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Review on Intelligent Traffic Management System Based on VANET

Nikhil Suresh Kshirsagar[1], Dr. U. S. Sutar[2]

P.G. Student, Dept. of Electronics and Telecommunication, AISSMS's COE, Pune University, Pune, Maharashtra, India[1]

Head of Department, Dept. of Electronics and Telecommunication, AISSMS's COE, Pune University, Pune, Maharashtra, India[2]

ABSTRACT: The reason behind to choose this topic is to make awareness in everyone and also fruitful for future point of scope. As we know that the vehicle population increases daily this leads towards the accidents. So to overcome this issue VANET [Vehicular Ad Hoc Network] has come with lot of ideas such as vehicular communication, traffic controlling, Navigation and other application in VANET. In this paper we are focusing on accident prevention and traffic signal control for ambulance, police van, and normal vehicles too. To overcome this we have implemented a highway model, intersection model that manages vehicle mobility and shows the actual communication between vehicle to vehicle (V2V) and vehicle to infrastructure (V2I). In this paper we are going to through some light on the pervious researchers done in the area and will compare various drawbacks of these researches.

KEYWORDS: awareness; VANET; highway model; intersection model; V2V; V2I.

I. INTRODUCTION

This is era of automation where each and every vehicle is trying to communicate with each other and also with the infrastructure around them. Vehicular ad hoc networks (VANETs) is rapidly emerging technology and used for communication and cooperative driving between cars on the road.

As we know that the number of deaths and injuries from traffic accidents has been rapidly increasing. Most of those accidents occur at intersections, because the driver cannot see what's come in the other road which is colliding in his moving road.

The security of VANET technology is one of the most critical issues because their information transmission is propagated in open access environments. A few year back VANET has received increased attention as the potential technology to enhance active and preventative safety on the road [1].

1. Necessity:

A vehicular ad hoc network (VANET) is a advance technology in which vehicle to vehicle and vehicle to roadside infrastructure wireless communication can be achieved [2].

In recent years, this is important to obtain road safety for vehicles and drivers and collision avoidance. That's why in this paper we propose a basic warning advertisement system based on the use of 802.11p standard. The target is to send vehicle safety message with high reliability and low delay.

2. Objectives:

The objective of proposed system is as given below

- To select proper scenario size for a required workspace.
- To control the moment of moving nodes and vary them according to scenario size.
- Use roadside unit (RSU), traffic control unit (TCU) to control the traffic and also to prevent accidents at intersection.
- To develop network simulator code for simulation.
- To obtain highly accurate and proper scenario.

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II. LITERATURE SURVEY

In 2007, Fussler, H., discussed the history of vehicular ad-hoc networks and shows the early vision of creating a huge MANET that would facilitate cheap and ubiquitous communication on the ISM band, and how this vision was reduced to cross sending emergency information in a geographically limited area [6].

Leung, K. K., proposed the concept of node connectivity in vehicular ad-hoc networks. He focused on studying transport system with structured mobility. He provides an analytical framework including the design requirements of the mobility model for realistic vehicular networks [9].

In 2013, Pandit, K. and Ghosal, D., proposed to use vehicular ad hoc networks (VANET) to collect and aggregate real time speed and position information on individual vehicles to optimize signal control at traffic intersections. They give an online algorithm, referred to as the oldest job first (OJF) algorithm, to minimize the delay across the intersection [5].

Sok-Ian sou gives brilliant idea about modelling Emergency messaging for car accident over Dichotomized headway model. This paper proposes an analytical model for evaluating the performance of emergency messaging via wireless CA systems. He utilizes the dichotomized headway model, the braking model, and Greenberg's logarithmic model to generate vehicular mobility traces for analysis [7].

In 2014, Penna, K., proposed evaluation of active position detection in vehicular Ad-hoc networks. The main contribution of their approach by running an ns-2 simulation with dynamic number of nodes in various mobility scenarios such as urban, rural, Manhattan. Their first proposed algorithm replies on signal propagation time for verifying the position. And their second algorithm verifies the position information with the help of base station located in the coverage area of the vehicular networks [2].

Sivakumar, T. proposed a concept of stable routing protocol for vehicular ad hoc networks. In this paper he mainly focuses on finding a reliable route between source and destination vehicle in VANETs. A new uncast routing protocol is proposed to route the packets from source to destination vehicles in a reliable and stable path by introducing Reliability Index (RI) metric [3].

Tyagi, P. and Dembla, D. works on investigation the security threats in vehicular ad hoc networks (VANETs). This paper investigates the security aspects of VANET and the attacks. The study of security features and flaws is expected to lead to lead to developed broadcasting and routing services, adding to the quality-of-service. This paper examines various security threats in VANETs, analyse how they are implemented and their impact on the VANET security architecture. A few gaps in the VANET security frame works have also been highlighted which can be worked upon in the future [4].

Khabazian, M. proposed a concept of performance modelling of safety message broadcast in vehicular ad hoc networks. In this paper, he presents an analytical model for the performance evaluation of safety message dissemination in vehicular ad hoc networks with two priority classes. In particular, considering the IEEE 802.11 broadcast protocol and using 2-D Markov Modelling, he derive the joint distribution of the numbers of low- priority periodic messages, which are in transmission mode and in a back off process in a highway. Then, the result is used to derive the average dissemination delay of high priority event driven messages in the presence of the low-priority traffic in the networks. The results are helpful in determining a good trade off between network parameters such as vehicles transmission range, safety traffic generation rate, and medium access control (MAC) parameters to satisfy the required delay bounds for the critical high-priority traffic [8].

Baldini, G. and Mahieu, V. works on identity based security systems for vehicular ad-hoc networks. This paper investigates the application of identity based (id_based) cryptographic (IBC) scheme to provide better security and privacy for VANET. Along with a presentation of the start-of-the-art in this area, this paper presents a security framework for cat to car VANETs based on a protocol for the distributed generation of signing keys that overcome key escrow issues [10].

Xiaodong Lin proposed a concept of achieving efficient co-operative message authentication in vehicular ad- hoc networks. In this paper, he proposes an efficient co-operative authentication scheme for VANETs. To reduce the authentication overhead on individual vehicles and shorten the authentication delay, this scheme maximally eliminates redundant authentication efforts on the same message by different vehicles [11].

Rakhshan, A. and Pishro-Nik, H. works on Tuning collision warning algorithms to individual drivers for design of active safety systems. In this paper, they propose their solution to address the described problem. First, they briefly describe their method for estimating the distribution of brake response times for a particular driver using data from a Vehicular Ad-Hoc Network system. Then, they investigate how brake response times of individual drivers can be used

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in collision warning algorithms to reduce false alarm rates while still maintaining a high level of safety. This will yield a system that is overall more reliable and trustworthy for divers, which could lead to wider adoption and applicability for V2V/V2I communication systems. Moreover, they show how false alarm rate varies with respect to probability of accident. Their simulation results show that by individualizing collision warnings the number of false alarm can be reduced more than 50%. Then they conclude safety applications could potentially take full advantage of being customized to an individual's characteristics [12].

III. HISTORY OF VANET

A VANET turns every participating car into a wireless router or node, allowing cars approximately 100 to 300 meters of each other to connect and, in turn, create a network with a wide range. It is estimated that the first system that will integrate this technology are police van, ambulance and fire vehicles to communicate with each other for safety purpose. Automotive companies like General motors, Toyota, Nissan, DaimlerChrysler, BMW and Ford promote this term.

Intelligent vehicular ad hoc network (InVANET) is another term for promoting vehicular networking. InVANET integrates multiple networking technologies such as Wi-Fi, IEEE 802.11p, wave IEEE 1609, WiMAX IEEE 802.16, Bluetooth, IRA and ZigBee.

IV. SOFTWARE REQUIREMENTS

1. Ubuntu 14.04 LTS

It is Debian based linux operating system, with unity as its default desktop environment. It is based on free software and named after the southern African philosophy of ubuntu. Development of ubuntu is led by UK-based canonical Ltd. a company owned by South African entrepreneur mark shuttle worth. The ubuntu project is publicly committed to the principles of open source development.

2. Network Simulator 2:

In 1996-97, ns version 2 (ns-2) was initiated based on a refactoring by Steve McCanne. Use of Tcl was replaced by MIT's object Tcl (OTcl), an object oriented dialect Tcl. The core of ns-2 is also written in C++, but the C++ simulation objects are linked to shadow objects in OTcl and variable can be linked between both language realms. Simulation script is written in the OTcl language, an extension of Tcl scripting language.

V. SYSTEM OVERVIEW

The main reason behind accident in the intersection is when one vehicle upcoming from another roadside which is not visible to the driver. This may be overcome by using the road side unit (RSU), traffic control unit (TCU), and onboard unit (OBU) along the roadside. When we make this happen we can be able to reduce and prevent the accidents. In our system, each vehicle periodically broadcasts information about itself. When a vehicle receives a broadcast message, it stores and immediately forwards it by re-broadcasting the message. The purpose of 802.11p is to provide the minimum set of specification required to ensure interoperability between wireless devices that communicate in potentially rapid changing communication environments, as well as in situations where transactions must be completed in time frames much shorter than the minimum allowed with ad hoc 802.11 networks.

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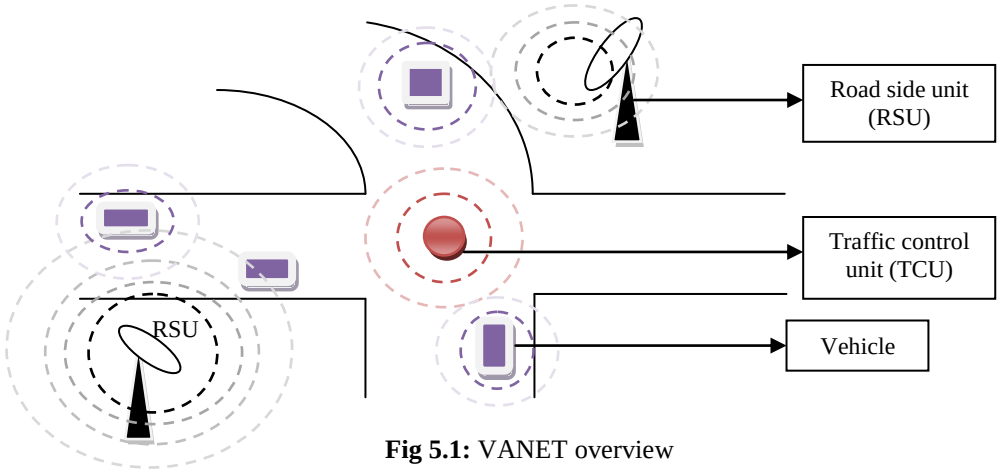

Fig 5.1: VANET overview

In above figure 5.1 we use RSU and TCU on the road so that the accidents can be prevented effectively. The vehicles which are approaching the intersection will be calculating the distance for the destination. It means when two vehicles come at the intersection then the RSU and TCU unit get activated and send message to each other which will be helpful to the society. Now the vehicle will communicate with each other and will passes a safety way to cross the intersection, by sending and receiving information between the vehicles which are about to cross the intersection.

VI. CONCLUSION AND FUTURE WORK

In this paper we discussed various methodology used by researchers on VANET. With the wireless technology become pervasive and cheap, VANET is going to turn out to be the networking platform that would like to propose a scenario that would overcome all types of accidents and much more useful for ambulance as well as for police vans.

REFERENCES

[1]. Kumar, A., Sinha, M., "Overview on Vehicular ad hoc network & its security issues", computing for sustainable Global Development (INDIACom) 2014 International Conference on, vol., no., pp. 792, 797, 5-7 march 2014.
[2]. Penna, K., Yalavarthi, V., Huirong Fu Zhu, "Evaluation of active position detection in vehicular Ad-hoc Networks", Neural Networks (IJCNN), 2014 International Joint Conference on, vol. no. , pp. 2234, 2239, 6-11 July 2014
[3]. Sivakumar, T., Manoharan, R., Kupppusamy, K. S., "A stable Routing Protocol for vehicular Ad hoc Networks", Networks and soft computing (ICNSC), 2014 First International conference on, vol., no., pp. 46, 49, 19-20 Aug. 2014
[4]. Tyagi, P., Dembla, D. "Investigating the security threat in vehicular ad-hoc Networks (VANETs): Towards security engineering for safer on road transportation", Advances in computing, communication and Informatics (ICACCI), 2014 International Conference on, vol., no., pp. 2084, 2090, 24-27 Sept. 2014.
[5]. Pandit, K., Ghosal, D., Zhang, H. M., Chen-Nee Chuah, "Adaptive Traffic signal control with vehicular Ad-hoc Networks", Vehicular Technology, IEEE Transactions on, vol. 62, no.4, pp. 1459,1471, May 2013
[6]. Fussler, H., Schnaufer, S., Transier, M., Effelsberg, W., "Vehicular ad-hoc networks: from vision to reality and back", wireless on Demand Network Systems and Services, 2007. WONS'07. Fourth Annual Conference on, vol., no., pp.80,83, 24-26 Jan. 2007
[7]. Sok-Ian Sou, "Modeling Emergency messaging for car- Accident over Dichotomized Headway Model in Vehicular Ad-hoc Networks", communications, IEEE Transaction on, vol 61, no.2, pp.802, 812, February 2013
[8]. Khabazian, M., Aissa, S., Mehmet Ali, M., "Performance Modeling of safety message Broadcast in vehicular Ad hoc Networks", Intelligent Transportation system, IEEE Transaction on, vol. 14, no.1, pp. 380, 387, March 2013
[9]. Ho, I. W. H., Leung, K. K., "Node connectivity in vehicular Ad Hoc Networks with Structured Mobility", Local computer Networks, 2007. LCN 2007. 32nd IEEE conference on, vol., no., pp. 635,642, 15-18 Oct. 2007.
[10]. Baldini, G., Mahieu, V., Favino, I. N., Trombetta, A., Taddeo, M., "Identity based security system for vehicular Ad hoc Networks", Connected vehicles and Expo (ICCVE), 2013 International conference on, vol., no., pp. 672, 678, 2-6 Dec. 2013.
[11]. Xiaodona Lin, Xu Li, "Achieving Efficient co-operative Message Authentication in Vehicular Ad Hoc Networks", vehicular Technology, IEEE Transaction on, vol. 62, no. 7, pp. 3339, 3348, Sept. 2013.
[12]. Rakhshan,A., Pishor-Nik, H., Fisher, D., Nekoui, M., "Tuning collision warning algorithms to individual drivers for design of active safety systems", Globalcom Workshops (GC Wkshps), 2013 IEEE, vol., no., pp. 1333, 1337, 9-13 Dec 2013.