International Journal of Trend in Scientific Research and Development (IJTSRD)
Volume: 3 | Issue: 3 | Mar-Apr 2019 Available Online: www.ijtsrd.com e-ISSN: 2456 - 6470

Broadcasting Emergency Message in VANET during an Emergency Event

Preethika D[1], Dr. M. Babu[2]

[1]Student, [2]Professor
[1,2]Computer Science and Engineering, G.K.M College of Engineering and Technology, Chennai, Tamil Nadu, India

***How to cite this paper**:* Preethika D | Dr. M. Babu "Broadcasting Emergency Message in VANET during an Emergency Event" Published in International Journal of Trend in Scientific Research and Development (ijtsrd), ISSN: 2456-6470, Volume-3 | Issue-3, April 2019, pp.231-234, URL: http://www.ijtsrd.com/papers/ijtsrd21673.pdf

IJTSRD21673

ABSTRACT

Broadcasting emergency message to vehicles in the region in advance to reduce accidence so that the vehicle can take preventive measure to avoid accidents. It is a big provocation to broadcast emergence messages to the exact vehicle at right time without any delivery latency. Even though many protocol have been proposed to deliver emergency message in Vehicular ad hoc networks (VANETs) they suffer from many issues, like some protocols obligatory to receive nearby information to broadcast emergency message which again raise delivery latency. We propose a new protocol which reduce delivery latency during broadcasting emergency message to the vehicle nearby without creating any chaos to the vehicles in the adjacent lane.

***Keywords:** vehicular ad hoc network (VANET), broadcasting emergency message, region of interest*

I. INTRODUCTION

The amount of road accidence and traffic worthy of attention than any other natural calamity and life threatening disease. Approximately 1.35 million people die each year as a result of road traffic crashes. Millions of people undergo serious injuries During road accidence. Therefore, it is very much essential and chore to study how toeffectively reduce road accidence using emergency message broadcasting. There are many projects are developed automotive industry worldwide. Most of the projects are based on vehicle to infrastructure and Vehicle to vehicle communication. Usually vehicle to vehicle communication involve vehicular ad hoc networks (VANET), that implement progressive communication technology, in IEEE 802.11p, to communicate message between the vehicles vehicular ad hoc network mainly focus on transmission of emergency message between the vehicle in the near that particular area of network so that the vehicles can take preventive measure to avoid accident during that particular time. When vehicle identify uncertain event it instantly broadcast an emergency message to the vehicle in the region of risk. The broadcasting of the emergency message to send to all the nearby vehicle in the region where the accident about to occur effectively. There may be some uncertain emergency event may occur ,such as sudden break can be applied by the vehicle in front that may affect the preceding vehicles. In such cases, it is difficult task to broadcast emergency messages effectively because of delivery latency and immense mobility. The immense mobility of the vehicle can create chaos in the delivery of the emergency message between the vehicles in the region at risk during an accident. Mainly when there are many vehicle in the region there may be huge change in network topology. All the provocation result in delivery latency and broadcasting the emergency message. There are many projects have proposed to fulfil the needs of delivery latency during the broadcasting of emergency in the vehicular ad hoc network. Hafeez as shown the Consistency in broadcasting and retransmission of the messaged but it have immense collision rate in wireless communication and delivery latency may be high. Yang and Chou have also shown increase the reliability and low transmission rate. There difference between reducing the latency delay and reliability. Even though there are many schemes have been proposed, but still more problems while broadcasting the emergency message between the vehicles. Mainly before broadcasting any emergency message there should be real time information like position of the vehicles nearby, speed of each vehicles in the region of interest, direction at which each vehicle are moving these information must be calculated. Despite, the velocity and frequency of each vehicle in the VANET changes dynamically it might cause huge number of collision and latency problem in the real time information. The existing vehicle broadcasting schemes are classified as following.

1. Distance based schemes: The vehicle preceding the initial vehicle has the higher preference to broadcast message. Essentially, the common idea of the existing system is to reduce the moving vehicles and differentiate the waiting time of the preceding vehicles to reduce the message collision.
2. Probability based scheme: The broadcasting of the message depends on the predefined probability. This scheme have reasonable probability of broadcasting message to each vehicles.

The scheme cannot differentiate between the vehicles which is in the same distance to theinitial forwarder. For example, when the vehicle A wants to broadcast the message in Multi-hop scenario. Since B, C, G, F are near The vehicle A region of interest they have same distance between the vehicle A, the priority to broadcast the message between them is same. Si it may have message Collision and redundant error.

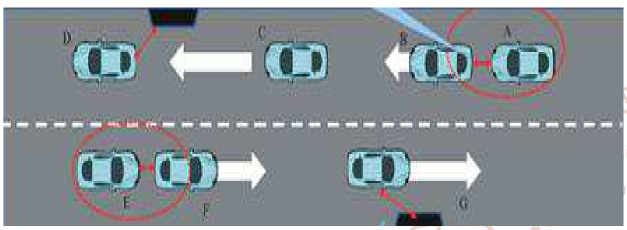

Fig.1.schematic of message broadcasting in VANET

It cannot assure that the vehicle in the receiving end can have packet loss and fading of broadcasting message. This scheme cannot overcome the requirement of broadcasting the messages to the vehicle in the region of interest. Most of the protocols have been design for highway scenario and urban scenario. Existing system is not suitable for both the scenario. All the messages are based on the Multi-hop scheme. Multi-hop is wireless network uses two or more hops to convey information between source to destination. In single hop it will only broadcast the message to the vehicle nearest following it when this type of broadcasting done using Multi-hop scenario it have more packet of channels and delivery of the other emergency message may delay. In this paper, we propose ah protocol to reduce the drawbacks discussed above. The main aim of the proposed protocol is to deliver the emergency messages to the vehicle in the required region without any delivery latency to the right vehicle at right time. So that it can avoid the unwanted broadcasting of messages to the vehicle in the region of interest.

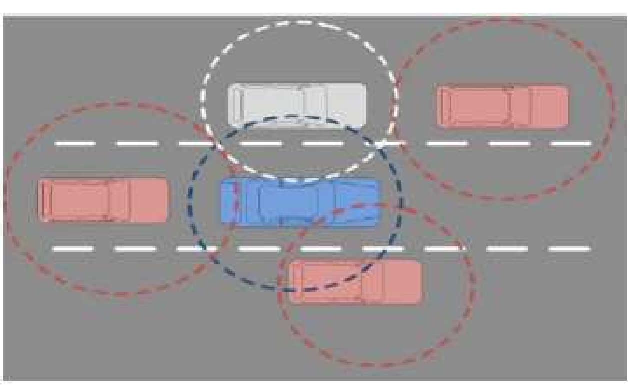

Fig.2.schematic of Multi-hop region of interest

In the existing protocol broadcast the message to the all the vehicle in the region of interest this may also increase the accidence in the road due to delivering the message to the vehicle which does not get affect during an emergency event. The broadcasting messages to the vehicle must be reasonable so that the chaos between the vehicles during any uncertain event may not occur.

II. RELATED WORKS

In the vehicle for broadcasting of the message to the nearby vehicle will increase in the delivery latency of the message. The impact of the broadcast storm was discussed in the Vehicular Ad Hoc Network scenario. As discussed decrease of broadcasting message collision can enhance the dependability and reduce delivery latency of message broadcasting. The aim of moderating the massage collision is to decrease the re-broadcasting. Many schemes allow minimum part of vehicle to re-transmit it massage and crush their own transmission. The networks are split into many subsequent clusters commander is responsible for re transmission of message. Despite, this approach can efficiently decrease message collision, it cannot easily support the cluster formation because of dynamic change in the vehicle in VANET.

Bakhouy et al and Yassein et al developed adoptive counter based broadcast system, in which each vehicle can distinctively determine either to re-transmit messages or to depend on the message received from the nearby vehicles. On other hand the receiving time of the first vehicle to decrease message collision among the neighboring vehicle, which can be determine by the speed and the position of the neighbor vehicles. The vehicle away from the region of interest will receive the broadcasted message in the enduring time, but the importance of the forwarded vehicle to re-broadcast messages are distinguished by the preceding vehicle. Kim and Yoo also studied the connection between the shortest waiting time of two vehicles and the message collision. Oh et al. consolidate distance based and probability based method to distinguish the waiting time of each forwarded vehicle if the timing of each vehicle in the region of interest disappear the vehicle retain until there is another time interval between two vehicles moderate clustering, when there are too many vehicles at the region of interest. Hafeez et al. has studied the rapid change in the broadcasting in the region to decrease the number of channels. The broadcasting range is measured using number of features such as delay of message transmission, broadcasting rate, network density and data rate in this scheme, the average waiting time of the vehicle dynamically change based on the network range and the density of vehicles.

To enhance the efficiency of message transmission and to stop the hidden terminal, acknowledgement mechanism used in request broadcast which need to transmit message to all the vehicles. Request broadcast may lead to message Collision and every vehicle continuously transmit to the nearby vehicle which receives the message, it may cause uncertain deliver latency. However unicasting in 802.11 does not support request to broadcast when the transmission size is limited than a threshold range. Usually the emergency broadcasting is limited than the fixed value, request to broadcast handshake does not needed for emergency message transmission. Furthermore, some researchers introduced the transmission protocol by some natural mechanism. There are different routing technologies developed to enhance the working of the pandemic routing. Lu and Huy proposed and N-epidemic routing protocol to transmit messages to all the nearby vehicles with some threshold rate. This scheme reduces the re-transmission for unwanted vehicles, in the large network. Tian et al. have proposed the vehicle speed and location and damage rate caused in the scheme but this scheme depend on the information about the nearby vehicles and it is not distributed scheme.

III. NEIGHBOR CALCULATION

There are too many uncertain events and traffic occur in large network range there may be different emergency messages can be received and transmitted. Each vehicle must identify the priority of the emergency message to avoid unnecessary chaos during accident. For this each and every vehicle in the network range must know which message to receive or not so that each vehicle must have different port number.

Even though, not all the vehicle in the region of interest will need the emergency message to take necessary precaution to avoid accidents. So as to decrease the efficiency of channels and re-transmission of messages. Instead of broadcasting emergency messages to all vehicle in the road using multi-hops. i.e., if an ambulance need to travel a dense network the broadcasting message from the ambulance must transmit multi-hops along all the vehicles in front which can take preventive action to make way for the ambulance to move on uninterruptedly. If the vehicle in the front rapidly slows down it must broadcast a message to the preceding vehicle to avoid collision, one hop transmission is applied on this event. Simultaneously if the vehicle in front applies brake the preceding vehicles will change the lane or stop. Type of emergency message received in the region of interest.

TABLE I Paradigm of types of messages received

TYPE	PORT NUMBER	MESSAGE RECEIVED
One-hop	1000	Overtaking
	1001	Change lane
	1002	Emergency declaration
Multi-hop forward	2000	Vehicle out of control
Multi-hop backward	3000	Accident
	3001	Traffic crash

The broadcasting of the message depends on the emergency event occurred such as when there is overtaking or lane change occurred one-hop broadcasting takes place between the vehicles. In multi-hop forward scenario broadcasting takes place when the vehicle goes out of control. In multi-hop backward takes place when there is any accident or traffic chaos in the road.

IV. BROADCASTING EMERGENCY MESSAGE

In VANET formation each nodes of the vehicles longitude and latitude of the neighbor node is calculated. We must calculate the neighbor node to send messages among node in the region of interest which in the same lane. The information will be broadcasted to destination to source via neighbor if the vehicles are in the broadcasting range. For example, when there is event like sudden break, partial break, overtaking, ambulance takeover etc are the some of the events. if a vehicles detect any emergency event, the vehicle node must immediately generate and broadcast an emergency message to the target region or the region at risk

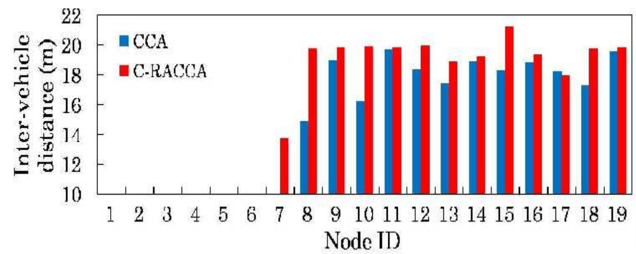

Fig.3. inter-vehicular distance between the nodes

The main aim of the proposed system is to broadcast the emergency message to the vehicle in the same lane without any without any delivery latency and chaos in receiving the right message in the right time. Fig.3.shows the inter-vehicular distance between the nodes.

1. CCA (chain collision avoidance) is used to avoid transmission collision between the nodes in the VANET environment. There are different nodes have inter-intermediate distance between them based on the latitude and the longitude of each vehicles in the VANET environment. The node ID and the inter-vehicular distance are shown in the above Fig.3. The number of nodes and there inter-vehicular distance are calculated. This must be calculated to reduce the collision between each node so that the broadcasting of message to each vehicle will faster and there won't be any delivery latency during the transmission the emergency message.
2. C-RACCA (cluster based risk aware scheme) is mainly used in the cluster based risk awareness so that the vehicles can reduce the risk in the broadcasting of emergency message. the clustering of the nodes will not affect because of the collision and the delivery latency of too many nodes. The emergency message will be transmitted to the nodes at high risk percussively so that each vehicles can take required before an accident occur in the VANET environment.

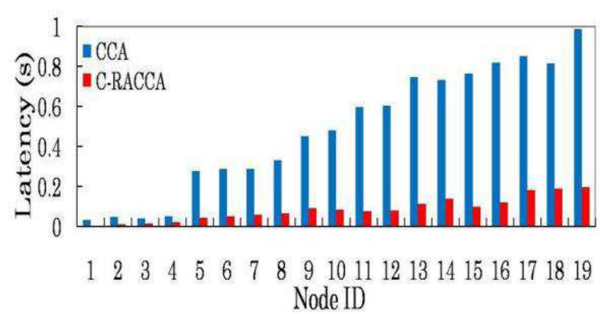

Fig.4. Latency delay between the vehicular nodes

In fig.4. Shows the broadcasting latency between the vehicles and the message collision. The above fig shows the range at which the transmission delay between the vehicles and node in the VANET. When the number of nodes increases in the environment the broadcasting of the emergency message may delay or the collision of the broadcasting message will increase. When the number of node ID increase the delivery of the message from the node at risk will rapidly decrease.

In VANET environment many emergency events can occur like for example Partial Brake, Emergency Brake, and Overtaking etc. When an emergency event occurs it create chaos in the environment. Based on the emergency event occurred an emergency message will be created. After an emergency event occurred an emergency message will be created by the vehicle. Emergency message will be created based on the type of event occurred. Many emergency events may occur in the environment. For example events like sudden break, Partial Brake, Overtaking, ambulance takeover etc are some of the examples of the emergency event. If a vehicle detects a dangerous event, it immediately generates and broadcasts an emergency message to the vehicles in the region of interest (or target region with safety risks), such that the nearby vehicles can take effective actions to avoid traffic accident. In essence, the emergency message, which contains life-critical and time-sensitive information, should be disseminated to all targeted vehicles in a very efficient and effective way.

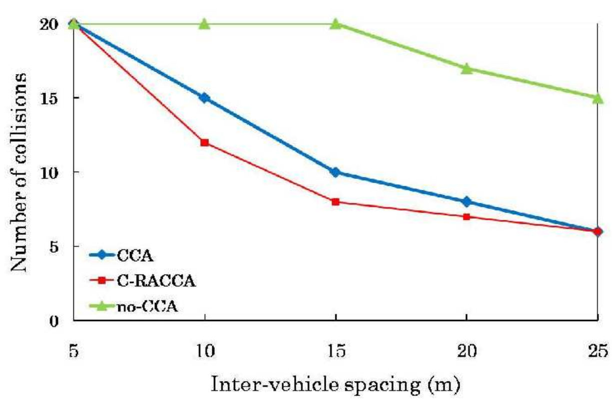

Fig.5. schematic of inter-vehicle spacing and the number of collision

In fig.5. Shows the number of inter-vehicular spacing and the message collision during the broadcasting of the message. The message collision will rapidly increase when the node are closer and the message broadcasting is difficult. CCA and C-RACCA will continuously chance in the collision and inter-vehicular space. Fig.5.shows the collision and distance between the vehicles during the message broadcasting of the ad hoc network.

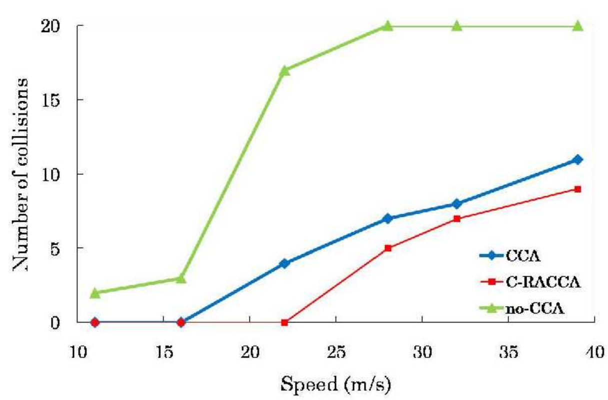

Fig.6. schematic of the speed and the number of collision

The above fig.6. Shows the speed of each nodes and inter-vehicular spacing of each nodes. The collision of each nodes will have high collision rate during the broadcasting of each vehicle in the VANET environment. The collision rate rapidly increase when the speed increase and the distance between the nodes are more and the CCA will decrease and the broadcasting will be faster without any latency delay between the nodes. When the speed increase of forwarder node the distance will also increase between them so that there won't be high collision between the other nodes. Similarly, when the two nodes move in the same distance the delivery of the message will be faster because the broadcasting take place in that region of interest and there won't be any message loss.

CONCLUSION

This project is to broadcast emergency messages to vehicles in advance in VANET environment and reduce traffic accidents. In this paper, we have proposed a position-based broadcast protocol for emergency messages propagation in VANETs environment. Unlike most of the existing protocols, the proposed protocol does not require vehicles to collect the real-time information of their one-hop neighbors before they broadcast a message. In other words, vehicles just depend on the information including in a received message to judge whether to rebroadcast the message, which can reduce the deliver latency and drivers will have more time to take actions to avoid accident happening. Since messages are just broadcasted along their regions of interest, the proposed protocol can efficiently reduce unnecessary rebroadcasts and collisions, which helps to improve the utilization ratio of wireless channel. Additionally, the proposed protocol can deliver messages with low delay and few collisions by changing the parameter to adapt to the transmission conditions. Last but not the least, the proposed protocol is suitable for both urban and highway environment, because it is a distributed protocol and more than one vehicles can be chosen as the next forwarders. This protocol helps to reduce the accidence and broadcast immediately to the nearby vehicles and reduce the accidence and traffic.

REFERENCE

[1] Da Li, Hongyu Huang, Xu Li, Minglu Li, Feilong Tang, "A Distance-based Directional Broadcast Protocol for Urban Vehicular Ad Hoc Network" ,oct.2007.

[2] S. Oh, J. Kang, and M. Gruteser, "Location-based flooding techniques for vehicular emergency messaging," in Proc. 3rd Int. Conf. Mobile Ubiquitous Syst. Netw. Services, San Jose, CA, USA, 2006, pp. 1–9.

[3] F. F. Hassanzadeh and S. Valaee, "Reliable broadcast of safety messages in vehicular ad hoc networks," in Proc. IEEE INFOCOM, Rio de Janeiro, Brazil, 2009, pp. 226–234.

[4] Yong Li, Zhaocheng Wang, Depeng Jin, Li Su, Lieguang Zeng Shang C hen," Optimal Beaconing Control for Epidemic Routing Delay-Tolerant Network",vol.61, Nov 2011.

[5] Feng Lyu, Hongzi Zhu, Haibo Zhou, WenchaoXu, Ning Zhang, Minglu Li,XueminShen," A Novel Time Slot-Sharing MAC for Safety Messages Broadcasting in VANETs", vol.67,2018.

[6] C.-W. Yi, Y.-T. Chuang, H.-H. Yeh, Y.-C. Tseng, and P.-C. Liu, "Streetcast: An urban broadcast protocol for vehicular ad-hoc networks," in Proc. Veh. Technol. Conf., Taipei, Taiwan, 2010, pp. 1–5.

[7] Y. Li et al., "Optimal beaconing control for epidemic routing in delay-tolerant networks," IEEE Trans. Veh. Technol., vol. 61, no. 1, pp. 311–320, Jan. 2012.