

Improving path duration in high mobility vehicular ad hoc networks

Abstract

In this paper, we consider a high-speed highway mobility scenario, where the available knowledge about the network's topology is used to improve the routing path duration. The improvement is mainly due to the use of a topology control algorithm, which increases the path duration by decreasing the probability of path breaks. For network regions having an enough density of vehicles, the packets are preferentially routed over the oldest links created by the vehicles moving in the same direction. For smaller values of vehicles' density, the routing preferentially uses the most recent links created in both moving directions. This choice is shown to increase the routing path duration.

The topology control scheme here proposed can be easily integrated in the existing routing protocols: we describe how to integrate it in the Optimized Link-State Routing Protocol (OLSR).¹ We compare the performance of our approach with other routing protocols for different values of vehicles' density. The comparison includes end-to-end path delay, path availability and path length (in number of hops). Finally, we evaluate the path duration achieved with our approach, concluding that it exhibits a significant improvement over the most relevant topology and position-based routing protocols.

Keywords

Topology control Routing protocols Vehicular ad hoc networks