A spatial analysis approach to evacuation management: shelter assignment and routing

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Abstract

Evacuation planning requires an integrated analysis of heterogeneous spatial datasets including population, road network and facilities. It is a complex and challenging task to represent and make reasonable connections among the datasets which evacuation management of emergency situations will be based on. An evacuation management system requires an easy configuration by evacuation managers who do not necessarily have full knowledge of Geographic Information Systems (GIS) but need to understand the situation promptly and provide decisive instructions that can be fulfilled only when they can manipulate datasets and develop new workflows in various scenarios. A spatial analysis platform provides toolkits for spatial data acquisition and processing, analysis, and visualization from/to online open sources. Such toolkits built in GIS software or toolboxes developed to work in GIS software are presented in this paper to show the feasibility of enabling users to manage spatial data and customize their analysis by combining common data analysis tools to meet their requirements in evacuation planning. Case studies are provided to demonstrate the usability of these toolkits in Brisbane flood evacuation management.