ABSTRACT

Recently, rescue worker resources have not been sufficient to meet the regular response time during large-scale catastrophic events in every case. However, many volunteers supported official forces in different disaster situations, often self-organized through social media. In this paper, a system will be introduced which allows the coordination of trained volunteers by a professional control center with the objective of a more efficient distribution of human resources and technical equipment. Volunteers are contacted via app on their private smartphone. The design of this app is based on user requirements gathered in focus group discussions. The feedback of the potential users includes privacy aspects, low energy consumption, and mechanisms for long-term motivation and training. The authors present the results of the focus group analyses as well as the transfer to their app design concept.

Keywords: App, Disaster, Rescue Workers, Smartphone, Volunteers
1. INTRODUCTION

Due to new technologies, such as mobile phones, new opportunities for crisis communication are emerging (e.g., Starbird & Palen, 2011). The present research explores the potentials of a smartphone-based system that would assign medically or technically trained volunteers to emergencies in their direct environment. The idea of this system is to alert volunteers when it is foreseeable that regular emergency forces may not be able to arrive in the regular response time. The selection of volunteers will be automatically supported, but the decision remains with the dispatchers in the control center. This approach might be particularly helpful in cases of major catastrophic events, when the regular staff is drawn to operations that are connected to the disaster and therefore might not reach additional emergencies as quickly as necessary. The volunteers register online and will provide basic support (similar to first responders, see Timmons & Vernon-Evans, 2012).

In this article, we will discuss the current state of the art with regard to voluntary help and how mobile applications could help to integrate volunteers into official rescue processes. With the example of the research project “Automated Allocation of Volunteers in Major Disasters” (“Automatisiertes Helfer-Angebot bei Großschadensereignissen”, AHA), we will analyze the motivation of potential volunteers and derive concepts for a mobile application. The project is a cooperation between the Hochschule Ruhr West, University of Applied Sciences, the University of Applied Sciences for Public Administration Duisburg, the University of Duisburg-Essen, the company CKS Systeme GmbH, developer of software for fire departments, and the Institute for Fire Department and Rescue Technology Dortmund (IFR).

In the following, we first describe the motivation (Section 1.1), then several related projects (Section 1.2) and introduce the AHA project in this context (Section 1.3). After this, a first user study is presented (Section 2): with an explanation of method (Section 2.1) and procedure (Section 2.1) and first results (Section 2.3). Afterwards requirements and functions for the volunteers’ mobile app are derived (Section 3). Starting with an overview of possible functions (Section 3.1), followed by a more detailed look upon: data privacy and security (Section 3.2), a quiz function (Section 3.3), automated readiness (Section 3.4) and dashboard design (Section 3.5). Finally, conceptual challenges are summarized and a brief outlook is given (Section 4).

1.1. Motivation

Eight, ten or twelve minutes, this is the legal response time for fire fighters or medical help in Germany, depending on the geographic region. During large-scale catastrophic events this time limit is not always met. In interviews, which we have conducted in preparation of this project, rescue workers mentioned that the resources of the emergency services had problems handling the number of incoming rescue and security tasks in a timely manner. New incidents could not be processed immediately, as all forces, including human resources and equipment, were already in rescue operation. Supra-regional help can be requested, however, it is common in major disasters that their forces are occupied as well.

The goal of the AHA project is to mobilize additional, qualified resources from the population and make them available for the dispatcher. Additional helpers from the region and technical aids are recorded, checked and registered in the system, in order to be available in case of an emergency. Their locations and availabilities can be determined and are shown to the dispatcher in the control center. The final decision whether to alert a volunteer or not, remains with the dispatcher and is not automated.
Exploring Cloud-Based Distributed Disaster Management With Dynamic Multi-Agents Workflow System

Supporting Domain Ontology through a Metamodel: A Disaster Management Case Study
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