Diffusion of Protest Information in Twitter During Shahbag Movement of Bangladesh

Md Hassan Zamir
School of Library and Information Science
University of South Carolina
zamir@email.sc.edu

ABSTRACT
The advent of social media and microblogging tools, particularly Twitter, has been used by the protesters during worldwide social movements as the means of organization, communication and diffusion of protest information. Key protesters play significant roles in the information diffusion process and influence the protest network by disseminating specific types of information. The focus of this work is to investigate how information diffusion takes place in Twitter during social movement. To understand the phenomenon, this poster analyses the tweets of Shahbag Movement of Bangladesh and seeks answers to these questions: who are the influential protesters, what are the properties of the protesters' information sharing behavior. Ultimately, it is founded that the instrumental protesters represent the citizens, journalists and not the government officials. This poster also finds that the protesters demonstrate information cascade behavior during disseminating protest information into the network.

Keywords
Information diffusion behavior, Twitter, social network analysis, social movement.

INTRODUCTION
The availability of Web 2.0 tools and various social networking sites (Facebook, Twitter, etc.) empower citizens by providing a channel for communication and information dissemination. Twitter is primarily used for sharing real-life experiences in connection with elections, disasters, crisis events, sports, entertainment and so on. However, use of Twitter, particularly, during global social movements like Arab Spring and Occupy Wall Street has been revolutionary (Haimson & Cartagena, 2013). Twitter has been deliberately used as a tool for opinion formation, communication and protest organization during social movements. The influential information sources play critical roles during information diffusion process. Large numbers of followers help the influential nodes achieve their target of information dissemination (Tufekci & Wilson, 2012).

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In February, 2013 the protesters of Shahbag Movement, named after the protest site associated with a central location of Dhaka, capital of Bangladesh, started demonstration by demanding capital punishments for all of the country's war criminals. The city wide demonstration converted into a country wide protest once the demands raised by the protesters were not fulfilled which gradually received global media attentions. Political parties got involved into it as the war criminals represent the leaderships of one particular political group. Their supporters started, consequently, counter-protest demanding releases of the accused and convicted leaders (Prokopp, 2013). The protesters started to flock together on Twitter and commonly used '#Shahbag' to tweet for and against the demonstration. Till date the war criminal tribunal issue has not been completely resolved. Although the site has been cleared by the Government agency, the Twitter conversations among protesters still continues.

Despite the use of Twitter for information dissemination and communication is very popular, research reporting about the trends and insights of how protest information is shared in Twitter is limited. Moreover, a report related to the type of information diffusion behavior the protesters expose is also scarce. This poster examines the following research questions:

1. Who are the central figures in the protest network?
2. What interaction patterns are common in the protesters?
3. What type of information diffusion process takes place in the protest network?.

RELATED WORKS
The type of communication channels influence the flow of information (Cha, 2010). Protesters of social movements have strong connections with each other and maintain formal, informal and interpersonal relationships (Cha, 2010). Social networking analysis assists to detect the

personal ties people have with their peers. It also exposes how protesters hear about social movements and what motivates them to participate in it (Wellman, 1999; McAdam & Paulsen, 1993; Snow, Zurcher & Ekland-Olson, 1980). Several studies also examine the role of social media as a communication tool during social movements and apply network visualization and ethnographic methods to understand how information spreads (Haimson & Cartagena, 2013; Wilson & Dunn, 2011). Despite the interests to understand the role social media plays in protests, limited number of research investigate the large scale social media data to analyze the protest based activities which is the focus of this poster.

DATA COLLECTION

Twitter API was used for data collection from the Twitter public timeline. The dataset was created by using both the search term "Shahbag" and the hashtag "#Shahbag" which was observed from 26th to 29th May, 2014. A total of 213 tweeters were found with a total of 713 tweets in those four days. Due to the scope of this poster, it only analyzes the sample collection of tweets out of the actual more than 80 thousands of large corpora till date. NodeXL, a Microsoft Excel network structure software, was employed for data collection. Twitter rate limit challenges researchers how much data can be retrieved in one request(Twitter, 2014). All of these tweets commonly have tweeter's id, followers, retweet counts, edge relationships, posting dates, geographical locations along with the standard NodeXL feature based data. The dataset was collected to investigate the information diffusion activities of the Shahbag protesters.

OBSERVATIONS FROM THE DATASET

Figure 1 displays a densely connected protest network. The tweeters share tweets or retweet among their followers. They maintain direct relationships through sending and sharing similar messages. A retweet graph is generated when a particular tweeter disseminates a tweet produced by others. Like-minded protesters post new items and retweet each other's contents. The graph shows that a large number of protesters are involved in retweeting protest information which ultimately propagates to a greater number of audiences. There are isolates in the network, who generally post and often times retweet their own contents. These nodes do not always follow the mainstream protest information. After reading through the descriptions about the top tweeters' found on their Twitter profile page it was revealed that they represent citizen journalists, and local and international news media. None of the Bangladesh Government posted any tweet about the movement.

Figure 2 exhibits the network of nodes with highest scores of eigenvector centrality, a network measure which generalizes degree centrality by incorporating the importance of the neighbor nodes in the protest network. The nodes have eigenvector centrality from 0 to 0.076. The protester with a score of 0.071 has the largest eigenvector value, which indicates that this protester is the most influential node in the network

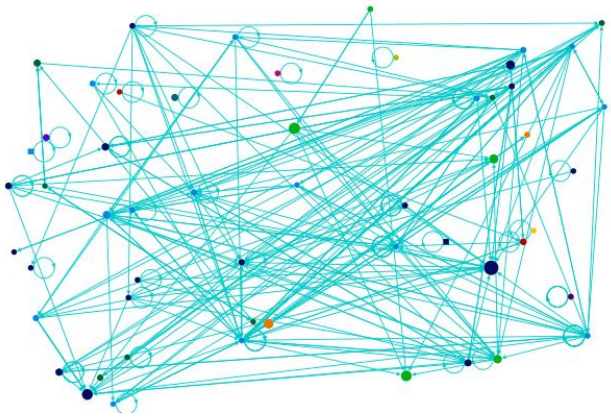

Figure 1: Shahbag Movement Tweeter Network

To identify who controls the flow of information, the betweenness centrality, a centrality measure to compute the number of shortest paths in which user is in the sequence of nodes in the path, is also measured. Figure 3 shows that one of the protesters have 505.778 as betweenness centrality value which means that this particular node or protester is very important because s/he controls the routes of information flow in the network.

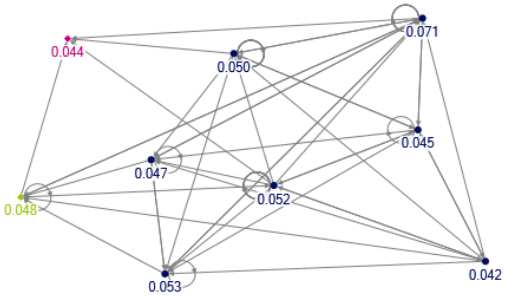

Figure 2: Eigenvector Centrality- who is the most influential protester

Another network measurement strategy is degree centrality

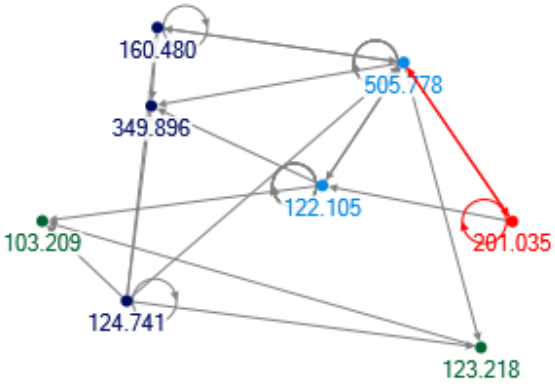

Figure 3: Degree Centrality – who controls the flow of information

which reveals who gets most retweets in Twitter. One of the most commonly used degree centrality measures is to compute in-degree centrality, the number of edges entering to the node. Figure 4 exposes a retweet graph with nodes measured by their in-degree centrality. The protester with an in-degree centrality value of 20 gets most retweets. Most edges points toward that particular node which also denotes that the node is the most important protester in the network. Therefore, the person may be a significant source of information or provides important protest information since his/her messages get re-shared most frequently among the larger groups of protesters.

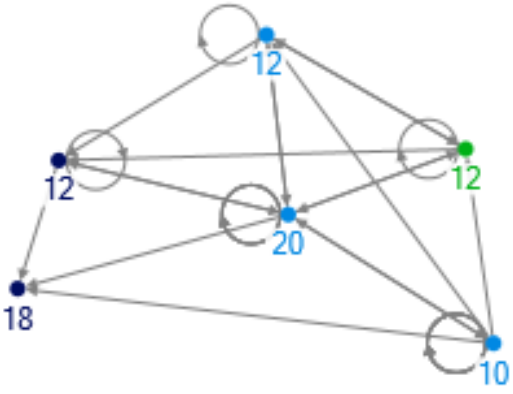

Figure 4: In-degree Centrality- who gets most retweets

To understand what is the common interaction pattern among the nodes in the social media a specific behavior needs to be observed. The network graphs reveal that retweet is the most popular activity among the protesters of Shahbag Movement. Protesters want to reach fellow members of their networks quickly, which may be the reason why retweet is commonly practiced interaction on Twitter.

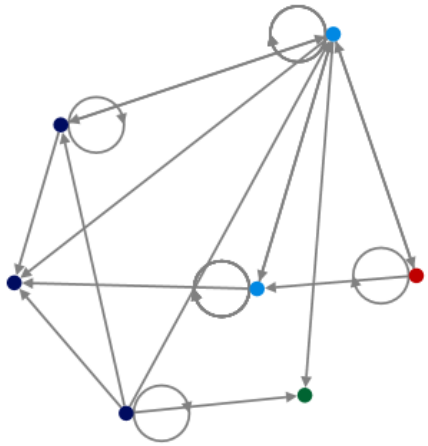

Figure 5: The properties of information cascades in the dataset

The diffusion process signifies specific type of information sharing behavior of the protesters. A sender generally posts a message which eventually may or may not be received by the receivers or followers. The information diffusion process depends on subjective decision making actions. Figure 5 demonstrates that the Shahbag protesters have properties of information cascade behavior, which describes that the protesters propagate information by observing their immediate neighbors or nodes. In an explicit network like Shahbag Movement the protesters observe their nearby strongest nodes' activities and quickly diffuse their tweets to the other followers.

CONCLUSIONS AND FUTURE WORK

This poster investigated on the information diffusion process of the protesters of Shahbag Movement. To understand who are the most influential protesters and control the flow of information, the poster conducted network measures and found that citizen journalists were mainly propagating protest information. Although mainstream news media were involved in broadcasting the movement information, Government representation was absent on Twitter. The poster also identified the nature of information behavior protesters expose during social movement. The Shahbag protesters had the traits of information cascades. They were reposting contents posted by their friends and followers. They were propagating information in the network by observing their immediate neighbors or friends.

The contribution of the current work is a set-piece for understanding the insights about social movement information diffusion in Twitter. This is a segment of a work in progress which is required in order to robustly comprehend and analyze how social media, particularly Twitter, is facilitating or impeding social movements. The ultimate goal of this research is to design an information system to track, analyze, and visualize global social movements by utilizing large scale real time tweets. Such system will be utilized to report quickly about any social protest, and, eventually, it will facilitate the mitigation of social havocs.

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