

## Guest Editorial Preface

# Special Issue on Information Systems for Crisis Response and Management in the Mediterranean Countries

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The adverse consequences of natural or man-made disasters, depending on their nature and severity, can affect many regions and countries. In case of occurrence of such a disaster, the emergency response agencies of one country must be prepared to collaborate with agencies from other affected countries. Also, the involved agencies must be prepared to effectively exchange and share data and information, as well as to utilise common resources to fulfil a task.

Such disasters occur in different parts of the world including the regions and countries located around the Mediterranean Sea. This special issue contains extended versions of selected research papers, presented at the 4<sup>th</sup> ISCRAM – Med Conference on October 2017, which was organised by the Civil Engineering Department of Democritus University of Thrace in the city of Xanthi, Greece.

ISCRAM–Med is a series of annual international conferences, under the aegis of the ISCRAM Association. ISCRAM – Med conferences aim to enhance the collaboration and solidarity between Mediterranean countries by bringing together researchers and practitioners to discuss and propose novel methods and technological solutions to address the emerging research challenges of the Information Systems for Crisis Management and Response domain.

The research works which presented in the ISCRAM – Med 2017 conference were selected by an anonymous review process that involved the evaluation of each submission by three reviewers, according to the specifications and criteria of the annual ISCRAM Association conference. The extended versions that were accepted for publication in this special issue were evaluated again for their content and quality, following the IJISCRAM journal specifications.

### INSIDE THIS ISSUE

In this regard, the first article is devoted to the design of autonomous robotic systems for crisis management tasks, which humans can trust to collaborate with. Specifically, it focuses on the concept of dependability which can be viewed as the level of trust a human operator can put on the system to operate without human supervision for a specific time frame. The paper outlines a hierarchical framework for defining and measuring the dependability of a system to retain increased human trust in emergency and crisis management contexts and demonstrates how the proposed framework can be utilised by applying it in a real robotic agent.

The second article presents a system for use by the civil protection agencies that define the impact that air pollutants have to the morbidity and mortality of the citizens of a major urban center. Specifically, the article presents a hybrid intelligent system that determines the degree of dependence/independence of air pollution and meteorological parameters, to the number of serious Cardiovascular-

Respiratory hospitalisation incidents. The proposed system was tested and evaluated using official data from the urban area of the city of Thessaloniki in Greece.

The next article focuses on data security and privacy issues on the tools that can be used by the citizens during disasters. Specifically, the authors propose evaluation criteria for security and privacy of information sharing tools that are commonly used as community engagement and information sharing tools during disasters. The criteria were also used to evaluate some community engagement tools. Practical recommendations for privacy and data security are reported for those who design and implement new public engagement tools.

The fourth article discusses the advantages of serious games for emergency management training and presents the development phases of a 3D serious game for decision-making training when a responder faces a series of events occurring under extreme weather conditions with limited resources and with limited time to respond. The serious game was inspired by a real case of dealing with emergencies during extreme weather conditions.

The fifth article highlights the growing interest of serious games for crisis management training and the need to identify evaluation criteria for comparing the effectiveness of a serious game in learning. In this article the authors propose a set of new criteria, inspired by studies focused on criteria used to evaluate the effectiveness of digital game-based learning, to assist and support the evaluation of a serious game for training skills.

The last article acknowledges that drills to test the efficiency of the emergency response plans of the first responders have a high cost and are not always applicable to large-scale. The authors focus on the problem of cooperation between the different agencies during an emergency management event and present a framework that aims at simulating the cooperation of the different organisations involving in disaster response to identify potential problems and testing different strategies of information exchange to identify their impact on the response efficiency.

## **CONCLUSION**

The aim of this special issue, apart from presenting possible solutions to specific problems, is to enhance the ongoing dialogue on how to address emergent problems and to provide catalysts for the creation of future research ideas.

The contributions in this issue form a good sample that indicates the diversity of problems that need to be addressed by researchers and practitioners through interaction and exchange of ideas and international dialogue. Specifically, the technologies of robotics, social media, multi-agent systems and serious games can expand the capabilities and improve the interactions (or minimise the dysfunctional interactions) of crisis management systems to deal with disasters and to be better prepared to manage the adverse consequences of a disaster.

These technologies, however, can be further enhanced to be utilized by agencies and citizens beyond time and space and across the boundaries of countries, cultures. The articles in this issue propose ways on how these technologies could be enhanced. Illustrate also that interdisciplinary and multidisciplinary approaches are important dimensions for any research to reach an acceptable level of maturity and a possible solution.

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