

Social Network Analysis on Twitter Data about Airlines



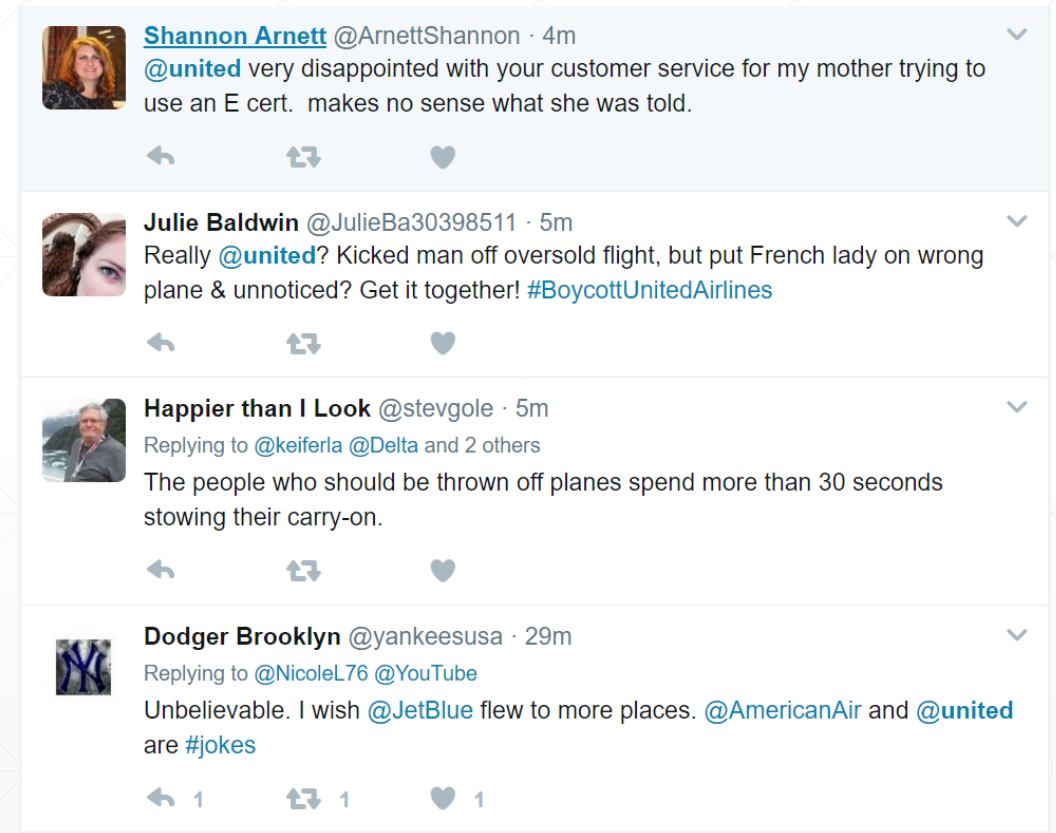
Group 6: Tejas Bhandari, Thoai Phan, Bhavin Shah, Jian Xu

Outline

- Overview
 - Data collection
 - Data cleaning
 - Texting mining
 - Sentiment analysis
 - Social network analysis
 - Conclusion
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Overview

- Applied social network analysis and sentiment analysis on Twitter data about major airlines in US
- Key findings:
 - Identified the overall sentiment and the key topics of tweets about each airline
 - Identified the most popular tweets and top influential users within each airline's network



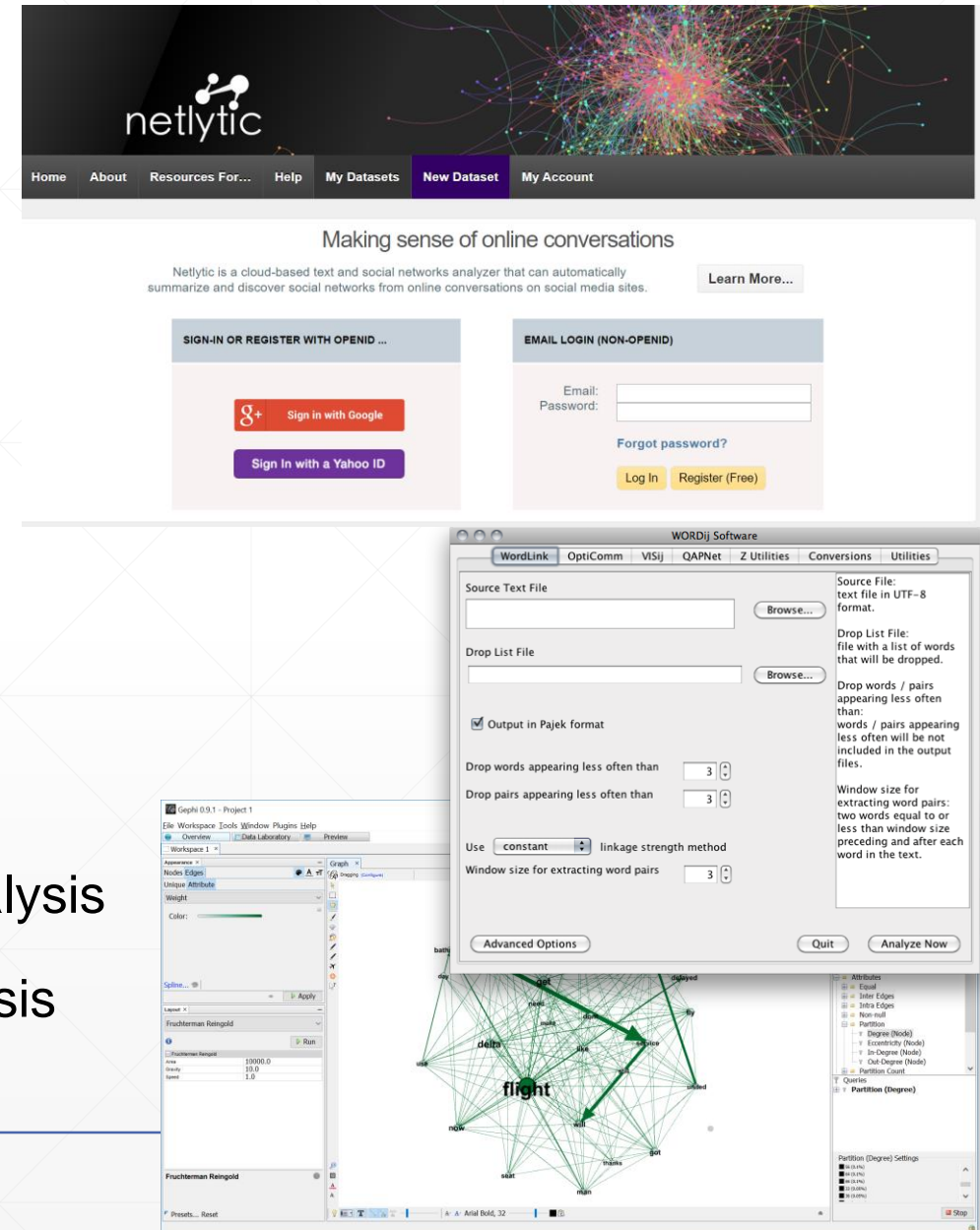
Techniques and Tools

Techniques

- Text mining
- Sentiment analysis
- Social network analysis

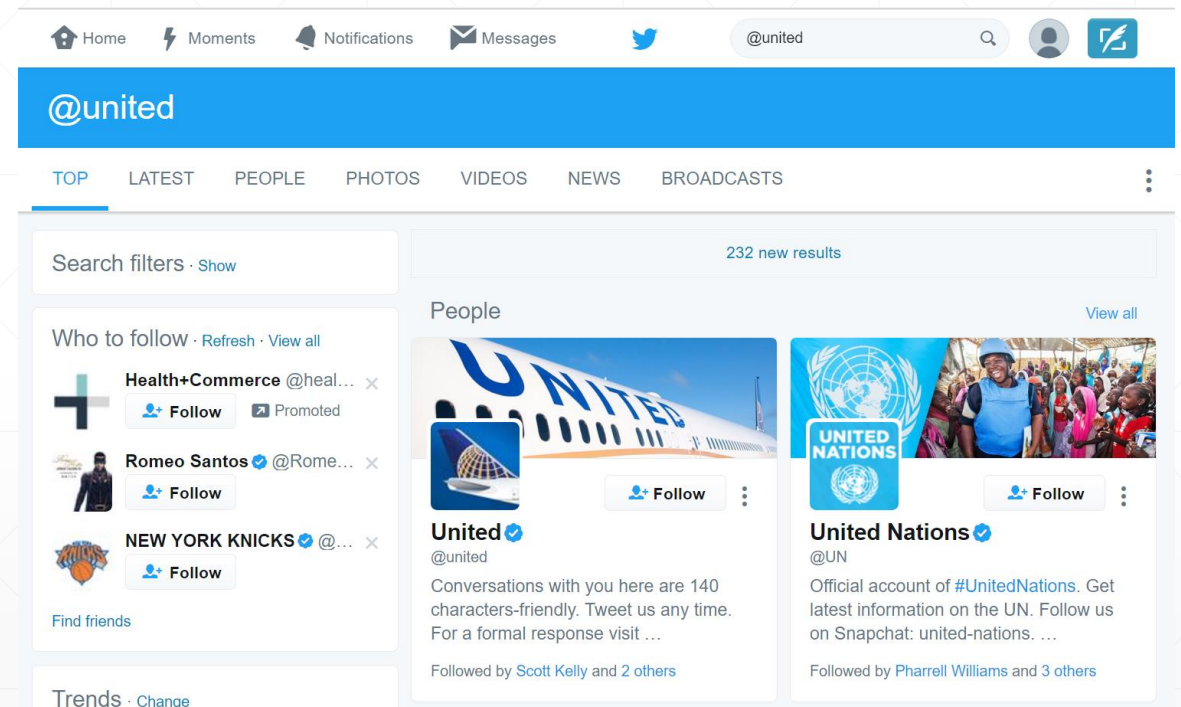
Tools

- Netlytic: Collecting Twitter data
- Rstudio: Text mining and Sentiment analysis
- Gephi and Wordij: Social network analysis



Data Collection

- Extract tweets from Twitter that mentioned United Airline or Southwest Airline or Delta Airline (**@united** or **@southwestair** or **@delta**) using Netlytic
- Tweets were collected over a period of 24 hours



Data Description

- United: 6639 tweets
- Delta: 5998 tweets
- Southwest: 1002 tweets
- Other information collected: link, publication date, author, user statuses count, user friends count, user follower count, user bio, etc.

A	B	C	D	E	F	G	H	I	J	K	L
id	guid	link	pubdate	author	title	description	source	postertime	user_id	profile_image_url	user_status
1	https://twitter.com/TravelEuropeEN	https://twitter.com/TravelEuropeEN	4/27/2017 22:59	TravelEuropeEN	RT @hbomb_worldwide: Just checked in online for my @united flight	RT @hbomb_worldwide: Just checked in online for my @united flight	RoundTeam	1	1.88E+08	https://pbs.twimg.com/profile_images/1111111111/1111111111.jpg	
2	https://twitter.com/SideShowAnnie21	https://twitter.com/SideShowAnnie21	4/27/2017 22:59	SideShowAnnie21	@united Why did I have to initiate a refund when it was @united	@united Why did I have to initiate a refund when it was @united	Twitter for iPhone	-6	43778093	https://pbs.twimg.com/profile_images/1111111111/1111111111.jpg	
3	https://twitter.com/sarstar	https://twitter.com/sarstar	4/27/2017 22:59	sarstar	@AllysonDowney @united YES. Why won't they seat us @united	@AllysonDowney @united YES. Why won't they seat us @united	Twitter Web Client	-4	16176135	https://pbs.twimg.com/profile_images/1111111111/1111111111.jpg	
4	https://twitter.com/BrianMuskoff	https://twitter.com/BrianMuskoff	4/27/2017 22:59	BrianMuskoff	@EricMinick @united Although he may have finally triggered @united	@EricMinick @united Although he may have finally triggered @united	Twitter for iPhone	-4	18886551	https://pbs.twimg.com/profile_images/1111111111/1111111111.jpg	
5	https://twitter.com/NickHorton	https://twitter.com/NickHorton	4/27/2017 22:59	NickHorton	@virtualjad @united Funny. Missing a @united flight attendant @united	@virtualjad @united Funny. Missing a @united flight attendant @united	Twitter for iPhone	-4	18726332	https://pbs.twimg.com/profile_images/1111111111/1111111111.jpg	
6	https://twitter.com/NaomiQ17	https://twitter.com/NaomiQ17	4/27/2017 22:58	NaomiQ17	@united Dr. Dao got his big payday which he was seeking @united	@united Dr. Dao got his big payday which he was seeking @united	Twitter for iPhone		8.26E+17	https://pbs.twimg.com/profile_images/1111111111/1111111111.jpg	
7	https://twitter.com/igmccull	https://twitter.com/igmccull	4/27/2017 22:58	igmccull	RT @jonfavs: @danpfeiffer @united @PodSaveAmerica RT @jonfavs	RT @jonfavs: @danpfeiffer @united @PodSaveAmerica RT @jonfavs	Twitter for iPhone		4.05E+09	https://pbs.twimg.com/profile_images/1111111111/1111111111.jpg	
8	https://twitter.com/WeeJoe_Allen	https://twitter.com/WeeJoe_Allen	4/27/2017 22:58	WeeJoe_Allen	RT @NatBurner89: Dr. Dao settled for how much?? \$5M— RT @NatBurner89	RT @NatBurner89: Dr. Dao settled for how much?? \$5M— RT @NatBurner89	Twitter for Android	2	1.62E+09	https://pbs.twimg.com/profile_images/1111111111/1111111111.jpg	
9	https://twitter.com/bourbon_brawler	https://twitter.com/bourbon_brawler	4/27/2017 22:58	bourbon_brawler	RT @AdviceIShouldHave: We will apologise when it costs us @united	RT @AdviceIShouldHave: We will apologise when it costs us @united	cox-speed-complain	-7	5.95E+08	https://pbs.twimg.com/profile_images/1111111111/1111111111.jpg	
10	https://twitter.com/bourbon_brawler	https://twitter.com/bourbon_brawler	4/27/2017 22:58	bourbon_brawler	RT @AdviceIShouldHave: Our CEO makes \$50 million a year @united	RT @AdviceIShouldHave: Our CEO makes \$50 million a year @united	cox-speed-complain	-7	5.95E+08	https://pbs.twimg.com/profile_images/1111111111/1111111111.jpg	
11	https://twitter.com/stiletto_sequin	https://twitter.com/stiletto_sequin	4/27/2017 22:58	stiletto_sequin	Just got a long @united email about changes they're making @united	Just got a long @united email about changes they're making @united	Twitter Web Client	-3	8.18E+08	https://pbs.twimg.com/profile_images/1111111111/1111111111.jpg	
12	https://twitter.com/weisspat1	https://twitter.com/weisspat1	4/27/2017 22:58	weisspat1	@PLinny32 @united disgusting @united	@PLinny32 @united disgusting @united	Twitter for iPhone	-5	41370346	https://pbs.twimg.com/profile_images/1111111111/1111111111.jpg	
13	https://twitter.com/jenn	https://twitter.com/jenn	4/27/2017 22:57	jenn	Just received the first marketing email from @united since @united	Just received the first marketing email from @united since @united	YoruFukurou	-7	6077152	https://pbs.twimg.com/profile_images/1111111111/1111111111.jpg	

Text Cleaning

- Remove retweet entities
- Remove mention
- Remove punctuation
- Remove numbers
- Remove HTML links
- Remove extra spaces
- Remove stop words
- Remove non-ASCII symbols

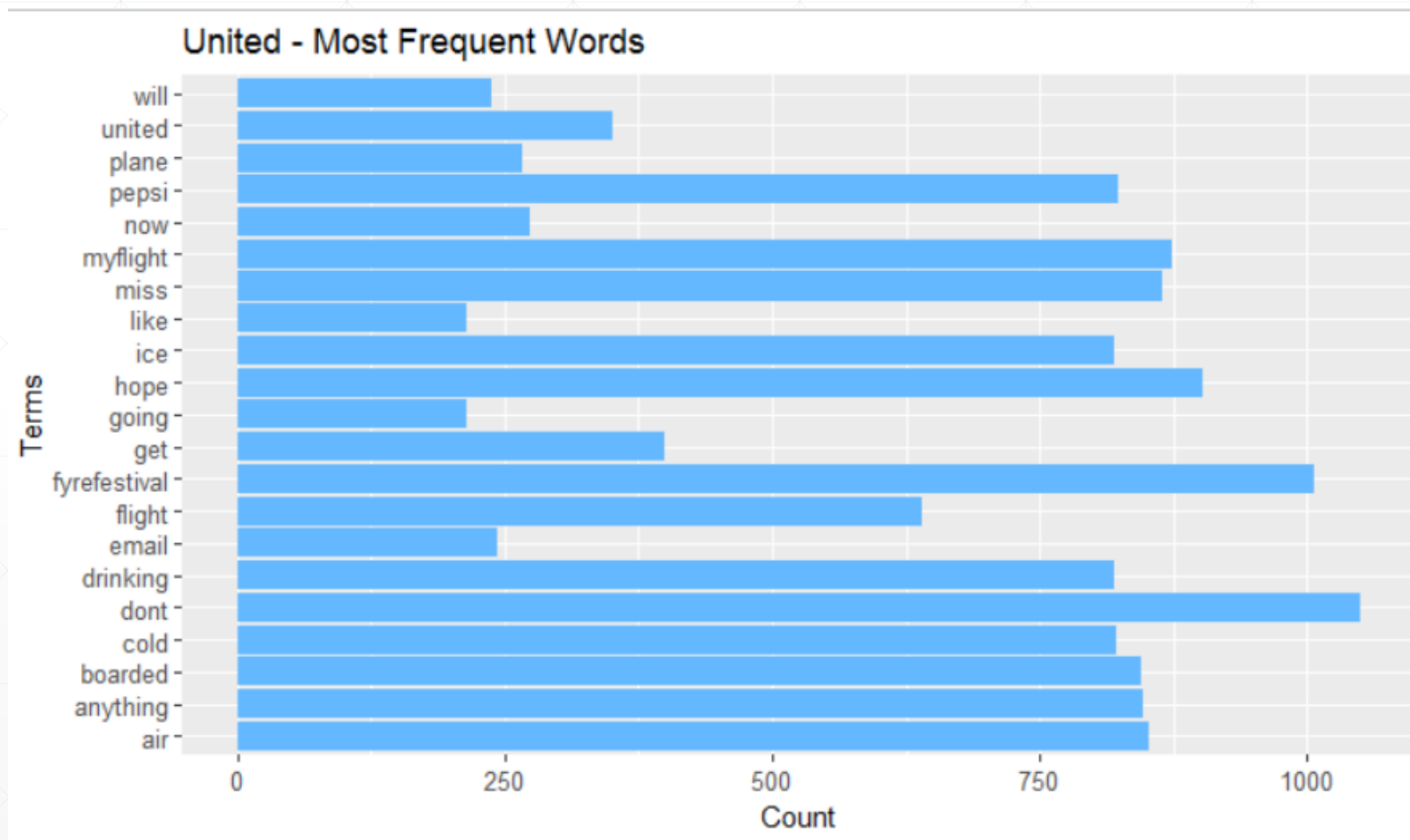
- **Before text cleaning**

“RT @OneGreenPlanet: Giant Rabbit Died On a @united Flight - Tell Airline to Update #PetSafe Travel Policies!https://t.co/gZDZydTUCk https:â€””

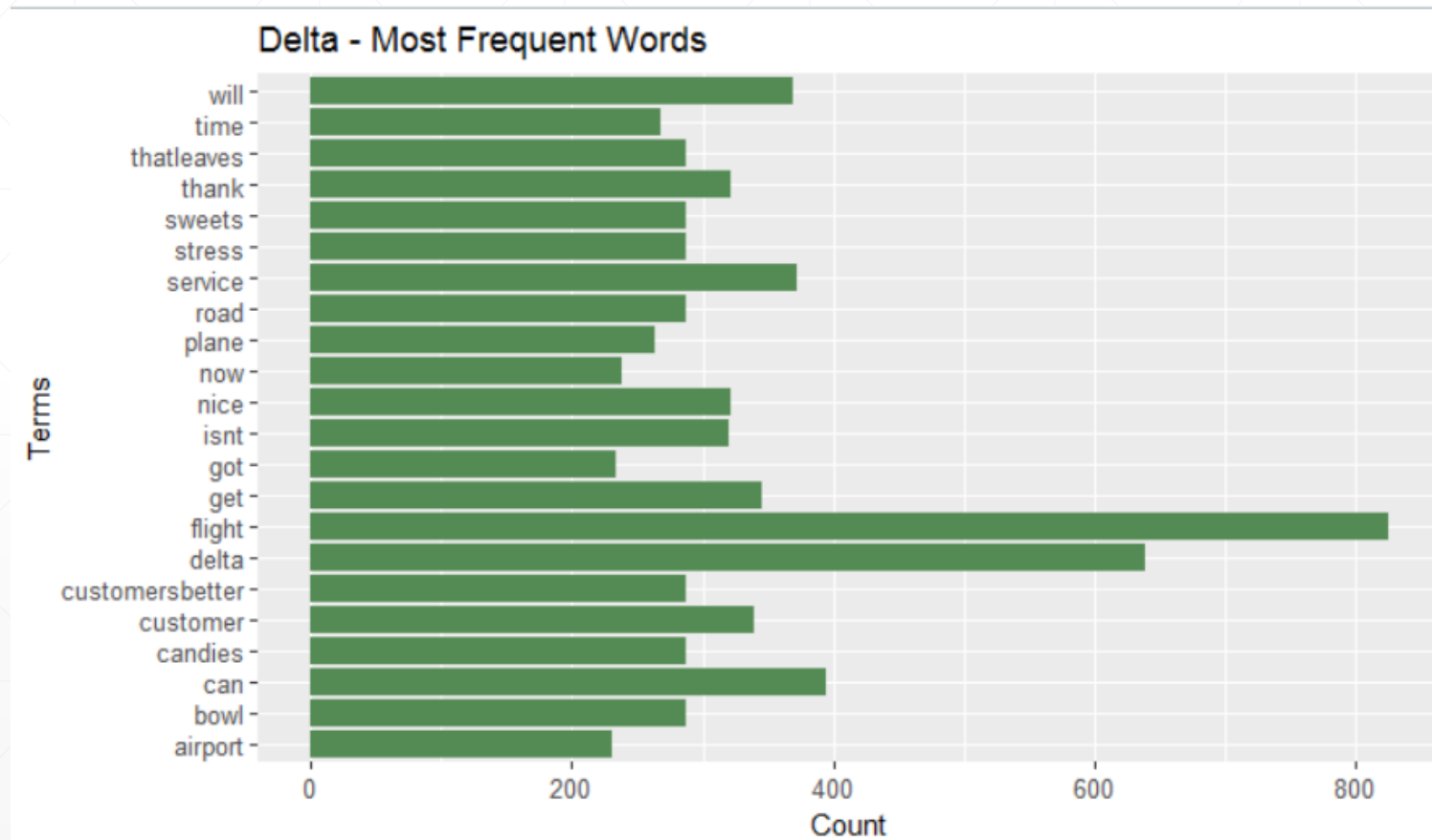
- **After text cleaning**

“giant rabbit died flight tell airline update petsafe travel policies”

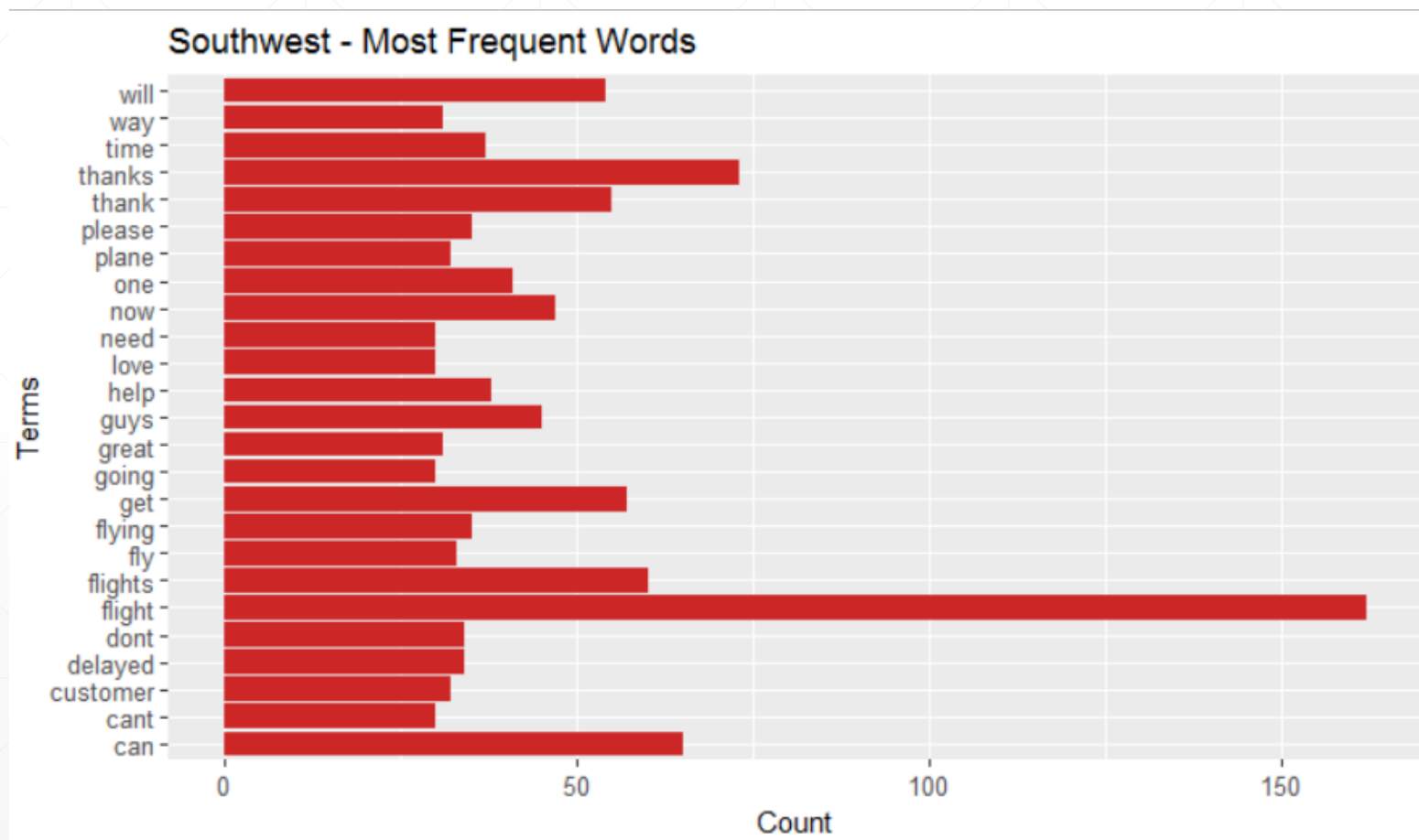
Most Frequent Terms



Most Frequent Terms



Most Frequent Terms



Word Cloud



United

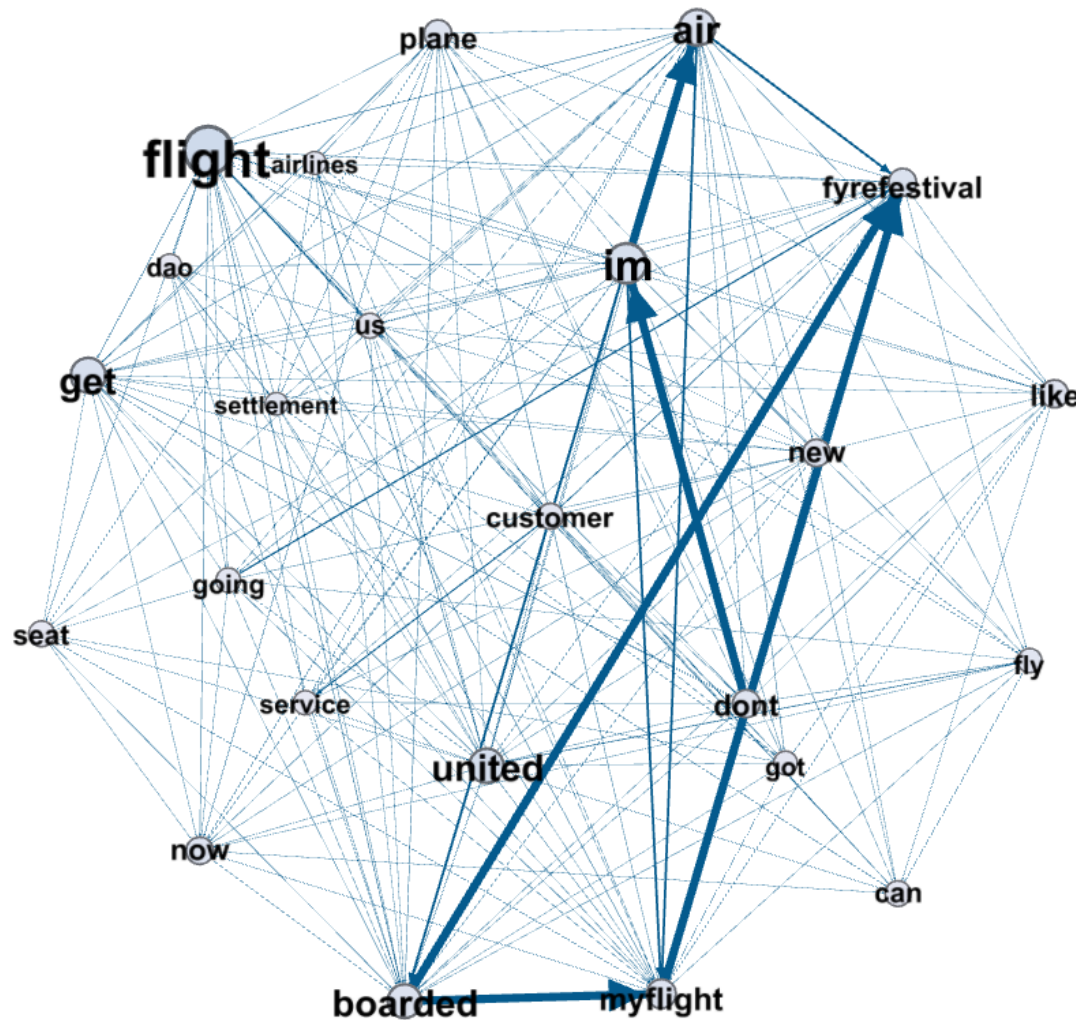


Delta



Southwest

Network of Most Frequent Terms



Expectation Vs. Reality [#fyrefestival](#)



FORTUNE | Travel

UNITED

United Passenger David Dao Reaches 'Amicable' Settlement With Airline

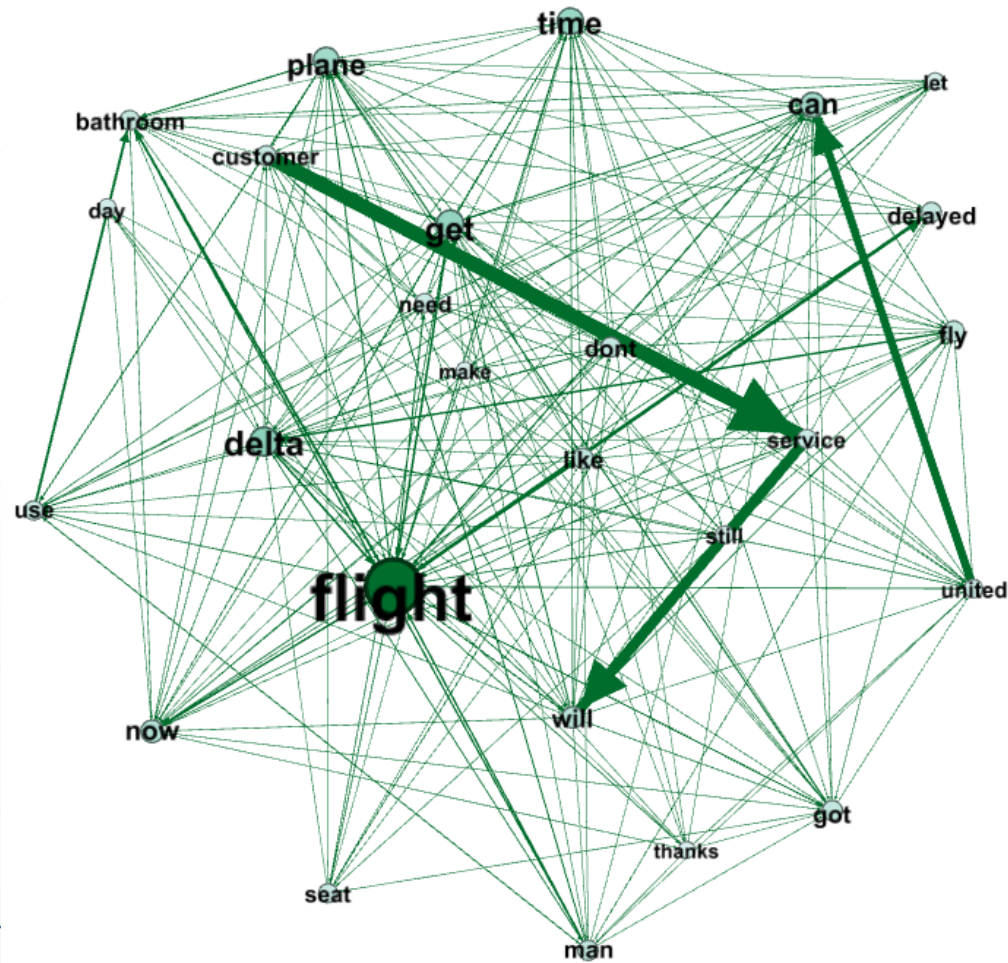
Alana Abramson
Apr 27, 2017



Dr. David Dao reached a settlement with [United Airlines](#) — just two weeks after he sustained a concussion and other injuries when he was forcibly removed from a flight, his

Waiting for images.outbrain.com...

Network of Most Frequent Terms



abc NEWS U.S. International Politics Lifestyle ... Watch Live Shows

Delta passenger kicked off flight after bathroom emergency

By KARMA ALLEN and ERIN DOOLEY
Apr 27, 2017, 9:17 AM ET

Share with Facebook Share with Twitter

Delta passenger kicked off flight after bathroom emergency

House passes Obamacare replacement bill

Senate passes government funding bill

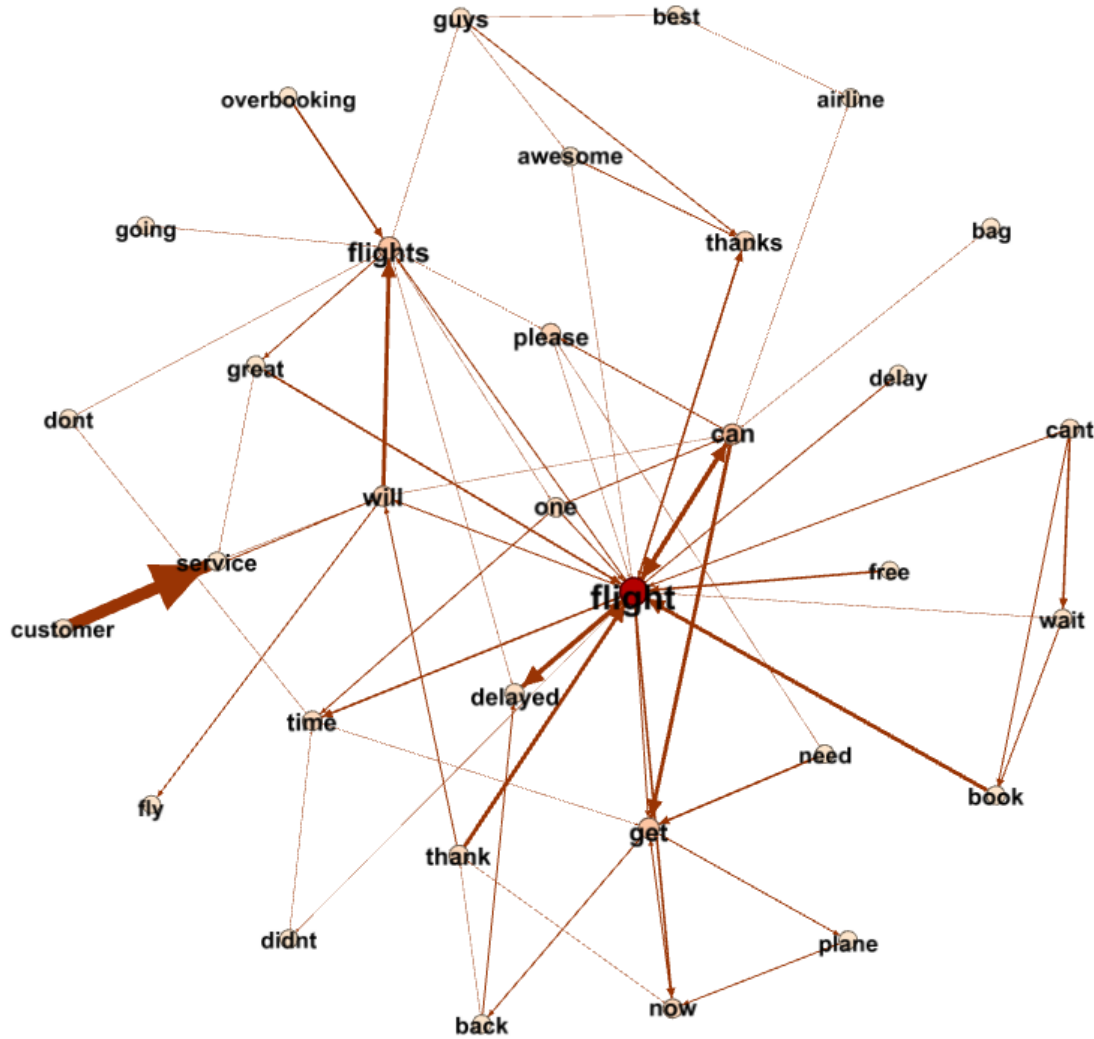
Trump administration takes a step

Here's why a Delta passenger was kicked off a plane for using the bathroom

Benjamin Zhang
Apr. 27, 2017, 1:10 PM 121,988

FACEBOOK LINKEDIN TWITTER

Network of Most Frequent Terms



TRAVEL 06/16/2016 03:01 pm ET

Southwest Is Officially America's Favorite Airline

Sorry, JetBlue.

By Suzy Strutner

GENE J. PUSKARI/AP

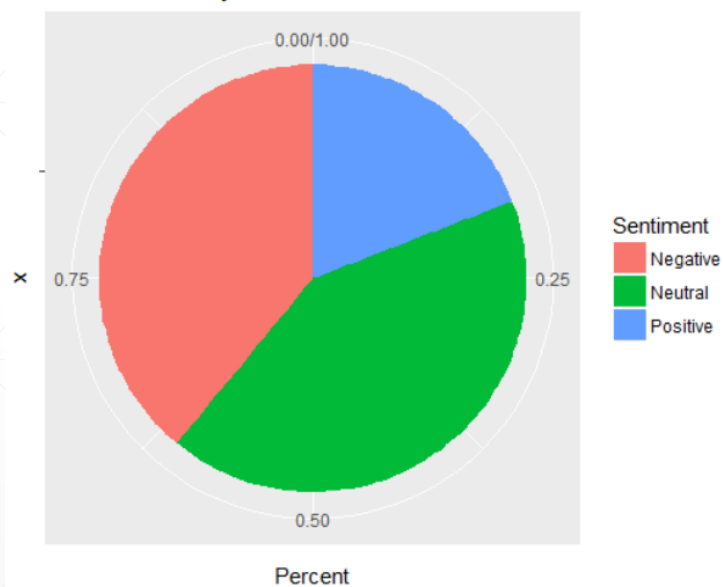
In the contentious world of air travel, we often forget to celebrate those who are doing things right.

And according to a survey of more than 11,000 U.S. fliers, [Southwest Airlines](#) is doing them best.

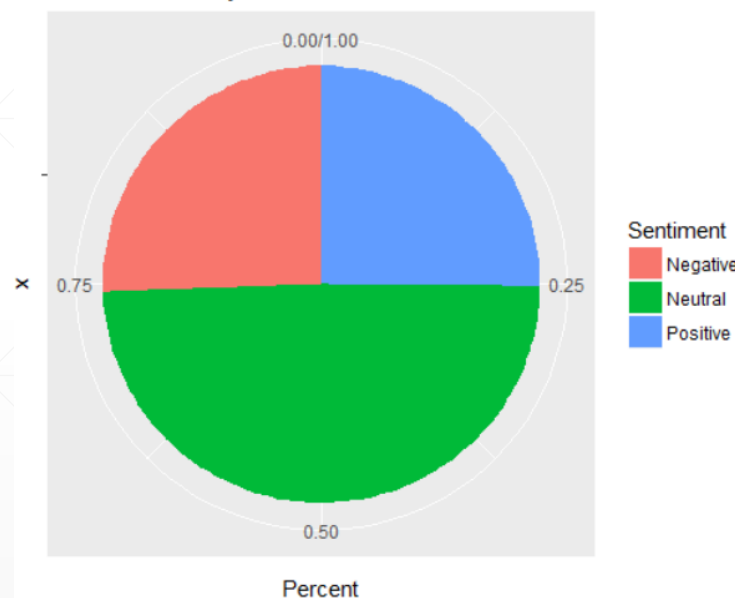
Southwest took top honors in [Airfarewatchdog's](#) annual travel survey, which ranks

Sentiment Analysis

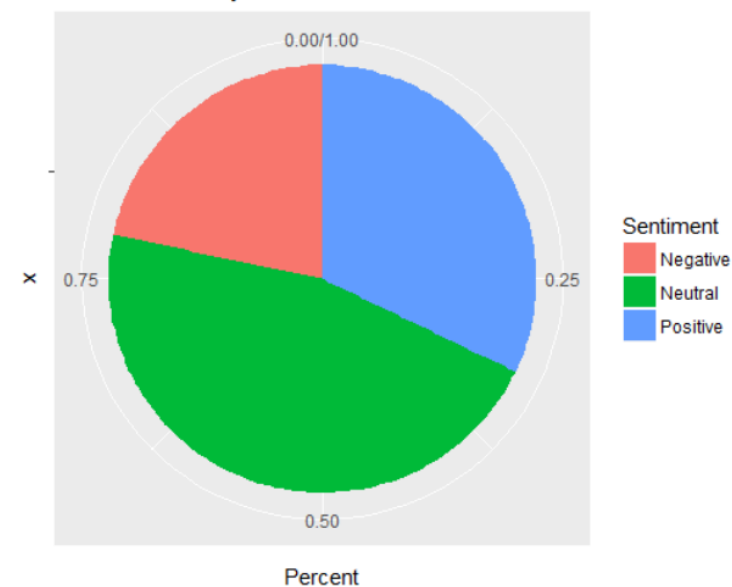
Sentiment Analysis of Tweets about United Airlines



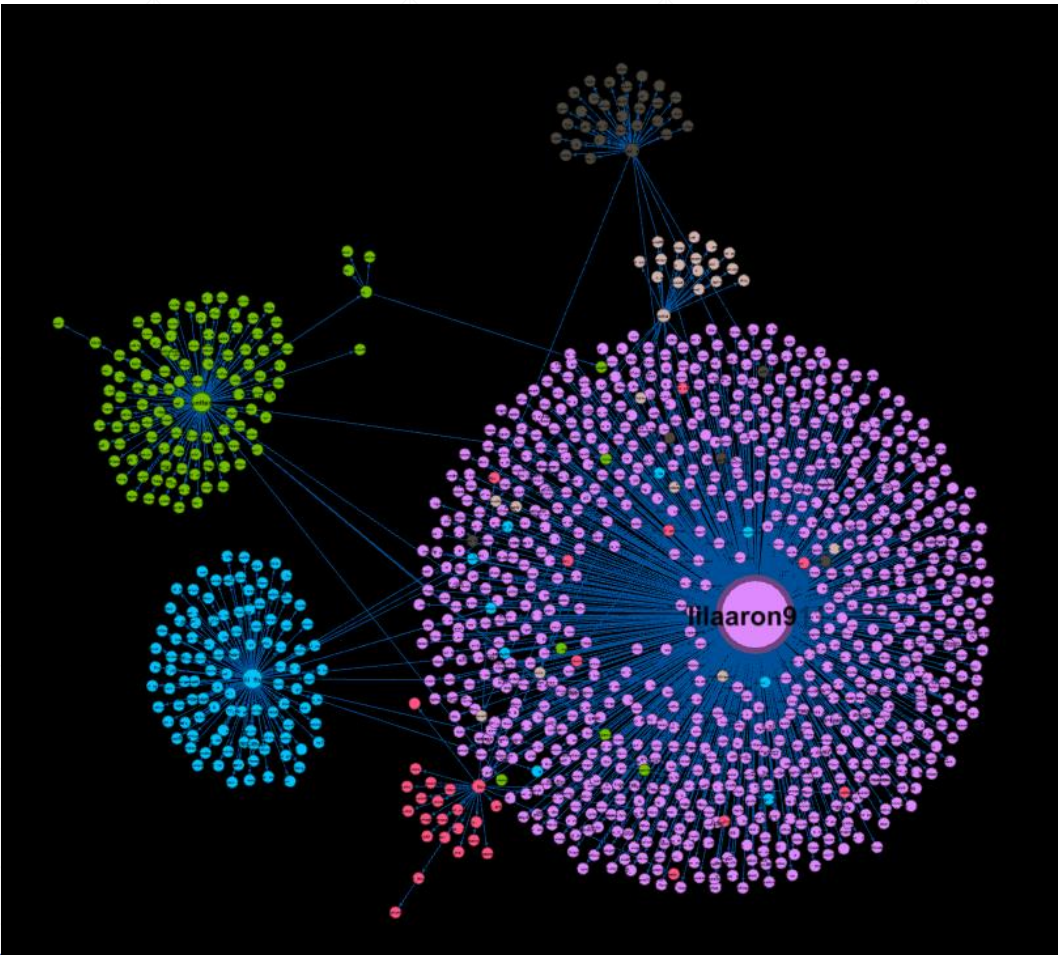
Sentiment Analysis of Tweets about Delta Airlines



Sentiment Analysis of Tweets about Southwest Airlines



Network of Retweets



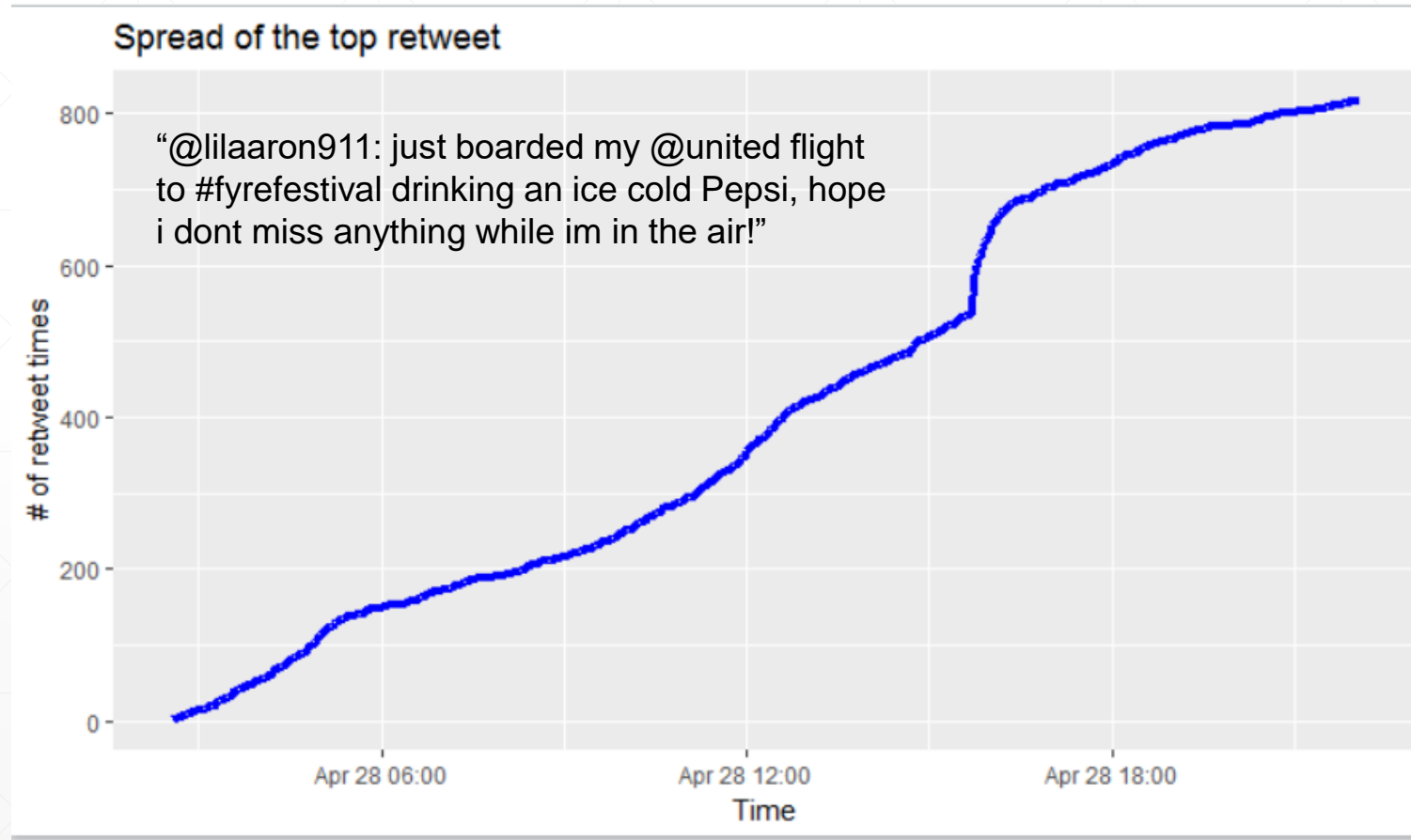
Accounts that have most retweets

- lilaaron911: 817 times
- phillyfloyd: 115 times
- united: 55 times
- jayseDavid: 38 times
- henryGammill: 32 times

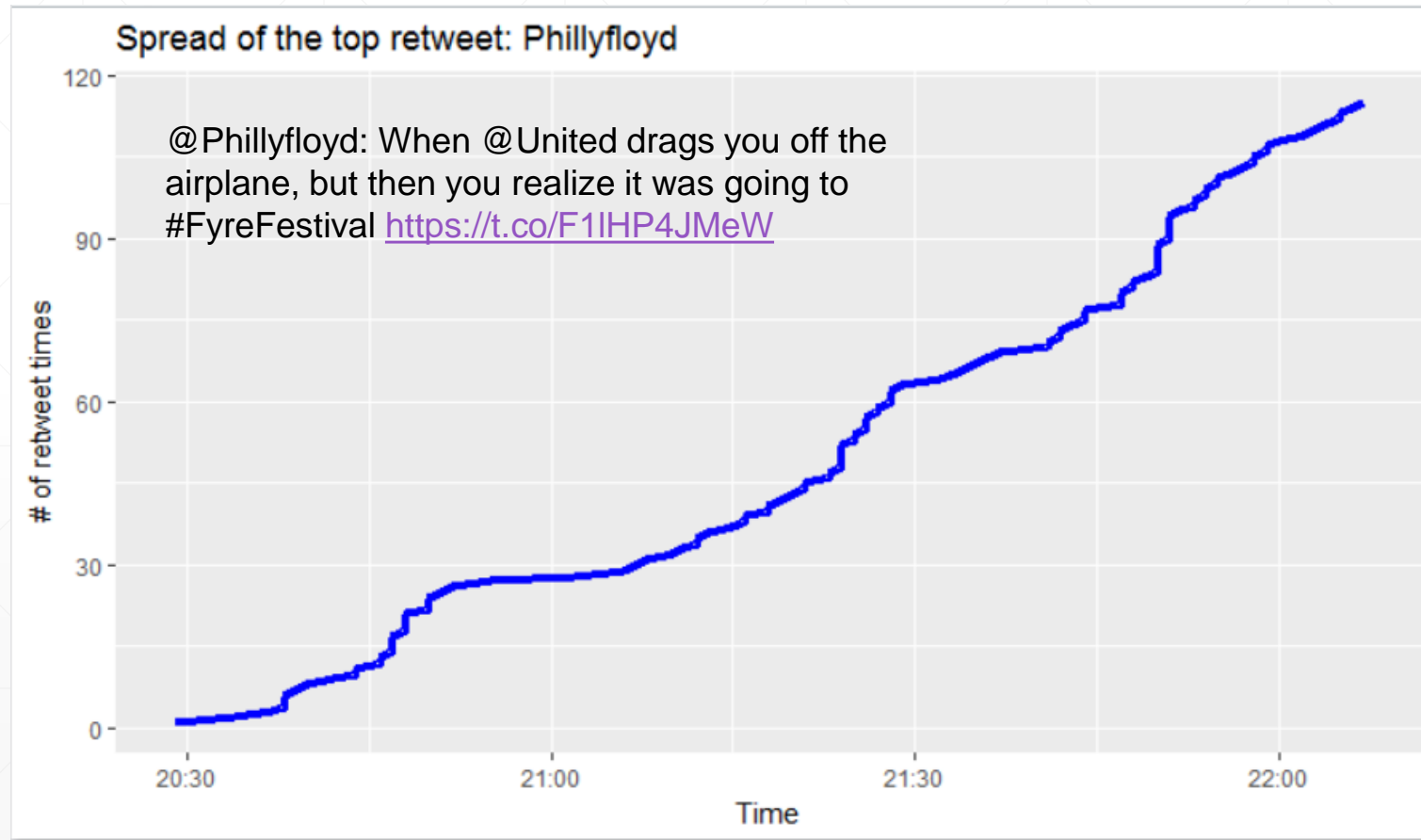
Top Retweets

- @lilaaron911: just boarded my @united flight to #fyrefestival drinking an ice cold Pepsi, hope i dont miss anything while im in the air!
 - @Phillyfloyd: When @United drags you off the airplane, but then you realize it was going to #FyreFestival <https://t.co/F1IHP4JMeW>
 - @united: We let policies get ahead of our values. Weâ€™re taking steps to change. <https://t.co/a7J0ZzcbrE> <https://t.co/Hsag45geex>
 - @JayseDavid: @United overbook #flight3411 and decided to force random passengers off the plane. Here's how they did it: <https://t.co/Qfeâ€¦>
 - @HenryGammill: .@united I asked for a drink of water and one of your flight attendants spat into my mouth. She told me, "Drink my mouthâ€¦"
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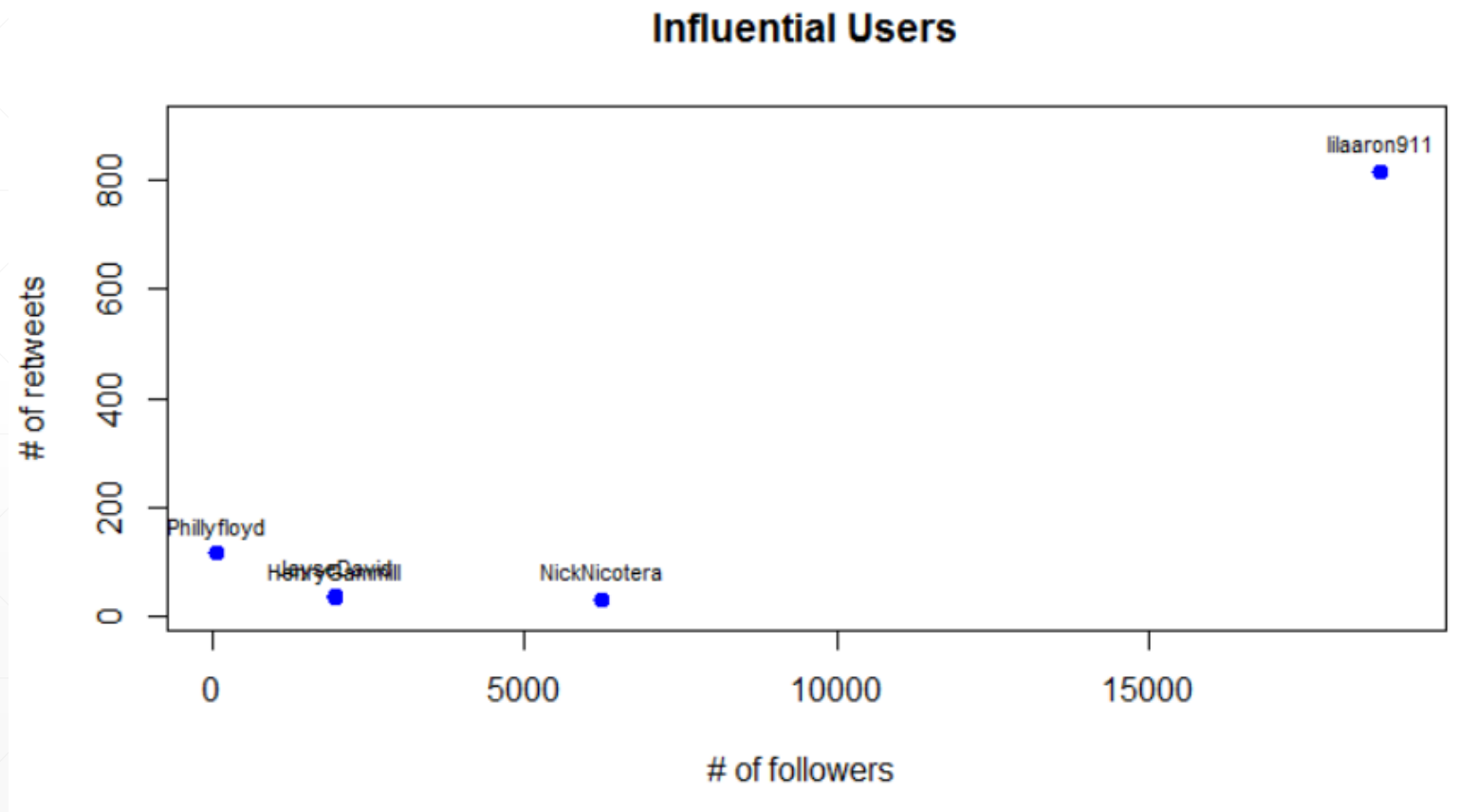
Spread of the Top Retweet in the Network



Spread of the Top Retweet in the Network



Influential Users



Conclusion

- Sentiment analysis and topic identification allow airlines to gain a quick overview of public opinion about their services, identify the key issues, and take action accordingly to improve their customer service.
 - Sentiment analysis on social media data has a lot of limitations because analyzing grammatical nuances, cultural variations, contextual understanding, slang and misspellings that occur in online mentions is a difficult process.
 - Social network analysis helps airlines to identify the top influencers in the network. While influencers may only represent a small percentage of an overall conversation, their role ultimately shapes how information spreads. By identifying these influencers, airlines can develop the marketing strategy that helps improving their service messaging.
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Thank you!

