Abstract

The increase in number of vehicles on Indian Highways and the immense number of fatal accidents have driven research and development of new generation technology to help drivers travel more safely. One major cause of traffic accidents is that drivers cannot appropriately respond to the changing road conditions consistently. In fact, most of the accidents could be avoided if drivers could use traffic related relevant information on Mumbai-Pune Express Highway, India using wireless communications technology.

Recently, the IEEE adopted the IEEE 802.11p standard as the main technology for Vehicular Ad-hoc Networks. To test the feasibility of this technology, most researchers use simulations, to evaluate protocols for new applications and prohibit the cost of implementing real time Vehicular Ad-hoc Network setup on Mumbai-Pune Express Highway. Different simulators like Openstreet, eWorld, SUMO, NS2, NS3 etc. as well as routing protocols like AODV, DSDV, DSR, GPSR for vehicular ad-hoc networks were looked upon for this study.

Wireless channel for Vehicular Ad-hoc Networks was analyzed, using simulation techniques to find out the most appropriate propagation model with minimum hidden terminal problems for reliable communication. Broadcast communication protocol is proposed for Vehicular Ad-hoc Networks using clustering formation algorithm and CDS connectivity with efficient routing algorithm for V2V communication on Mumbai-Pune Express Highway. It is based on exchange of information with neighboring vehicles, which will reduce the channel contention and message travel time leading to reliable and efficient data dissemination. Our goal is to find a connected dominating set (CDS), then calculate CDS for multi-hop, then construct clusters using the cluster-head selection code and extend this approach to multi-level clusters.
for communication on Mumbai-Pune Express Highway.

The reliability of the IEEE 802.11p in Vehicular Ad-hoc Networks, safety and warning applications scope after taking into consideration many factors, is analyzed. Further, it is authenticated through extensive simulations that the specifications of Direct Dedicated Short Range Communication (DSRC) protocol may lead to undesirable performance under harsh vehicular environments. An adaptive algorithm is proposed to alleviate the impact of the hidden terminal problem, and increase the network capacity and reliability. Reliability in the context of VANETs broadcast services is defined as the networks ability, for all intended mobile nodes, to receive the broadcast messages within specified duration of operation.