[ISSN 2250 - 3765]
UACEE International Journal of Computer Science and its Applications

TLOV REBROADCASTING METHOD FOR VANET

Vaishali Mishra
M.Tech(SE) 2nd year
SRMSCET
Bareilly, India
vaishalimishra13@gmail.com

Gaurav Kumar Gaur
M.Tech(SE) 2nd year
SRMSCET
Bareilly, India
gkgdoc@gmail.com

L.S.Maurya
Dept. of IT
SRMSCET
Bareilly, India
lsmaurya@gmail.com

***Abstract*— Vehicular ad hoc network is surging in popularity in which vehicle constitute the mobility nodes in network. Profits of using improved VANET technology are reduce traffic congestion, provide general information services and provide safety critical applications such as enhanced lane and distance control and emergency break warning etc. Safety alert application is one of the most important applications for vehicular network communication. It disseminates emergency messages to all vehicles in a crucial problem in traffic scenarios as case of an accident. The dissemination of safety messages may prevent secondary accidents. In this paper, we first introduced a method named as TLOV rebroadcasting method for VANET. Then analyze it & compare it with other known traditional solutions for broadcast storm problem. This method is designed to make effective alarm message dissemination in ad hoc network of vehicles in a highway or a road. This is a method which is simple and have better performance compared to other broadcasting method .Using TLOV its try to find out vehicle that is most suitable to rebroadcast alert message. When TLOV applying, we also try to introduce priority concepts in which we give priority to big vehicle during selection of last vehicle.**

***Keywords*—TLOV, VANET, GPS**

I. Introduction

Vehicular Ad-hoc Networks (VANET) are emerging as the preferred network design for intelligent transportation systems. VANET are based on short-range wireless communication (e.g., IEEE 802.1 1) between vehicles. The Federal Communications Commission (FCC) has recently allocated 75 MHz in the 5.9 GHz band for licensed DSRC (dedicated short range communications [9]) aimed at enhancing bandwidth and reducing latency for vehicle-to vehicle. Safety alert application is one of the most important applications for vehicular networks communication. Safety alert application disseminates emergency messages to all vehicles in a crucial problem in traffic scenarios as case of an accident. The dissemination of safety messages may prevent secondary accidents and play a crucial role in the rescue of people. The main problem of Safety alert application is broadcast storm problem. Many researchers propose their solutions to reduce the effect of broadcast storm and improve VANET's performance in broadcasting, such as Simple broadcast, weighted p-persistence, etc.

In this paper, we propose an effective broadcast method for safety alerts in VANET. It can reduce broadcast storm and time to send emergency messages to all vehicles by choosing the last one in transmission range to rebroadcast emergency message. This paper is organized as follows: In section 2 & 3, we present the previous work and our solution. In section 4, we define an algorithm for our work. In section 5, we discuss the conclusion of work.

II. EXISTING SOLUTIONS

A. Related Work

When the traffic density is above a certain value, one of the most serious problems is the choking of the shared medium by an excessive number of the same safety broadcast Message by several consecutive cars. Because of the shared wireless medium, blindly broadcasting the packets may lead to frequent contention and collisions in transmission among neighbouring nodes is sometimes referred to as broadcast storm problem [1]. Various solutions exist to alleviate the broadcast storm problem in a usual MANET environment [2-8].

The primary goal for safety alert application is to deliver the alert message to all following vehicles from the incident site so that drivers may be alerted prior to their natural visual reaction. So time to send alert message from end-to-end must be as fast as possible. Therefore it delays the alert message. In this section we will show traditional broadcast methods that are used in safety alerts application for VANET.

1). Simple broadcast

It's the simplest method used in Safety alert applications for VANET. In this method when there is an accident, safety alerts application will simply send alert message to all vehicles proceeding towards accident site. When a vehicle receives a broadcast message for the first time, it retransmits the message. The vehicle then ignores all subsequent broadcast messages it receives from other vehicles, which also rebroadcast the same message. There are two main problems in this simple broadcast method.

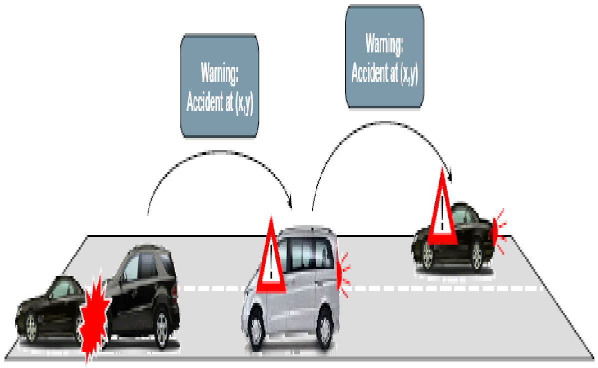

Fig.1. VANET

First, there are a lot of redundant rebroadcast messages because of its flooding nature. Thus, when a message reaches n hosts, the packet will be sent n times. Second, there is a high probability that a message will be received by many hosts in a close proximity. Every host will severely contend with one another for access to the medium as show in figure 2, all vehicles in transmission range will rebroadcast alert message.

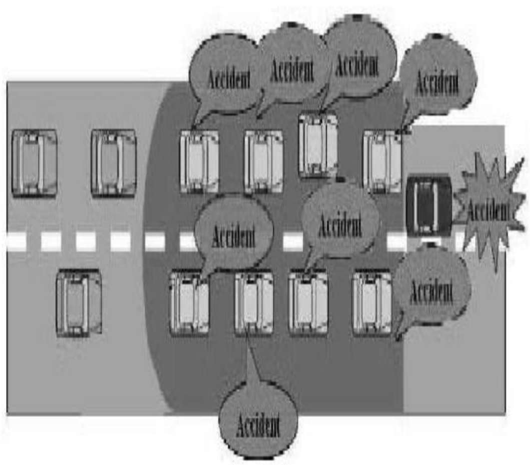

Fig. 2. Simple Broadcast [1].

2). Weighted p-persistence

This method tries to reduce broadcast storm problem by using probability to decide the vehicle that will rebroadcast alert message. When a vehicle receives a broadcast message for the first time, the vehicle will rebroadcast the alert message with a random probability. This method will help to reduce number of rebroadcasting vehicles and thereby broadcast storm problem. However this could not fully ensure to avoid broadcast storm. It just reduces the chance of its occurrence.

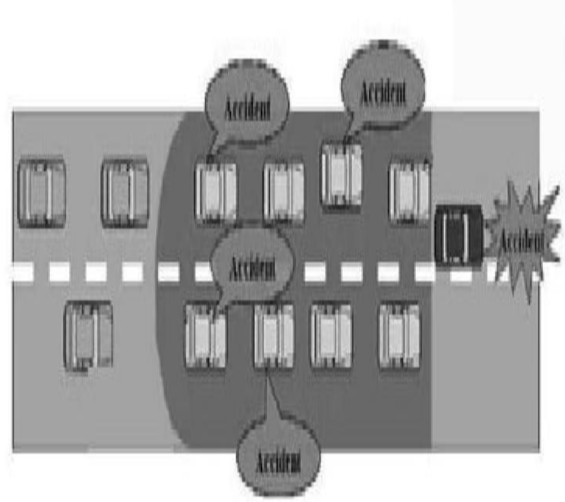

Fig.3. P-persistence broadcast [1

B. Our solution

We propose TLOV (The last one vehicle) broadcast method, an effective solution to reduce end-to-end delay and broadcast storm problem. TLOV is designed to make effective alarm message dissemination in the ad hoc network of vehicles in a highway or a road. The algorithm of TLOV is simple and its performances better compared to above two algorithms. TLOV will try to find the vehicle most suitable to rebroadcast alert message.

We assume that every vehicle is equipped with GPS. Thus every node of the wireless network, i.e., the moving vehicle, knows the geographical location of vehicles within communication range. This information is updated at close intervals. No that we can assume it is available real-time. We, therefore, further assume that the relative velocity (and distance) between vehicles changes slowly so that longer update intervals can be used.

First, when there is an accident, the victimized vehicle begins to broadcast an alert message to tell the vehicles behind it of the situation. All vehicles that receive an alert message do not rebroadcast it immediately. They will use TLOV algorithm to find the last vehicle i.e. furthest from the place of accident. That particular vehicle will rebroadcast the message while the other vehicles will wait for a threshold time interval to take a decision about rebroadcast. Only the node, which is designated by TLOV as the last node(and all the nodes are aware of) will rebroadcast the alert message the decision.

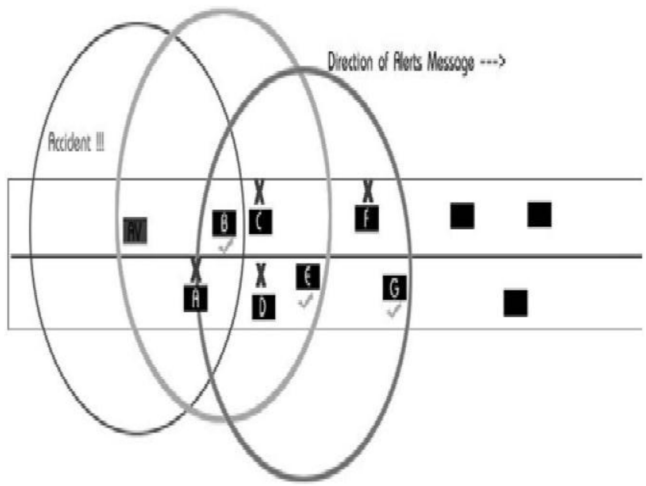

Fig.4. TLOV Rebroadcast

When the threshold interval time expires, if the other nodes do not receive the same alert message from another node behind it i.e., from the designated TLOV, the vehicles will decide that there is no relay node behind them or there is a problem. TLOV is run again to find the next last node. The next designated TLOV node broadcast the alert messages. This is repeated until a successful rebroadcast is done. The core of our protocol is TLOV algorithm. In fig. 4, successive TLOV are marked with tick. As mentioned earlier. Here, we introducing one more concept of priority for coming relay; i.e. coming toward LV according to their size and speed. The Vehicle which are heavy and if their speed also high ranked first in relay list saved by last vehicle (LV).According to this list the safety message rebroadcast by last vehicle.

Following figure 4, when an accident occurs, we call accident vehicle as "AV". AV will send alert alarm message to all following vehicles. In this situation vehicle A, B are in alert message range within the circle with "AV" as centre.

Immediately A, B gets alert alarm message. They will start TLOV algorithm to choose the last one who will be assigned to rebroadcast to all behind vehicle. Let us designate last vehicle as "LV". In this case the vehicle B is "LV" and is chosen to do rebroadcast. After vehicle B has rebroadcasted C, D, E will receive the message and run TLOV. E will be the new "LV" and is chosen to rebroadcast. The flow of TLOV algorithm is show in figure 5.

Following figure 5, first TLOV will check condition "Am I LV" by using GPS data. In figure 3, vehicle A will know that vehicle B will do rebroadcast because vehicle B is the last one, by select using TLOV algorithm, and vehicle B will know itself that it is the last one. Vehicle B will keep alert message and rebroadcast message immediately. In this case A will wait until ThB (Threshold time for which to wait for broadcast message) intervals to make sure that B rebroadcast. In normal case vehicle B will rebroadcast and vehicle A will hear rebroadcast message from B. If broadcast interval ThB did successfully expires and A doesn't listen rebroadcast, A will do rebroadcast by itself. This rebroadcast help us to prevent losing safety alert messages.

And during this it create a prioritised list of coming relay i.e. coming in range of last vehicle according to its size and speed. The vehicle which are heavy & and have high speed select first during rebroadcasting which is done by LV.

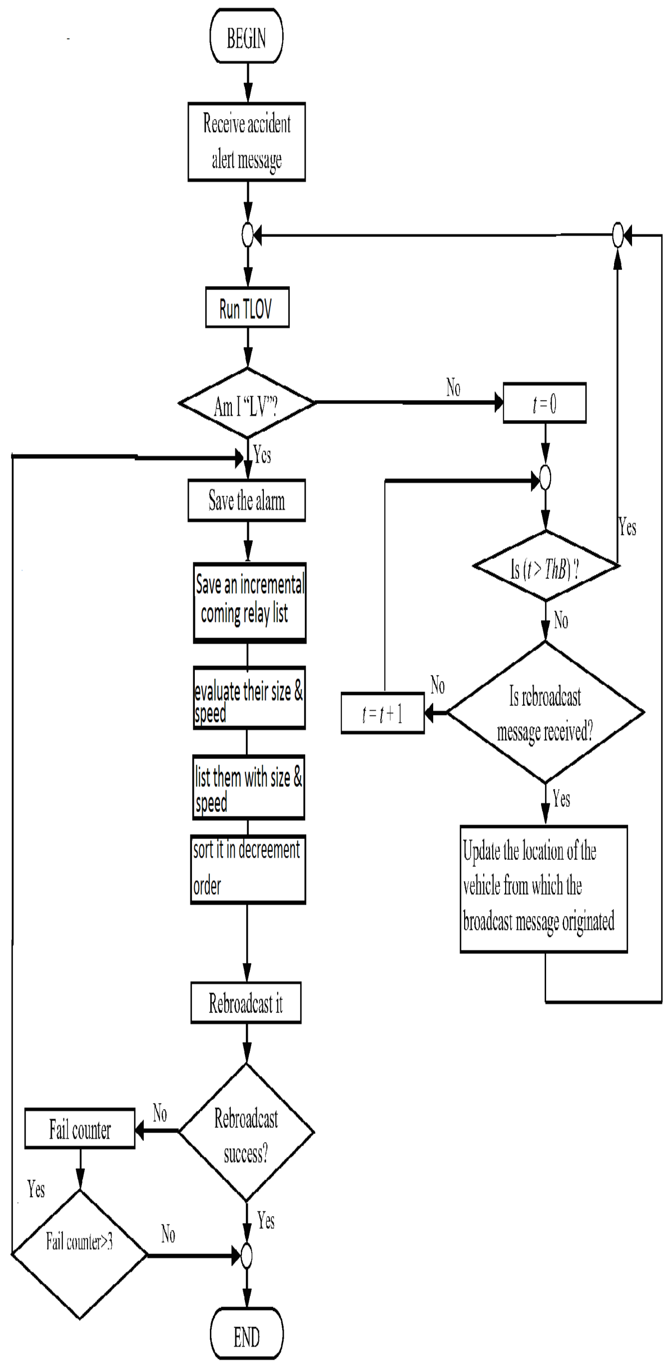

fig.5 TLOV Rebroadcast

III. Training Algorithm

Step1: Receive accident alert message(when an accident occur the vehicles nearer to accidental area get alert message, but not rebroadcast it).
Step2: Run TLOV.
Step3: Check whether it is last vehicle or not? If it is last vehicle go to step:4 else step 13.
Step4: Save the alarm message.
Step5: Save an incremental coming relay list (by last vehicle).
Step6: Evaluate each vehicle's size & speed.
Step7: Again list those vehicles with size & speed.
Step8: Sort list in decrement order (i.e. vehicle according to size).
Step9: Rebroadcast massage to that prioritize list's each vehicle.
Step10: Is rebroadcast done successfully i.e. no further relay is there then go to Stop else go to next step.
Step11: If relay is there i.e. rebroadcasting fails then count its fail count (how much times it fails).
Step12: If fail count >3 go to step 4 and again start training Else go to stop(end).
Step13: If t> Thb i.e. vehicle is too far away from incident vehicle then may be it is last one vehicle apply TLOV i.e go to step 2 else go to next step Here T=time ,Thb =threshold value
Step14: If t<Thb then it is nearby go to next step.
*Step15:*Check whether rebroadcast message received? If yes go to next step else go to step16.
*Step15:*Update location of vehicle from which the broadcast message originated.
*Step16:*t=t+1& go to step13.
Step 17: Stop(end).

IV. Conclusion

In this paper, we proposed another rebroadcast technique that uses the GPS information to improve the performance of safety alert application on VANET. When the accident occurs and accident vehicle has sent emergency message. Our rebroadcast technique can choose the last one in transmission range to rebroadcast emergency message. Here, we introducing one more concept of priority for coming relay; i.e. coming toward LV according to their size and speed. This technique reduces the broadcast storm problem. But there is a limitation that our proposed should work on correct GPS information.

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