

Facts and Fabrications about Ebola: A Twitter Based Study

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Social Media

- social media and mobile devices
- ability to publish and share instantly
- receive constant updates on events (both personal and news)

Social Media

- information dissemination is quick
- PRO
 - for news media
 - for organizations and event updates

Social Media

- information dissemination is quick
- CON
 - rumour
 - misinformation

Disease outbreak

- spread of misinformation and rumours
 - high school student in San Diego displayed symptoms of Ebola.
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 - high school student in San Diego displayed symptoms of Ebola.
 - Parents refused to send kids to school. Everyone was clinically checked.
- creates unnecessary panic and tension
- waste of resources

Medical Misinformation

To counter the medical misinformation, one needs to understand its nature and characteristics.

Our Goal

- Ebola outbreak in North America in fall 2014
- Study misinformation and verified information posted on social media
- We use Twitter as the social media platform

Approach

Produce two categories of messages: one misinformation, and another confirmed truths, and analyze the differences.

Producing the set, ideally..

- human annotators (genie) tells which messages (tweets) are rumours, and which are verified

Surrogate Approach: Hashtags

- A sequence of characters followed by ‘#’
- Widely used convention on Twitter
- Gives context to a tweet

Surrogate Approach: Hashtags



Jayse Bassitt @JusdoitJ · Aug 2

Finally got to see [#JurassicWorld](#) and it didn't disappoint 🍗

FAVORITES

2



6:08 PM - 2 Aug 2015 · Details



Surrogate Approach: Hashtags

a tweet with a 'credible' hashtag is credible, a tweet with a more 'speculative' hashtag is misinformation

Data

- 'ebola', 'ebov', 'ebolavirus', 'sudan virus', 'reston virus', 'bundibugyo virus'
- 47M Twitter feeds, October 2014 (Twitter streaming API)

Data

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- 2.7M tweets with hashtags (5.7%)

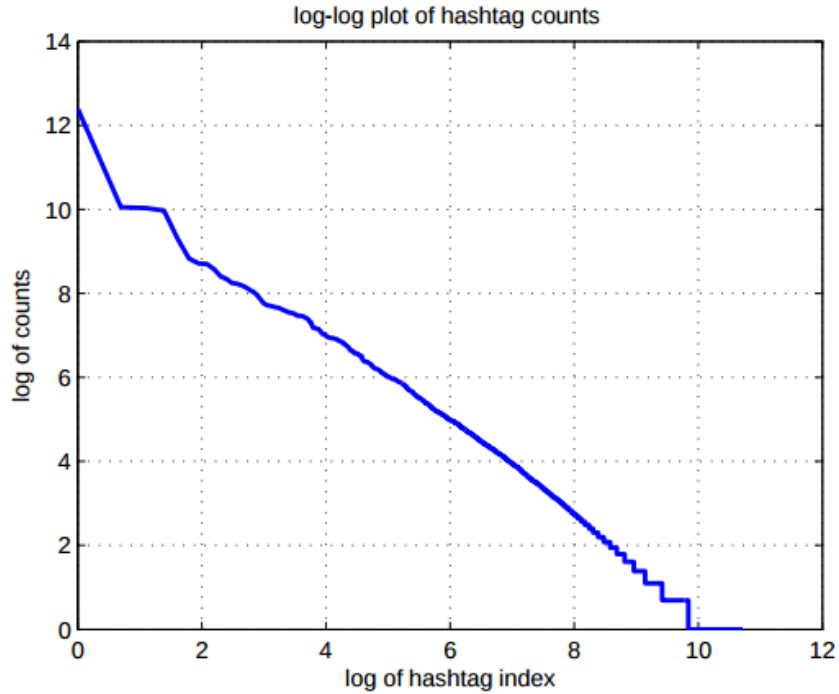
Data

- Very sparse in terms of hashtags
- 2.7M tweets with hashtags (5.7%)
- 184.8K unique hashtags

Data

- 110K (60%) used only once
- Only 400 (0.2%) occurred in more than 1000 tweets.

Hashtag-vs-counts



Creating the sets

- credible hashtags: should indicate origin from an authoritative source
- speculative hashtag: should indicate sarcasm, humor, fear e.t.c.

Creating the sets

speculative	credible
#falsenews	#cdc
#ebolafootballchants	#breakingnews
#cdcwhistleblower	#cnn
#thewalkingdead	#foxnews
#gossip	#ebolaresponse
#the_walking_dead	
#ebolazombie	
#walkingdead	
#betterebolaczars	
#andnowihaveebola	
#scarystoriesin5words	
#zombie	
#twitterjoke	
#ebolajokes	
#ebolahoax	
#lies	

Data

- credible tweets: ~89K of credible
- speculative tweets: ~21K of speculative

Twitter Features

- Several interesting features on Twitter.
- retweets, favorites, followers, followees e.t.c
- Have social and semantic interpretations at a higher level

Feature analysis

feature	description	<i>credible avg.</i>	<i>speculative avg.</i>
retweeted_status	[0/1] feature indicating if the tweet is a retweet	0.4378	0.5507
retweet_count	number of times the tweet has been retweeted	189.3917	78.3532
favorite_count	number of times the tweet has been favorited	59.8401	33.1443
in_reply_to_status_id	[0/1] feature indicating if the tweet is a reply	0.0727	0.0267
entities_urls	number of urls in the tweet	0.4574	0.4226
entities_symbols	number of \$ symbols in the tweet	0.0114	0.0005
entities_hashtags	number of hashtags in the tweet	2.7971	2.3286
user_verified	[0/1] feature indicating if the user is verified	0.0176	0.0014
user_friends_count	number of followees for the user	1619.29	1741.45
user_followers_count	number of followers for the user	6960.54	2635.26
user_status_count	number of status updates by the user	36241.94	19549.95
user_favourites_count	number of favourites received by the user	2620.60	2237.58
possibly_sensitive	indicates if the media is sensitive	0.0134	0.0157

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Conclusion

Promising that the two sets display different characteristics

Future

- Hashtags have their limitations. Explore other methods to produce the two sets.
- Use Ebola specific features.
- Comparison to a baseline.
- Algorithms to analyze short texts.

Thank You!