

# Regional Analysis of User Interactions on Social Media in Times of Disaster

Takeshi Sakaki  
The University of Tokyo  
sakaki@weblab.t.u-  
tokyo.ac.jp

Fujio Toriumi  
The University of Tokyo  
tori@sys.t.u-tokyo.ac.jp

Kosuke Shinoda  
Riken  
kosuke.shinoda@riken.jp

Kazuhiro Kazama  
Wakayama University  
kazama@sys.wakayama-  
u.ac.jp

Satoshi Kurihara  
Osaka University  
kurihara@ist.osaka-  
u.ac.jp

Itsuki Noda  
National Institute of Advanced  
Industrial Science and  
Technology  
I.Noda@aist.go.jp

Yutaka Matsuo  
The University of Tokyo  
matsuo@weblab.t.u-  
tokyo.ac.jp

## ABSTRACT

Social media attract attention for sharing information, especially Twitter, which is now being used in times of disasters. In this paper, we perform regional analysis of user interactions on Twitter during the Great East Japan Earthquake and arrived at the following two conclusions: People diffused much more information after the earthquake, especially in the heavily-damaged areas; People communicated with nearby users but diffused information posted by distant users. We conclude that social media users changed their behavior to widely diffuse information.

## Categories and Subject Descriptors

J.4 [Computer Applications]: Social and behavioral sciences

## General Terms

Human Factors, Measurement

## Keywords

Twitter, online social network, information diffusion, disaster situation, earthquake, regional analysis

## 1. INTRODUCTION

During a disaster, collecting information is important to save lives. Victims require information about shelters or especially dangerous points. Furthermore, rescuers require information such as victim locations or the availability of supplies.

Social media attract attention for their information sharing capabilities, especially Twitter, which is one hugely popular social medium that is used during disasters [1],[2]. By

analyzing interaction behaviors on Twitter, we can estimate how people use social media during crises.

In the previous research, we revealed that the use of Twitter was different from area to area [3]. In this paper, we focus on regional differences in user interactions of Twitter during the Great East Japan Earthquake that occurred at 14:46 on March 11, 2011.

We prepared a dataset of tweets by crawling those posted by 1.3 million Japanese Twitter users from March 7 to March 23. We collected 362,435,649 tweets, which were posted by 2,711,473 users.

## 2. REGIONAL ANALYSIS OF USER INTERACTIONS

In case of the Great East Japan Earthquake, the degree of damage caused by it varied depending on the area. We assume that the variety affected the user interaction on Twitter. Therefore, we performed a regional analysis of user interactions on it around the earthquake.

First, we extracted location information of Twitter user and selected target areas for analysis. Second, we analyzed the changes in the number of replies and retweets. Third, we compared them based on the distance between the users making interactions.

### 2.1 Regional Information on Twitter

We estimated user locations from their Twitter profiles and analyzed the user interactions by prefecture based on it. However, showing all analysis results is difficult due to space limitations. We chose five representative prefectures based on the degree of damage (Table 1).

We compared the following two types of user interaction:

- Reply : messages for a specific user. We treat a reply as *communication interaction*.
- Retweet : messages to diffuse a tweet to followers. We treat a retweet as *diffusion interaction*.

