CERTAIN INVESTIGATIONS ON THE HYBRID METHODOLOGIES FOR IMPROVING THE PERFORMANCE IN VEHICULAR AD HOC NETWORKS

ABSTRACT

Vehicular Ad Hoc Network is a wireless network designed to provide safety, comfort and other information needed by the drivers. Rate control algorithm plays an important role in IEEE 802.11 wireless network. Rate control algorithm is widely used for static residential and enterprise network scenarios. This algorithm assesses the channel condition to adjust the data transmission rate. The objective of the thesis is to find the best performing combination of rate control algorithm with routing protocol and to implement them to improve the performance of the Vehicular Ad Hoc Network. In this thesis, the performance of rate control algorithms such as Auto Rate Fall, Adaptive Auto Rate Fall, Onoe and Minstrel rate control algorithms are evaluated with Ad hoc On-Demand Distance Vector, Destination Sequence Distance Vector and Optimal Link State Routing protocols for the real-time scenario in vehicular ad hoc network. Real time scenario is selected from Google map and the vehicle traffic is generated using Simulation of Urban Mobility. The proposed methodologies are simulated using Network Simulator ns-3 for the vehicle node densities of 20, 30, 50 and 100. Average routing goodput, packet delivery ratio and macphyoverhead are the performance metrics used for the analysis. The simulation results show that Minstrel Rate Control algorithm with DSDV Routing protocol performs better when compared with other combinations. Finally the best selected combination for each vehicle density is tested with propagation loss models such as friis, log distance, two ray ground model and Nakagami-m fading model. Simulated results of selected combinations with propagation loss models are compared. Finally, results prove that the two ray ground model with Minstrel-DSDV performs better than other two propagation loss models.