

Real-Time Recommendations for Traffic Control in an Intelligent Transportation System during an Emergency Evacuation – Part 2

Abstract

Recent hurricanes caused mass evacuations and brought attention to many issues and challenges during these mass evacuations. Effective and proper traffic control is crucial during an emergency evacuation, and intelligent transportation systems (ITSs) can play an important role in mass emergency evacuations. Moreover, diversity in human evacuation behavior (e.g., leaving versus staying, and different evacuation times and routes chosen by individuals) should be considered in the planning and implementation of an emergency evacuation. More ITSs incorporating information technology and smart sensors have been built in North Carolina. These ITSs provide us opportunities to improve the effectiveness and efficiency of emergency evacuations. In this project, we propose to create ecological models for human evacuation behavior prediction using Monte-Carlo simulation, Brunswik's Lens model and machine learning algorithms, which will be integrated with optimization models to generate initial evacuation traffic control plans. We will also develop a predictive model for the changes in the number of connections of hurricane-affected airlines and airports and an optimization model to recommend personalized, multi-modal options for passengers whose flights are cancelled. The predictive and optimization models to be developed in this project will help improve the safety and mobility of people during a hurricane evacuation.

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