Available Online at www.ijcsmc.com

International Journal of Computer Science and Mobile Computing

A Monthly Journal of Computer Science and Information Technology

ISSN 2320–088X
IMPACT FACTOR: 6.017

IJCSMC, Vol. 6, Issue. 4, April 2017, pg.284 – 288

Effective Vehicle Collision Detection System by Using Vehicular Ad-Hoc Network

Miss. Komal V. Dhole
Department of Computer Science and Engg., Babasaheb Naik College of Engg. Pusad(MS)
Email_id: komaldhole145@gmail.com

Prof. A. S. Dhudhe
Department of Computer Science and Engg., Babasaheb Naik College of Engg. Pusad(MS)
Email _id: amol_dhudhe@redffimail.com

ABSTRACT: Vehicular Ad-hoc Networks (VANETs) is considerable attention from the research community and the automotive industry to improve the services of Intelligent Transportation System (ITS) [1]. Rapid simulation of Vehicular ad hoc networks (VANETs) is increasingly needed. However, this is not easy to achieve because road traffic and network communication simulators are complex and often hybrid frameworks are required. One such a hybrid approach, Vehicles in Network Simulation (Veins), incorporates the widely used Simulation of Urban Mobility (SUMO) and the renowned discrete event simulation environment OMNET++ [2]. We present guidelines for rapid VANET simulation with the combined use of OSM, Traffic Modeler, SUMO, OMNET++, and Veins. We create and present an example to illustrate how to develop a rapid VANET simulation.
Keywords: Vehicles, Vehicular ad hoc networks, Hybrid, Veins, Traffic control, Junctions.

INTRODUCTION:

VANETs are new type of networks which are expected to support a large spectrum of considerable services in VANET on the roads is that it can give drivers safety in driving. VANET can transmit useful information about road and traffic conditions as well as other noticeable information for people who drive in the range of the typical road. For example, if a car encounters a dangerous situation, then it can communicate with other cars and warn those cars which have not arrived at that place yet using Vehicle to Vehicle (V2V) communication. As per the World Health Organization (WHO) statistics, millions of peoples around the world are killed every year in road accidents. According to article published in Deutsche. Welle by Murali Krishnan dated 29.04.2010, In "India's

© 2017, IJCSMC All Rights Reserved

record in deaths has touched at least 14 deaths per hour in 2009 against 13 the year 2008". VANET is a form of Mobile ad-hoc network, MANET, to provide communications among vehicles and roadside fixed infrastructure [3]. These roadside units provide geographical information to the vehicles and act as an internet gateway. The most of the important applications is driving assistance. Adjacent vehicles can share road and traffic information with each other [4].

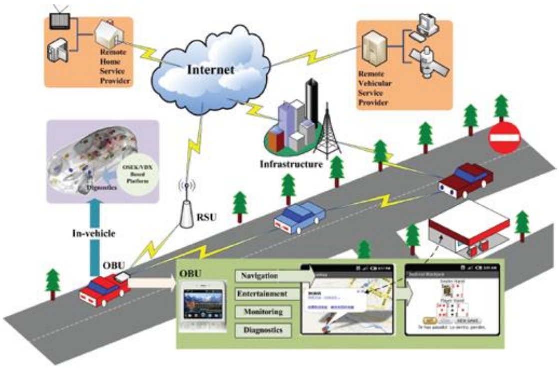


Fig 1 VANET network Communication

Literature Review:

Hager, M., Seitz, J. and Waas, T. (2015) supports framework proposed for VANET. This framework was agent-based architectures for intelligent traffic management systems.

an autonomously driving vehicle is already possible for most traffic situations. But due to legal constraints and open questions regarding the liability in the event of a failure, this technology is mostly used to support the driver or to react in critical situations as in case of an imminent rear-end collision. The combination of this sensor information and other context data with IVC leads to intelligent transportation systems (ITS) [5] . Kashif Dar *et al.* described the structure and general applications of ITS and provided a comparison to other wireless communication systems, whereas Willke *et al*. presented a more comprehensive discussion of this topic as well as d'Orey and Ferreira . IVC is based on the IEEE standard 802.11p which is a modified version of IEEE 802.11a. As in classical mobile communications, the situation is different in the US and Europe , but in general, the principles are the same. The applications can be classified into safety, traffic efficiency and entertainment solutions. Apart from the latter, not a core element of ITS applications, the corresponding protocol mechanisms are based on beacons for vehicular safety and on multi-hop routing and forwarding schemes in case of traffic information. At this point, we want to exclude advanced techniques like further mobile communication systems or background. [6] Nabeel Akhtar has presented realistic analysis of the VANET topology characteristics over time and space for highway . In this analysis, Author integrate real-world road topology and real-time data extracted from the Freeway Performance Measurement System (PeMS) database into a microscopic mobility model to generate realistic traffic flows along the highway. But because of failuar in implementation. New technique are arrived. Monika *et al*. used NS2 simulator to compare among three protocols DSDV and AODV over VANET. IEEE 802.11p is the standard protocol that is applied on their network. The comparison aims to analyze the performance of the throughput and
the packet loss rate The performance of AODV and DSDV was analyzed based on
variation values of speed and node density. but The performance of AODV, DSR and DSDV routing protocol shows some differences in low and high node density. In low density with low pause time the packet delivery ratio is high for DSR and average for DSDV. Under the same scenario average end to end delay is low in DSDV If the density is low but the pause, time is high then the packet delivery ratio for DSR is high and average for AODV & DSR. For the same scenario, DSDV and AODV possess lower performance in comparison to DSR which possess better results with end-to-end delay [7]. *after that OMNET++* OMNET++. (Objective Modular Network Testbed inC++) is an object-oriented modular discrete event network simulator. In this section, we will introduce Model Structure

© 2017, IJCSMC All Rights Reserved

and Logical Architecture in OMNET++. OMNET++ model consists of simple modules and compound modules(Fig. 1). Simple modules are atomic elements in the module hierarchy: they can not be divided any further, it's the most frequent task is sending and receiving messages. Messages can be sent either via output gates, or directly to another module. Gates are the input and output interfaces of modules, they can be linked with connections. Connection can be assigned properties (such as Propagation delay , Data rate and Bit error rate). Gate via one of the several variations of the receive call to receive messages or directly transmit deliver messages from the simulation kernel [8].

PROBLEM DEFINITION:

There is a big trend to replace conventional vehicle collision detection techniques with the vehicular Ad hoc network systems. A VANET is a advance technique that is usefull for the efficient vehicular collition and detection on the road. To develop the mechanism for controlling automatic adjustment to maintain safe distance between vehicles and avoiding accidents. To develop the mechanism for communication between vehicles and maintain efficiency and safety of a modern transport system. To develop a mechanism for proper exchange of safty stetus information to increase safty awareness [9] . In a Vehicular Ad-hoc Network (VANET), the amount of interference from neighboring nodes to a communication link is governed by the vehicle density dynamics in vicinity and transmission probabilities of terminals. It is obvious that vehicles are distributed non-homogeneously along a road segment due to traffic controls and speed limits at different portions of the road. The common assumption of homogeneous node distribution in the network in most of the previous work in mobile ad-hoc networks thus appears to be inappropriate in VANETs. VANET simulators provide traffic and network simulation or can combine traffic and network simulator. Examples are Veins, TraNS, MOVE, NCTUns, Grooven Netand, and MobiREAL. Veins connects SUMO and OMNET++. At First the cars are generated in SUMO and then exported to the network simulator. OMNET++ considers all cars as nodes and simulates the scenario. If any change occurs in the network, Veins can change the cars scenario in SUMO [10]. depicts how Veins works in more details.

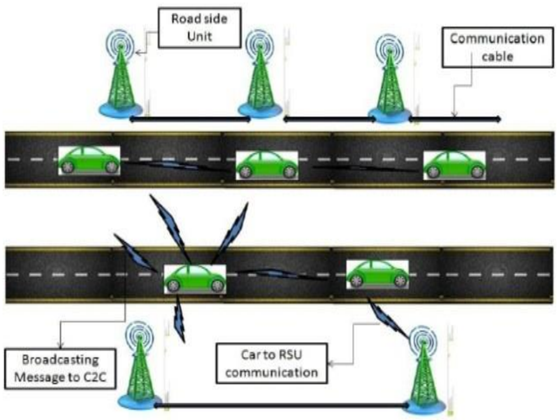


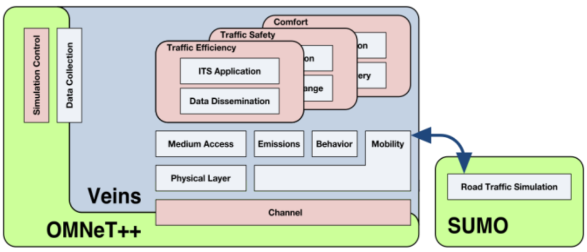
Fig 3 Communication between vehicles

We can do realistic VANET simulations by combining the following three software
1.Omnet++
2.SUMO
3. Veins
Among the above three, Omnet ++ is the Network simulator which can do the real networking aspects of the simulation and be dealing with the networking components of a typical "network simulation" (such as mac, TCP, routing, etc.,)

SUMO:
The Simulator for Urban Mobility, can accurately model the vehicular traffic, signals, accidents, etc., on any road or on a city road map. SUMO can be used independently without Omnet++ or any other simulator. Generally, the traffic patterns or mobility traces created by SUMO can be imported to some of the popular network simulators including Omnet++ to create realistic vehicle and traffic dynamics. Finally, Veins is nothing but a set of extensions exclusively written for Omnet++. In other words, Veins is one of the model library written for Omnet++ which will provide a set of protocols to simulate VANET under Omnet++ . In addition to that, Veins will work along with SUMO and can use its traffic models (mobility scenarios and patterns) under Omnet in a well-integrated fashion. By combining the all the above three, we can do a very realistic vehicle to vehicle(V2V), vehicle to infrastructure (V2I), vehicle to pedestrians (V2P), vehicle to home (V2H), etc., and in general Vehicle-to-Everything (V2X) network simulations on any realistic roadmap with realistic network protocol stacks. So, with this three we can accurately model any modern vehicular ad-hoc network [11].

IMPLEMENTATION:

Veins, the Open Source vehicular network simulation framework, ships as a suite of simulation models for vehicular networking. These models are executed by an event-based network simulator (OMNeT++) while interacting with a road traffic simulator (SUMO). Other components of Veins take care of setting up, running, and monitoring the simulation. This constitutes a simulation *framework*. What this means is that Veins is meant to serve as the basis for writing application-specific simulation code. While it can be used unmodified, with only a few parameters tweaked for a specific use case, it is designed to serve as an execution environment for user written code. Typically, this user written code will be an application that is to be evaluated by means of a simulation. The framework takes care of the rest: modeling lower protocol layers and node mobility, taking care of setting up the simulation, ensuring its proper execution, and collecting results during and after the simulation. Veins contains a large number of simulation models that are applicable to vehicular network simulation in general. Not all of them are needed for every simulation and, in fact, for some of them it only makes sense to instantiate at most one in any given simulation. The simulation models of Veins serve as a toolbox: much of what is needed to build a comprehensive, highly detailed simulation of a vehicular network is already there [12]. Still, a researcher assembling a simulation is expected to know which of the available models to use for which job. To give a trivial example, one would not want to use a path loss model designed for cities to simulate a freeway scenario. Veins is an *Open Source* vehicular network simulation framework. What this means is that it (and all of its simulation models) are freely available for download, for study, and for use. Nothing about its operation is (or needs to be) kept secret. Any simulation performed with Veins can be shared with interested colleagues -- not just the results, but the complete tool chain required for an interested colleague to reproduce the same results, to verify how they were derived, and to build upon the research performed.



As discussed before, with Veins each simulation is performed by executing two simulators in parallel: OMNeT++ (for network simulation) and SUMO (for road traffic simulation). Both simulators are connected via a TCP socket. The protocol for this communication has been standardized as the Traffic Control Interface (TraCI). This allows bidirectionally-coupled simulation of road traffic and network traffic. Movement of vehicles in the road traffic simulator SUMO is reflected as movement of nodes in an OMNeT++ simulation. Nodes can then interact with the running road traffic simulation, e.g., to simulate the influence of IVC on road traffic. The simulation models of Veins constitute the current state of the art in vehicular network simulation research. Aside from numerous publications that base their conclusions wholly or in part on simulations conducted with Veins, many proposed new and improved simulation models or techniques, implemented for the first time in Veins [13].

CONCLUSIONS:

In this article we proves that OMNET++ is an excellent WSN simulation software, its functions follows requirements of WSN simulation. Compare with NS2, it reflects that OMNET++ have better performance than NS2, also have some advantages when comparing with OPNET which is an expensive commercial software. Directed Diffusion simulation under simpleMAC and IEEE 802.11 MAC in both OMNET++ and NS2 proved OMNET++ use less execution time and memory usage in WSN simulation. Execution time and memory usage's performance indicates that OMNET++ is much more scalable. Its excellent performance, animating graphical user interface, convenience topology describing language and easy operation obtains more and more user's favor. In future, we will define and implement in OMNET++ generic classes for several newly emerging WSN functions, such as coverage, time indexing, and power management [14].

REFERENCES:

[1] Sun Limin, Li Jianzhong, Chen Yu, "Wireless Sensor Networks", Tsinghua University Press,2005.
[2] Youssef, Mohamed, El-Sheimy, Naser, "Wireless Sensor Network: Research vs. Reality Design and Deployment Issues", Communication Networks and Services Research, 2007. CNSR '07. Fifth Annual Conference on May 2007 Page(s):8 – 9.
[3] Li Shihan, Bai Yuebin, Qian Depei, "Research on Software Technology for Wireless Sensor Networks", Application Research of Computers, 2007, 01.
[4] OMNET++,http://www.omnetpp.org/
[5] András Varga. "OMNET++—Discrete Event Simulation System Version 3.2 User Manual".
[6] András Varga. "The OMNET++ Discrete Event Simulation System".
[7] NS-2, http://www.isi.edu/nsnam/ns/
[8] Xu Leiming, Pang Bo, Zhao yue, "NS and Network Simulation" [M].*Post & Telecom*, 2003.
[9] Wu Junhong, Yang Yang, etc., "Network Simulation Method and OPNET's Simulation", *Technology Computer Engineering*, 2004, 30(5): 106-108.
[10] Sam Phu Manh Tran,T, Andrew Yang, "OCO: Optimized Communication & Organization for Target Tracking in Wireless Sensor Networks", *IEEE International Conference on Sensor Networks*, Ubiquitous, and Trustworthy Computing, Vol 1 (SUTC'06) pp. 428-435.
[11] "IEEE Std. 802. 11", Wireless LAN Media Access Control (MAC)and Physical Layer (PHY) Specifications, 1999.
[12] Li Chunshi， Wang Guangxing, "A Survey of the IEEE 802.11 MAC Protocol in Wireless Ad Hoc Networks", *Computer Science* 2007 Vol.34 No.1 P.26-28.
[13] C. Intanagonwiwat, R. Govindan, and D. Estrin, "Directed Diffusion: A Scalable and Robust Communication Paradigm for Sensor Networks", *Proc. ACM Int'l. Conf. Mobile Comp. and Networking*, Aug. 2000.
[14] Zhao Haixia, "Secure geographical and energy aware routing protocol in wireless sensor networks", *Information Technology*, 2006, 09 .
[15] Tareq Emad Ali, Layth A. Khalil al dulaimi, Yamaan E. Majeed, "Review and Performance Comparison of VANET Protocols: AODV, DSR, OLSR, DYMO, DSDV & ZRP", Al-Sadeq International Conference on Multidisciplinary in IT and Communication Science and Applications (AICMITCSA)– IRAQ (9-10) May, 2016

© 2017, IJCSMC All Rights Reserved