Editorial of Special Issue on Emergency Management Systems

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Even though the world is improving on many aspects through our continuous effort, there have always been natural disasters, civil unrest and industrial incidents. We are also required to be ready for new forms of threat from terrorist groups, such as, 9/11 (2001), Tsunami (2004), and Hurricane Katrina (2005). Therefore, there has been an essential requirement in research initiatives and activities to improve our national and international capabilities.

The real demonstration of the 9/11 event is the strategic and technical fallacy of making the integration of communications between incompatible systems (fire, police, medical, etc.) dependent upon a single physical command and control center. Such centers are vulnerable to a planned act of sabotage. If there is any strong technical conclusion from the events of 9/11 it is the requirement to develop an integrated communications capability that can react as a distributed virtual system with no required need for the humans involved to be in a single location.

Emergency management is trying to prepare, prevent, avoid, process, and manage unpredictable events. Emergency management systems (EMS) are computer-based tools that support people dealing with crisis and emergency. They should support people's routine activities and improve their abilities in responding to a crisis. Such systems can assist in crisis, disaster and emergency planning, response and management. In responding to emergency, people require highly intelligent assistance from computer-based systems. Intelligence and intelligent methodologies are a must in such systems. Without the special discipline of structure and process in EMS it is highly unlikely that technology will be successfully developed and employed. There is a critical need for international investment and leadership to form during this post disaster period while people are paying attention. Therefore, research comprehensively on EMS can assist the managers, designers, and users of such systems to design, develop, manage and apply such systems in times of crisis.

In this special issue, we include nine papers out of many high-quality submissions some of which will be published in the future regular issues due to the schedule of this special issue. All the papers in this issue have been under normal review process and meet the high standard of the journal papers. The papers in this issue cover many topics in EMS relevant to control and intelligent systems.

In *Knowledge Management, Emergency Response, and Hurricane Katrina*, the authors describe and analyze two knowledge management systems that were utilized during Hurricane Katrina response. They conclude that emergency information systems are enhanced by incorporating knowledge management tools and concepts.

The paper *WIPER: Leveraging the Cell Phone Network for Emergency Response* describes the Wireless Phone-based Emergency Response (WIPER) system that helps detect possible emergencies, as well as to suggest and evaluate possible courses of action to deal with the emergency. WIPER is designed to evaluate potential plans of action using a series of Geographic Information Systems (GIS)-enabled agent-based simulations that are grounded on real-time data from cell phone network providers.

During emergency response, emergency management and its command and control system are particularly challenged as the responding taskforce puts countermeasures in place intensively and dynamically. *Role-Playing Exercise – A Real-Time Approach to Study Collaborative Command and Control* presents a real-time approach combining role-playing games and emergency management exercises. The experience suggests that this approach is a feasible method for research studies, where interaction and communication of commanding staff are in focus.

In the very beginning of emergency situations such as terrorist attacks and natural disasters, the number of injured people exceeds the capability of a treatment facility and rescue workers cannot always rely on the existing communication infrastructure. *Topology based Infrastructure for Medical Emergency Coordination* presents a coordination strategy for scheduling doctors to casualties in a crisis area, which uses an algorithm inspired by behavior of ants in nature.

In *Task-Adaptive Information Distribution for Dynamic Collaborative Emergency Response*, the authors show us the Task-Adaptive Information Distribution (TAID) method that consists of a system for adaptive information distribution of collaborative emergency responders and an adaptive workflow system (AWS) used to obtain knowledge of tasks and work processes. They conclude that using task knowledge significantly increases the quality of distributing relevant information so making collaborative response work much more effective.

The paper *Using I-X Process Panels as Intelligent To-Do Lists for Agent Coordination in Personnel Recovery* describes the I-X system with its principal user interface, the I-X Process Panel, and its underlying ontology and how this panel can be used as an intelligent to-do list that assists emergency responders in applying pre-defined standard operating procedures in different types of emergencies. The result shows that an I-X application can be used in a scenario eliminating some basic problems that often occur.

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In the paper *Assessing Large Scale Emergency Rescue Plans: an Agent Based Approach*, the authors show us how agent-based approach can benefit simulating a complex socio-technical collaborative complex system. They focus on two organizational strategies (centralized versus decentralized) combined with two communication modes (traditional paper versus new electronic forms) affect rescue process efficiency in terms of the global evacuation time, the percentages of losses of lives and the rescue rate.

Role-based access control (RBAC) has been actively applied in security system management for many years. *An RBAC Model-Based Approach to Specify the Access Policies of Web-Based Emergency Information Systems* presents an RBAC-based approach to designing a Web-based Emergency Management Information System (WEMIS) in order to overcome the difficulties in management of the diversity of users and responsibilities to be considered.

Natural and human-made disasters create challenges to Disaster Situation Management. In *Multi-Agent Situation Management for Supporting Large-Scale Disaster Relief Operations*, the authors describe two important solutions meeting these challenges: distributed situation-driven disaster relief operations management and a multi-agent architecture scalable to large numbers of interacting agent platforms.

We would like to thank the organizers of the *third International Conference on Information Systems for Crisis Response and Management (ISCRAM'06), Newark, NJ, USA, May 14-17, 2006*, because most of the papers in this issue are extended from the publications in the proceedings of this conference.

Haibin Zhu is an associate professor of the Department of Computer Science and Mathematics, Nipissing University, Canada. He received B.S. degree in computer engineering from Institute of Engineering and Technology, China (1983), and M.S. (1988) and Ph.D. (1997) degrees in computer science from the National University of Defense Technology (NUDT), China. He was a visiting professor and a special lecturer in the College of Computing Sciences, New Jersey Institute of Technology, USA (1999-2002) and a lecturer, an associate professor and a full professor at NUDT (1988-2000). He has published 60+ papers, 4 books and 1 book chapter on object-oriented programming, distributed and collaborative systems, and computer architecture.
He is serving and served as a co-chair of the technical committee of Distributed Intelligent Systems of IEEE SMC Society, a guest editor for the special issue of "Collaboration Support Systems" for IEEE Trans. on SMC(A), a guest associate editor for the CIT 2005 special issue for the Int'l Journal of Pervasive Computing and Communications, an organizer for the workshop on "Role-Based Collaboration" of the 2006 ACM Int'l Conf. on Computer-Supported Cooperative Work (CSCW'06), a program committee member for 10+ international conferences.
He is the receipt of the Best Paper Award from the 11th ISPE Int'l Conf. on Concurrent Engineering (ISPE/CE2004), the 2004 and 2005 IBM Eclipse Innovation Grant Awards, the Educator's Fellowship of OOPSLA'03, a 2nd Class Nation-Level Award of Education Achievement from Ministry of Education of China (1997), a 2nd Class Nation-Level Award of Excellent Textbook from the Ministry of Education of China (2002), three 1st Class Ministry-level Research Achievement Awards from DOD of China (1997, 1994, and 1991), and a 2nd Class Excellent Textbook Award of the Ministry of Electronics Industry of China (1996).
Dr. Zhu is a senior member of IEEE, a member of ACM and a life member of the Chinese Association for Science and Technology, USA.

Murray Turoff is a distinguished professor of Information Systems at the New Jersey Institute of Technology. For over three decades Dr. Turoff has been active in research and development associated with the use of computers to aid and facilitate human communications including collaborative learning as one application area. Credited as "the father of computer conferencing", he designed the first computer conferencing system while working in the Office of Emergency Preparedness in the executive offices of the president of the United States in the late 60's. Currently Dr. Turoff is very active in the area of Emergency Management Information Systems and has helped to create ISCRAM (Information Systems for Crisis Response and Management http://iscram.org) as a community of professionals (over 1200 members) and was program chair for the third international meeting at NJIT in May of 2006. A complete bio is located at http://is.njit.edu/turoff .