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Survey Paper on Traffic Management in VANET using Text and Video Technique

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ABSTRACT:Video content delivery for vehicular ad hoc networks (VANET) is envisioned to be of high benefit for traffic management as well as for providing value-added entertainment and advertising services. This communication can have ability to provide safety while driving, reduces the everyday expenditure spent on fuel by avoid traffic jams and provide information like emergency medical enquires. Message based rebroadcasting in Vanet scheme for increasing reliability of emergence messages based on its nature. This mechanism improves the network utilization, reduce number of redundant message broadcasting and aims to broadcast emergency message to all vehicles in a zone by fast retransmission. Instead of using text message or voice message, a new mechanism ReViV is used for efficient video streaming over VANET. The ReViV methodology selects a minimum subset of rebroadcaster vehicles in order to reduce interferences and achieve high video quality.

KEYWORDS: VANET, Broadcasting, Vehicular networks, DSRC, Message agent, ReViV, SNA

I. INTRODUCTION

VANET is composed of On-Board-Units (OBUs) mounted on the vehicles and Road-Side Units (RSUs) installed along sides of the urban roads/highways which facilitate vehicle-to-vehicle (V2V) communications and Vehicle to Roadside (V2R) communication [9].In V2V message can send and receive through network devices installed in the vehicle. In V2R Message can communicate both vehicle and also the devices which are placed near the road or may in nearest building to road shows in Fig. 1.

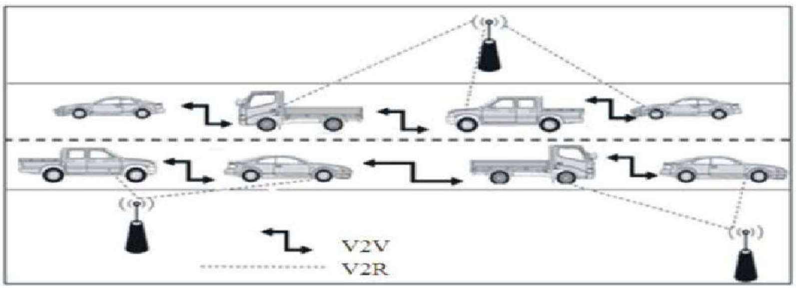

Fig. 1. Types of communication in VANET [2]

VANETs have stimulated the development of several interesting applications such as vehicle collision warning, security distance warning, cooperative driving, driver assistance, etc. The vehicle engine provides enough power for intensive data processing and communications. The on-board buffer storage, positioning system, and intelligent antenna further aid efficient video forwarding and collaborative downloading among vehicles or from/to RSUs.

Besides the traditional applications of VANET such as accident alert and traffic information exchanged in form of simple text messages, the scientific and industrial communities envisage video communication within vehicular

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networks to be of major benefit for traffic management and also to provide a value added entertainment / advertising services. Certainly, in a road emergency, streaming a live video of the accident area allows vehicles approaching the scene, mostly official vehicles, to better understand the nature of the accident and take the right decision consequently.
Message based rebroadcasting in Vanet [2] is used when an emergency situation is occur, any one of the vehicle will generate a message and send to all nodes in a zone. That message should be deliver fast, with in message's lifetime. Because receivers needs little bit of time to recognize the problem and reacting based on the given message. If the message not delivered with particular time, that effort taken is a waste of time in emergency period. More over emergency message should be rebroadcast immediately than other messages.

ReViV [1], a selective Rebroadcaster selection mechanism for Video streaming for VANET is designed for urban environment where the channels are overloaded and the network suffers from high interference degree. In such conditions, ReViV selects the best vehicles to rebroadcast the data in order to reduce interference and perform high video quality delivery. Indeed, the proposed mechanism selects a subset of strategic broadcasting nodes, rather than traditional all node broadcasting mechanism. For that purpose, the vehicles are ranked based on a new centrality metric called dissemination capacity DC(*v*) that we propose. This metric is inspired from node centrality metrics of Social Network Analysis (SNA) [7].

II. LITERATURE SURVEY

In order to provide Dedicated Short Range Communication (DSRC) for future vehicle-to-vehicle (V2V) communication the IEEE is working on the IEEE 802.11p Wireless Access in Vehicular Environments (WAVE)[3] standard. The standard shall provide a multi-channel DSRC solution with high performance for multiple application types to be used in future Vehicular Ad Hoc Networks (VANETs).WAVE can prioritize messages, though, in dense and high load scenarios the throughput is decreases while the delay is increasing significantly.
Streetcast [4] makes use of beacon suppression mechanism to reduce massive beacon message exchanged at the congested intersections. In addition, Streetcast takes advantage of RSUs deployed in roads intersection to select the best vehicle to rebroadcast the message.

Urban Multi-hop Broadcast protocol (UMB) [5], an 802.11-based protocol, designed to suppress broadcast redundancy by selecting the furthest vehicle from the sender to acknowledge the response of the message and rebroadcast it. In UMB, at the intersections, there are simple repeaters which repeat the packets to the road segments incident to the intersection. We assume that since the repeater is at the intersection, it has a line-of-sight to all road segments. Also we assume that each vehicle is equipped with a GPS receiver and an electronic road map. Since the vehicle mobility is high and vehicles leave and enter the network frequently, the topology of network changes fast. Therefore, UMB protocol is designed to operate without exchanging location information among neighbouring nodes.
In order to overcome the problem of interferences and exploit the different DSRC channels, the standard IEEE 1609.4 DSRC multi-channel [6, 8] has been proposed. It defines a time-division pattern for DSRC channels to alternatively switch between these channels to support different applications simultaneously. The standard suggests allocating alternatively a time slot of 50 ms for control channel (CCH) which conveys safety messages and another equal time slot to service channel (SCH) which conveys other services messages.

III. METHODOLOGIES

A. Message Based Rebroadcasting in Vanet [2]:

It is assumed that set of vehicles are move on a highways in two directions. Each vehicle is equipped with an antenna for DSRC/802.11p for V2V communication and installed a GPS. Every vehicle is used GPS methodology to identify its location and its neighbours and maintains a table to store the information about their neighbour. This table contains information like neighbour's vehicle id, direction, speed and time when the records were updated recently. Here propose a solution for message dissemination that will be work with efficiently in all types of network conditions. Our Proposal includes three major agents: 1. Message Analyst 2. Forward node selection 3. Broadcaster
1. Message Analyst Agent: Whenever a system receives any message, that message classifies its type by the message analyst. The messages in VANET are divided into three categories Level 1 - Passengers Safety Message, Level 2 - Emergency Warring Message, Level 3 - Acknowledgement and Hello bacons. Some priority code will be allocated for

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these messages.
Level-1: Passengers Safety Message: In highways, even though there is lots of monitoring and checking will be implementing by the law enforcement department, many criminals are moving from one place to another place easily through highways. Passengers in the highways will not know about the criminal who travelled along with them. Sometimes innocent Passengers may be affected when the law enforcement people round up the criminals on the road. So, P003 is Passenger Safety Message from law enforcement department about the moving of criminals and P004 is Passenger Safety message to law enforcement department about the moving of criminals by any passenger. If a prior message passed to drives about the criminals and their vehicle numbers, they may get awareness and also providing additional information about the criminals to the law enforcement department. In highways ambulance is also travelling in high speed to save some one's life. Due to its sound and sign all other vehicles are give a way for its moving. Some time due traffic ambulance is force to waiting. To avoid such traffic a prior message can broadcast to all the Passengers on the particular zone to get way without collusion. So, P001 and P002 are Passenger Safety Messages which gives highest priority to Ambulance Moving and Ambulance Service request by the passengers respectively. Table 1 shows the level-1 priorities with classification.

Table 1. Level 1 Messages with priority [2]

Priority	**Description**
P001	Ambulance Moving
P002	Ambulance Service request by the passengers
P003	Message from law enforcement department about the moving of criminals
P004	Message to law enforcement department about the moving of criminals by any passenger

Level-2: Emergency Warring Message: When a driver on the vehicle or a vehicle automatic system identify or detected any problem in the vehicle or roadside, first they analysis nature of the incident if that is any critical related to life or environment then a message is generated by the driver or by the automatic system and spread all nearest vehicle or in particular zone. That incident is may be P005, P006 and P007 are Emergency Warring Messages for break failures, traffic jam and weather problem respectively. Such a message communication is implemented in beginning of the vehicle to vehicle communication. Table 2 shows the level-2 priorities with classification.

Table 2. Level 2 Messages with priority [2]

Priority	**Description**
P005	Emergency Break failures to other vehicles
P006	Traffic jams due to some accident or other reasons
P007	Emergency Whether forecasting

Level-3 Messages: This includes three types of message like Hello Beacons, Advertisement Messages and Acknowledgement messages. Passengers on the highways are needs some additional guidance through their path like nearest Oil station, parking zone, Hotels and Hospitals. Such on organizations can sending messages like advertisement regarding their status and announce some discounts thorough this vehicle to vehicle to communication.

2. Node Selection Agent: Here assume that every vehicle when it is on the road it will broadcasting a hello beacons which containing the information like neighbour id, number neighbours it had, its position, through hello beacons at every particular period. Here assume, when a vehicle receive hello messages that information in the message will be store in neighbour table. This schema proposed a reliable algorithm to select next vehicle for rebroadcasting by the use of such information. For all level-1 & level -2 messages are need rebroadcasting. Thus sender should choose one of its neighbours to carry the same message to next hop. The major aim of this message is give more production of people from the criminals and also it carries information about the ambulance services. So it should be send to other vehicle as

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soon as possible. The sender will stop all the works and broadcasting these message immediately to all nearest vehicles which are in its transmission range. Then it will move to the process of selecting one of its neighbours to retransmit the message. That neighbour should be in capable of sending that message to more vehicles. Sender already had a collection of vehicles which are in long distance from its position. Now the sender will pick one vehicle from distance_ set which is having maximum transmission range. If more than one vehicle are in same transmission range then choose a vehicle which is travelling in highest speed. Because level -1 message is very close to life of the Passengers so it should be passes as much as earlier. Speed is opt parameter to giving message to all vehicle in particular zone with in short period of time

3. Broadcasting Agent**:** First this agent will find their entire neighbours who are going broadcast the message. Next it generates a message by the structure. After that the message will be send to the priority queues based on its priority.

B. ReViV: Selective Rebroadcast Mechanism for Video Streaming over VANET [1]:
In the urban environment where the spectrum availability is more and more rare, handling the interference problem is a primordial issue to ensure a high content delivery in VANET. Indeed, the traditional broadcasting mechanism advocates that each node in the network receiving the content will rebroadcast it. This rebroadcasts increase the interferences. Consequently, the packets loss increases and the video quality is degraded. Thus to enhance our video streaming system over VANET by new rebroadcaster selection mechanism, it will select a minimum subset of neighbours' vehicles to rebroadcast the content. The selected nodes should be as central as possible in order to broadcast the content to a maximum number of neighbours without need to further retransmissions.
The proposed mechanism is inspired from the Social Network Analysis (SNA) [7] methods to select the central nodes in their communities. The difficulty of broadcaster's nodes selection is illustrated in Fig. 2, where a roadside unit is broadcasting content in a road corner. Only A, B, C vehicles are in its range. The other vehicles receive the content in ad hoc manner. In example only nodes A and C (and not B) are selected to rebroadcast the content. Then only node G (not H or I) will rebroadcast again the content. Redundant rebroadcasts are omitted, namely the rebroadcast of nodes B, H and I.

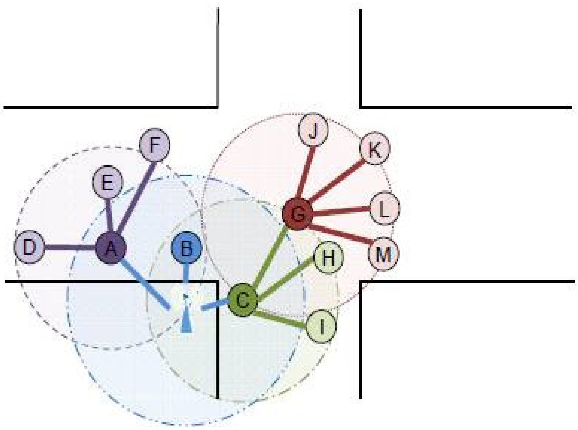

Fig. 2. Example of rebroadcaster nodes selection [1]

ReViV protocol selects a sub set of neighbours' vehicles, which ensure a large dissemination in the network, to rebroadcast the content. The rest of vehicles (non-rebroadcaster) will not retransmit the received content. Our target in ReViV is to select a minimum set of neighbours' vehicles which are more "central" in the network and which covers all the 2 hops neighbours. In Social Network Analysis (SNA) [7] the centrality problem has been widely studied and many centrality metrics have been proposed such as the node out-degree, the Shortest-Path Betweenness Centrality (SPBC). In Fig. 3, the nodes C, D, F and G are equally central in terms of out-degree; they have all an out-degree equal to 4. Node C, F has all network nodes at its range (at distance 2-hops). Based on the observation, here a new centrality metric, named the dissemination capacity (DC) defined as follows:
Definition: The dissemination capacity DC(v) of a node v is the maximum node v degree n which ensure that n 1-hope neighbour has a degree equal to n.

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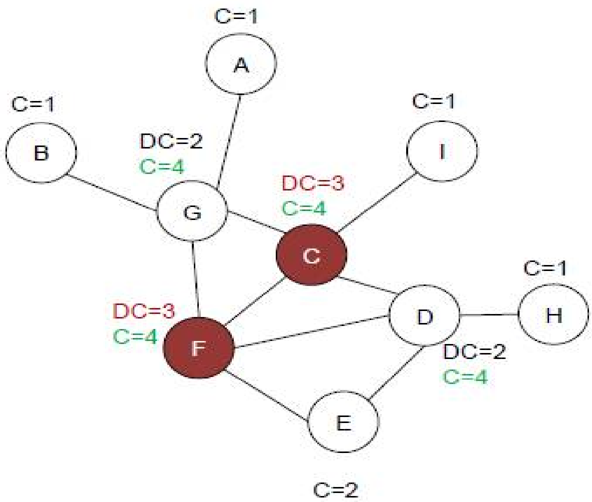

Fig. 3. Node dissemination capacity example [1]

Applying this definition to the graph in Fig. 3, we find that DC(G) = DC(D) = 2, whereas DC(F) = DC(C) = 3.It is clear that the nodes which have more connections (larger degree) are more likely to be "powerful" to disseminate the content in the network, since they can directly contact more other nodes. But, their power depends also on the degrees of their 1-hop neighbours. Large values for the DC(*v*) of a node *v* indicate that this node *v* can reach others nodes on relatively short paths. Thus the proposed centrality metrics, in addition to the reducing the amount of redundant rebroadcast, allows also to minimize the end to end delay.

Despite of the advantages that the DC metric offer, its calculation is not computational costly neither introduces an important communication overhead. Indeed, each vehicle in the network computes locally its DC and disseminates it to its neighbours in beacon message. In order to compute its DC, a vehicle needs only the out-degree of its 1-hope neighbours.

IV. CONCLUSION

Figure 1 gives brief idea about types of two communications over VANET i.e. Vehicle to Vehicle (V2V) and Vehicle to Roadside (V2R). Figure 2 is example of rebroadcaster nodes selection which shows how to select the node for rebroadcasting the content over network. Figure 3 is node dissemination capacity example which calculates DC*(v)*. This node can directly contact more other nodes to disseminate content in the network.

A message based rebroadcasting protocol for VANET which is reliable and fast message transmission in efficient way. It consists of three agent's message analysing agent, node selection agent, broadcasting agent. Also it broadcast emergency message to all vehicles in a zone by fast transmission. It split the message and allocated in separate queue and gives more priority for broadcasting level1 - emergency messages than other level messages.

Instead of using text message or voice message, streaming a live video of the accident area allows vehicles approaching the scene, to better recognize the nature of the accident and take the right decision consequently. So, ReViV, a rebroadcasters selection mechanism for video streaming over VANET. ReViV selects a subset of vehicles in the networks to rebroadcast the content, based on their strategic location in the network and their capacity to reach a maximum of vehicles in a minimum of hops. ReViV reduces the frame loss to its low values and enhances the PSNR of the received video compared to similar protocols while reducing the frames delay to acceptable values for real time streaming.

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BIOGRAPHY

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