

Location based tweets with standardized Hashtag for post disaster information management

Suman BARAL, Shashish MAHARJAN, Ram SHRESTHA, Suresh MANANDHAR

**shumanbaral@gmail.com, shashish@ku.edu.np,
sendmail4ram@gmail.com, sureshmdhr@gmail.com**

Key words: post disaster information management, hashtag, location based service, twitter

SUMMARY

Aftermath of any disaster, the news breaks out, thousands of tweets with dozens of hashtags will be published. National and international humanitarian communities keeps on blogging facts and ficitons. But it would have been synergetic if we had some standards regarding the post and use of hashtags. Our focus is towards the use of standardized hashtagged and location aware tweets for filtering big data and analytics visualizaiton.

The methods we are using has been rarely used for disaster management as the components(twitter, streaming api, data analytics and visualization) are either used in single or not used all of it at a time. The streaming of filtered tweets from big data to own server is an important for analytics.The spatio-temporal visualization plays an important role while managing by answering where, when and how to of action.

The simulation by Geospatial Lab,Kathmandu University, witnessed an increase of 69 percent in sharing location by users after ten minutes of orientation. And 100 percent wasusing standard hashtags. Moreover, it's real time analytics under own server's database. Imagine how much information would have been gathered with thousands of multimedia posted frequently on the internet. With just an awareness and the big data will no more be a problemfor filtering and analytics. It becomes an important tool in saving thousands of lives and sharing happiness among millions.

1. INTRODUCTION

When 7.8 magnitude earthquake hit Nepal on 25th April, 2015, the glib information cropped up here and there like a fume. The bloggers and social networkers flooded their wall with information. Although these are the best medium to disseminate information but the main concern is about the standardization and place of origin of information. Twitter defines it mainly by the use of location and hashtag. Hashtag is a

Baral Suman, Maharjan Shashish, Shrestha Ram and Manandhar Suresh 1/9
Location based tweets with standardized hashtag for post disaster information management

FIG – ISPRS workshop, 2015: International Workshop on Role of Land Professionals and SDI in Disaster Risk Reduction: In the Context of Post 2015 Nepal Earthquake.

Kathmandu, Nepal, 25th-27th November, 2015

meta-data of any tweet which is created by hash sign (#) followed by the related keyword e.g. #disaster. It helps easily identify conversations related to a given topic. On the other hand location is a set of latitude and longitude attached defining it's origin.

The standardization of hashtags has a short history. #RescuePH began in August 2012 as a private crowd-developed Twitter-classification system for Filipinoflood victims (Hashtags standards for emergencies, 2014). Similarly, UNOCHA(United Nations Office for the Coordination of Humanitarian Affairs) in collaboration with Qatar Computing Research Institute (QCRI) published a publication on hashtag standardization. With this appeal, a trend started in hashtag standardization. Geospatial Lab, Kathmandu University's hashtag standardization is based on the OCHA hashtags for emergencies,2014.

Hitherto current twitter hashtag landscape, the information gets flooded. For example there were more than 5,500 tweets per second about the disaster after the 2011 Japanese tsunami (Crisis Communication Management, 2012). Similarly, after 2015 Nepal earthquake on 27th April between 6:06 pm to 6:10 pm(Nepal standard time), there was 5012 tweets including hashtags #Nepal and #PrayForNepal. With this big data, the information seems useless and nowhere in use. The better method is the proactive use of standardized hashtags. This helps in disaster relief, response and recovery by filtering and adding threshold to it. For example, Geospatial Lab, Kathmandu University had proposed standard hashtags for earthquake : #EqNp- for indicating an earthquake in nepal, #EqNeedNp- for indicating need in certain area etc. Our initiative was the use of standardized hashtag and location based service for standardizing the tweets along with defining it's origin. The location service is optional and can be used by GPS or data service. This is an attempt to manage and extract information from big-data.

Moreover, the major challenge is turning tweet into information; the tweet is foremost here. So, the tweets get extracted and streamed into our database by twitter streaming api 1.1. It extracts the real time tweet from twitter database. After availability, the data visualization helps the relief, response and recover by volunteers and concerned stakeholders to act accordingly without conflict and repetition. This issue can be addressed by analytics in the form of interactive map, table and graph.

2. METHODOLOGY

The process of disaster information management starts with a hashtag standardization and enabling location based services. We have developed a hashtags standards for disasters. The system process has been categorised into 5 subparts:

Baral Suman, Maharjan Shashish, Shrestha Ram and Manandhar Suresh 2/9
Location based tweets with standardized hashtag for post disaster information management

FIG – ISPRS workshop, 2015: International Workshop on Role of Land Professionals and SDI in Disaster Risk Reduction: In the Context of Post 2015 Nepal Earthquake.

Kathmandu, Nepal, 25th-27th November, 2015

2.1 Hashtag Standardization

The hashtag is based on the idea of standardization by UNOCHA with some local modifications. The formational technique can be modified with any disaster. The idea is simple by just replacing disaster name with the short code of disaster.

Table 1 Disaster and their short code

Disaster name	Short code
Earthquake	Eq
Landslide	Ld
Flood	Flood
Swine Flu	SFlu

Table 2 Hashtag and their formation technique

Hashtag	Description	Formation technique
#EqNp	Earthquake in Nepal	Disaster name + Country code
#EqResponseNp	Public response for earthquake in Nepal	Disaster name + Response + Country code
#EqNeedNp	Need in field/hit area of earthquake in Nepal	Disaster name + Need + Country code
#EqImpactNp	Earthquake's impact (damage) in Nepal	Disaster name + Impact + Country code
#SafeEq	Safe from earthquake	Disaster name + Safe

2.2 Tweet

Tweet using standard hashtag and location. It may be retweet or reply as well. It is a sign that a particular piece of information is important.

2.3 Streaming

”The Streaming APIs give developers low latency access to Twitter’s global stream of Tweet data. A proper implementation of a streaming client will be pushed messages indicating Tweets and other events have occurred, without any of the overhead associated with polling a REST endpoint.”(Twitter Streaming, 2015) We set the track

Baral Suman, Maharjan Shashish, Shrestha Ram and Manandhar Suresh 3/9
Location based tweets with standardized hashtag for post disaster information management

FIG – ISPRS workshop, 2015: International Workshop on Role of Land Professionals and SDI in Disaster Risk Reduction: In the Context of Post 2015 Nepal Earthquake.

Kathmandu, Nepal, 25th-27th November, 2015

and it gets fetched to our database. For example, if we have set the tracks #EqNp and #EqNeedNp, it will stream only tweets including these hashtags.

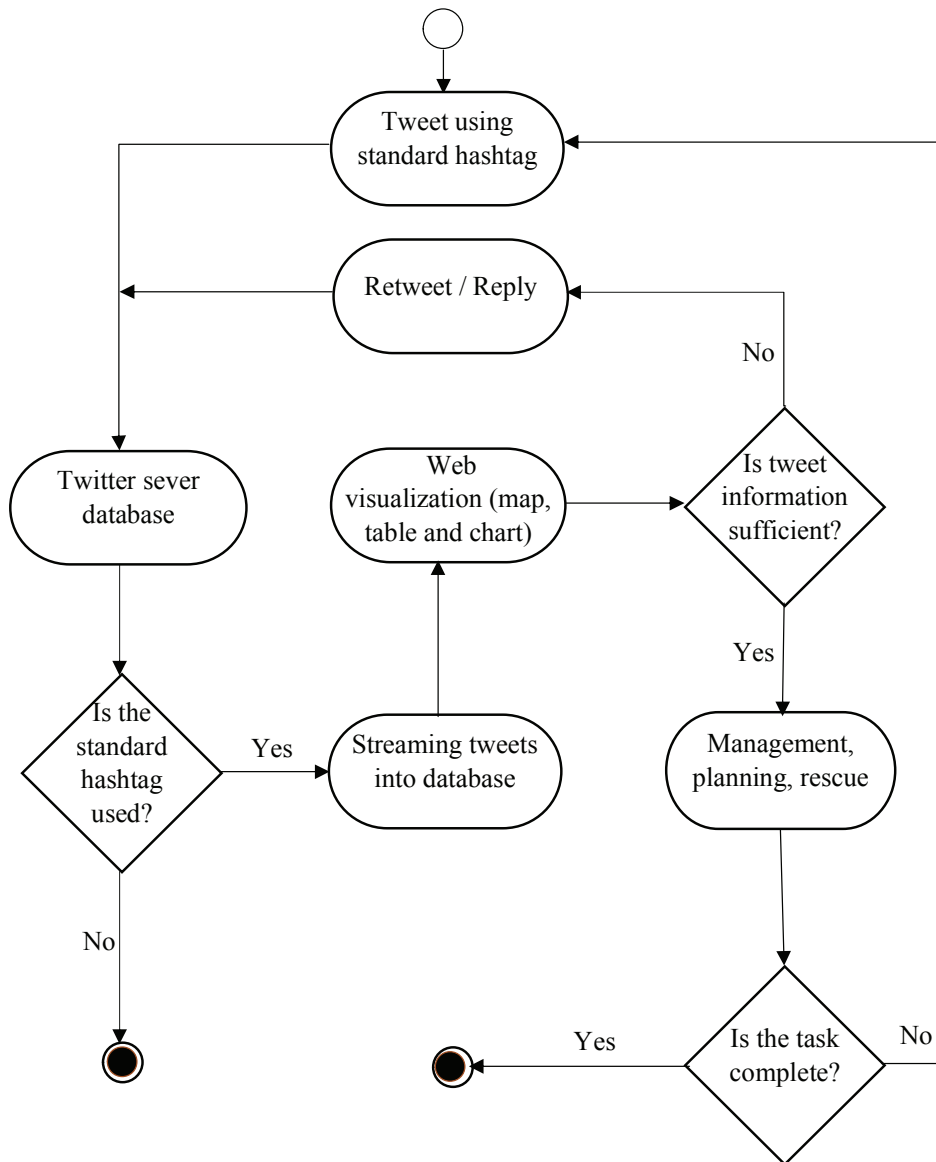


Figure 1 System flow diagram

2.4 Visualization

The visualization is done in the web in the form of analytics: interactive map, table and chart. This will provide a clear understanding of trend. The trend is a way to plan, process and manage the disaster related problems.

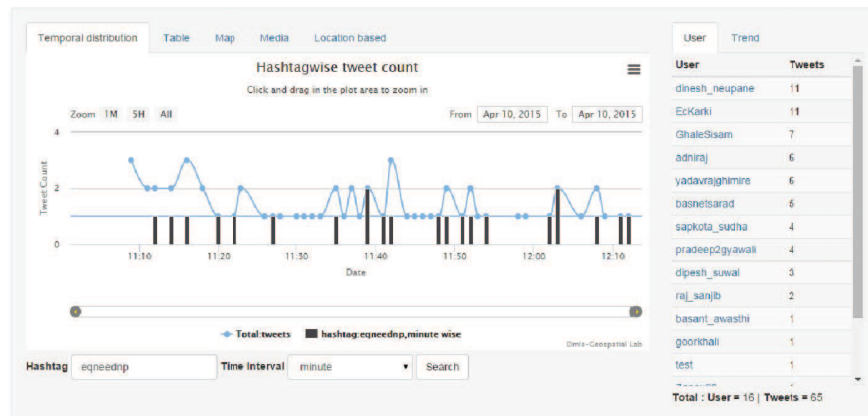


Figure 2 Temporal distribution of tweets

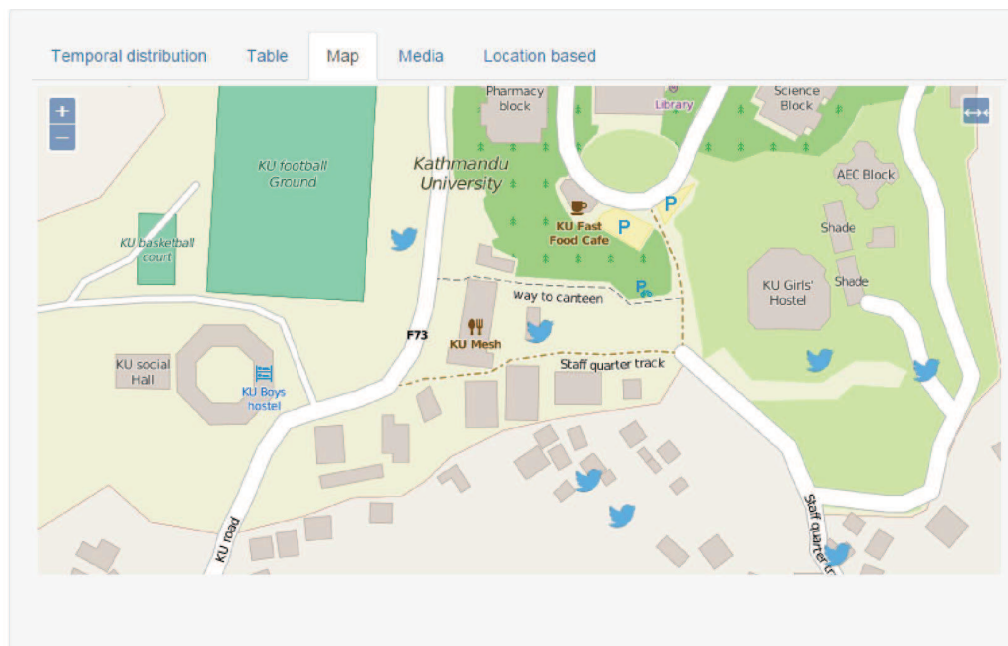


Figure 3 Tweets visualized in map

Baral Suman, Maharjan Shashish, Shrestha Ram and Manandhar Suresh 5/9
Location based tweets with standardized hashtag for post disaster information management

FIG – ISPRS workshop, 2015: International Workshop on Role of Land Professionals and SDI in Disaster Risk Reduction: In the Context of Post 2015 Nepal Earthquake.

Kathmandu, Nepal, 25th-27th November, 2015

2.5 Field work

With the help of analytics, the enthusiastic individual or humanitarian organizations can plan accordingly. By having a glance at the web visualization, the process then enters to interaction level. The reply or retweet is the communication for knowing the ground reality and aiding accordingly.

3. CASE STUDY

The twitter simulation was conducted around the premises of Kathmandu University on 10 April, 2015, just before 15 days of 7.8 magnituded Nepal earthquake. The simulation was aimed towards the use of standard hashtag during the disaster along with geotagging the information. Moreover, the simulation has been arranged as a field reporting to report response, need and impact. A control station was controlled to deal with the issues related to server and the tweet streaming.

During the simulation 65 tweets were reported in an hour. Among these, 67 percent had location information; 77 percent had image attached to it and 55 percent had both image and location information. 26 volunteers with 16 user accounts were implemented in the field.

Table 3 Hashtag and their respective number of reported tweets

Hashtag	Description	Tweets reported
#EqNp	Earthquake in Nepal	9
#EqResponsep	Public response for earthquake inNepal	12
#EqImpactNp	Earthquake's impact (damage) in Nepal	28
#EqNeedNp	Need to earthquake in Nepal	16
#SafeEq	Safe from earthquake	0

In a sample of 202 tweets streaming randomly in an equal time with hashtag "earthquake and disaster", only 16 percent had image attached and 8 percent had location information. The difference between the above two cases clarifies the reliability of standardized hashtagged tweets having location and image with the normal ones.

Baral Suman, Maharjan Shashish, Shrestha Ram and Manandhar Suresh 6/9
Location based tweets with standardized hashtag for post disaster information management

FIG – ISPRS workshop, 2015: International Workshop on Role of Land Professionals and SDI in Disaster Risk Reduction: In the Context of Post 2015 Nepal Earthquake.

Kathmandu, Nepal, 25th-27th November, 2015

4. DISCUSSION

The internet has changed the way we act. Even some decades ago, the aftermath of disaster, the source of information was newspapers, radio and television. With the evolution of social networking services(eg. twitter), the disaster information dissemination and interaction plummeted to a whole new level. An individual to bigger organizations are all on twitter. They produce a big data. If it's standard, it adds value towards implementation. The standardization is achieved by using standard hashtag and location based services.

The result is exciting. The implementation to real scenario, hashtag will voice stories of thousands with known ground who are in a necessity to basic human need which aid in humanitarian work. So, the technology and system has a potential to produce tangible outputs on the ground. The government and the bigger NGO's and INGO's should take an initiative if it is to be implemented to any sort of disaster occurring any time. The major challenge is not in standardization but are public awareness and regular operation. Then we can imagine it is one platform for all.

References

- Abbasi, M.-A., Kumar, S., Filho, J. A., & Liu, H. (Abbasi, Mohammad-Ali, et al. "Lessons learned in using social media for disaster relief-ASU crisis response game. 2012). Lessons Learned in Using Social Media for Disaster Relief - ASU Crisis Response Game. *Social Computing, Behavioral-Cultural Modeling and Prediction*. Springer Berlin Heidelberg, 282-289.
- Kaya, H., Cavusoglu, A., Sen, B., & Calik, E. (2014). Disaster Management and Disaster Preparedness: Examples of Practices in California and Turkey. *The Online Journal of Science and Technology* 4.4, 36-47.
- Twitter Streaming*. (2015, 8 15). Retrieved from <https://dev.twitter.com/streaming/overview>
- Vemparala, R. S., & Sayed, Y. (2014). Using Twitter Tweets for Earthquake Detection and Reporting System Development. *International Journal of Computer and Electronics Research*, 281-283.

BIOGRAPHICAL NOTES

Suman Baral is a Geomatics Engineering-2013 graduated from Kathmandu University. As a researcher he has been involved in use of Geo-IT solutions for disaster management. Also, during the Nepal earthquake 2015, he has been involved with different organizations in the field of information management on the web.

Shashish Maharjan is a Lecturer of Geomatics Engineering at Kathmandu University till date since Sept 2011. He is graduate of geo-Information Science and Earth Observation (ITC), Enschede, The Netherlands. Thesis: Matching raster and trajectory data using web services.

Ram Shrestha is a Geomatics Engineering graduated-2013 from Kathmandu University. He is a researcher and has been involved in geospatial solutions for disaster management. Also, during the Nepal earthquake 2015, he has been involved in disaster management information System (DMIS) developer on web.

Suresh Manandhar is a Geomatics Engineering graduated-2014 from Kathmandu University. As a researcher he has been involved in use of geospatial solutions for development of android systems for disaster management. Also, during the Nepal earthquake 2015, he has been involved in disaster management information System (DMIS) developer on android.

Baral Suman, Maharjan Shashish, Shrestha Ram and Manandhar Suresh 8/9
Location based tweets with standardized hashtag for post disaster information management

FIG – ISPRS workshop, 2015: International Workshop on Role of Land Professionals and SDI in Disaster Risk Reduction: In the Context of Post 2015 Nepal Earthquake.

Kathmandu, Nepal, 25th-27th November, 2015

CONTACTS

Suman Baral

Kathmandu University
Dhulikhel
Nepal
Tel. +9779841017872
Email: shumanbaral@gmail.com

Shashish Maharjan

Kathmandu University
Dhulikhel
Nepal
Tel. +9779843595342
Email: maharjan.shashish@gmail.com

Ram Shrestha

Kathmandu University
Dhulikhel
Nepal
Tel. +977011441188
Email: sendmail4ram@gmail.com

Suresh Manandhar

Kathmandu University
Dhulikhel
Nepal
Tel. +9779841006412
Email: sureshmdhr@gmail.com

Baral Suman, Maharjan Shashish, Shrestha Ram and Manandhar Suresh 9/9
Location based tweets with standardized hashtag for post disaster information management

FIG – ISPRS workshop, 2015: International Workshop on Role of Land Professionals and SDI in Disaster Risk Reduction: In the Context of Post 2015 Nepal Earthquake.

Kathmandu, Nepal, 25th-27th November, 2015