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POLITICAL RUMORING ON TWITTER DURING THE 2012 US PRESIDENTIAL ELECTION: AN EXPLORATORY STUDY

Jieun Shin
University of Southern California, Annenberg School for Communication & Journalism

Lian Jian
University of Southern California, Annenberg School for Communication & Journalism

Kevin Driscoll
Microsoft Research

François Bar
University of Southern California, Annenberg School for Communication & Journalism

Introduction & Research Questions

Our research team explored the massive political rumoring phenomenon on Twitter. Although rumors pose a real threat to democracy by unjustly biasing voters' electoral decisions (Weeks & Garrett, 2014), there has been little research on political rumor diffusion on social media. In an attempt to shed light on this topic, we asked the following research questions.

RQ1. How do political rumors diffuse on Twitter? What specific features are used in passing along rumors?

RQ2. To what extent are rumor believers and rebutters polarized based on the target of the rumor?

RQ3. Are rumor debunking sites effective in curbing the spread of rumors on Twitter?

Method

We explored a large dataset of political tweets (with more than 419 million tweets) collected during the 2012 presidential election in the United States. The dataset was created in real-time using the Gnip PowerTrack service. The stream was filtered according to 427 election-related keywords including the names of candidates, issue-specific terminology, and hashtags used to promote debates and other important events.

In addition, the research team has analyzed 57 rumors that were circulating in the traditional news media or on social media sites during the same period of time. This set of 57 rumors was identified by three popular rumor checking websites: Factcheck.org, Snopes.com, and About.com's "Urban Legends" page. If any of these sites checked a rumor within the data collection period, we included it in our rumor collection. Based on

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the final collection of 57 rumors, we retrieved a preliminary set of relevant tweets (n=438,556) that contained matching keywords for each rumor from the political tweets set.

To ensure high accuracy, we human-coded each tweet for two variables: (1) whether it was actually about the rumor (2) whether the user's attitude was endorsing, rejecting, or unclear. The content coding involved four pairs of independent undergraduate coders with two coders coding the same tweet messages. The Krippendorff's Alpha values ranged from .75 to 1. Of all the tweets preliminarily identified as relevant to these 57 rumors (n=439,556) via keyword matching, 75.20% of them (n=330,538) were human-coded to be relevant.

Results

Rumor Tweeters' Communicative Behavior

Overall, there was little rejection of any rumor in our dataset, be it true or false. After eliminating rumors (n=12) with fewer than 200 tweets, we calculated the percentage of tweets that were coded as rejecting the rumor. Out of the 33 false rumors, we found an average rejection rate of 3.37%, while we observed an average rejection rate of 0.06% for 10 true rumors. Two unverifiable rumors had an average rejection rate of 8.43 % and endorsing rate of 89.37 %.

We compared rumor tweets that endorsed 57 rumors with randomly chosen political tweets from our larger dataset in order to explore systematic differences between two datasets. The result showed that rumor tweets had a much higher proportion of retweets (65.48%) than non-rumor tweets (44.43%). Such a level of retweet proportion in our rumor dataset, combining both false and true rumors, seems unusually high compared with previous studies (Nagarajan, Purohit, & Sheth, 2010; Tonkin, Pfeiffer, & Tourte, 2012) which reported to be 27~48% of retweets in social movement discussions on Twitter.

Additionally, the rumor tweets showed a significantly lower proportion of hashtag adoption (17.11%) compared to the non-rumor tweets (31.59%). We also compared the ratio of tweets that generated at least one reply between two sets. The analysis showed that the rumor tweets (2.62%) had a significantly lower proportion of tweets that were replied to by other users than non-rumor tweets (7.13%).

Membership Overlap Between Rumors

To explore the community structure and the patterns of membership among different rumors, we utilized network analysis viewing the relationship between a rumor and its participants as affiliated. We first identified unique believers and debunkers for each false anti-Obama (n=21) and false anti-Romney rumors (n=7) that have more than 200 users. Then, a two-mode network matrix was constructed where the rows represent each user, and the columns indicate each rumor. This matrix was subsequently converted to a one-mode co-membership matrix (28 rumors by 28 rumors).

To identify sub-clusters in the rumor co-membership network, we used the Infomap algorithm, which is considered to be one of the best-performing community detection

methods (Rosvall & Bergstrom, 2008). The results showed that there were two communities (modularity=0.48) for the rumor believers, corresponding exactly to anti-Obama and anti-Romney rumors. On the other hand, the analysis identified 13 communities (modularity=0.57) for the debunkers where anti-Obama and anti-Romney rumors were clustered together in some communities.

Impact of Rumor Debunking

To examine whether rumor debunking was effective, we identified the date on which each rumor was first debunked by one of three fact-checking websites and split each rumor tweet set into two groups - before and after the date of rumor debunking. A series of chi-square tests revealed that, in 12 out of the 33 false rumors, the proportion of rejecting rumors significantly increased after debunking while that of endorsing rumors decreased. We also noticed that debunking sites tended to have a significant impact on rumors that were started by a satirical news website. Nevertheless, such changes in attitude were small, given that the majority of tweets were endorsing both before and after the publication of debunking information.

Discussion & Conclusion

Our analyses reveal that rumors were mainly transmitted through the retweet function, which requires minimum issue engagement. In addition, while we observed the clear division between anti-Obama rumors and anti-Romney rumors among rumor spreaders, we did not find partisan community structures among rumor debunkers. Our analyses also show that professional fact-checking sites were relatively effective in reducing the spread of rumors that were started by a satirical website, but had a limited impact on other types of rumors (i.e., rumors created by an elite partisan or unknown source).

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