isrjournals

International Journal of Advanced Research in Computer Science Engineering and Information Technology

Volume: 6 Issue: 3 Oct,2018,ISSN_NO: 2321-3337

MULTI CHANNEL EMERGENCY DISASTER DATA EXTRACTION FROM SOCIAL FORMS USING BIG DATA AND IOT BASED ANALYSIS

Kamal.N[1], Rajendran.T[2]
Professor – Department of Computer Science, GRT Institute of Engineering and Technology
Assistant Professor - Department of Computer Science, GRT Institute of Engineering and Technology
drkamalnatarajan@gmail.com, tlrajen@gmail.com

Abstract **-**Here the crowd source user posts their information about disaster of respective location. Respective user of the social network communication or group posts their information to publish about disasters. Social network communication is initialed to obtain overall opinion about a particular issue. Using social network communication, reliable disaster information is retrieved by having particular disaster issue on the social network using reliable data extraction a mail alert is sent to the respective social network user. Data is extracted using Stemming Algorithm and Zigbee based communication is established when mobile network is not present. People are rescued before the disaster. Retrieve reliable situational information from crowd sourcing during the disasters. When mobile network is not present a Zigbee based IOT communication is established.

Keywords: Social Network, Stemming Algorithm, Mail Alert, Zigbee, Data Extraction.

1. INTRODUCTION

Disaster Management is a holistic process involving the affected population, the rescuers, the relief providers, and also potentially the well-wishers. Evidently, to execute disaster management efficiently and to take appropriate decisions, accurate information with minimum latency becomes an extremely critical component. Traditional sources of information for the disaster managers to take proper decision for nee assessment are generally survey results conducted by local and deployed volunteers. Televisions, local newspapers etc. Do not serve the purpose of supplying proper need assessment due to subjective interpretations and lack of micro-level data. Also, the process is slow, cumbersome, takes more resources, lesser scopes of collaboration among different organizations operating in the field, limited reach and so on. Information and Communication Technology or *ICT* has the potential to provide a solution for efficient and fast supply of relevant information. One of the latest contributors in ICTs progress is social media. In case of disaster situations, people who are directly involved or affected by a crisis can provide important and near precise information using social media. Social media also carries a potential to work as a decision support for the organizers and policy makers, because it has the ability to engage the crowd in a self-organized manner to work as an aide to solve problems. To gather micro-level data, one-to one interaction is the most suitable way to ensure control, continuity and relevance. However, the free format of social media that allows anyone and everyone to post just about anything make it difficult to find relevant information. The other issues are misinformation and rumours spread centering a disaster, collection of accurate information or information credibility, technological limitations like network availability, power supply, and the affected populations' familiarity with social media platforms, etc. The proposed system ensures interactive and guided information extraction from ground level using social media. The research prototype collects data from the users through tweet-reply or SMS-reply type interactions and stores it in a centralized database. The framework comprises of three components viz., inviting users for participation, automated interaction for data crowd sourcing and, organisation of received data. Automated data collection platform using SMS and Twitter. Automated data filtering and sorting at the user level to find out specific answers as per the need of a disaster manager. A web platform for the disaster manager to view sector, location and time segregated data in order to make decisions on the go. SMS alert is sent to the respective users who belong to a community/ group. After they accept for the communication in the social networks then they can post their information and finally published.

2. RELATED WORKS

2.1. The Role of Social Media in Emergency Response: The Case of the Great East Japan Earthquake. In the wake of the Great East Japan Earthquake on March 11, 2011, social media was used, for example, for sending information from disaster affected areas, sorting as well as sharing +information on relief activities, and disseminating insightful information. The Japan Self-Defense Forces (JSDF) utilized social media albeit on a limited scale. Social media has challenges, such as the risk of transmitting incorrect information, but nevertheless has significant importance and potential. For this reason, the JSDF will need to be able to utilize this form of media more proactively. To this end, the JSDF should keep in mind the development of the "influencer," who has influence on the dissemination of information, and the "person inside," who transmits information from within the organization, taking advantage of the organizational characteristic of the JSDF, i.e., it is composed of a wide range of age groups. The introduction of devices, the use of JSDF officers' personal devices as well as the development of an environment for interacting with volunteers, NGOs and others on social media are imperative. If the JSDF enhances their sensitivity towards social media and utilizes it more actively, then social media can be used as an effective means not only for large-scale disaster responses but also for the collection, exchange and transmission of information in various other crisis situations.

2.2. Utilization of Social Media in the East Japan Earthquake and Tsunami and its Effectiveness - During the 2011 East Japan Earthquake and Tsunami, newly popular social media such as Twitter and Face book served as a lifeline for directly affected individuals, a means of information sharing, and a way for people inside and outside Japan to volunteer and to provide information-based support to affected individuals. Social media was used to perform vital relief functions such as safety identification, displaced-persons locating, damage information provision, support for disabled individuals, volunteer organization, fund-raising, and moral support systems. This study discusses the potential for public, civil society, and government organizations to utilize social media in disaster preparedness and response.

2.3. Emergency Management, Twitter, and Social Media Evangelism - Considers how emergency response organizations utilize available social media technologies to communicate with the public in emergencies and to potentially collect valuable information using the public as sources of information on the ground. The authors discuss the use of public social media tools from the emergency management professional's viewpoint with a particular focus on the use of Twitter. Limited research has investigated Twitter usage in crisis situations from an organizational perspective. This paper contributes to the understanding of organizational innovation, risk communication, and technology adoption by emergency management. An in-depth longitudinal case study of Public Information Officers (PIO) of the Los Angeles Fire Department highlights the importance of the information evangelist within emergency management organizations and details the challenges those organizations face engaging with social media and Twitter. This article provides insights into practices and challenges of new media implementation for crisis and risk management organizations.

3. PROPOSED SYSTEM

The free format of social media that allows anyone and everyone to post anything and it will make difficult to find relevant information. The other issues are misinformation, rumors spreading news about disaster and collection of accurate information. The disadvantages are Congestion occurring, less security, waiting time is increased.

In the proposed system SMS alert is sent to the respective users who belong to a community / group. After they accept the communication in social media, they can post their information. Retrieve reliable situational information from crowd sourcing during the disasters. Respective user of the social network communication or group posts their information to publish about disasters. When mobile network is not present a Zigbee based IOT communication is established. Integrating big data for data analysis about the public opinion.

isrjournals

International Journal of Advanced Research in Computer Science Engineering and Information Technology

Volume: 6 Issue: 3 Oct,2018,ISSN_NO: 2321-3337

4. STEMMING ALGORITHM

Stemming is the process of reducing words to their stem, base or root form. The stem need not be identical to the morphological root of word. It is usually sufficient that related words map to the same stem, even if this stem is not in itself a valid root. Stemming is used as an approximate method for grouping words with a similar basic meaning together. Stemming is used to determine domain vocabularies in domain analysis. Applying stemming will improve cluster quality.

Entropy method

|Dα*i*| - > the number of words in a text body beginning with the i length sequence of letter α
|Dα*ij*| - > the number of words in D*αi* with the successor j
The probability that a member of number of words in D*αi* has the successor *j* is given by |Dα*ij*| / |Dα*i*|

$$H_{\alpha i} = \sum_{j=1}^{26} - \frac{|D_{\alpha ij}|}{|D_{\alpha i}|} \cdot \log_2 \frac{|D_{\alpha ij}|}{|D_{\alpha i}|}$$

5. ARCHITECTURE DIAGRAM

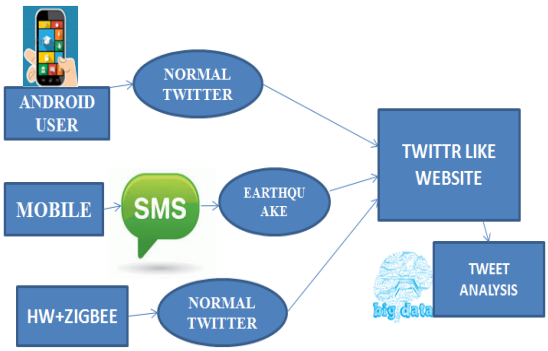

Fig: 3.1 Architecture Diagram of Social Media

6.1 CLIENT APPLICATION MODULE

Twitter is used to exploit the growing popularity of social media, increasing Smartphone penetration and internet connectivity. SMS even today is a medium through which every single phone user can be reached. **Twitter***:* Twitter provides a public Applications Program Interface (API) which lets remote programs stream in all the tweets that are being posted, in real-time and also post and reply to tweets. ***Target a user*****:** Our system needs to identify only those Twitter users who are most likely to engage and be able to share relevant information. ***Filtering*****:** Relevant users have been assumed to be users that are tweeting with the hash tag and are based in and around the location of incident. Creating an application to tweet with our friends. While creating the application, we'll assign the design fields like Username, Password, Phone and other information. The created user is allowed to enter the data **.**

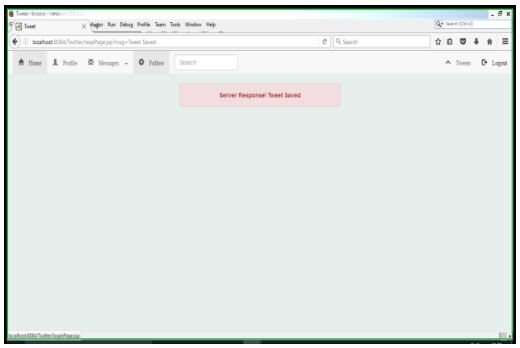

Fig: 6.1 Client Application Module

6.2 SERVER MODULE

It will store the data and allow the user to enter in to the chat application. It is used to verify the user information and allow the User to Tweet with their friends. User will enter the tweets through this application

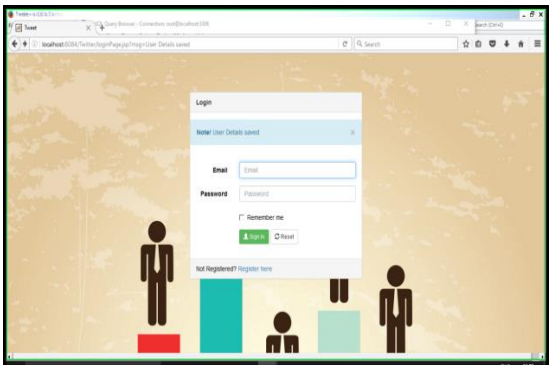

Fig: 6.2. Server Module

isrjournals

International Journal of Advanced Research in Computer Science Engineering and Information Technology

Volume: 6 Issue: 3 Oct,2018,ISSN_NO: 2321-3337

6.3. KEYWORD EXTRACTION

The Server will analyze the Tweets between the Users and the extract the Keywords using Particle Filter. The Particle Filter will the extracts the Keywords and filters the other words using the Stemming Algorithm. By using the Stemming algorithm we can filter the unwanted words in the chat so that we can calculate the extracted words counts. So that we can generate an automatic SMS alert to the Rescue Team.

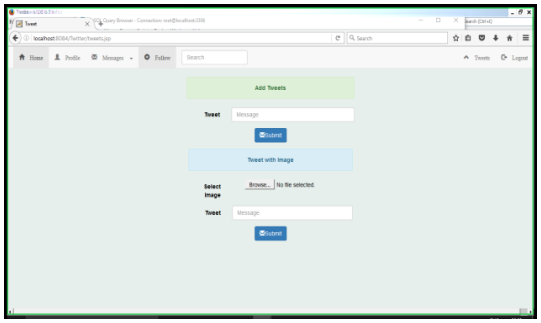

Fig.6.3. Keyword Extraction

6.4 AUTOMATIC ALERT

The Server will analyze the Tweets between the Users and the extract the Keywords using Particle Filter. The Particle Filter will the extracts the Keywords and filters the other words using the Stemming Algorithm. By using the Stemming algorithm we can filter the unwanted words in the chat so that we can calculate the extracted words counts. So that we will generate an automatic SMS alert to the Rescue Team.

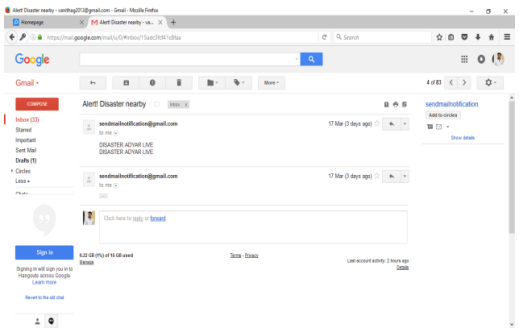

Fig.6.4.1. Email Alert

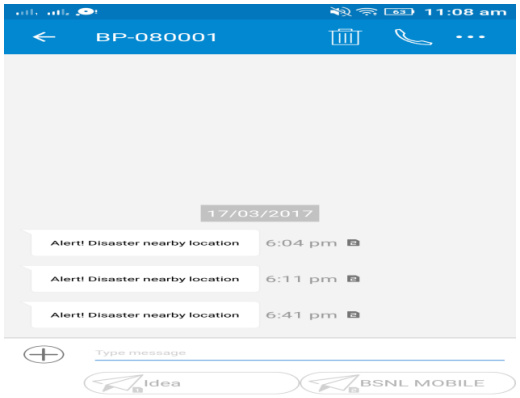

Fig.6.4.2 SMS Alert

7. Experimental Result

This result discusses about the extraction of data after receiving communication from the required source.

Fig.7.1. Extracted Data

8. CONCLUSION & FUTURE WORK

Interactive crowd sourcing has been shown to be an improvement over traditional crowd sourcing in terms of aggregation of relevant, precise, hyper local information. Social media's increasing ubiquity has rendered itself as a vital tool during crisis. The framework suggested for the automated interactive crow sourcing for information aims at removing human errors by organising and structuring crowd sourced data and presenting to the affected population, rescuers and relief providers for the clear understanding of current situation during disaster and enable informed, calculative decision on the fly.

The prototype mentioned in this paper serves as a proof of concept to establish the advantage of interactive crowd sourcing and thereby provide the motivation for subsequent enhancement and scaling of the model. Personal interaction leads to better

engagement of the crowd. Therefore, we are working on building a stable NLP model to converse better with the user and provide a richer experience. Further, our system would in the long run be equipped with an analytical engine which would not only let the information consumer view data collected, but the system would also report results of preliminary statistical tests and analysis on the data. Thus, our system would establish interactive crowd sourcing using mainstream communication channels and be a decision support system for disaster management.

REFERENCE

[1] Vieweg, Sarah. "Social Networking Sites: Reinterpretation in Crisis Situations."CSCW 2008 Workshop on Social Networking in Organizations. 2008.

[2] White, Eritc T. "The Application of Social Media in Disasters How Can Social Media Support an Effective Disaster Response?". (2014)

[3] Lindsay, Bruce R. "Social media and disasters: Current uses, futureoptions, and policy considerations." (2011).

[4] Chapter 1 and 5. World Disaster Report(2013). http://worlddisastersreport.org/en/.

[5] Quintanilla, J. 'Disaster communications: covering the "last mile"' in The Guardian, 3 April 2013. Available online: www.guardian. co.uk/global-development-professionals-network/2013/apr/03/ disastercommunications-ict-internews.

[6] Peary, Brett DM, Rajib Shaw, and Yukiko Takeuchi. "Utilization of social media in the east Japan earthquake and tsunami and its effectiveness." Journal of Natural Disaster Science 34.1 (2012): 3-18

[7] Sutton, Jeannette, Leysia Palen, and Irina Shklovski. "Backchannels on the front lines: Emergent uses of social media in the 2007 southern California wildfires." Proceedings of the 5th International ISCRAM Conference. Washington, DC, 2008.

[8] Hughes, Amanda L., and Leysia Palen. "The evolving role of the public information officer: An examination of social media in emergency management." Journal of Homeland Security and Emergency Management 9.1 (2012).

[9] Denef, S., P. S. Bayerl, and N. Kaptein (2013). Social Media and the Police Tweeting Practices of British Police Forces during the August 2011 Police Riots. Proceedings of CHI 2013, ACM Press (2013), 3471 – 3480.

[10] Hughes, A.L., L.A. St. Denis, L. Palen, and K. Anderson (2014) Online Public Communications by Police & Fire Services during the 2012 Hurricane Sandy. Proceedings of CHI 2014, ACM Press.

[11] Starbird, Kate, and Leysia Palen. "Voluntweeters: Self-organizing by digital volunteers in times of crisis." Proceedings of the SIGCHI Conference on Human Factors in Computing Systems. ACM, 2011.

[12] Bradley, Declan T., Marie McFarland, and Mike Clarke. "The effectiveness of disaster risk communication: a systematic review of intervention studies." PLoS currents 6 (2014).

[13] Wei, Zhang, et al. "Role Of Social Media In Knowledge Management During Natural Disaster Management." Advances in Information Sciences & Service Sciences 4.4 (2012).

[14] Chen C., Huang Y., Liu Y., Liu C., Meng L., Sun Y., Bian K., Huang A., Duan X., Jiao B. (2014) : Interactive Crowdsourcing to Spontaneous Reporting of Adverse Drug Reactions. In: IEEE ICC 2014, At Sydney.

[15] Laskey, Kathryn B. Crowdsourced Decision Support for Emergency Responders. George Mason Univ Fairfax Va Center For Excellence In Command Control Communications Computers-Intelligence, 2013.

[16] Roy, Senjuti Basu, et al. "Crowds, not drones: Modeling human factors in interactive crowdsourcing." DBCrowd 2013-VLDB Workshop on Databases and Crowdsourcing. CEUR-WS, 2013.

[17] Goodchild, Michael F., and J. Alan Glennon. "Crowdsourcing geographic information for disaster response: a research frontier." International Journal of Digital Earth 3.3 (2010): 231-241.

[18] Gao, Huiji, Geoffrey Barbier, and Rebecca Goolsby. "Harnessing the crowdsourcing power of social media for disaster relief." IEEE Intelligent Systems 3 (2011): 10-14.