

ABSTRACT

Traffic congestion and accidents, which increase every year due to the growth in the number of vehicles in congested areas, are serious problems. This topic is important because it requires smart technology solutions to improve traffic efficiency and safety. One approach is to implement vehicle-to-vehicle (V2V) communication using Vehicular Ad-Hoc Networks (VANETS) and the reactive AODV routing protocol. This research simulates the performance of AODV using SUMO as a traffic simulator and OMNeT++ as communication analysis software in vehicular networks. The evaluation parameters are Throughput, which is the amount of data that is successfully processed, Packet Delivery Ratio (PDR), the ratio of the success rate of data delivery, and End-to-End Delay (EED) or the time required to transmit a data. The solution was developed on a real map and visualized through a web-based dashboard. Simulation results show that increasing the number of vehicles can increase throughput up to a certain optimal point, but at high density, PDR decreases from 4.85% to 4.19%. Vehicle speed affects the stability of the communication route, where the higher speed causes an increase in EED from 94.7 ms to 119.2 ms. This shows that the AODV protocol still faces challenges in maintaining stable connectivity under conditions of high mobility and dynamic network topology. Thus, the performance of AODV is strongly influenced by the number and speed of vehicles, and requires further optimization to be more adaptive in urban traffic scenarios.

Keywords: *AODV, network performance, OMNeT++, SUMO, VANETS.*