

## ABSTRACT

Vehicular ad-hoc networks (VANETs) developed based on mobile ad hoc networks (MANETs), which is expected to provide communication among the vehicles and used it for safety and entertainment applications for drivers and passengers. VANET have different characteristics than MANET, on VANET mobile node moves faster, a larger number of nodes, topology changes very dynamically.

Previous research shows that the model of mobility affecting network performance. An example of mobility model that is used to illustrate the movement of the mobile node is Gauss-Markov mobility model, which is used to illustrate changes of acceleration, velocity, and location, as well as its direction at any time. This thesis attempts to evaluate network performance metrics of Gauss-Markov mobility model, in particular, packet delivery ratio (PDR), throughput, and delay on a network that combines VANET with LTE. Hybrid LTE-VANET network is expected to improve network performance metrics with using the advantages of both types of these networks. The contribution of this thesis is to enrich the evaluation of the performance of Gauss-Markov mobility model on LTE-VANET hybrid network by evaluating various network performance metrics, particularly, PDR, throughput, and delay. Utilizing ns-3 software, this research tries to simulate Gauss-Markov mobility model and performed with the number of nodes and randomness index ( $\alpha$ ) that varies.

The results show that there is a strong correlation between PDR, throughput, and delay with the addition number of MNs. Based on simulation result, although the resulting performance especially PDR and throughput are relatively similar, but the hybrid LTE-VANET produce better delay compare to pure VANET. The average delay is smaller by about 40% compared to pure VANET. This simulation also concludes that different value of alpha on Gauss-Markov mobility model does not influence PDR, Throughput, and delay.