

DUAL-CHANNEL BASED MOBILE AD HOC NETWORK ROUTING TECHNIQUE FOR INDOOR DISASTER ENVIRONMENT

ABSTRACT

The existing network infrastructure may not work well in a disaster environment caused by a fire or an earthquake. Instead of relying on the existing infrastructure, communicating through a mobile ad hoc network (MANET) is recommended because MANET can configure a network without an infrastructure communication system. In addition, firefighters conducting emergency activities in harsh environments surrounded by flames and smoke need a communication system to assist their rapid firefighting operations. Existing work is not suitable for indoor firefighter communications because they did not consider the indoor disaster environment well. In this project proposed, dual channels (i.e., 2.4 GHz and sub-GHz bands) are used for an efficient routing table configuration. Data frame and HELLO message are exchanged through the 2.4 GHz band, while the neighbor list of each node is exchanged through the sub-GHz band. Each node can configure the routing table based on the exchanged neighbor list. A performance evaluation is conducted to compare the proposed technique with enhanced versions of optimized link state routing (OLSR) and destination sequenced distance vector routing (DSDV). The results show that the proposed scheme outperforms the other two MANET routing algorithms (i.e., OLSR-mod and DSDV-mod) in terms of the packet delivery ratio (PDR), end to end delay, and initial routing table configuration time approximately 7.8%, 4.7%, and 166.7%, respectively.