

MULTI-CRITERIA EMERGENCY ROUTE PLANNING BASED ON ANALYTICAL HIERARCHY PROCESS AND pgROUTING

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Abstract: Routing calculation has an important role to play in emergency responses and decisions. For example, it can help ambulances to take one patient to the hospital as fast as possible. This paper presents the implementation of an alternative method for computing dynamic ways, according to the location of an accident and the situation at the destination point. The minimum travel-time from the accident point to the nearest hospital is calculated and some others parameters are taken into account such as the availability of beds in the targeted hospital. The method is based on an adaptation of the pgRouting algorithm with an analytical hierarchy process (AHP) for the Emergency Routing Planning Decision (ERPD). First, a weighted travel-time model was built based on a minimum time-consumption criteria, with the consideration of six impedance factors that are influencing the ERPD. Then, AHP was used to calculate priority weights of the impedance factors and taken into account for every parameter. Then, a new and improved routing algorithm was implemented using and extending pgRouting to obtain the weighted travel-time according to the situation of the destination point. The integration of AHP and pgRouting constitutes a powerful tool for analysing both road conditions and the conditions at the destination point. It can be used for evacuation planning after disasters such as flooding, forest fires, earthquakes or tsunamis.