Guest Editorial Preface

Special Issue on Contextual Data for Crisis Management and Response

Andrea H. Tapia, School of IS and Technology, Penn State University, University Park, PA, USA
Kathleen A. Moore, Mercyhurst University, Erie, PA, USA

In May of 2016 the international community of scholars and practitioners focusing on Information Systems for Crisis Response and Management (ISCRAM) gathered in Rio de Janeiro, Brazil to hold their annual meeting. The ISCRAM Association's primary mission is to foster a community dedicated to promoting research and development, exchange of knowledge and deployment of information systems for crisis management, including the social, technical and practical aspects of all information and communication systems used or to be used in all phases of management of emergencies, disasters and crises. (iscram.org) This special issue draws from the very best papers presented at this meeting.

In this special issue, the works presented focus on contextualization of data and information during crises. As Quarantelli (1988) asserted, not all disasters are the same, each is a unique event and should be treated as such, therefore, tactics and methods used in one crisis event may not necessarily be appropriate for another. However, in studying pasts disasters and understanding lessons learned, researchers are able to draw specific parallels to emerging events and better inform decision making. Kapucu (2008) also stresses the important of having a high-level of preparedness as a critical factor in dealing with future events, and how proper planning begins at the local level and with an intricate understanding of the uniqueness of each geographic area. Extracting seemingly old data out of context, and understanding current geographic data in context has inspired the researchers presented here in furthering the understanding of information systems in emergency management.

Meier (2013) described the rise of social media as a new nervous system for the planet, capturing the pulse of our social systems. The widespread adoption of social media applications has caused a significant change in how people communicate, collaborate, create, and consume information. There is a new possibility of continuous, automated, real-time monitoring, and analytics of social media content and interactions (Stieglitz et. al. 2014). When people interact through web, mobile device and distributed sensors, digital traces of these interactions are left behind. There is an increasing quantity and heterogeneity of communicators, unbounded communication, higher level of information diffusion with respect to range, scale, and speed, in particular due to the rapid development of mobile devices. As a consequence, we face a transformative and disruptive data deluge, from which new scientific, economic, and social value can be extracted. Lazer, et al. (2009) argue that the "digital breadcrumbs" of contemporary life offer "the potential of transforming our understanding of our lives, organizations, and societies in a fashion that was barely conceivable just a few years ago."

This recent interest in these digital breadcrumbs, or big social media data, (Manovich 2012) has been driven in part by facilitated access to large-scale empirical datasets. As Boyd and Crawford (2012) point out, "the era of Big Data is underway. Computer scientists, physicists, economists, political scientists, and sociologists are seeking access to the massive quantities of information produced by and about people, things, and their interactions" (Boyd and Crawford 2012, p. 663). Defined as a cultural, technological, and scholarly phenomenon that rests on the interplay of technology, analysis, and methodology, Big Data is "less about data that is big than it is about a capacity to search, aggregate, and cross-reference large data sets" (Boyd and Crawford 2012, p. 663). From a research perspective,

social media can be understood as a kind of living lab, which enables academics to collect large amounts of data generated in a real-world environment. (Stieglitz et. al. 2014)

If integrated with traditional data, social media can help crisis response and management organizations achieve and maintain situational awareness in real-time. Social media provides a means to search for and solicit information for general and specific inquiries, verify pre-existing information, and establish general situational awareness. This will assist with decision-making, planning, and resource allocation. Situational awareness activities enhanced by social media also fall within two areas: monitoring and crowdsourcing. Social media can also be used to engage the public in aggregating information, such as damage reports from the affected area, to enhance information coming in from the field. Similar to passive monitoring and active listening for rumors, public safety agencies can also leverage social media to search and engage the crowd for general or specific information. Social media can also be used to engage the public in aggregating information, such as damage reports from the affected area, to enhance information coming in from the field.

In this edition, researchers present work looking at how old Twitter data sets may help automate the classification of data garnered during new and similar crises, and potentially even predict a successful or widely seen tweet. There is also work examining how embedded emotional content may better inform trust assessment in social media data. Lastly, the final study poses how understanding, mapping, and assessing vulnerability in specific urban areas based on embedded infrastructure allows emergency responders to better risk during a potential high-stakes emergency.

The first study addresses the continue need to better analyze social media in real-time during a crisis. Imran et al. present a machine learning approach to the problem by taking Twitter data gleaned and analyzed from previous events and using this data to train classifiers to better help sort, label, and categorize data. The researchers found that data sets from similar events (e.g. earthquakes), and with similar language structure (e.g. Italian and Spanish), showed promise in developing an automated system.

In the next article, investigators seek to answer what makes a tweet "retweetable," that is, what are the characteristics of an individual tweet that assure it will be widely disseminated during a crisis event, and thus, help spread useful information while counteracting poor information provided in the medium. Caragea et al. siphoned highly retweeted tweets from a previous event and decoded the possible characteristics from both content and user that assured their popularity. The researchers present a model of predicting retweetability based on their experiments.

In our third article, Shane Halse from The Pennsylvania State University, examines a possible missing piece in the evolution of research concerning the automation of trust and credibility assessments in social media data. Halse posits that in conjunction to examining author and content in any given data submission, the perceived emotional state of the person should also be taken into consideration. In looking at Twitter data sets from two different and large-scale events (Hurricane Sandy in 2012 and the Boston Bombing in 2013), the study shows significant findings in the perceived level of trustworthiness based on the perceived emotional state of the author of a tweet. Future work in this area has the potential to cause investigators to re-think research approach to this area of study.

Our last article addresses the uniqueness of infrastructure in any given area concerning a crisis. Water, gas, and electrical lines, and how and where they are installed may pose particular risks to on-scene responders. Grangeat working with Paris firefighters, developed a method for mapping and assessing hidden risks of these installations, and devised a method for determining vulnerability level. The result of this research is to better equip and inform first responders improving their capability in dealing with emergency events.

Data and information do not exist in a vacuum, but rather in fixed context of individual places and individual events. The research presented in this special edition seeks to help both researchers and practitioners alike expand the utility of older and seemingly stagnant data draw it into practice addressing current events.

REFERENCES

Boyd, D., & Crawford, K. (2012). Critical questions for Big Data, Information. *Communicatio Socialis*, *15*(5), 662–679.

Kapucu, N. (2008). Collaborative emergency management: Better community organising, better public preparedness and response. *Disasters*, *32*(2), 239–262. doi:10.1111/j.1467-7717.2008.01037.x PMID:18380853

Lazer, D., Pentland, A.S., Adamic, L., Aral, S., Barabasi, A.L., Brewer, D., … Jebara, T., (2009, February). Life in the network: The coming age of computational social science. *Science*, *323*, 721–723. doi:10.1126/science.1167742 PMID:19197046

Manovich, L. (2012). Trending: The Promises and the Challenges of Big Social Data. In M. K. Gold (Ed.), *Debates in the Digital Humanities* (pp. 460–475). Minneapolis: U of Minnesota P. doi:10.5749/minnesota/9780816677948.003.0047

Meier, P. (2013, January 11). How to Create Resilience Through Big Data. *Irevolutions.org*. Retrieved from https://irevolutions.org/2013/01/11/disaster-resilience-2-0/

Quarantelli, E. L. (1988). Disaster Crisis Management: A Summary Of Research Findings. *Journal of Management Studies*, *25*(4), 373–385. doi:10.1111/j.1467-6486.1988.tb00043.x

Stieglitz, S., Dang-Xuan, L., Bruns, A., & Neuberger, C. (2014). Social Media Analytics - An Interdisciplinary Approach and Its Implications for Information Systems. *Business & Information Systems Engineering*, *6*(2), 89–96. doi:10.1007/s12599-014-0315-7