends is an integer value bound by zero [3].

```r
## Resample the Data
kt_pop <- sample(x, size = 10^6, replace = TRUE)

## Make the Population
bt_pop_data <- tibble("Followers" = bt_pop)
ggplot(data = bt_pop_data, aes(x = Followers)) +
  geom_histogram(aes(y = ..density..), fill = "lightblue", bins = 35,
   col = "pink") +
  geom_density(col = "violetred2") +
  scale_x_continuous(limits = c(1, 800)) +
  theme_bw() +
  labs(x = "Number of Followers", y = "Density",
       title = "Bootstrapped population of Follower Numbers")
```

Listing 7: Bootstrapping a population from the sample.

b.) Estimate a Confidence Interval for Follower Counts

- The normal t value bootstrap offers now advantage over using a t distribution (other than being illustrative of bootstrapping generally) [1, Section 4.1]

References

references

References

[1] Tim C. Hesterberg. “What Teachers Should Know About the Bootstrap: Resampling in the Undergraduate Statistics Curriculum”. In: *The American Statistician* 69.4 (Oct. 2015), pp. 371–386. ISSN: 0003-1305. DOI: 10.1080/00031305.2015.1089789. URL: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4784504/ (visited on 04/26/2020) (cit. on p. 5).

[2] Michael Kearney. *Get Tweets Data on Statuses Identified via Search Query. — Search_tweets*. en. Manual. 2019. URL: https://rtweet.info/reference/search_tweets.html (visited on 04/26/2020) (cit. on p. 1).

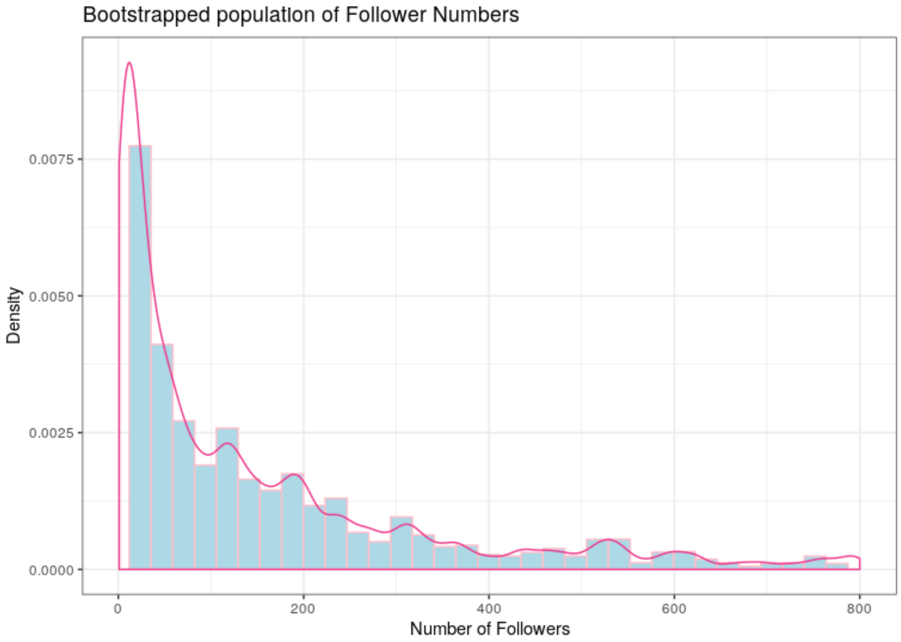

Figure 1: Histogram of the bootrapped population of follower counts

[3] NIST. *1.3.3.14.6. Histogram Interpretation: Skewed (Non-Normal) Right*. Oct. 2013. URL: https://www.itl.nist.gov/div898/handbook/eda/section3/histogr6.htm (visited on 04/26/2020) (cit. on p. 5).