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NORAIDA ABDUL GHANI
Universiti Sains Malaysia, Malaysia

NURULHUDA RAMLI
Universiti Sains Malaysia, Malaysia

INTAN HASHIMAH MOHD HASHIM
Universiti Sains Malaysia, Malaysia

ZULKARNAIN AHMAD HATTA
Universiti Sains Malaysia, Malaysia

MODELING HUMAN FACTORS IN AN EVACUATION WITH BAYESIAN NETWORK FRAMEWORK

Abstract:

The success of an evacuation process during any emergency situations involves many interacting factors between the occupants, hazards, building geometries and environment. With the advancement of computer capability, an increasing number of scholars are now focusing on developing evacuation models by applying the laws and theories of human behaviour. However, these models did not take into account the socio-psychological aspects that can impact an individual's decision making in emergency situations. Consulting experts in the related field of human behaviour can be a useful means to provide substantive information and supplement existing evacuation model. In this paper the relevance of important variables such as physical, psychological, sociological and situational characteristics are discussed. In the case of an emergency, these factors can either motivate or constrain human evacuation process. Using an expert judgment exercise, a graphical presentation called a Bayesian Network (BN) connecting all key factors that affect the success of an evacuation is developed. The usefulness of the approach is investigated using an example. The findings of this paper will be used in the quantification phase of the current model to identify possible consequences of influential factors in decision making and predicting human fatalities in an evacuation system.

Keywords:

Evacuation, Human factors, Bayesian Network, Elicitation, Expert Judgment