Towards Developing Methodology to Stem the Tide of Fake News

Kiran Kumar Bandeli, Muhammad Nihal Hussain, Samer Al-khateeb, and Nitin Agarwal
Department of Information Science
University of Arkansas at Little Rock
Little Rock AR 72204, USA
{kxbandeli, mnhussain, sxalkhateeb, nxagarwal}@ualr.edu

Numerous journalistic accounts have highlighted the prolific but disturbing use of social media to spread fake news. This phenomenon is fairly new with regards to the tactics, strategies, and procedures deployed to disseminate disinformation. Very little to no research has been conducted to systematically study the tactics, techniques, and procedures used to disseminate fake news. It is intriguing to see the way misinformation is disseminated along different social media channels.

For this data challenge, we explore the dataset provided to find answer to the following research question: *Can we detect patterns or develop measures to help identify fake news*? We started the experiment by loading the dataset into IBM Watson Analytics to have an insight about the data attributes, i.e., the data structure, in an effort to detect key patterns that will help us in finding an answer for the aforementioned research question. Then, we used off the shelf tools such as TouchGraph SEO Browser, MALLET (Machine Learning for Language Toolkit), LIWC (Linguistic Inquiry and Word Count), and Alchemy API to do a deep dive into the problem space. Next, we present our empirical observations based on the data exploration and provide heuristic measures for fake news source detection.

Observations and Heuristics

The first step of our analysis started by performing an exploratory analysis called "reverse image search" (i.e., taking the given image URL and search it on "Google Images" to identify other sources that used this image) – we found out that the images were not unique for each article and not relevant with the context it's used for. The same images were reused with different narratives or agenda. This pattern is used to make the audience/readers think the story is authentic.

The second step of our exploratory study is examining the domain names. Generally, website domains are indicative of the website content. This also helps keep the URLs user friendly. In an earlier research, we observed that URLs could be used to categorize the webpage content with almost 90% accuracy[1]. A similar pattern is observed here as well. The website domain names are either highly opinionated or clearly indicate a bias. For instance, the domain names like, 100percentfedup, antiwar, consciouslifenews, blackagendareport, defenddemocracy, endingthefed, govtslaves, etc. contain polarizing words to influence readers.

The third step is to investigate the use of mix media approach in disseminating stories virally. In this experimental study, we encountered instances where same article is being shared on different sites. For instance, stories such as *'Obama Signs Executive Order Declaring Investigation Into Election Results; Revote Planned For Dec. 19th - ABC News'* and *'The Amish In America Commit Their Vote To Donald Trump; Mathematically Guaranteeing Him A Presidential Victory*

1 Nitin Agarwal, Huan Liu, and Jianping Zhang. Blocking Objectional Web Contents by Leveraging Multiple Information Sources. SIGKDD Explorations, 8(1): 17 - 26, June, 2006.

- *ABC News'* were disseminated on multiple sites, e.g., *twitter.com*, *business2community.com*, *worthychristianforums.com*, *phantomlimb.wikity.cc*, *conservativeread.com*, and *unimedamparo.com.br*. Both of these stories are verified as **false** by *snopes.com*.

The fourth step of our experiment is to perform statistical analysis on the given dataset. Incidentally, most of the posts had none or very few comments, which could imply that the stories are mainly disseminated but not much discussed on these sites. We found out that during the period of US elections there were a lot of posts primarily intended to reach more crowds, draw their attention, and direct them to non-factual stories with the intention of impacting or influencing the readers. For example, 96% (12,468 of 12,999) of the posts had Zero "*likes*" and 94% (12,304 of 12,999) of the posts had Zero *"replies".* These posts were primarily intended to be disseminated to reach more people and mislead. We also found out that the majority of the stories are originated from a set of domains, which are usually reported as containing false information by *snopes.com*.

Finally, we studied the structure of the websites disseminating these false stories. We found out in many cases that the "contact us" page do not provide any real contact information or it redirects the readers into another website usually a social media site, e.g., Facebook or Twitter.

Proposed Methodology

Based on the observations and heuristics laid out in earlier section, we develop a step-wise methodology to slow down the spread of fake stories.

1. Look for biased nature of *domain names*.
2. Pay attention to the *contact us* page to validate and verify site authors.
3. Do not just read the *headline*; instead traverse to the *body content* to know more details of the story.
4. Pay close attention to URLs, sources, *images* and editorial standards of writing.
5. Always crosscheck the story with the *fact-checking websites* like snopes.com, factcheck.org, or politifact.com for the credibility of the story.
6. Search for the post in *well-known search engines* like Google, Bing, Yahoo, etc., if the same post is repeated in many sites, then it is an indication of using mix media approach as explained above.
7. Check if the article is *previously published* and if it is being reused to impact or mislead an event i.e., look for the date of the published article.
8. Check to see if the post is *disturbing or controversial* which usually is where fake stories can be embedded.
9. Check to see if the post has any likes, replies, or comments. This will indicate how interested the readers are in the given story, e.g., agree or disagree with it. The *sentiment* can be used to infer this.
10. Check the *credibility* of the source.

We plan to explore more datasets/posts from blogs. We plan to enhance the proposed methodology using various statistics and text analytics based features from Blogtrackers tool, such as keyword trends, blogger's posting frequency, sentiments, blogger's influence, etc. We also plan to develop an information flow model to analyze the spread of mis/dis-information and help develop counter measures to stem the tide of fake news.