Chapter 14
A Social Media Content Based Location and Situation Analysis Model for Disaster Management

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ABSTRACT

Social media has evolved as an inseparable entity in everybody's life. People make use of social media like Face book, twitter, etc. to express their feelings. That's the reason organizations make use of social media information to infer the behavior of its users. The recent ChennaiRains2015 followed by Chennai flood show the reachability of social media as most of the people have utilized it to convey their status and requirements. Many people have utilized the same social media to express their willingness for providing help (food, shelter, evacuation and medical) to the flood victims. Connecting such people to the needy in a timely manner can make the disaster management process more efficient. In this paper, the authors highlight, (1) the design of Apache Storm based real time analytics of twitter data for extracting location and status of flood affected areas and (2) the development of an optimized map connecting the volunteers (people ready to help flood victims) and the flood victims who have raised their requests via social media.

1. INTRODUCTION

Recent Chennai Rain 2015 followed by Chennai flood has proved that, social media is not only a medium to express one's opinions but also a medium that paved a way for disaster relief works. Social media like twitter has become a platform for raising requests for help as well as expressing willingness to help.

Distinguishing the messages on behalf of such a scenario is very critical as huge amount of data are getting generated in a single second during a disaster. Understanding these two categories and establishing an optimized connection among them in a timely manner can facilitate the relief processes. There has been considerable number of works that focus on deriving public views from social media using sentiment analysis and data mining techniques. Thus, derived information can then be utilized for framing organizational policies. Hence, techniques that can generate more insights from such social media play a very important role in decision making.

The approach which we have adopted for this paper is different from the previous works as sentiment and location analysis of public tweets have been merged with development of an optimized map, which can be used to deliver on time relief works for Chennai flood. By location analysis, we try to locate the flood victims as well as volunteers so that a minimal connection can be established between them. Our work purely depends on sentiment analysis and classification followed by location analysis of public tweets collected during the period of Chennai flood 2015. This includes well known machine learning algorithm: Support Vector Machine (SVM). There are varieties of techniques to implement sentiment analysis and classification algorithms on micro-blogging texts to extract and classify the tweets according to their polarity. This work mainly concentrates on classifying the tweets into two categories namely, (1) volunteers and (2) victims based on the degree of criticality. This in turn acts as the input to develop an optimized map using the concept of bipartite graphs.

The paper is organized as follows. In section 2 we present some of the facts that lead us to utilize tweets on behalf of Chennai flood for building a map which can reduce the gap between the flood victims and volunteers. In section 3, we focus on the general information on Apache Storm, Apache Kafka and the techniques and technologies used for the implementation of the proposed work. The corpus we are using for the work is a collection of tweets during period of Chennai flood 2015. Next, in section 4, the overall dataflow, workflow and the algorithm of the proposed system has been described. As a conclusion in the last section, we present the current challenges and the possible directions for future work.

2. RELATED WORKS

Effective disaster management is a global challenge as it can affect any country on earth. Many researches are going on to find a standard platform in this area. Here we examine some research papers that gave us an idea on

1. Why social media?
2. How to use social media?
3. What to be done with social media?

Linna Li and et. al., discuss the role of social networks in crowd sourcing of geospatial information for emergency management, data generation and dissemination. The authors bring attention towards the requirement of information diffusion over social networks and on the effectiveness of possible channels for distributing relevant information in emergencies so that authorities can wisely choose platforms for giving evacuation orders.

Related Content

Interaction Protocols Adaptation Based Coordination for Crisis Management Processes
Wassim Chtourouand Lotfi Bouzguenda (2015). *International Journal of Information Systems for Crisis Response and Management (pp. 67-87).*
www.irma-international.org/article/interaction-protocols-adaptation-based-coordination-for-crisis-management-processes/156567

Disaster Is in the Eye of the Beholder
JJ Pionke (2019). *Emergency and Disaster Management: Concepts, Methodologies, Tools, and Applications (pp. 1351-1369).*
www.irma-international.org/chapter/disaster-is-in-the-eye-of-the-beholder/207630

Microblogging During the European Floods 2013: What Twitter May Contribute in German Emergencies
Christian Reuterand Julian Schröter (2019). *Emergency and Disaster Management: Concepts, Methodologies, Tools, and Applications (pp. 739-759).*
www.irma-international.org/chapter/microblogging-during-the-european-floods-2013/207599

Introducing Predictive Policing Technologies (PPT): An Action Research-Oriented Approach for EBOCD Initiatives
Peter Watt, George Boak, Marija Krlic, Dawn Heather Wilkinsonand Jeff Gold (2020). *Improving the Safety and Efficiency of Emergency Services: Emerging Tools and Technologies for First Responders (pp. 180-192).*
www.irma-international.org/chapter/introducing-predictive-policing-technologies-ppt/245163

Communication Process of Disaster Management: Shift From Web 2.0 to Web 3.0
Ashir Ahmed (2018). *Smart Technologies for Emergency Response and Disaster Management (pp. 243-263).*
www.irma-international.org/chapter/communication-process-of-disaster-management/183485