Abstract

Recently, the IEEE has standardised the 802.11p protocol for Vehicular Ad hoc Network (VANET). The main medium access control mechanism (MAC) of IEEE 802.11p is known as Enhanced Distributed Channel Access (EDCA). EDCA uses a contention algorithm based on distributed coordination function to provide the access for traffic in each access category (AC). When the contention window reaches its maximum size, the contention window is reset to its minimum size when frames are transmitted successfully, or the associated retry counter is reached, and the frame is discarded. In this paper, propose an analytical model of the throughput for the IEEE 802.11p protocol is proposed using continuous time Markov chain (CTMC) with upper bound of drop limit. During transmission, some messages require RTS/CTS prior to transmitting data and others don’t require it. Therefore, this idea along with the concept of drop limit is considered for modeling. A 3-D Markov chain is created to model the back off procedure for each access category. The analytical evaluation of the throughput for each access category of IEEE 802.11p EDCA has been given. The model is applicable for four access categories and the solution is given without including the computational complexity.
References


Index Terms

Computer Science  Wireless

Keywords

Vehicular Networks, Throughput, WAVE, IEEE 802.11e EDCA, IEEE 802.11p, retry limits.