第 I 部門 Detection of Flood Disaster Information by Social Media and Its Reliability

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1. Introduction

Recently social media can be used as a communication tool for residents in disaster areas to obtain the latest information and possibly for affected people's decision on the evacuation, but rumors and misunderstanding might also happen.

For the effective use of the social media on disaster risk reduction, it is very important to analyze what kind of messages are posted during disaster events. Moreover, the reliability of social media information should be well investigated. With this background, this study analyzes posted messages on Twitter during the Kinu River floods in September 2015 to understand how local information conveyed through social media.

2.Study area

The Kinu River is the longest tributary of the Tone River. On 10 September, 2015, there was an overtopping happened around 6:00 am and then levee was breached around 12:50 in Joso City.

3.Methodology

3.1 Data Harvesting

This study used the following three data sources to detect tweets during the Kinu River flood: 1) Twitter Application Programming Interface (APIs); 2) Advanced search on Twitter web page; and 3) DISAaster–information ANAlyzer (DISAANA).

3.2 Non-Probability sampling

several rules were set for taking samples by using non-probability sampling methods: 1) information representing experience of the target flood event, 2) first-hand information showing damages caused by the flood, 3) first-hand information indicating current water depth or inundated area, 4) first-hand information related to rescue and evacuation, 5) information on inundation sent by close friends or families, 6) information on infrastructure or equipment damages caused by flood, and 7) information related to precipitation, weather, or flood hazard map. As a result, 114 tweets were detected.

3.3 Data analysis

The tweets were analysis based on the following rules: 1) what are the messages in tweet content, 2) tweets content related to user or others, 3) tweets posted in real time or not, 4) users attitude reflected in tweets, 5) if tweets related to inundation situation, categorize the tweets with clear inundated location or not and clear water depth or not, 6) if tweets related to rescue, categorize the tweets that call for help or provide rescue related information with/without specific locations, 7) tweets related to damages, and 8) tweets related to evacuation center or shelter and evacuation advices or not.

4. Discussions

4.1 Summary of tweets

In the 114 tweets, the most proportion of the messages was related to inundation information (46/114), followed by damaged-related

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information (24/114). The third highest proportion was water-level information (22/114). Rescue information also mentioned in tweets (15/114).

4.2 General characteristics of the collected tweets

Photos during the flood event were posted about 43% of the total tweets. However, there are 57% of tweet were posted without photos. 50% of the posted tweets were related to users themselves. Generally, they can be considered as the first-hand information with comparatively high reliability.

During disasters, on-time information is very valuable. Although there are 47% of tweets posted by indicating time in tweet contents, only 32% tweets were posted in real time.

4.3 Inundation information

Inundated location and water depth are clearly shared in 23% of the tweets. If these tweets are well shared among residents, they may provide clear image of the hazard areas and possibly raise the awareness of the immediate risk (Fig. 1). The other 23% tweets posted with clear location but without inundated water depth, which only provides residents with information on the risky 55% of tweets places. However, provides inundation-related information but without location information.



Fig. 1 Inundation information from tweet post

4.4 Rescue information

Among all rescue-related information, 20% of the tweets call for help with specific locations. The other 20% tweets call for help without a specific location. Outsiders who provide rescue-related information with specific location and without a specific location are 7% and 53%, respectively.

- 5. Conclusions
- Many people report their local flood situations. 46/114 tweets were related to inundation information.
- Well-positioned tweets accounting for 46% of the inundation-related tweets showed good agreement with flood hazard information provided by the GSI.
- Regarding the timing of posting tweets, only
 32% users posted real-time situation.
- Rescue requests, train services stopped and road blocked information were also posted which may be useful for emergency response for residents and rescuers.

6. Recommendations

- To make the social media as an effective source of flood disaster information, it is ideal that people post inundation situation with specific locations and geotag information.
- To obtain adequate inundation information on decision making, it is efficient for searching 'inundation' and 'location' on the DISAANA system which can display inundation information on a map.
- To request help from social media, it is recommended to mention situations and places as precisely as possible.

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