Analysis of Community Response to Disasters through Twitter Social Media

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Abstract. Disasters that occur in a place can give a variety of reactions in the community. Social media users, the dissemination of Twitter with followers, makes it easy and fast to share emergency information like a disaster. Some disasters often occur in Indonesia, such as earthquakes, volcanic eruptions, weather anomaly, and flooding. To find out the public response to an accident, researchers conducted twitter data crawling on July 26, 2019, to July 29, 2019, using the keyword "gunung tangkuban parahu erupsi", crawling data produced a dataset of 14,045 records. This study calculates the number of tweets before the disaster, to several days after the accident. The results of the survey indicate the response of the community to disasters relatively increased on the first day of the crash and decreased after two or three days after the disaster.

1. Introduction

Disasters that occur in several places can give various reactions among the public, including social media users, the use of social media such as Facebook, Twitter, and LinkedIn. Dissemination of information such as Facebook with Facebook Friends, Twitter with followers makes it easy and fast to spread news, both regular moving information, business, politics, to emergency information such as disasters [1], [2]. Some of the tragedies that often occur in Indonesia, such as earthquakes, volcanic eruptions, weather anomalies, and floods.

Some disasters occur, society react in various ways, one of them with social media Twitter, this research analyzes how the community response to emergencies, when the time spent tweeting also counts tweet every hour within a specific time frame.

Social multimedia is currently pervasive online; people were making or posting, sharing, or sharing throughout the day all grow into a row of information that can be processed that requires computing and network processing for data processing [3]. To get the data you need, the process that is done is Crawling data on Twitter. Crawling is a worker to find, download, and store data [4].

To find out the public response to an accident, researchers conducted twitter data crawling on July 26, 2019, to July 29, 2019, by crawling data on twitter with a predetermined time. Because counting the number of tweets based on the time it is necessary to convert the time from Greenwich Mean Time (GMT) to the time in Indonesia, namely at GMT+7. At the time calculation is done the addition of seven hours from GMT.
2. Literature Review

A. Twitter and Social Media
The increasing use of smartphones and data usage and high connectivity in the popularity of social media. The tendency of users to share the latest news and opinions about social media platforms for them is an essential source for getting real-time news and reactions [5]. Social media can solve coordination problems between users and also increase the effectiveness of social campaigns, including sharing information about disasters [6]. Every minute, millions of tweets are posted, which varies significantly according to the topic area [7]. Including disasters became a hot topic discussed on social media.

Microblogging is a rapidly growing new trend on the Internet. Traditionally blogs have been long posts that take many minutes to write. Microblogging enables users to post short musings or information within moments. Thus, microblogging platforms such as Twitter are a great way to discover what people think to do and communicate [8].

B. Twitter API and Crawling (Data Extraction)
Twitter offers an Application Programming Interface (API) that is easy to crawl and collect data [9], this research conducted twitter data crawling on July 26, 2019, to July 29, 2019, crawling data produced a dataset of 14,045 records. Crawling is done to get resources from social media in the form of simple text or data [3].

C. Data Preparation
The preparation of the data is concerned with obtaining, cleaning, normalizing, and transforming data into an optimized dataset [10] and also part of an analytics process [11].

D. Data Exploration
Data exploration is about efficiently extracting knowledge from data even if we do not know exactly what we are looking for [12].

E. Data Visualization
Data visualization described herein can be utilized to organize and visually represent data [13]. Visualization can also be referred to as engineering in making drawings, diagrams, or animations and even mapping for the appearance of information [14].

3. Methodology
In this study, the authors used empathic research methods, which consisted of Data Extraction, Data Preparation, Data Exploration, and Data Visualization. Figure 1 shows the research method chart.
Data Extraction

At this session of Data Extraction is the stage of crawling data sets taken from Twitter user tweets on July 26, 2019, until July 29, 2019, by using the keyword "Gunung Tangkuban parahu erupsi" crawling data produces a dataset of 14,045 records. Crawling results on Twitter are saved in comma separated values (CSV) file format.

Data Preparation

At this stage, the selection of data will be processed, crawl data that has been obtained, such as Tweets, Users, User_Statuses, users_followers, User_location, user_verified, fav_count, rt_count and tweet_date. In this study only the tweets data, tweet_date will be used. The tweet_date data contains data of time tweet, so particular calculations are required to get the tweet time.

In the third stage, the dataset is processed to get the number of tweets per hour from the 26th to the 29th of July 2019, so that it can be seen the activities of Twitter users about the Mount Tangkuban eruption.
Data on July 29, 2019, shows that the response of Twitter users about the eruption of Mount Tangkuban Parahu began to decrease, so starting from 09.00 a.m. to 23.00 p.m. no more visible tweets related to the explosion of Mount Tangkuban Parahu. Visualization of tweet data on July 29, 2019, can be seen in Figure 13.

Figure 3. Graph of tweets on July 28, 2019

Figure 4. Number of tweets on July 29, 2019
Figure 5. Graph of tweets on July 29, 2019

From each graph, it can be seen that the number of tweets occurred on the first day of tweets, on July 26, 2019, around 17:00 to 18:00 hours totaled 3,778 tweets, tweets continued to decrease until the date change.

4. Result and Future Work

The results of the survey indicate the response of the community to disasters relatively increased on the first day of the crash and decreased after two or three days after the disaster. To see up and down the number of tweets, every time combined the number of tweets from July 26, 2019, to July 29, 2019. from the resulting graph, it appears that the highest number of tweets on the first day of the disaster occurred and continued to decline on the third day.

Figure 6. Graph of all tweets
For further research carried out in-depth analysis on the location of the tweet, how many retweets to build disaster management to facilitate assisting disaster victims.

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