International Journal of Innovative Research in Technology and Management (IJIRTM), Volume-3, Issue-2, 2019
ISSN: 2581-3404 (Online)

Enhance the Performance of Vehicle Node using Cooperative Scheme in VANET

Sandhya Dohare[1], Dr. Kamlesh Namdev[2]

[1]M. Tech. Research Scholar, Department of CSE, SIRTE, Bhopal (India)

[2]Prof, Department of CSE, SIRTE, Bhopal (India)

[1]doharesandhya55@gmail.com, [2]kamlesh.namdev@gmail.com

ABSTRACT
Nowadays, sensor-based technologies are playing a vital role in the automation industries. Depending upon the applications, appropriate sensor network-based infrastructure can be used to execute various applications in different domains such as health care, transportation, education to name a few. VANET is one of the domains of wireless sensor network (WSN) and mobile ad hoc network (MANET), which is popular for mobile sensing, computation, and communication. In this paper we proposed a Cluster head algorithms for the creation of cluster in vehicle ad-hoc network and improve the performance of network than existing system, our proposed method work with the dedicated short range communication protocol with simulation urban mobility model, all the implementations works done with the sumo and network simulator.

Keywords: VANET, MAC, Network simulator, Network animator.

INTRODUCTION

In this section we discuss about the introduction of mobile ad-hoc network with their classification such as wireless sensor network, cellular networks, vehicular ad-hoc network and mesh networks etc. Mobile ad-hoc network is very popular and rapidly used topology in the last two decades and as well as very popular also now these days. In these techniques we used various types such as wireless local area networks, wireless home area networks, wireless wide area networks and wireless neighborhood networks. Mostly there are two techniques infrastructure based such as cellular networks and infrastructure less network such as wireless networks. In infrastructure fewer networks there is no base stations and number of station can connect directly with each other.

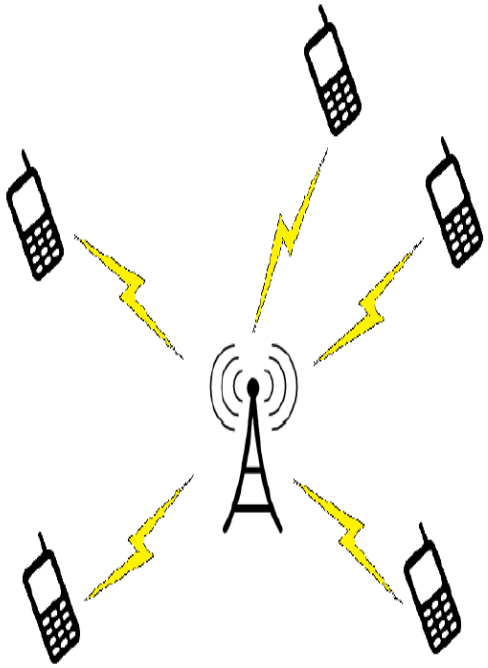

Figure 1: Infrastructure based network.

There is various challenges for the save of human life road accident is one of them, road safety is major concern for the government bodies and as well as vehicle manufacturers also. There is a very high number of population is affected from the

road accidents and they lost their lives or some major injuries. The intelligent transportation system is provide the solution for road accident, these policy we handle through using the vehicular ad-hoc network, vehicular ad-hoc network is a types of mobile ad-hoc network and mostly used for the intelligent transportation system which implement the road safety measurement and policies. Vehicular ad-hoc network consist of road base unit, on board unit and road transfer unit, form these units all vehicles in a road get the frequency and connected with each other, they all vehicle nodes are connected with each other in a strong manner and they communicate some information or pass the message to each other nodes.

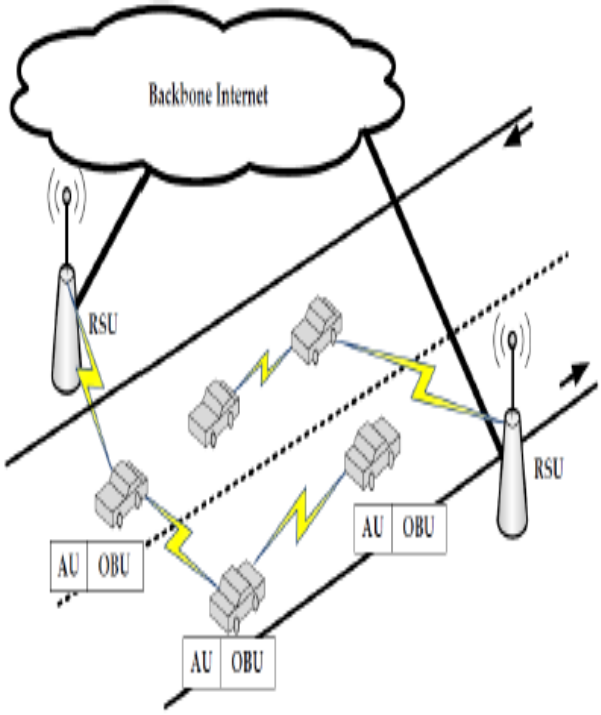

Figure 2: An illustrative network architecture of a VANET.

Both safety applications and commercial applications are important for VANETs. Safety applications relate to human life, health, and well being, and commercial applications often benefit companies in the industry [18]. Thus, the development of safety and commercial applications can encourage the evolution of VANETs. For safety applications, the periodic broadcasting of beacons plays an important role because the status of neighbors such as their geographical positions, speeds, directions, and other important information are usually provided by the beacons of neighbors to discover each other in time. The accurate and efficient neighbor-hood discovery link layer services guarantee the safety of the road environment. For commercial applications, the effective transmission of various application data (such as data from so called 'infotainment') is desirable. For example, it is available for passengers to watch television shows or use the multi person video conferencing application in the vehicles [3].

The rest of this paper is organized as follows in the first section we describe an introduction of about the VANET. In section II we discuss about the applications of Vanet. In section III we discuss about the man in middle attack. In section IV we discuss about the experimental result analysis and the comparative study between existing method and proposed methods and their simulation study, finally in section V we conclude the about our paper which is based on the experimental result study.

II APPLICATIONS OF VANET

VANETs offer possibilities for new applications, which will make our transportation system secure and efficient. But for various requirements, VANET's applications can be divided into different types. Here, some representative existing applications and several potential future applications of VANET are discussed. The first application is safety application in which Most desirable group of applications for VANETs is safety applications. To avoid the accidents, road safety applications can play an important role. Even in the case if the accident is unavoidable, these applications can at least minimize the impact of accidents. Safety applications are delay sensitive and they mainly rely on reliable inter vehicle communication. All safety applications require the exchange of messages with other vehicles. The data in these applications are

obtained from sensors or other vehicles. The data is processed in each application and after processing it sends messages to nearby vehicles or to the infrastructure. The next application is traffic management here The congested road notification (CRN) is another application for VANETs. Through this application traffic congestion on the road can be notified. For route and trip planning, we can use this application. Through this application, road congestions can be controlled and the information about the best route can be provided to a driver with efficient road conditions. In this application, some road side units like intelligent traffic signals or electronic sign boards can also be involved to capture and to disiminate the information.

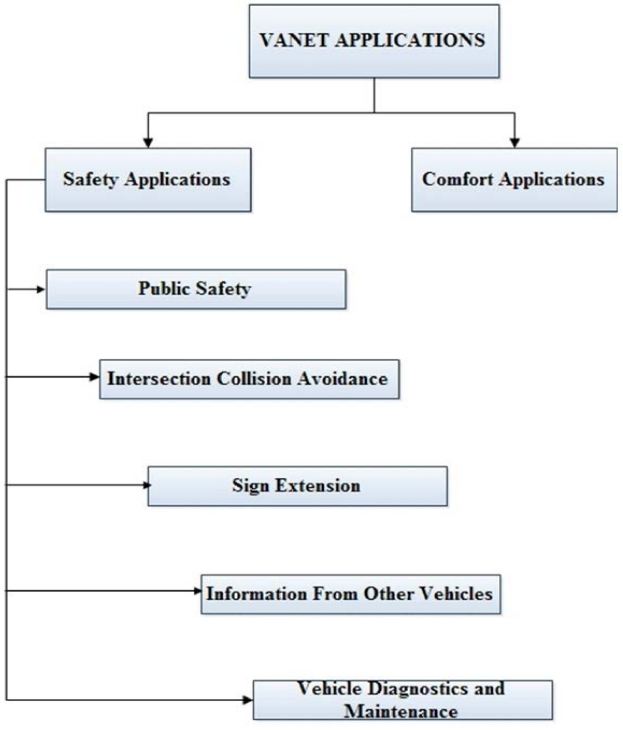

Figure 3: Vehicular ad-hoc network applications.

III MAN-IN-MIDDLE ATTACK

In man-in-middle attacks, the malicious attacker gets involved in network and receives a message from the sender. This message is modified and sent to the receiver. Due to this, sender/receiver obtains the wrong information from the attacker, while they presume that the message is true and trustworthy. This attack can be detected using an individual session key for each message transfer to encrypt the message. If the message is intercepted in the middle as shown in below figure, it cannot be decrypted by the attacker. Hence, no scope to carry out malicious activities.

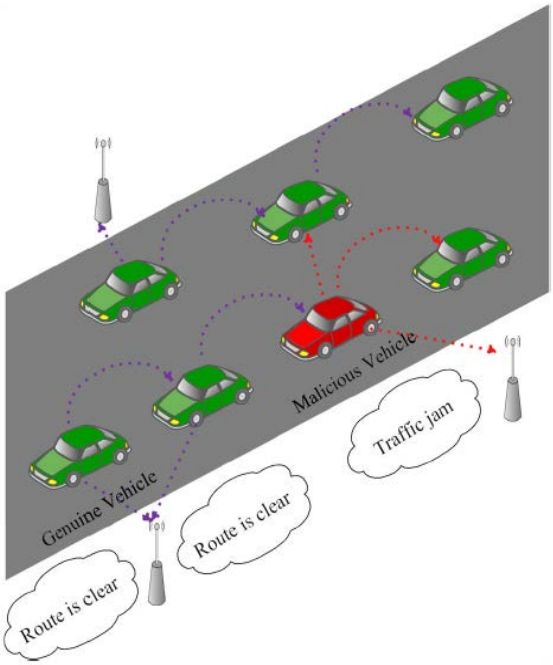

Figure 4: Man in the middle attack.

IV EXPERIMENTAL RESULT ANALYSIS

In this paper we proposed the scheme using cooperative communication for the vehicle and enhance the performance of the network and their participating vehicle nodes in a network. Vehicular ad-hoc network provide the scenario of intelligent transportation system which reduce the road accidental case and improve the road safety. Here we used the cooperative communication mechanism for the participating vehicles in a network and also using the dedicated short range communication protocol for the efficient performance.

In this section we discuss about the proposed experimental environment and used performance evaluation parameter with their respective software and tools. Here we using the network simulator tool for the proposed methods simulation, which is basically support linux

operating system, here we also used some other tools like simulation for urban mobility for the vehicle node simulation and also used the network animator for the vehicle positioning in the network.

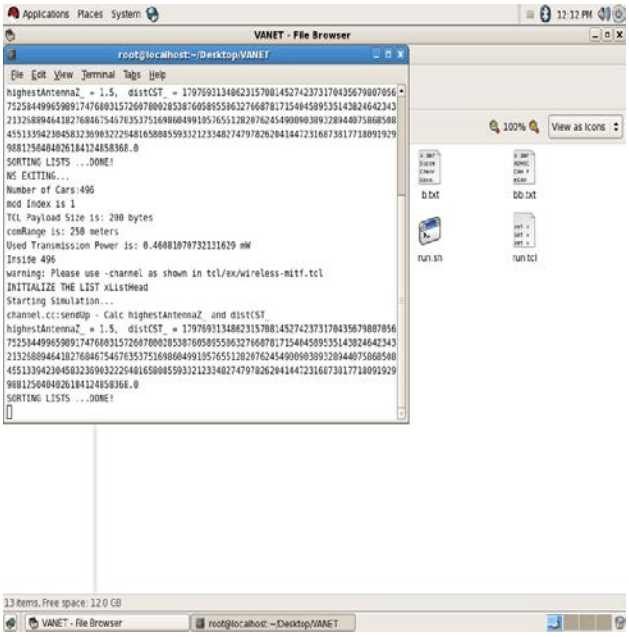

Figure 5: The above image shows the simualtion code window enviornment.

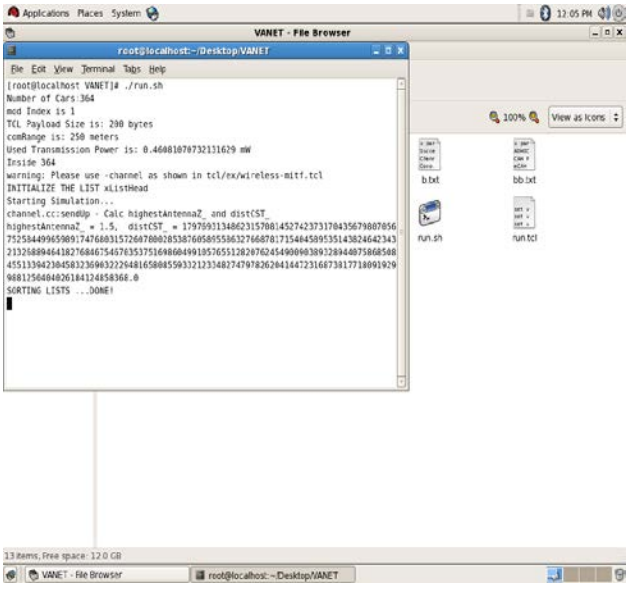

Figure 6: The above image shows the network simualtor enviornment.

V CONCLUSIONS AND FUTURE SCOPE

From the last few decades, VANETs faces challenges due to safety-related services for passenger comfort, and capability to provide safety warnings to the drivers. Any VANET application affected by the attacker can cause severe threats to the drivers and passengers. As we have seen that information like speed, current status, trajectories, and neighbourhood environment of a vehicle in a VANET can be compromised by an attacker so necessary steps need to be taken to mitigate these attacks. In this paper we present the cooperative communication between the nodes and reduce the collision or suspended nodes for the network, moreover also increase the successful ratio for the vehicle node communication while the number of node increases.

REFERENCES:-

[1] Zishan Liu, Zhenyu Liu, Lin Zhang, Xiaodong Lin, “MARP: A Distributed MAC Layer Attack Resistant Pseudonym Scheme for VANET”, IEEE, 2018. pp 1-15.

[2] Wenchao Xu, Haibo Zhou, Nan Cheng, Feng Lyu, Weisen Shi, Jiayin Chen, Xuemin (Sherman) Shen, “Internet of Vehicles in Big Data Era”, IEEE/CAA JOURNAL OF AUTOMATICA SINICA, VOL. 5, NO. 1, JANUARY 2018, pp 19-27.

[3] Zhexin Xu, Mengxue Wang, Yi Wu1 , Xiao Lin, “Adaptive multichannel MAC protocol based on SD-TDMA mechanism for the vehicular ad hoc network”, Article in IET Communications · April 2018, pp 1509-1518.

[4] ZEESHAN SHAFIQ, RANA ABBAS, MOHAMMAD HASEEB ZAFAR, MOHAMMED BASHERI, “Analysis and Evaluation of Random Access Transmission for UAV-assisted Vehicular-to-Infrastructure Communications”, IEEE access 2016. pp 1-18.

[5] Bin Pan, HaoWu, “Utility maximization for multi-vehicle multimedia dissemination in vehicular ad hoc networks”, International Journal of Distributed Sensor Networks 2018, pp 1-12.

[6] M.Rajesh, "A Review on Excellence Analysis of Relationship Spur Advance in Wireless Ad Hoc Networks", International Journal of Pure and Applied Mathematics, 2018, pp 407-412.

[7] Chuan Li, Hongwei Zhang, Jayanthi Rao, Le Yi Wang, George Yin, "Cyber-Physical Scheduling for Predictable Reliability of Inter-Vehicle Communications", Technical Report: WSU-CS-DNC-TR, 2017. pp 1-16.

[8] Mahdi Zareei, A.K.M. Muzahidul Islam, Cesar Vargas-Rosales, Nafees Mansoor, Shidrokh Goudarzi, Mubashir Husain Rehmani, "Mobility-aware medium access control protocols for wireless sensor networks: A survey", Journal of Network and Computer Applications 104 (2018) 21–37.

[9] Sudeep Tanwar, Jayneel Vora, Sudhanshu Tyagi, Neeraj Kumar, Mohammad S. Obaidat, "A systematic review on security issues in vehicular ad hoc network", Wiley 2018, pp 1-26.

[10] Sailesh Bharati, Weihua Zhuang, Lakshmi V. Thanayankizil, Fan Bai," Link-Layer Cooperation Based on Distributed TDMA MAC for Vehicular Networks", IEEE TRANSACTIONS ON VEHICULAR TECHNOLOGY, VOL. 66, NO. 7, JULY 2017. Pp 6415-6427.

[11] Sarang C. Dhongdi, K.R. Anupama, Rohit Agrawal, Lucy J. Gudino, "Simulation and Testbed Implementation of TDMA MAC on Underwater Acoustic Sensor Network", IEEE 2016. Pp 1-6.

[12] Ejaz Ahmed, Hamid Gharavi, "Cooperative Vehicular Networking: A Survey", IEEE TRANSACTIONS ON INTELLIGENT TRANSPORTATION SYSTEMS, VOL. 19, NO. 3, MARCH 2018. Pp 996-1014.

[13] Chuan Li, Hongwei Zhang, Jayanthi Rao, Le Yi Wang, George Yin, "Cyber-Physical Interference Modeling for Predictable Reliability of Inter-Vehicle Communications", 2017. Pp 1-10.

[14] SairaAndleeb Gillani, Peer Azmat Shah, Amir Qayyum, Halabi B. Hasbullah, "MAC Layer Challenges and Proposed Protocols for Vehicular Adhoc Networks", 2015. Pp 1-11.

[15] Mohamed Hadded, Paul Muhlethaler, Anis Laouiti, Rachid Zagrouba, Leila Azouz Saidane, "TDMA-based MAC Protocols for Vehicular Ad Hoc Networks A Survey, Qualitative Analysis and Open Research Issues", IEEE COMMUNICATION SURVEYS AND TUTORIALS , VOL. , NO. , FEBRUARY 2015, pp 1-36.

[16] Roberto M.Oliveiraa, Michelle S.P.Facina, Moises V.Ribeiro, AlexB.Vieira, " Performance evaluation of in-home broad band PLC systems using a cooperative MAC protocol", Computer Networks 95 (2016) 62–76.

[17] Ju Tan, Hongping Gan, Peng Li, " Improved MAC Protocol Based on Time Division Multiple Access In Multi Channel Vehicular Networks", Journal of Residuals Science & Technology, 2016. Pp 88.1-6.

[18] Meng-yue YU, Xin YANG, "A Multi-hop MAC Protocol Based on Coordinating Relay Node", 2nd International Conference on Advances in Management Engineering and Information Technology, 2017. Pp 279-284.

[19] Xin Yang, Ling Wang, Jian Xie, "Energy Efficient Cross-Layer Transmission Model for Mobile Wireless Sensor Networks", Hindawi Mobile Information Systems, 2017. Pp 1-9.

[20] Rodrigo Teles Hermeto, Antoine Gallais, Fabrice Theoleyre, "Scheduling for IEEE802.15.4-TSCH and Slow Channel Hopping MAC in Low Power Industrial Wireless Networks: A Survey", 2017. Pp 1-38.

[21] Omprakash Kaiwartya, Sushil Kumar, "Guaranteed Geocast Routing Protocol for Vehicular Adhoc Networks in Highway Traffic

Environment", Wireless Pers Commun, Springer 2015. Pp 1-27.

[22] Mahdi Zareei, A.K.M. Muzahidul Islam, Cesar Vargas-Rosales, Nafees Mansoor, Shidrokh Goudarzi, Mubashir Husain Rehmani, "Mobility-aware medium access control protocols for wireless sensor networks: A survey", Elsevier ltd. 2018. Pp 21-37.

[23] Damilare Oluwole Akande, Mohd Fadzli Mohd Salleh, Festus Kehinde Ojo, "MAC protocol for cooperative networks, design challenges, and implementations: a survey", Springer 2018. Pp 1-18.

[24] Muhammad Awais Javed, Duy Trong Ngo, Jamil Yusuf Khan, "Distributed Spatial Reuse Distance Control for Basic Safety Messages in SDMA-Based VANETs", 2015. Pp 1-27.

[25] Satoshi Kurosawa and Hidehisa Nakayama" Detecting Blackhole Attack on AODV-based Mobile Ad Hoc Networks by Dynamic Learning Method" in International Journal of Network Security, Vol.5, No.3, PP.338–346, Nov. 2007.