

# Analysing and Assessing the Credibility of Information on Twitter

K.S.S. PRITHVI<sup>1</sup>, Y. VIJAYALATA<sup>2</sup>

<sup>1</sup>CSE Department, GRIET, Hyderabad, Telangana, India.

<sup>2</sup>Professor, CSE Department, GRIET, Hyderabad, Telangana, India.

E-mail: [prithvikolachena@gmail.com](mailto:prithvikolachena@gmail.com) [vijaya@ieee.org](mailto:vijaya@ieee.org)

## Abstract

*Information being an important aspect for the readers to know about the various things that are happening around them. It has become a herculean task to distinguish between the credible information and non-credible information, from the source where this information has been published. Here we discuss about the online social platforms through which the information has been rapidly spread and shared to one among or in between group of people. This paper mainly focuses on the online social platform twitter where the majority of the users use to share the information between individuals or group of people. The following work will be an attempt to provide the overall view from the previous works conducted, to determine the importance of assessing the credibility of information in twitter.*

**Keywords:** Credibility, Twitter.

## 1. Introduction

In a single day million people across the globe tend to join the online social platforms to know about the various issues that are happening around them in their day to day lives. On an average majority of the people those who join the online social platforms are much more interested towards the Twitter network where the major trending topics can be into limelight quickly. We can here mention an example where there are almost 340 million tweets that are being posted on an average daily. Twitter has become a major hub for news even people living in the disastrous places or crisis can share about their problem through twitter where the others react to it by incorporating their social media into their communication channels. While majority of the messages and the content on twitter are related about the conversations and chatter, people do also use it as a platform to share relevant information and to report news [1]. In many of the prominent cases journalists have also made a note that the speediness of the service where “to report breaking news more quickly” and rapidly than the main sources of the mainstream. The presence of spam, unwanted messages or mails, malware has also become a major concern. Moreover the information in social platforms sometimes might become biased and subjective it all depends on making the perfect decisions [2]. In order to perform surveys through online social networks only the credible information is taken and analyses is performed. Applying conventional models for event detection which are frequently proposed for handling huge, formal and organized documents are inaccurate and less effective, because of the short length, noisiness, and familiarity of the social messages [18]. As twitter is been used for the purpose of the communication in general the communication process has three parts (message cred, source cred and media cred). The recent studies have shown that the twitter can even be used by political parties in order to collect their funds and even appeal to the voters. One important aspect is that the users are turning into gatekeepers so that the information they get from the unauthorized user accounts across all social platforms can be monitored, to know which information is credible and similarly

which information is not credible. In social network platform like twitter the users have started to respond and spread the posts or the tweets that are from a reputable social account user i.e. the authorized author who published particular news or information.

## 2. Related Works

The work related to the credibility of information has been so substantial, this section describes the description of work that was previously carried out. We do provide an outline of the research that has been utmost close to our research. Among the online news portals and blogs have turned to be less trusted than the original traditional news sites that do provide the news that's happening around. A survey which is conducted in 2005 has showed the results that even among the youngsters the news sites are considered as less trustworthy than the actual source of the news media. The reality is that twitter counterpart news stories from traditional media that can be used to exploit Twitter, e.g. in tracking the epidemics [3], detecting the news events [4], geolocations of similar events [5], and find the emerging controversial topics. The concept of credibility is a concept that constantly attracts the attention since the usage of internet has been set about in 1990's where the users are allowed to interchange, communicate and generate the various contents of information with limited source of references available. Namely, social online platforms have been put up that consisted of various many points that are bound together by links that exemplify a certain type of mutual relationship[6],[7]. The importance of the usage of twitter in our society has been increased rapidly and cannot be overstated. One of the very fascinating approach to automatic the assessment of credibility of information was proposed by Gupta et al [8]. Their aim was to assign a score of credibility for each event, so that the events that are most credible do have a higher score. The authors have illustrated a page-rank like concept for the credibility propagation of approach, in order to establish the event credibility. Further research was primarily focused on the analyses of microblog postings that are related to purely trending topics and then classifying them as credible and not credible, basing upon the features that have been extracted from them (as performed by Castillo et al.[9]). At last there has been some research trying to implement the proposed approach in more practical ways possible. One of the interesting system that has been recently studied is the – TweetCred – which was described by Gupta et al. [10] [11]. Where this Tweet-Cred works as a browser plugin and enumerates the credibility of the tweet contents in the near real time. Credibility of users is also considered as one of the important aspect to know the credibility of the information. According to Canini et al. [12] analysed the utilization of the strategies like automated ranking concept to measure the information credibility on Twitter on any particular given topic. The authors define the information is credible when the source of information has the trust and the domain expertise that is associated with it. Ghosh et al [13]. Identifying the topics basing upon experts on Twitter using certain features that are obtained from the list the user-created, completely counting on the wisdom of the people finding the information on Twitter. Popularity is the most important aspect in measuring the users credibility and the content that is being shared by them across the social media. Generally the popularity and credibility are interlinked with one another. Considering an example where many users intend to trust the information that is shared by a Twitter user depending upon the individual following and the followers. In the same way one would just believe a piece of information such as a clip from public domain like YouTube if many views have been registered. By using the same process of popularity idea, there have been some works that use the link based information (e.g. PageRank) for ranking the users and then evaluating them by the content or the information shared by them. Cha et al [14] used the three approaches (indegree, retweet, and mention) to measure and calculate the rank of the users in Twitter.

### 3. Research Methodology

This part of the paper focuses completely on the multiple methods of the credibility analysis which were acquired previously by the researchers who worked on the social media online platforms. The credibility analysis methods can be classified into the automatic methods, human dependent methods and the hybrid derived methods. This classification is based upon the researchers perspectives and their way of understanding the problem. The following three sections have been dedicated to the classification of methods of the credibility analysis that are mentioned above.

#### 3.1 Automation Methods

Assessing the credibility of the information content in the microblogs which are created and dispersed at an anomalous rate has become a crucial task [15]. The resources available are inadequate for the human operative in order to identify the misleading messages that are correlated to globally relevant, significant and are quick altering events. In the latest studies it is analysed that the information credibility on Twitter uses the supervised and unsupervised machine learning techniques and the graph based techniques.

**3.1.1 Machine Learning Techniques:** This section describes about the diverse supervised techniques that are formerly used to perform the process of credibility analysis. These techniques are classified in two categories:

- Supervised techniques, which include the Support Vector Machine (SVM), the Logistic Regression, besides the Linear Regression, and Bayesian Theory, Decision Tree Techniques.
- Unsupervised techniques includes the cluster formation such as k-means process, fuzzy c-means process, or hidden Markov Models concept.

Machine Learning techniques are used in order to complete the tasks that consists of humongous data and tedious for tracking the numerous parameters.

**a. Supervised Techniques:** Majority of the supervised learning techniques do contain the decision trees and decision rules along with SVM's and Bayesian concept algorithms. Castillo et al. [16] are instigators of the assessment of trustworthy on the Twitter platform. They have illustrated these, basing upon the diverse features, using J48 multiple path, the Bayesian Techniques are more related to the basic and the SVM's can be used as a firm measure for trustworthiness of the vital content.

**b. Unsupervised Methods:** Abbasi and Liu[17] have proposed a advanced algorithm known as CredRank to measure and assess the behaviour of the users across the online social platforms and then rank their credibility. The CredRank algorithm helps to categorise the attached members together and then analyse the groups basing upon the number of individuals or members. For example clustering of tweets is done by calculating the similarity of tweet used by the users. The use of CredRank Jaccard Coefficient helps in determining the resemblance of the user behaviour. In the process of conducting their experiment they have utilized a dataset that creped from the US Senate's website and then analysed the association among the users and have found that six highly associated senator's votes. They classified them in the descendent order depending on the number of senator's seats. They asserted that their solution had a wide scale of applications which includes putting an end to the propagation of erroneous news, halting the huge-scale actions, and thwart the inappropriate product illustrations. However the methods have no more showed much effectiveness with the real-case scenarios.

**3.2.2 Graph Based Techniques and Semi-Supervised Techniques:** Lone group of techniques that are presented in analysis of credibility research are based on automation analysis and ranking systems that are based upon the graph based techniques. Modelling the connection among the users, contents, blogging and certain other topics, by using an

algorithm which is similar to PageRank algorithm known as EventOptCA which is used to compute these relations iteratively and then calculate the scores of credibility. The other graph-based techniques are used with semi-supervised techniques to utilize numerous structures that consists of both marked and unmarked amount of test data. Typically the group of methods are stretched up to marks through prepared matrix, where each group consisting both marked as well as unmarked events that are elucidated as node, meanwhile these associations specify the relation between every pair of events.

#### 4. Conclusion

This paper is a part of the ongoing research about the credibility of the information in twitter. We have studied the previously carried out research works regarding the credibility of the information shared in the twitter and how people have worked in identifying the credibility and trustworthiness of a particular information. It is evident that there is much more scope for the improvements of the mechanisms that are being used to determine the credibility of the information, identifying the non-credible information. This paper provides a description of the previous works that have been performed to determine the information credibility in the online social platform Twitter.

#### 5. References

- [1] Dr. Bhoomi Gupta and Shivani Shukla An Analysis of Credibility of Content on Twitter GRD Journals Volume 2 ,issue 5, April (2017).
- [2] Mohammad-Ali Abbasi and Huan Liu Measuring User Credibility in Social Media by Arizona State University (2013).
- [3] Vasileios Lamos, Tijn De Bie and Nello Cristianini Flu detector – tracking epidemics on twitter. Machine Learning and Knowledge discovery in databases. Eurpoean conference, ECML PKDD (2010).
- [4] Jagan Sankaranarayanan, Hanan Samet, Benjamin E. Teitler, Michael D Lieberman and Jon Sperling : TwitterStand: News in Tweets, ACM Gis’09, November (2009).
- [5] Takeshi Sakaki, Makoto Okazaki and Yutaka Matsuo: “Earthquake Shakes Twitter Users: Real-time Event Detection by Social Sensors.” Presented In International WWW Conference April (2010).
- [6] M.-Y. Yeh, Y.-J Lin and C.-T.. “Forecasting participants of information diffusion on social networks with its applications.” Inf.Science, Vol,422,PP. 432-446 Jan (2018).
- [7] Majed Alrubian, Atif Alamri, M. Shammim Hossain and Muhammad Al Qurishi “Leveraging analysis of user behaviour to identify malicious activities in large-scale social networks,” IEEE Trans. On Ind. Informatics, pp. 799-813 Feb (2017).
- [8] Manish Gupta, Peixiang Zhao and Jiawei Han: “Evaluating Event Credibility on Twitter.” Presented In: SIAM International Conference on Data Mining(SDM), pp. 153-164, (2012).
- [9] Carlos Castillo, Marcelo Mendoza and Barbara Poblete: “Information Credibility On Twitter.” Presented In: International World Wide Web Conference , March (2011).
- [10] Krzysztof Lorek, Michal Jankowski-Lorek, Jacek Suehiro- Wicinski, Michal, and Amit Gupta . Automated Credibility Assessment on Twitter (2015).
- [11] Meier P, Kumaraguru P., Castillo C., Gupta A.,: Tweet Cred: A Real-time Web-based System for Assessing Credibility of Content on Twitter. ACM (2012).
- [12] P.L. Pirolli, Bongwon Suh and K.R.Canini “Finding Credible information sources in social networks based on content and social structure”. In: IEEE SocialCom (2011).
- [13] Ganguly, Sharma and et al., K.:Cognos: crowdsourcing search for topic experts in microblogs. In: Proc.SIGIR (2012).
- [14] MeeYoung Cha, Hamed.H, Fabricio Benevenuto, and G.P.Krishna Measuring user influence in twitter: The million follower fallacy. In fourth International Conference of AAAI on Weblogs and social media(ICWSM), (2010).
- [15] Yang Fan, Xiaohui Yu, Yang Liu and Min Yang. “Automatic Detection of Rumor on Sina Weibo” Presented In: ACM Special Interest Group on Knowledge Discovery and Data Mining (2012).
- [16] Carlos Castillo, Marcelo Mendoza and Barbara Poblete “Information Credibility on Twitter” Presented in International World Wide Web Conference Committee (2011).
- [17] Aditi Gupta, Vikram Goyal and Srinaknta Bedathur “A survey on Analyzing and Measuring Trustworthiness of User-Generated Content on Twitter during High-Impact Event”IIIT-D, (2013).

- [18] Yadala Sucharitha, Y Vijayalata, V Kamakshi Prasad Emergent Events Identification in Micro-Blogging Networks Using Location Sensitivity Journal of Advanced Research in Dynamical and Control Systems, 11 (8 Special Issue) (2019).

## 6. Authors



K.S.S.Prithvi, pursuing M.Tech(Computer Science) from department of Computer Science and Engineering at Gokaraju Rangaraju Institute of Engineering and Technology, Hyderabad. He completed B.Tech in Computer Science and Engineering from NRI Institute of Technology, Vijayawada. His areas of interests are Machine Learning, Data Mining and Big Data Analytics.



Dr Y Vijayalata, an academican with more than 23 years of teaching and research experience, is a Professor in Department of Computer Science & Engineering and Dean at Gokaraju Rangaraju Institute of Engineering & Technology, Hyderabad; completed Ph.D. from Jawaharlal Nehru Technological University Hyderabad. She earned M.Tech in Computer Science from BITS, Ranchi.

Dr Y Vijayalata's area of research includes Image Processing, Cloud Computing and Big-Data Analytics. She have published more than 25 papers in various journals and conferences. She also mentored TCS student internships at GRIET.