Providing Warning Signals for Road Safety Using Vanet

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Abstract- **Regarding traffic safety applications for VANETs, warning messages have to be quickly and smartly disseminated in order to reduce the required dissemination time and to increase the number of vehicles receiving the traffic warning information. Vehicular ad hoc networks (VANETs) are wireless networks that do not require any fixed infrastructure. Adaptive techniques for VANETs usually consider features related to the vehicles in the scenario, such as their density, speed, and position, to adapt the performance of the dissemination process. These approaches are not useful when trying to warn the highest number of vehicles about dangerous situations in realistic vehicular environments. The Profile-driven Adaptive Warning Dissemination Scheme (PAWDS) designed to improve the warning message dissemination process. PAWDS system that dynamically modifies some of the key parameters of the propagation process and it cannot detect the vehicles which are in the dangerous position. Proposed system identifies the vehicles which are in the dangerous position and to send warning messages immediately. The vehicles must make use of all the available information efficiently to predict the position of nearby vehicles.**

Keywords— PAWDS, VANET, Ad hoc network OBU , RSU, GPS.

I. INTRODUCTION

Vehicular Ad Hoc network is a sub class of mobile ad hoc networks. VANET provides wireless communication among vehicles and vehicle to road side equipments. The performance of communication depends on how better the routing takes place in the network. Routing of data depends on the routing protocols being used in the network. Ad Hoc networks are collection of self-governing mobile nodes. VANET is the emerging area of MANETs in which vehicles act as the mobile nodes within the network. VANET is the wireless network in which communication takes place through wireless links mounted on each node. Security is one of the major concerns in deployment of VANET. Trust may be one of tools to solve the security related issues.

A. Applications of Ad Hoc Network

The decentralized nature of wireless ad hoc networks makes them suitable for a variety of applications where central nodes cannot be relied on and may improve the scalability of networks compared to wireless managed networks, though theoretical and practical limits to the overall capacity of such networks have been identified. Minimal configuration and quick deployment make ad hoc networks suitable for emergency situations like natural disasters or military conflicts. The presence of dynamic and adaptive routing protocols enables ad hoc networks to be formed quickly.

B.Components of VANET

- On Board Unit(OBU)
- Road Side Unit(RSU)
- Global Positioning System(GPS)
- Radio Transceivers For Message exchange

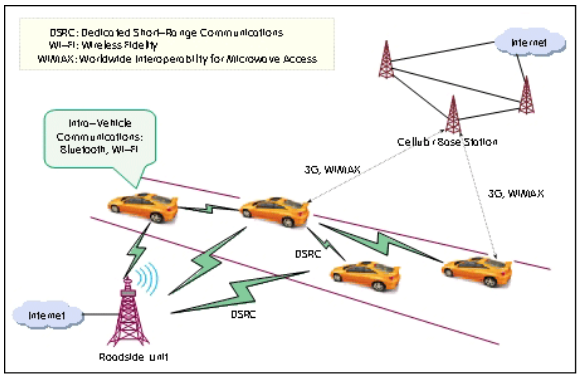
a) On Board Unit

A device which is inside the vehicle which process the data collected from various sensors fitted inside the cars and gives conditions of the vehicles is responsible for communication with outside network. i.e. with other vehicle and infrastructure.

b) Road Side Unit

Vehicular Ad hoc Networks, also known as VANETs, enable vehicles that are not

necessarily within the same radio transmission range to communicate with each other. VANETs also allow vehicles to connect to Roadside Units (RSUs). The latter are connected to the Internet, forming a fixed infrastructure that offers them the capability of communicating with each other and with roaming vehicles. RSUs support cooperative and distributed applications in which vehicles and RSUs work together to coordinate actions and to share and process several types of information. RSUs have so far been used for different roles such as data disseminators, traffic directories, location servers, security managers, and service proxies.



c) Radio Transceivers for Message Exchange

A radio transceiver both sends and receives radio signals. In order to be classified as a transceiver, the transmitter and the receiver must use the same set of wiring or be located within the same device. In a radio transceiver, the user is able to perform a wide range of functions for both the receiver and broadcaster of signals on radio frequencies. There are several key functions that are critical to the value of a radio transceiver Signal Strength, Part Quality, Warranty, Ease of Use. These units typically cost more than a dedicated signal transmitter or receiver since they offer the convenient of multiple functions in one device. It is important to ensure that full value of this purchase is received.

Considering a radio transceiver, it is a good idea to make a list of requirements. Write down all the transmitter and receiver functions that you required and those that would be nice to have. Prioritize them to help in the decision-making process. Not all radio transceivers will have all the functions that you want, so it is important to know what is necessary and what is nice to have before the process begins.

d) Global Positioning System

The Global Positioning System (GPS) is a space-based satellite navigation system that provides location and time information in all weather conditions, anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites. The system provides critical capabilities to military, civil and commercial users around the world. It is maintained by the United States government and is freely accessible to anyone with a GPS receiver.

The GPS project was developed in 1973 to overcome the limitations of previous navigation systems, integrating ideas from several predecessors, including a number of classified engineering design studies from the 1960s. GPS was created and realized by the U.S. Department of Defense (DoD) and was originally run with 24 satellites. Advances in technology and new demands on the existing system have now led to efforts to modernize the GPS system and implement the next generation of GPS III satellites and Next Generation Operational Control System (OCX).

In addition to GPS, other systems are in use or under development. The Russian Global Navigation Satellite System (GLONASS) was developed contemporaneously with GPS, but suffered from incomplete coverage of the globe until the mid-2000s. The rest of the paper is organized as follows. Section II reviews the related work on the proposed system, Section III shows the Architecture of the Proposed Approach, Section IV reviews the Conclusion.

C. Vanet Communication Process

a) Vehicle to Vehicle Communication

Inter-vehicle communication (IVC) systems (i.e., systems not relying on road-side infrastructure) have the potential to radically improve the safety, efficiency, and comfort of everyday road travel. Fig.1 represents IVC. Their main advantage is that they bypass the need for expensive infrastructure; their major drawback is the comparatively complex networking protocols and the need for significant penetration before their applications can become effective. Conclude the article by presenting several projects related to IVC as well as a review of common performance evaluation techniques for IVC systems.

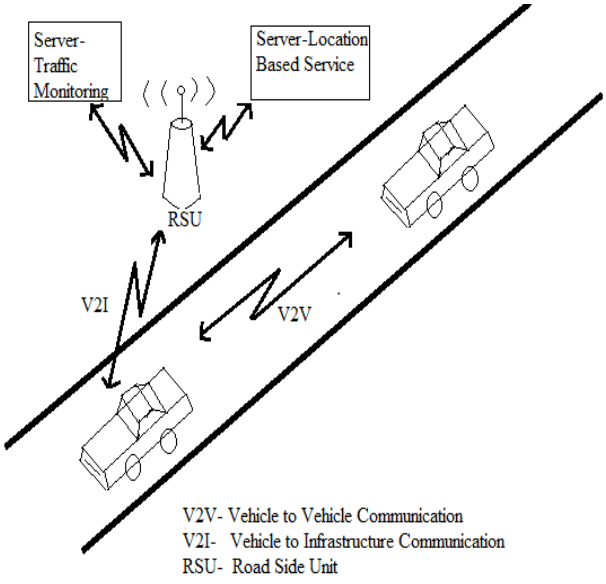


Fig.1. VANET Communications

b) Vehicle to Infrastructure/Roadside Communication (V2I/V2R)

Vehicle to Infrastructure provides solution to longer-range vehicular networks. It makes use of preexisting network infrastructure such as wireless access points (Road-Side Units, RSUs). Fig.1 represents the V2I communication. Communications between vehicles and RSUs are supported by Vehicle-to-Infrastructure (V2I) protocol and Vehicle-to-Roadside (V2R) protocol. The Roadside infrastructure involves additional installation costs. The V2I infrastructure needs to leverage on its large area coverage and needs more feature enhancements for Vehicle Applications**.**

II. PROPOSED SYSTEM

PAWDS, a Profile-driven Adaptive Warning Dissemination System that dynamically modifies some of the key parameters of the propagation process, such as the interval between notifications and the selected broadcast scheme, to achieve an optimal performance depending on the features of the roadmap in which the propagation takes place. Proposed system is combined with the enhanced Street Broadcast Reduction (eSBR) to improve performance when the dissemination process takes places in real urban scenarios where the signal can be seriously affected by nearby buildings.

To ensure the reliable operation of VANETs and increase the amount of authentic information gained from the received messages, each OBU should be able to check the revocation status of all the received certificates in a timely manner. Most of the existing work overlooked the authentication delay resulting from checking the CRL for each received certificate. In the proposed system, it uses Hasten Message Authentication Protocol which replaces the time consuming CRL checking process by an efficient revocation checking process using a fast and secure HMAC function. System Initialization, Message Authentication, Revocation, Security Analysis, Authentication Delay, End-to-End Delay**.**

Advantages of Proposed System

- Dissemination in all the direction.
- Inform about the dangerous situations to maximum number of vehicles.
- Not only used in highways, it is also used in urban environment.

III. ARCHITECTURE

In this Fig.2.1 represent the system architecture. PAWDS Profile-driven Adaptive Warning Dissemination System that dynamically modifies. Some of the key parameters of the propagation process, such as the interval between notifications and the selected broadcast scheme, to achieve an optimal performance. The street profile having three different layouts, Simple, Regular, Complex.

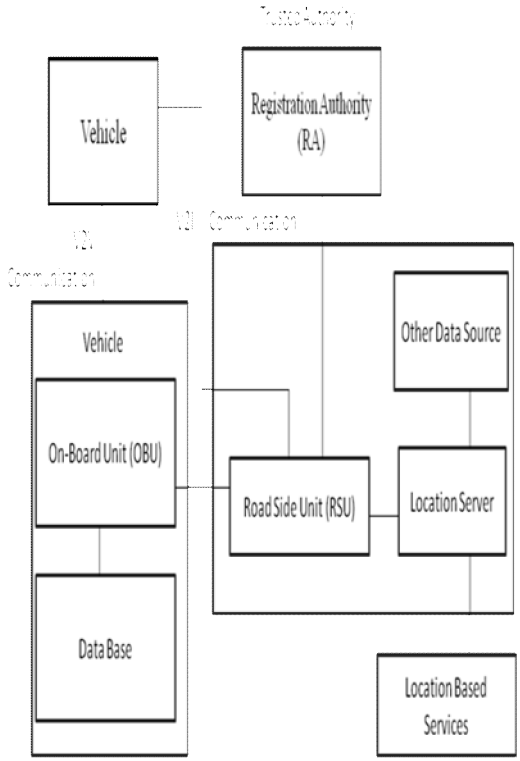


Fig. 2.1 System Architecture

IV. CONCLUSION

This paper proposed a new adaptive approach that allows increasing the efficiency of warning message dissemination processes using the information about the urban environment where the vehicles are moving. It can identify the vehicles which are in the dangerous position and immediately send warning message to that dangerous position vehicle. This approach make all the available information is used efficiently.

REFERENCES

[1] Arzil.S.A, M. H. Aghdam, and M. A. J. Jamali, (2010) "Adaptive routing protocol for vanets in city environments using real-time traffic infor- mation," in Proc. ICINA.

[2] Bi.Y, L. Cai, X. Shen, and H. Zhao, (2010) "A cross layer broadcast protocol for multihop emergency message dissemination in intervehicle communication," in Proc. IEEE ICC.

[3] Fall.K and K. Varadhan, (2000) "ns notes and documents," The VINT Prohect. UC Berkeley, LBL, USC/ISI, and Xerox PARC.

[4] Fogue.M, P. Garrido, F. J. Martinez, J.-C. Cano, C. T. Calafate, and P. Manzoni,(2011) "Analysis of the most representative factors affecting warning message dissemination in VANETs under real roadmaps," in Proc. 19th Annu. Meeting IEEE MASCOTS, Singapore.

[5] Jianwei.N, L. Chang, C. Canfeng, and M. Jian, (2009) "Adaptive copy and spread data dissemination in vehicular ad-hoc networks," in Proc. IEEE ICCTA.

[6] Krajzewicz.D, G. Hertkorn, C. Rossel, and P. Wagner, (2002) "SUMO (Simulation of Urban MObility)—An open-source traffic simulation," in Proc 4th MESM, Sharjah, UAE.

[7] Krauss.S, P. Wagner, and C. Gawron,(1997) "Metastable states in a microscopic model of traffic flow" *Phys. Rev. E*, vol. 55, no. 5, pp.5597–5602.

[8] Mariyasagayam.N, H. Menouar, and M. Lenardi, (2009) "An adaptive forwarding mechanism for data dissemination in vehicular networks," in Proc. IEEE VNC, Tokyo, Japan.

[9] Martinez.F.J, M. Fogue, M. Coll, J.-C. Cano, C. Calafate, and P.Manzoni, M. Crovella, L. Feeney, D. Rubenstein, and S. Raghavan, Eds.,(2010) "Evaluating the impact of a novel warning message dissemination scheme for VANETs using real city maps," in Proc. NETWORKING, Berlin/Heidelberg, Germany.

[10] Tee.C and A. Lee, (2009) "Adaptive reactive routing for VANET in city environments," in Proc. 10th ISPAN, Kaoshiung, Taiwan.

[11] Bo Yu, Cheng-Zhong, Xuand Minyi Guo, ―*Adaptive Forwarding Delay Control for VANET Data Aggregation* ―,IEEE Transactions on Parallel and Distributed systems, vol. 23, no. 1, january 2012.

[12] Junliang Liu, Zheng Yang,Ivan Stojmenovic,‖*Receiver Consensus:On-time Warning Delivery for Vehicular Ad-hoc Networks*―,1063-6927/12 2012 IEEE DOI 10.1109/ICDCS.2012.41

[13] Adil Mudasir, Malla Ravi ,Kant Sahu , ― A Review on Vehicle to Vehicle Communication Protocols in VANETs, IJARCSSE 3(2), February - 2013, pp. 409-414.

[14] M.Chitra and S. Siva Sathya: Efficient Broadcasting Mechanisms For Data Dissemination In Vehicular Ad Hoc Networks, (IJMNCT) Vol. 3, No.3, June 2013.

[15] Dr.M.BalaGanesh, MissD.Radha, J.Dhivya― Warning Message Dissemination Scheme Using Advanced Traffic Assistance System, IJACT/ ISSN:2319-7900 .