

ABSTRACT

Emergency events never happen with prior alert and notification, and can damage people and cause permanent loss as consequences. For that reason, how to report the emergency service organizations, to distinguish the location of emergency case exactly and to drive that place in time become the key factors in developing countries. The performance of emergency services will be the best if they reach the incident site without delay where lives of damaged people and properties can be saved. In order to get the incident site finally, emergency vehicles use the road network. Therefore, the optimal route finding problem for emergency vehicle becomes the imperative component in evacuation processes. But, according to the lack of effective emergency route response system and good structure road network, there are many difficulties for drivers to go and give the rapid response and rescue actions immediately. Calculating the optimal route becomes one of the main tasks for emergency service transportation, which aims to provide the route from an emergency service location to the emergency event location on a road map. Choosing a suitable route finding methods amongst the existing ones that apply on actual road networks is also an important task for emergency service transportation. According to these inspirations, the optimal route finding system for emergency vehicles is developed on the principles of client-server architecture. This architecture includes reporting and identifying the exact location of emergency case, calculating the nearest emergency services and calculating the optimal route between emergency services and incident place. The proposed route finding system is mainly focused on Fire Emergency Event. In this research work, the importance of road network structure is presented, the problems faced by the drivers on the road network and the issues of route finding process are discussed and the solutions to these problems are described and explained in detail. To develop the proposed work, the database of Yangon Region Road Network is created with Open Street Map (OSM), and Quantum Geographic Information System (QGIS) tool is applied on it to create the usable data format in the system. The location of emergency services and streets condition data such as the streets that are not wide enough to pass in or one-ended streets which are supported by Myanmar Fire Service Department and some data are collected from satellite images and some are composed by crowd sourcing. The well-organized database of proposed system can be used for verifying the exact location emergency case, providing the nearest emergency services locations and the optimal route to go to the emergency location. The optimal route identification system for emergency vehicles is developed

based on Web Service by using well-organized database. In this research work, the distinction of the original route finding method and the proposed route finding method are presented, and these two methods are applied on real road network data in order to compare and analyze their operational performance. In this proposed work, distance and time are used as cost factors to calculate the optimal route. The proposed optimal route finding system is implemented as Web Based Application, and the results are displayed on Google map that must guide the drive way to reach the preferred place in time. The system can offer various kinds of optimal route finding system for other applications by altering and using appropriate geo-spatial databases.