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Features for Measuring Credibility on Facebook Information

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***Abstract*—**Nowadays social media information, such as news, links, images, or VDOs, is shared extensively. However, the effectiveness of disseminating information through social media lacks in quality: less fact checking, more biases, and several rumors. Many researchers have investigated about credibility on Twitter, but there is no the research report about credibility information on Facebook. This paper proposes features for measuring credibility on Facebook information. We developed the system for credibility on Facebook. First, we have developed FB credibility evaluator for measuring credibility of each post by manual human's labelling. We then collected the training data for creating a model using Support Vector Machine (SVM). Secondly, we developed a chrome extension of FB credibility for Facebook users to evaluate the credibility of each post. Based on the usage analysis of our FB credibility chrome extension, about 81% of users' responses agree with suggested credibility automatically computed by the proposed system.

***Keywords*—**Facebook, social media, credibility measurement.

I. Introduction

SOCIAL media is user generated content. Users can share messages, images, videos, or link of websites. This content will be news, events, or some opinion. Social media has many types such as Facebook, Twitter, LinkedIn, Pinterest, Google+, and Instagram. Facebook is the most popular social networking site in Thailand and in the world. Facebook users can update status that can be a personal message or webpage link. Users can modify the description of the link before posting. Moreover, users can upload photos or videos. To be a friend of a Facebook user, one needs to request that user first, and he/she will be a friend if that user accepts that request. By default, friends can see posts of one another if there is no customized privacy setting.

Credibility on social media is an import part because information can rapidly spread online. Many users share fake news or misinformation without considering its credibility or spending time to check whether the truth of the information. Many researchers have developed the system for credibility measurement on Twitter information. The problem of the credibility of Facebook information has faced more challenges than that of Twitter. First, it is easier to access Twitter content via Twitter API. Although Facebook has Graph API that has the capability to access content, Facebook restricts the information access via Graph API. Secondly, Facebook has many more active users than Twitter has. In June 2014, there were 1.28 billion Facebook active users while there were 255 million Twitter active users [1]. Lastly, compared with Twitter, Facebook has richer features, such as the feature that allows users to click like and to comment. Posts with a large number of likes and comments will easily be viewed and shared by friends.

There is some existing research about credibility information on popular social networking sites, such as Twitter. But there has not been one that focuses on computing the credibility score for the information on Facebook, which has many more number of users.

This paper presents features for the measurement of credibility information on Facebook. We have implemented the proposed algorithm as a Google chrome extension called FB credibility, which is available on Chrome web store for free.

The remaining of this paper is organized as follows. In the next section, we review related work. In Section III, we provide the tool design and methodology. Section IV presents the experimental result and discussion. Section V concludes our work and gives some future work.

II. Related Work

Credibility computation in social media can be classified in two categories, which are Web-page-independent and Web-page-dependent. Web-page-independent uses messages in social media for computing credibility by comparing the messages with trusted news sources. If the message is similar with trusted news sources, the credibility score of the message is high. The advantage of this method is that the computation is independent from social media types. However, the main drawback of web-page-independent is that some topics may be found a few in trusted news sources, and thus make the computation is likely incorrect. The second drawback is that its poor capability in understanding the semantics of the news. The other important drawback is that it cannot handle with the media such as videos or images. On the other hand, web-page-dependent approaches use features of each social media for computing credibility such as like, comment, and re-tweet. The advantage of this approach is that it attempts to understand the meanings of the media. However, the main drawback of web-page-dependent is that this algorithm is dependent on social media types. Different social types need to have different appropriate algorithms to compute the credibility scores.

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A. Web-Page-Dependent

One of the popular methods is to exploit the features of social media, such as like, share, or retweet, for computing credibility. Morris et al. [2] conducted a survey for finding credibility on Twitter and indicated that many features of Twitter have impacts on the credibility rating. They used three groups of features, which include message topic, user name, and user image. They found that message topic and user image did not significantly impact with credibility while user name type did. Retweet had an impact on credibility, but this feature is not available to compute the credibility on Facebook information because Facebook does not have such feature. On the other hand, like Twitter information credibility problem, we also take into account the feature having URL for Facebook information credibility problem.

Castillo et al. [3] applied J48 decision tree measurement credibility of Twitter. The output of the system was divided into credible and not credible. The proposed system received precision and recall about 70%-80%. Compared with our proposed work, this related work differs from our proposed work in two aspects 1) they used different machine learning techniques while we used only SVM and 2) they focused on computing measurement credibility of Twitter information while we focused on that of Facebook information.

Gupta et al. [4] proposed to solve the credibility on Twitter information by using Pseudo Relevance Feedback (PRF), which is an information retrieval technique for improving performance of query. The output of this related work was the ranking from 0 (not credible) to 4 (credible). It has been found that the performance of ranking algorithm was improved by using PRF technique. Like this related work, we also use the features of social media to compute the credibility of its data.

Gupta et al. [5] measured the credibility of images, which were posted during hurricane sandy. They proposed two algorithms, which were Naïve Bayes and J48 Decision Tree for detecting fake image. They received 97% accuracy in predicting fake images from real.

B. Web-Page-Independent

This approach does not use any feature for measurement credibility, but compares content with trusted news sources by using Natural language processing (NLP). It enables computer to understand human languages such as comparing two documents similarly. However, in practices, this approach is unsuitable for social media data, which has not only text, but also images and videos.

Al-Eidan et al. [6] proposed the measurement credibility on Twitter with Arabic text content. They use bag-of-word comparing Twitter content in Twitter trusted news sources. They received average precision and recall as 0.52 and 0.56 respectively.

Ikegami et al. [7] tackled the problem of the credibility measurement on Twitter at Great Eastern Japan Earthquake in 2011 event. They used count opinions in each post. If a user received several positive opinions with his/her post, the credibility of that post would be high. The result of their proposed approach is more than 0.6 in kappa statistics between their method and human score.

C. Chrome Extension for Twitter

TweetCred [8] is a real-time, web-based system to assess credibility of content on Twitter. TweetCred provides a Chrome extension tool to give the credibility rating from 1 to 7 for each tweet. The score is computed using a supervised automated ranking algorithm that determines credibility of a tweet based on more than 45 features, such as the tweet content and external URLs.

The main difference between our proposed work and TweetCred chrome extension is that TweetCred retrieves data from Twitter API. It gets post ID of Twitter and sends back to the server. It calls Twitter API for retrieving complete data from Twitter API, but Facebook does not allow total data access. We thus retrieve Facebook feature data by using Javascript code that parses Facebook page.

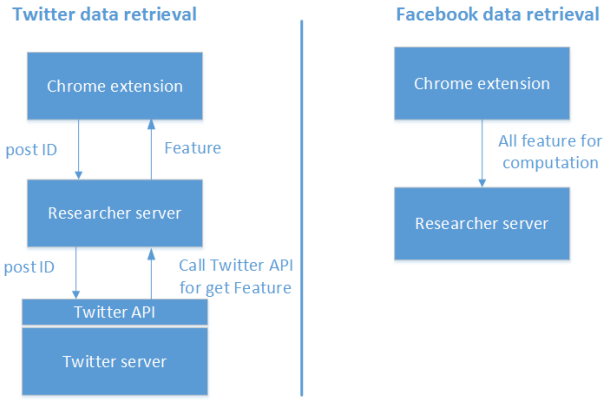

Fig. 1 Comparison between Twitter data retrieval and Facebook data retrieval

Existing researches have focused on the measurement credibility on Twitter content. However, none of them has attempted to compute the credibility on Facebook information. Although both Twitter and Facebook provide API for data access, Twitter API is easier to access all data and less restrict than Facebook. In Facebook, if a developer wants to access some content such as a friend list, he/she needs to submit his/her Facebook application for review in order to obtain permission.

III. Design and Methodology

The system overview is shown in Fig. 2. The proposed system consists of two subsystems, which are FB credibility evaluator and FB credibility. Those systems call at Python server via https by using JSON. Based on the usage of FB credibility evaluator by users, the system creates a model by using LIBSVM [9]. In FB credibility, we retrieved Facebook data to compute the credibility score.

Table I illustrates eight features of Facebook used for computing credibility. The reasons that we chose these features to consider because we can access the values of these features via Facebook graph API and users often set these

distinct features.

TABLE I
FACEBOOK FEATURES FOR CREDIBILITY COMPUTATION

Feature	Description
likes_count	The number of likes
comments_count	The number of comments
shares_count	The number of shared posts
url_count	The number of urls
images_count	The number of images
hash_tag_count	The number of hash tags
vdo_count	The number of videos
is_location	Whether using GPS to indicate the location of this post

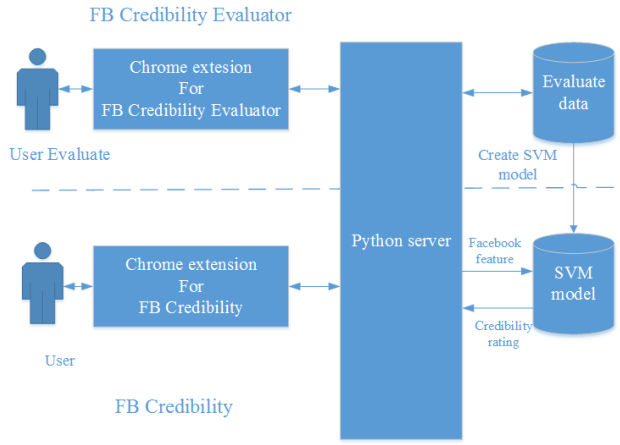

Fig. 2 System overview

A. FB Credibility Evaluator

FB credibility evaluation was developed to evaluate the credibility of each post. An evaluator will select the range of credibility from 1 (the lowest credibility value) to 10 (the highest credibility value) and then click the submit button to send this credibility value selection to the Python server. About 1,427 user post evaluations were used as training data to create a SVM model.

B. FB Credibility

Like FB credibility evaluator, FB credibility is also a Chrome extension tool. However, FB credibility is for general users to perceive credibility of each post in Facebook. Any user can download this extension from Chrome web store at http://bit.ly/fbcredibility. After a Facebook user installs this tool, he/she will see the display of the GUI tool as shown in Fig. 3. As illustrated in this figure, the credibility score is ranged from 1-10. In this figure, the credibility score is 8 as we can observe by the circles with the green color. There are two buttons on the right hand side: “Yes” and “No” to give the feedback whether they agree with the proposed credibility score. If a user clicks “Yes”, that means he/she agrees with the credibility score. On the other hand, if a user clicks “No”, that means he/she does not agree with the credibility score.

Fig. 3 FB credibility GUI

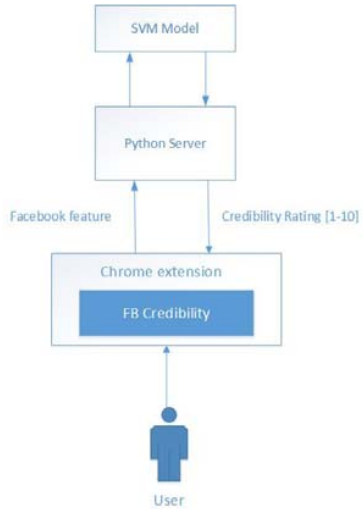

Fig. 4 The overview of FB credibility system

IV. EXPERIMENTS AND RESULT

We have published FB credibility evaluator at http://bit.ly/fbcredibilityeval and FB credibility at http://bit.ly/fbcredibility on Google Chrome web store. Users can install one app per time. There have been 1,348 post feedbacks, and 1,103 records agree with proposed credibility score. This means 81.82% of evaluations agree with the proposed credibility score. Table II illustrates the details of the percentage of disagree, the proportion of the number of posts at each score point out of the total number of posts.

From Table II, we can observe that the small number of posts with low credibility scores. This is because the training data consists of many posts with high credibility scores. Another interesting point from this table is that there is the relatively high percentage of disagree proportion for the credibility score as 10 compared with the percentage of disagree proportion for other credibility scores. This is because there are many advertising posts that contain URLs

and videos for which the proposed system give high credibility. Sample of such advertisement is shown in Fig. 5.

TABLE II
DISAGREE OF EACH CREDIBILITY SCORE POINT

Credibility score	Disagree (%)	Proportion	Disagree Proportion (%)
1	0	0	0
2	0	0.07	0
3	0	0	0
4	0.74	1.48	0.01
5	2.82	7.75	0.21
6	1.19	2.89	0.03
7	0	0	0
8	1.26	6.60	0.08
9	3.12	22.26	0.69
10	9.05	59.12	5.35
Total disagree	**18.18**	**100**	

Fig. 5 Data of Facebook that user disagree with credibility of the system

V. CONCLUSION

This paper presents the system for the measurement of the credibility on Facebook information. We have developed FB Credibility Evaluator and FB Credibility, which are available for free download at Chrome web store. FB Credibility Evaluator is the tool for data collection from users' evaluation. The user evaluation data is then submitted to LibSVM to generate a SVM model based on the training data and selected Facebook features. FB Credibility then uses the model for credibility score prediction. A user can select the buttons Yes/No to agree/disagree with the credibility value of the system. There is 81% of user evaluations agree with the proposed credibility score. We are interested to selectively choose to filter out advertisement posts. In addition, the system should calculate the credibility score of only non-personal messages, especially the ones with have a high impact on the society.

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