Efficient and Privacy Traffic Control System using Vanet

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***Abstract*- In vehicular collision avoidance system mobile users are periodically broadcasts by safety messages within a range telecasting to their neighbors. These are time sensitive and slight delay communication. Then protocol sequence is used to broadcast safety messages which use binary digits 0-1 indicating free and traffic road respectively. This requires no time synchronization. We compare this with ALOHA random access scheme. In this paper we propose the concept using VANET to control the traffic. In an emergency case the signal is detected by the use of Road Side Units(RSUs). After detecting the signals the emergency message is passed to all the other vehicles. At the same time traffic signal is changed for the favor of emergency case. If a vehicle does not provide a way then these vehicles are blocked and reporting to the corresponding traffic control system.**

Keywords: DSRC, ALOHA, RSU (Road Side Unit), VANET.

I. INTRODUCTION

In a vehicular ad hoc network (VANET), it maintains the time synchronization among users is a difficult task due to their mobility. Moreover, unlike cellular networks there are no base stations to facilitate synchronization and there is also no dedicated control agent in a VANET who monitors users at the lower protocol layers. Due to high mobility of the user nodes, it is difficult and undesirable to designate any particular subset of nodes as central access nodes with control authority[1]. Because every year, approximately 1.27 million people are died over the globe in traffic accidents and about millions of people are affected. In this paper, we implement the application of safety message broadcast in VANET.

The goal is to allow all the user nodes to simultaneously broadcast safety message to all other vehicles based on protocol sequences[1]. Using these protocol sequences, we send messages through RSUs, to providing the way in case of the emergency period. The main concept is that clearing the traffic, while the ambulance is arriving on the heavy traffic. The need for transportation and number of vehicles can also increasing nowadays. So it is necessary to regulate vehicle traffic and improve safety for vehicles and human lives on roads. This initiates the development of new kind of network called Vehicular Ad-hoc Network(VANETs) .Vehicular communication network is one of the developing technologies and it is a form of Mobile Ad-Hoc Network which provides communication between vehicles and road-side base stations. Its aim to provide safety, traffic management, and infotainment services. The security of VANET is in concern state from early time. VANETs face several security threats and coverage problem that can lead to human life loss. VANET provides two types of applications , first is safety applications to send safety related information's like traffic alerts and to avoid collisions, at every300ms each vehicles can transmit its current location, speed and directions which can be generated by the Global Positioning System (GPS). Second are non safety applications for internet surfing, chatting and toll payment services. We can implement our concept by sending broadcast emergency messages using VANET[2]. With the passage of time the rate of road accidents is increasing and by 2020 the increasing road accidents will become serious threats to human lives and safety.

II. PRELIMINARIES

Vehicular ad-hoc network :

VANET is a subset of Mobile Ad hoc Network(MANET) in which vehicles are communicate with the road side unit and the intention of this network is to solving the traffic problems. Motivation behind the VANET is to provide safety to users.

A. Characteristics of VANET are as follows:

a) It is a fixed cellular gateways and WLAN/WiMAX APs at traffic intersections to connect to the internet, gather traffic information or for routing purposes. This is called pure cellular or WLAN.

b) Communication link lives for a short period of time.

c) No centralized authority is required in VANET as nodes can self organize and self manage the information in a distributed fashion.d) It is a highly dynamic topology.(i.e) a network is formed by VANETs is always changing as vehicles are moving at high speed.

e) On highways, vehicles are moving at speed of 60.70mph (25m/sec) and vary for different vehicles.

f) If the radio range between two vehicles is 125m then the link between two vehicles would last at most 10sec.

g) Authorized infrastructures such as RSUs are located at important regions to provide extra services. Nodes in the

network have high functionality (more power supply, able to perform computation quickly).
h) Unlimited Battery power and storage.
From these we can separate VANET from other wireless networks.

A.VANET Requirements: VANET requires authentication, availability, data verification, data integrity and privacy.
a) Authentication: To prove the message is obtained from the original vehicle, the received message must be authenticated. To perform authentication, vehicles incorporate its private keys and its certificate into every message it can be send. On the receiver side, the message is verified by assuring its keys and certificates.
b) Availability: Vehicular Network must be ready to provide requested services at any time, even a small delay will cause many serious problems.
c) Data Verification: After the sender vehicle is authenticated, the receiving vehicle performs data verifications to check whether the message contains the correct or corrupted data.
d) Data Integrity: It ensures that data or messages are not altered by attackers. Otherwise, users are directly affected by the altered emergency data.
e) Privacy: The information of a driver must be kept secure from the unauthorized observers, such as path, speed, identities etc. This can be done by temporary keys, these key can be changed frequently. It is used for one time and then it expires. Dedicated Short Range Communication is the frequency band that support all type of wireless communications between the vehicle and also with infrastructure.

Fig.1 shows the basic architecture of VANET. Technologies used in VANET are as follows Vehicular adhocal networks are expected to mplement wireless technologies such as Dedicated short-range communication (DSRC) which is a type of Wi-Fi. Cellular network, Wi-MAX and WiFi are some examples of infrastructure.

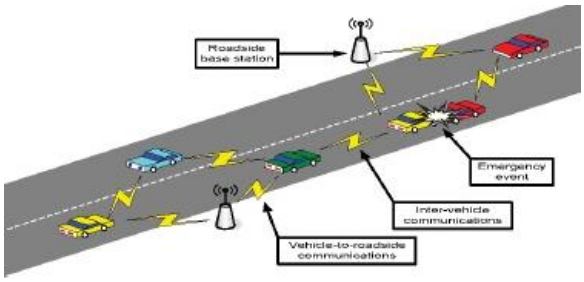

Fig.1. architecture of VANET

Role of Dedicated Short Range Communication (DSRC) in VANET

In VANET, moreover all type of communication are wireless, a special wireless frequency band assigned to VANET is called DSRC(dedicated short range communication)[4]. DSRC is a new frequency band that is allocated by Federal Communication Commission (FCC); purpose is to provide public safety application [4]. DSRC provides multiple channels and its transmission ranges from 5.850 to 5.925 GHz. This DSRC frequency band is divided into seven channels and each channel range is 10 MHz. The data transfer rate that DSRC provides is up to 27 Mbps [5]. The DSRC channel structure is shown in Fig. 2. The role of DSRC is important because it makes possible for vehicles communicate to each other and also with infrastructure.
DSRC applications are cooperative forward collision warning

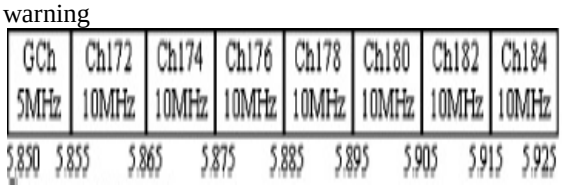

Fig.2. DSRC channel structure

Role of ALOHA

ALOHA: ALOHA is a system for coordinating and arbitrating access to a shared communication Networks channel. It was developed in the 1970s by Norman Abramson and his colleagues at the University of Hawaii. The original system used for ground based radio broadcasting, but the system has been implemented in satellite communication systems. There are two types of ALOHA are there, i) pure ALOHA ii) slotted ALOHA. In pure ALOHA, the stations transmit frames whenever they have data to send. When two or more stations transmit simultaneously, there is collision and the frames are destroyed and whenever any station transmits a frame, it expects the acknowledgement from the receiver. If acknowledgement is not received within specified time, the station assumes that the frame has been destroyed[7]. In slotted ALOHA, was invented to improve the efficiency of pure ALOHA as chances of collisions in pure ALOHA are very high and the time of the shared channel is divided into discrete intervals called slots. The stations can send a frame only at the beginning of the slot and only one frame is sent in each slot.

III. EXISTING SYSTEM

In vehicular adhoc network(VANET) maintaining time synchronization among users is a difficult task due to their mobility. Conventional carrier-sense multiple accesses, where the users must content with channel access, are not suitable for this kind of application. Moreover, unlike cellular networks, there are no base stations to facilitate the synchronization. There is also no dedicated control agent in a VANET who monitors users at the lower protocol layers[3]. Due to high mobility of the user nodes, it is difficult and undesirable to designate any particular subset of nodes as central access nodes with control authority, even temporarily[1]. This makes the design of a medium-access control (MAC) protocol for low-latency application a very challenging task. It is pointed out that the newly introduced IEEE 802.11p Wireless Access in Vehicular Environment (WAVE) over the dedicated short-range communications (DSRC) band for a VANET is not desirable for the transmission of time critical safety messages because the delay may be

unbounded when the channel is very busy[1]. DSRC does not checks whether the channel is busy or not. A packet arrives to an empty buffer and finds the channel is busy. This might occur time delay, to transferring safety messages and sometimes it cannot send emergency messages. RTS(Request to Send)/CTS(Clear to Send) access method is provide to alleviate the hidden terminal problem.

IV. PROPOSED SYSTEM

We propose idea, using protocol sequences to broadcast the safety messages. It requires no time synchronization among the users(i.e. protocol sequences are deterministic 0-1 sequences. Each user reads the 0's and 1's of the assigned protocol sequence periodically and transmits a packet in a time slot if and only if the sequence value is equal to 1). We consider the slot-synchronous single-hop broadcast and analyze the delay performance of a class of protocol sequences, which are called the generalized prime (GP) sequences[1]. The communication channel is modelled as a time-slotted collision channel. That the system is slot-synchronous. The results in this project can be extended to the slot-asynchronous case and we includes the concept as providing the way in an efficient manner. We will compare with two random access schemes. The first one is called persistent random access. In this acces, a user sends independently in a time slot with probability. From the existing one, we could transfer the safety messages within the access point itself. And the propose idea tells that it can be transfer the broadcast safety messages randomly using ALOHA . If two or more users transmit packets in a time slot, then there is a collision, and the collided packets cannot be recovered. If only one user among the K users transmits at a time slot, then the packet can be received by user 0 without any error. If there are errors due to thermal noise for instance, we can employ a forward error-correcting code. In addition,we change the traffic signal in favour for emergency vehicles.The vehicle which do not provide a way has been blocked.Fig.3. shows the architecture

V. ARCHITECTURE

Fig.3. System model

Functional Diagram

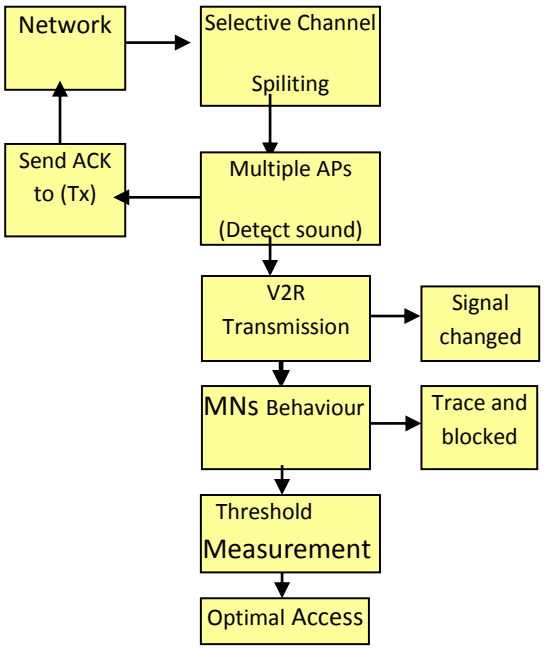

Fig.4. functional diagram.

V. CONCLUSION AND FUTURE ENHANCEMENT

The results provided ALOHA-type transmission scheme, pseudorandom bits are used as an input to the channel access mechanism. In this approach, show how a VANET can be used to aid in traffic signal control. The protocol sequences have a certain structure that can further reduce the individual and group delays. This illustrates the potential advantage of the protocol sequence scheme in the application for broadcasting safety messages in VANETs. The protocol-sequence-based scheme is effective as long as a group of neighboring users are assigned distinct protocol sequences. Maintaining the distinctness of protocol sequences is crucial and is an important direction for future research. It is used to reduces the problem of traffic jams at the traffic signal, and used to flow traffic smoothly without congestion. This is help to provided Emergency services at the critical condition like ambulance, fire brigade vehicle by using zonal algorithm. This project can be furtherly develop, if any accidents will occur on the road side, it directly transfers the message to the nearby ambulance through the sensor detection.

REFERENCES

[1] Yi Wu, Members, IEEE, Kenneth W. Shum, Member, IEEE,Wing Shing Wong, Fello,IEEE, and Lianfeng Shen, Member, IEEE "Safety message broadcast in VANET based on protocol sequences," IEEE *Commun.*

[2] First Global Ministerial Conference on Road Safety, " UN: forget Terrorism Threats, Try Crossing the Road" Posted by Jon C on Nov 22, 2009.http://www.auclandtrains.co.nz/2009/11/22/un-forget-terrorism-threats-try-crossing-the-road.

[3] Y. Qian, and N. Moayeri, "Design oig secure and Application Oriented Vanets "Vehicular Technology, 2008. VTC Spring 2008. IEEE, 11-14 May 2008, Singapore.

[4] R. Prasad, R. Kanjee.H Zui, Pishro, Nik and Ni,"DSRC Accident Warning system at Intersection" October 19, 2006.
[5] D. Jiang, V. Taliwal, A. Meier, W. Holfelder, R. Herrtwich "Design of 5.9GHz DSRC-based vehicular safety communication " wireless communication IEEE vo. 13, No. 5. 2006).
[6] Q. Xu, T. Mak, J. Ko, and J. Sengupta, "Medium access control protocol design for vehicle–vehicle safety messages," *IEEE Trans. Veh. Technol.*, vol. 56, no. 2, pp. 499–518, Mar. 2007.
[7] Y. Feng, Y. Du, Z. Ren, Z. Wang, Y. Liu, and L. Zhang, "Adaptive beacon rate adjusting mechanism for safety communication in cooperative IEEE 802.11p-3G vehicle–infrastructure systems," in *Proc. 16th APCC*, Auckland, New Zealand, Oct./Nov. 2010, pp. 441–446.