

Tweet Author Location Impacts on Tweet Credibility

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ABSTRACT

We investigate how certain features affect user perceptions of the credibility of tweets. Using a crowd sourcing experiment, we found that users perceive the credibility of tweets is impacted more by some features than by others. Most notably, we discover that displaying the location of certain types of tweets causes users viewing these tweets to perceive the tweets as more credible.

Keywords

Twitter, Credibility, CrowdFlower.

1. INTRODUCTION

The growth of social media over the last few years involving a large number of users has led to a vast wealth of social information. Twitter, the social network, began in early 2006 with around twenty million visitors every month. By the end of 2009, Twitter had around 75 million accounts with 2.5 million posts every day [11]. Currently Twitter has more than 645 million active users who send 58 million tweets daily.¹ The quantity of information in Twitter has motivated us to investigate the attributes that influence user credibility judgments.

Twitter has become an important news source playing a role in the Arab Spring and the Occupy Wall Street events in 2011 [7]. People use it in some crises to obtain updates[1] and many users post tweets about these events. Therefore, spammers have become more interested in Twitter [4] and many trend topics become popular due to spam. For that reason, users perceptions of tweet credibility are important. It is essential to know which tweet factors influence their decisions, as has been done for web pages [10].

In this paper we study the effect of four factors (Message topic, User Name, User Image, Location of the author), three have been considered in a previous study[8] in addition to a new one which is the location. We attempt to answer two research questions:

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¹ <http://www.statisticbrain.com/twitter-statistics>

1. What factors affect user perceptions of credibility?
2. How does tweet location affect credibility?

2. RELATED WORK

Much research has been conducted on examining the credibility of tweets. Different approaches have been taken: an automated approach which focuses on analyzing information in a tweet to predict credible tweets. Castillo et al [5] determined a set of features included inside a tweet and classified the tweets into number of categories: message-based, content-based, user-based, and propagation-based. Then they used these features to build an automated tweet credibility model. Al-Khalifa and Al-Eidan [3] measured credibility of tweet content by measuring similarity between a tweet and credible sources of information.

Some research focuses on predicting user credibility rather than the credibility of a tweet because user is the tweet source [2], they propose an algorithm to measure user credibility depending on his/her online behavior. Mainly they focus on kinds of users they called “coordinated users”, which are a group of users who act in Twitter in same behavior (their tweets and votes are very similar).

Factors influencing user credibility of web pages have been studied by many researchers [6,11]. Factors affecting credibility of microblogs and their influence on users is a new area and some work has started [10,8], they selected some tweet attributes and measured their effect on user perception.

3. TWEET FACTORS TO EXAMINE

We followed the methodology of Morris et al. [8] who examined three features: Tweet Topic, User Name, and User Image. To these, we added a fourth: tweet location, the location of the tweet author when the tweet was posted.

3.1 Message Topic

The topic of a tweet is one of the factors that users indicate affects its credibility. We selected three topics: tweets describing politics, science, and entertainment.

3.2 User Name

The User Name attribute has been indicated as an important factor [8] in credibility rating. Therefore, we included three kinds of user name in our experiment: *Traditional* (e.g., “William_Thomas”), *Topical* (e.g., “The_Politics”) and *Internet* (e.g., “Bill123”). All user names were distributed equally by gender. We created a

traditional user name by selecting popular first and last names in the United States for both genders. We used the Social Security official website in the US to obtain a list of popular names.² For all user name styles we verified that there was no actual Twitter account registered under the same user name, to ensure that participants would not have any preconceived ideas about any authors.

3.3 User Image

We chose five different types of image: Male, Female, Topical, Generic, and Default.

For Male and Female images we used the Twitter search engine to obtain real user accounts by searching in topics commonly used by men and women. As we did not wish to use any photographs from popular accounts, we chose Twitter accounts with 1000 followers and fewer to ensure that the popularity of account photographs did not affect user judgments. All photographs were of adults aged 20 and older and all were headshots.

For Topical photographs icons were collected from PowerPoint clip art because there are many Topical icons in Twitter associated with organizational Twitter accounts. These icons needed to be unknown by participants to avoid bias.

Generic icons were selected from actual Twitter accounts. The default twitter icon was like an egg image and it remained the user's image until they changed it.

3.4 Location

Including the location of the tweet author when he/she tweets is one factor that we want to measure its effects on user credibility judgments. Figure 2 (c) and (e) show samples of location tweets and we want to study the influence of tweet location on users' perceptions of credibility. Location of the tweet author in our experiment is always located in the same country of the tweet subject.

3.5 Content of tweet

For the purpose of our experiment, we simulated the real twitter environment and authored tweets that cover the three different topics. All tweets were written in English with standard spelling and grammar. All tweets were on current events taken from popular news sources (e.g., BBC, CNN, Aljazeera, Sky news, Reuters, New York Times) and all were actual true events, which happened during August 2014. Each tweet was followed by a constructed URL using the Bitly service [bitly.com], a service to make URLs shorter to fit within 140 character for each tweet.

We made half of the tweets describe true events and half of them describe events that never happened but were possible (see Figure 1). This was to ensure that the judgments of participants were influenced by the four factors (Topic, User Image, User Name, and Location) rather than the truthfulness of the tweets.

We inserted our experimental data into a our Twitter account and saved each tweet as an image. All URLs included in the tweets were not clickable and users were notified of that, to prevent participants checking credibility by clicking on a URL.

² <http://www.ssa.gov>



Figure 1: True and false tweets. (a) True, (b) False.

4. EXPERIMENTAL DESIGN

As mentioned in the basic study [8], running all combinations of possibilities for all factors – Message Topic, User Name, User Image, Event location, and tweet truth – would need $(3 \times 3 \times 5 \times 2 \times 2)$ 180 tweets, which we considered to be a large number for participants. As an alternative, we inserted user images between other factors and the number reduced to $(3 \times 3 \times 2 \times 2)$ 36 tweets.

We classified these 36 tweets as follows: in each topic area politics, science, and entertainment there were twelve tweets. In every topic area there were four tweets for each user name style (*traditional*, *topical* and *internet*), two of which included the location of the event and two which did not. Within each two was a true and a false tweet, to make it hard to determine which was which, both pairs of tweets described events from the same country. A participant saw 36 tweets and each tweet was combined with one image of the five image types³.



Figure 2. Samples of our experimental tweets. Tweet (a) default image, (b) Topical icon, (c) Female's image, (d) Male's image, and (e) Generic icon. Tweets (a) and (b) are samples of topical user name styles, (c) and (d) traditional, and (e) represents an internet user.

User images were assigned to each tweet randomly, and for the default image case, the same image appeared each time. Each user never saw the same tweet, image, or user name more than once.

³ Note, this is different from the basic study design[8]. In their experiment a given participant saw only one of the five images types associated with all tweets, and they needed to repeat the experiment by adding an extra image type because they found participants did not pay attention to the profile image since the same image type appeared with each tweet. Also, we considered that two images types were not enough and a participant needed to see all image types to be able to see the differences.

4.1 CrowdFlower Platform

We used the CrowdFlower platform to gather participants. Instructions were given on how to complete a task: users were notified that the URLs were not clickable and they should not try to leave the current web page and do additional search to help them to verify the information in tweets. To ensure the quality of judgements for participants, we inserted five gold questions and informed users that if they were able to answer them correctly their answers would be accepted. Tweets were shown to participants in random order, four tweets each time. Under each tweet there were two Likert scales with seven points from “strongly disagree” to “strongly agree”. The first scale asked users to give a rating whether “this tweet contains credible information” and the second one was “this author is credible”. There were another four questions for demographic information, including gender, age, and number of times users used Twitter.

4.2 Participants

Our study collected 708 judgments from 59 participants. The gender distribution was 83.05% male and 16.95% female. The participants age groups were 18-24: 27.12%, 25-34: 40.68%, 35-44: 16.95%, and above 45: 15.25%.

5. RESULTS

Since the participants in our experiment did one credibility rating for the tweet and another one for the user, after we made a correlation coefficient we found them to be closely correlated, as the original study showed. We obtained a Pearson correlation value of $R=0.92$, $p<0.0001$ which was higher than the original study [8] which was $R = 0.85$. Participants could likely choose the same scale for both, but this is out of the scope of this experiment. Also, the tweet and author credibility means were 4.79 and 4.88, respectively compared with 3.79 and 3.27 in the original study since they use same 7-point scale.

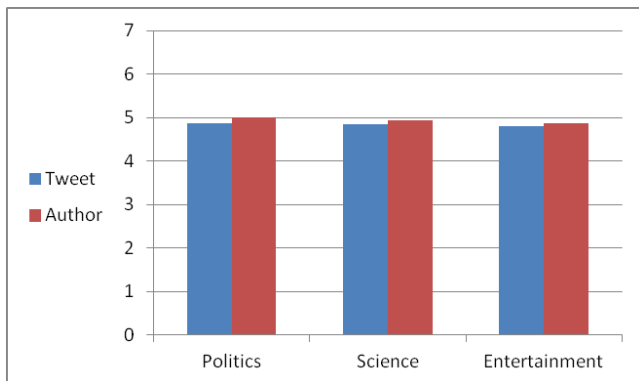


Figure 3. Message topics mean levels.

5.1 Message topic

We calculated the mean ratings of all three topics, and found that the tweet credibility rating for politics was the highest at 4.86 with 4.85 for science while entertainment received 4.7. For the author credibility ratings they received means of 5, 4.92 and 4.87 for politics, science and entertainment, respectively.

5.2 User Name

Since we had three user name styles, the traditional style tweet and author rating means were 5.02 and 5.08, the topical style

received 4.93 for both means, and the internet style received 4.50 a tweet credibility mean and 4.60 for author credibility mean.

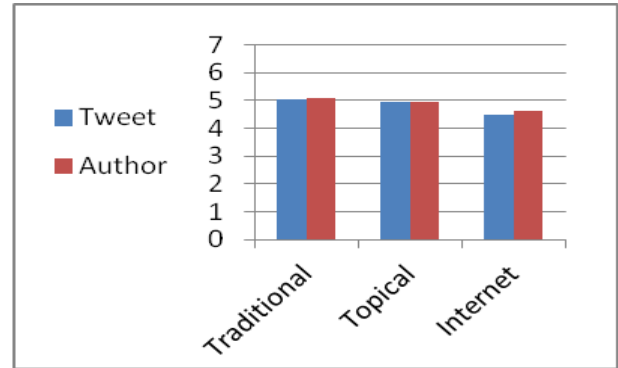


Figure 4. The level of credibility for each user name style.

5.3 User Image

The highest credibility rating for tweet and author was for a male’s image, the lowest rating was the default image, see Fig.3.

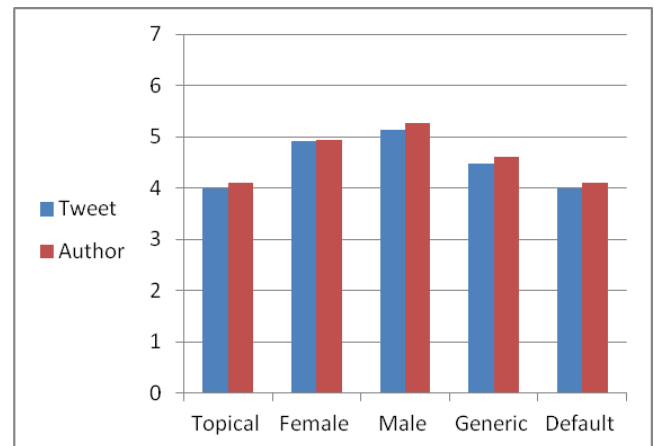


Figure 5. The level of credibility type for each image type.

5.4 Location

Studying the ratings of tweets and the author credibility with or without location, the mean rating was approximately the same. Tweets with location received 4.85 for tweet credibility and 4.90 for author credibility rating, compared with 4.81 and 4.99. No difference was statistically significant.

Since the three previous factors have been thoroughly analyzed in [8], we investigated more the influence of location on Tweet topic. We made two tweet groups for each of politics, science and entertainment, one group for tweets with location and one for without. We then compared the means between each topic group and computed the P-value. The tweet average for politics tweets with location was 5.15 and the author mean was 5.29, while politics with no location tweets received a tweet average rating of 4.25 and for author credibility 4.42, after doing the t-test ($p<0.001$) for both tweet and author credibility. For science there was no statistically significant impact between the two groups. In Entertainment tweets we found tweets with location had higher means than tweets with no location for both tweet and author credibility rating. Refer to Figure 6.

We followed the same procedure for User Name and Image level but we did not find any statistically significant impact.

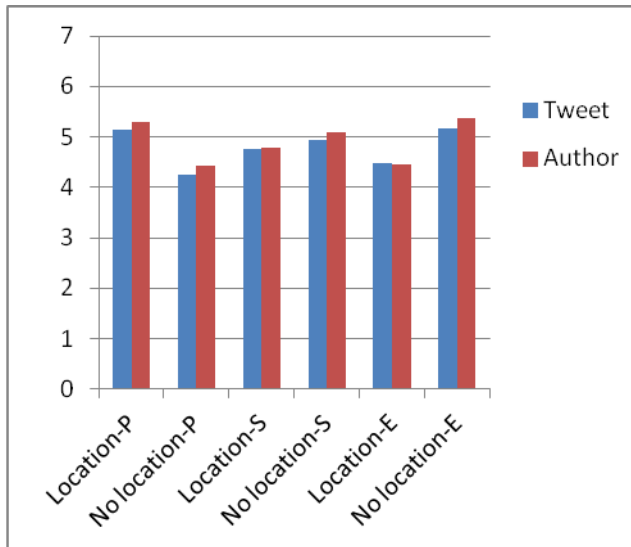


Figure 6. Users believed politics tweets more with location (P for Politics, S for Science and E for Entertainment).

6. CONCLUSION AND FUTURE WORK

In this work we studied four different factors that influence user credibility judgments with a particular focus on location factor and its relationship with other factors. We examined two research questions:

- 1- What affects user perceptions of credibility?
- 2- How does tweet location affect credibility?

We found that Twitter users believe politics tweets that include event location more than those which do not include location.

This study is a preliminary part for analyzing the problem in hand. For a future work, he would expand the size of the dataset to be able to build automatic classifiers for predicting credible tweets. Another part could be trying to validate the high correlation between tweets and author credibility reported earlier.

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