

ABSTRACT

In a disaster management system, the real-time information provides invaluable support for disaster response, rescue planning, decision making and reconstruction of the infrastructures. With the advent of communication technology along with the ubiquity of smart phones, the attention has been made toward citizen based data collection for disaster management. The geospatial information generated such unskilled people is termed as Volunteered Geographic Information(VGI). These data can be used as supplement to the authoritative data resources for development of efficient disaster management plan in real-time. In rural area of developing country, the local detailed map may not be available to the rescuers and the rescue experts take more time to reach into proper location. However, if the people from the disaster area can be utilized for initial rescue operation with proper rescue route guidance, then it is possible to save valuable life of the disaster victims. The focus of this work is to develop a platform to capture disaster related data from the local citizens and process it with the authoritative data for producing disaster management information. The Service Oriented Architecture (SOA) has been adopted to develop this platform. It consists of several geospatial data processing modules to predict the disaster extent map of risk zones with different severity values. However, the quality issue is the main concern to use the citizen generated contents. A statistical testing method have been developed to verify the credibility of volunteered geographic data generated during the disaster situation. The results indicate that the volunteered information is useful, even by the citizens with lack of experience. A model has been developed to identify and utilize the agreed volunteers for disaster management based on their expertize and domain knowledge. There are multiple teams of volunteers constructed for rescue operation based on the requirement of safe zones and the capacity of volunteers. A metaheuristic based optimization technique has been developed to obtain the best rescue route network in real-time by considering the recent road segments information provided by the rescue volunteers. In order to demonstrate the proposed approaches, a prototype of the framework and a mobile application have been developed. A flood prone area has been considered to carry out the case study. In order to realize efficacy this framework, the data has been collected during the disaster situation from the volunteers of the study area.