

iConference 2021 Workshop Proposal

Title:

Understanding the big data in emergency management: agenda for future research

Organizers:

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- Dr Ziqi Zhang: University of Sheffield, UK (ziqi.zhang@sheffield.ac.uk)
- Mr Guozhi Li: Beijing Jianghe RichWay Technology Development (lguozhi@sina.com)
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Abstract (up to 150 words):

Big data are playing a more and more important role in the lifecycle of emergency management. The workshop aims to develop a deep understanding of the multi-dimensional disparate data sources used in the emergency management and identify key trends that inform future research agendas and practices. Through two talks and a group discussion session, it is hoped to strengthen a multidisciplinary network consisting of academic researchers, practitioners and policy makers with interest and/or involvement in the intersection of big data and emergency management.

Description (up to 1,000 words):

Background:

With the increasing frequency of natural disasters in the world due to factors such as global warming, emergency management has become an increasingly important research area, where studies are conducted with an aim to better manage disasters and reduce their potential damage to the society [1-3]. Big data are playing a more and more important role in the lifecycle of emergency management, and timely and effective emergency management relies highly on the integration and utilization of the heterogeneous data [4-5]. Thus a better understanding of the big data and their use in information systems for emergency management has become a top priority for authorities and policy makers.

Purpose and Intended Audience:

The workshop aims to develop a deep understanding of the multi-dimensional disparate data sources used by information systems in the emergency management, and identify key trends that inform future research agendas and practices. The intended participants include academic researchers, practitioners and policy makers with interest and/or involvement in emergency management and big data. It is hoped to strengthen a multidisciplinary network consisting of different parties that will continue their collaboration in this direction.

An invited talk by Prof Fabio Ciravegna from the University of Sheffield, a scholar leading in the area of emergency response, will introduce participants to the leading research and practice on the role of citizens in monitoring the environment for emergency response with a particular focus on citizen observatories of water. Prof Ciravegna will focus on the data types that can be collected and their effectiveness.

The workshop will also discuss the findings of an ongoing research project based on a thorough review of existing studies on the big data emergency management, followed by a detailed discussion of the future research directions. The workshop will combine the findings of this

research project with the contributions of a variety of participants, and prepare for future work of developing a big data driven approach to effectively tackle emergency management.

Proposed Format:

The first session will include two talks from an invited speaker and the organizers, and the second session will be interactive, encouraging dialogue among participants. Those interested in participating in the workshop will be asked to submit background materials describing their background, current work, and relevance/interest in the workshop's topic. We will form working groups based on common themes among the submitted position papers, or as a whole group depending on the number of attendances. We will conclude with a group discussion synthesizing the discussions and identifying key themes in the future.

The workshop will focus on the following themes, but are not limit to:

1. Knowledge graph for emergency management;
2. Novel methods for big data analytics for emergency management;
3. The role of social media in emergency management;
4. Conceptual modeling and big data;
5. Emergency information visualization;
6. Datasets related to emergency management.

Activity	Timing
Welcome and introduction	10 min
1. - Introductions and workshop overview	
Invited talk	50 min
2. - The role of citizens in monitoring the environment for emergency response	
3. Presentation	30 min
- The big data in urban waterlogging emergency management: literature review and future research opportunities	
4. Break	
5. Group discussions	75min
6. Conclusions	15 min

Engagement:

Depending on number of attendances, there will be whole group or small group discussion. Participants will be able to introduce their research and projects in more depth, with an aim of identifying the common issues or divergence from their own disciplinary perspectives, and the challenges and opportunities in this cross field.

Goals or Outcomes:

The goals include: (1) to get comments on the research project from a variety of participants; and (2) to identify and clarify key issues for future research in this area. These outputs will be pivotal to enable the emergency management with the up-to-date big data technology.

Relevance to the iConference:

The topic of the workshop, focusing on the opportunities and challenges related to multi-disciplinary data in emergency management, fits well with the themes of the 2021 iConference, “diversity, divergence, dialogue”. Addressing the multi-source, multi-disciplinary big data in emergency management faces many challenges – also opportunities – that need to be accomplished through joint efforts by researchers, practitioners and policy makers. Participants will collectively identify their common issues, diversity and divergence through the dialogue, and finally contribute to the identification of future research directions. The workshop, jointly funded by the two iSchools respectively in Renmin University of China and the University of Sheffield, is intended to strengthen the collaborations between the research teams at the two iSchools, and more widely, to create a multi-disciplinary network of researchers, practitioners and policy makers for future collaborations in this direction.

Duration:

The workshop is intended to be two 90-minute sessions.

Attendance:

The workshop is expecting 20-30 participants.

Special Requirements:

There are no special requirements.

References:

- [1] Khantong, S., Nazir Ahmad, M. (2020) An ontology for sharing and managing information in disaster response: in flood response usage scenarios, *Journal on Data Semantics*, 9, 39-52.
- [2] Chen, N., Liu, W., Bai, R., Chen, A. (2017) Application of computational intelligence technologies in emergency management: a literature review, *Artificial Intelligence Review*, 52(11): 1-38.
- [3] Wu, X., Yang, X., Li, L., Wang, G. (2017) Review and prospect of the emergency management of urban rainstorm waterlogging based on big data fusion. *Chinese Science Bulletin*, Volume 62, Issue 9: 920-927.
- [4] Ogie, R. and Verstaevel, N. (2020) Disaster informatics: An overview, *Progress in Disaster Science*, 7 (2020), 100111.
- [5] Song, X., Zhang, H., Akerkar, R., Huang, H., Guo, S., Zhong, L., Ji, Y., Opdahl, A., Purohit, H., Skupin, A., Pottathil, A. and Culotta, A. (2020) Big Data and Emergency Management: Concepts, Methodologies, and Applications, *IEEE Transactions on Big Data*, Early Access.