Backbone Source and Positional Broadcast Routing for Emergency System in Urban VANETs

Abstract

Disseminating warning information by Vehicular Ad hoc Networks (VANETs) is of great significance to alleviate traffic problems in time critical applications in future Intelligent Transportation Systems (ITS). In the urban express environment, it is critically challenging to design efficient dissemination mechanisms with strict Quality of Service (QoS) requirements due to complex road structures, severe channel contention, message redundancy etc. In this paper, the Backbone Source and Positional Broadcast Routing (BSPBR) protocol has been proposed to lower message transmission delay and increase reliability. It employs dynamically generated backbone nodes as source nodes based on movement and link quality between vehicles based on a fuzzy logic. Novel forwarding node selection scheme is followed in all propagating directions using iterative partition, mini-slot and black-burst exchange. A single node is successfully chosen using the backbone ranking. Bi-directional broadcast, multi-directional broadcast and directional broadcast are designed on the basis of the position of senders to enable emergency messages to cover the target area seamlessly. Theoretical analysis and simulation results are used to show significant improvement in throughput with
marginal effects on end-to-end delay and packet delivery fraction by the proposed protocol over other existing alternatives.

References

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Index Terms

Computer Science  Biomedical

Keywords

Backbone node, data dissemination, directional broadcast, emergency message, QoS, VANETs