

Chapter 5

A Review of Various Modeling Software for VANETs: Simulation and Emulation Tools

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ABSTRACT

There is great demand for VANETs in recent times. VANETs enable vehicular communication with the advent of latest trends in communication like 5G technology, software-defined networks, and fog and edge computing. Novel applications are evolving in recent times on VANETs with the proliferation of internet of things. Real test bed implementation is not always feasible with various limitations like expenditure and manpower and requires more time to experiment with the new facets of VANETs. Hence, the researchers should be aware of the variety of simulation tools that are capable of running VANET simulations. Simulation is a powerful tool in developing any critical/complex system that constitutes minimum cost and effort. The simulation tools of VANETs should support multiple mobility models, real-world communication protocols, and traffic modeling scenarios. This chapter gives a clear view on available tools and their characteristics on VANETs for research purposes.

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INTRODUCTION

The vehicular mobility in VANETs relies on micro and macro mobility. Communication protocols support interchanging data between vehicles and RSUs.

VANETs simulation is possible in all layers of Open System Interconnection (OSI) reference model. Agarwal et al., developed a TraceReplay simulator at application layer to implement realistic implementation of applications in NS3. TraceReplay works from the network trace information to generate real world applications in NS3. Any application layer protocols like Hyper Text Transfer Protocol (HTTP) can be replayed with this TraceReplay proposed by Agrawal (2016). Jang (2017) proposed overlay platform at application layer with Greedy Perimeter Stateless Routing (GPSR) and Ad-hoc On-demand Distance Vector (AODV) protocols to increase reliability in VANET communication. Monir (2022) proposed seamless Mobile Edge Computing (MEC) based SDN handover management scheme for VANETs for handling the mobility challenges in VANETs. MEC server at Road Side Unit (RSU) runs the handover logic upon the intersection of adjacent RSU's. The handover is done when RSSI values falls below the defined threshold. The limitation of the proposed scheme is it is unable to handle cross roads handover. Summarized list of existing works is given in Table 1.

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