

## Detection of Flood Hazard Information with Social Media: Case Study of the Kinu River Flooding in 2015

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**Abstract:** Recently social media has been used widely during a disaster for emergency response, but the reliability of the information on social media is a concern for the application to disaster management. This study analyzes Twitter results during the Kinu River flood event in 2015 and to detect flood hazard information by regulated sample survey. The results from Twitter indicate that most of the tweets are relate to inundation situation during the flood.

**Keywords:** twitter, Kinu River, flood, hazard information, inundation

### 1. Introduction

Together with the development of the Internet and mobile devices, social media users are significantly increased in recent years. With the rapid development, social media has become important during a disaster. Social media is use as a platform for communication between people inside and outside of disaster area. Moreover, social media can use as a real-time communication channel for people inside disaster area to grasp disaster damage information and decision making on evacuation. Since 2007, social media had been used in San Diego Fires (Peary et al., 2012). During the disaster Twitter was newly popular used inside and outside fire zones, information on safe zone locations and supplies was mashuped with Google maps and aggregated by outside users. During Great East Japan Earthquake in Japan in 2011, Facebook and Twitter were used as a lifeline for directly affected individuals (Peary et al., 2012). Nowadays, social media has been used widely use in spreading the news rapidly and efficiently to the people, but the rumors

and misunderstanding might also happen.

Hence, the reliability of social media information for disaster management application has to be assessed. Thus, this study determines hazard information from social media by case study of Kinu River floods and Twitter use as the target social media.

### 2. Methodology

#### 2.1 Study area

Kinu River is a river in the main island of Honshu in Japan and the area of the river is 1,760 km<sup>2</sup>. It is the longest tributary of the Tone River. On 10 September 2015, there was an overtopping happened and the levee was breached broke around 12:50. This flooding causes one people dead and 27 people injured in Joso city; many houses were flushed away by the water, and countless houses were affected in this flood.

#### 2.2 Data Harvesting

In order to detect data from the Kinu River flood, 3 data sources were used as following:

##### a) Twitter APIs

A part of the data obtained from Twitter APIs by using REST APIs and Streaming APIs. REST APIs provides programmatic access to read and write Twitter data. Moreover, Streaming APIs continuously deliver new responses to REST APIs, tweets from Streaming APIs are approaching real time data and REST APIs can collect historical data.

##### B) Advanced search on Twitter website

A major part of the data that had been obtained are from advanced research. Many subjects were set to search for the tweets related to the flood event. (Refer

Fig 1)

c) DISAANA

DiSAaster-information ANalyzer (DISAANA) for Social Network System (SNS) developed by National Institute of Information and Communications Technology for the Tohoku Flood Disaster data in the period from September 10 to September 12. Users can obtain data by providing a certain question or search in the system.

### 2.3 Data analysis

Refer to the chosen samples, what are the concern in those tweets and the hazard information tweets by Twitter users have been selected based on a regulated sample survey. Moreover, suitable keywords for efficient information harvesting will be identified.

### 3.Results and Conclusion

The results shows 57.6% users post a tweet without adding photo, and 42.7% users posting tweets with photo. The importance of tweets with photo is to let the other users have a clear understanding of the situation of a flood event.

Fig. 2 shows the most concern tweets is inundation situation which is 45%. Apparently there was only 7% of tweets related to the residents' anxious towards floods. Moreover, tweets that concern about disaster damage information, rescue information and evacuation information are averagely same which are 14%, 13% and 12% for each.

In the conclusions, this study shows Twitter user concern the most during flood event is inundation situation.

### References

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Fig. 1 An example of harvested tweets

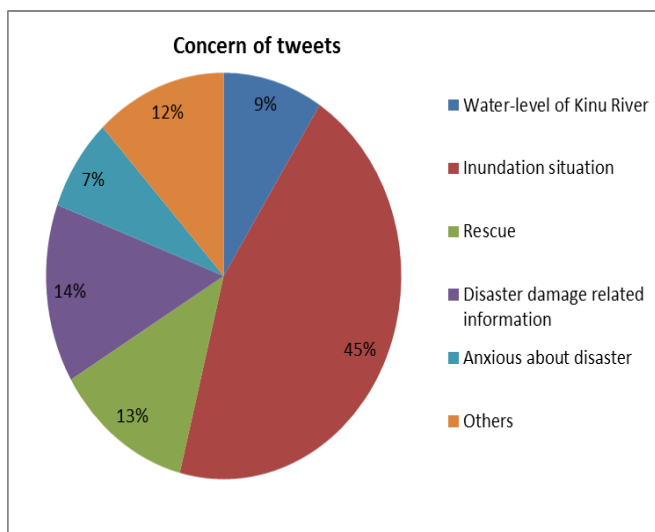


Fig.2 Concern of tweets