



Enhanced DV Cast Protocol for Data Dissemination in Urban Traffic

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Abstract-This paper attempts to give the solution for the urban scenario using DV cast protocol. Normally DV cast protocol is the best solution for highway traffic. But this paper proposed urban dv cast (UDV) protocol to deal with the urban traffic. This UDV protocol is extension of DV cast protocol. Our aim is to address the urban scenario where vehicles are equipped with sensors or wireless devices to identify the hazards. Urban DV cast (UDV) protocol is used to disseminate data efficiently in urban traffic. It suppresses the Broadcast storm which is the main problem in data dissemination because of data collisions and contentions in dense network. Store-carry-forward method is efficiently carried data with the disconnected networks. Urban roads are different from that of highways. It has many entry points or intersections. This protocol highly works well in urban network.

Keywords-DV Cast protocol, urban dv cast protocol, broadcast storm, store-carry-forward, data dissemination

I. INTRODUCTION

Vehicular ad-hoc network (VANET) is most popularly used to regulate traffic. VANET ensures safety, efficiency, security in data dissemination. Vehicles are equipped with sensors or wireless devices, so it can sense the road environment and gather details about the accidents, hazards, pollution and weather report. These wireless devices collect the data about environment and provide data dissemination to nearby vehicles. In dense network data can be broadcasted by all the vehicles at the same time, it might be a chance to occur broadcast storm. It means that data can be collided and contentions will heavily occur. It can be suppressed using the suppressed broadcasting technique. In sparse network, data cannot be easily disseminated because vehicles are spread in the network. So we use a method called store-carry-forward method. The data can be stored by one vehicle when it encounters the other vehicles it can pass the data to it. In this paper we concentrate on the urban roads so road topology is important. The vehicles are formed of clusters moving in one direction to cope with separate vehicle clusters as in [1][2]. The impact of this work lies in combining the adaptive optimized broadcast suppression technique and store-carry-forward method in a single data dissemination protocol known as urban DV cast protocol (UDV protocol). This protocol works well in dense and sparse network. When compared with other protocols, DV cast protocol works well in dense and sparse network. Normally DV cast protocol is used for highway but in this work proposed that the DV cast protocol disseminates data in urban network. By simulating various urban scenarios, UDV cast protocol works well and it is directly compared with DV cast protocol. This paper provides the data dissemination with the high level of reliability, security, efficiency. Consider that vehicles are equipped with IEEE 802.11p and it can focus only on vehicle-to-vehicle communication. Urban roads are concentrated using broadcasting protocol. Urban roads have many entry and exit points. It can also have intersections. Based on the information provided by GPS, the vehicle can identify the dense and sparse traffic.

The remainder of this paper is organized as follows: Section 2 provides a comparison between UDV and Other protocols with respect to suppression technique and protocols that works with the sparse networks. Section 3 provides the UDV protocol in detail. Section 4 describes the simulation of our protocol under different traffic conditions. Finally section 5 concludes this paper and outlines of future directions.

II. RELATED WORK

VANET provides many solutions for the data dissemination under various traffic control. Many protocols support dense and sparse scenarios in road traffic. In dense scenarios, suppression techniques are used to lessen the broadcast problem. In sparse scenarios, store-carry-forward technique is used to disseminate data. In this paper particularly focus on DV cast protocol which disseminates data in dense and sparse scenario. DV cast protocol has three techniques, slotted 1-persistence, weighted slotted 1-persistence, and slotted p-persistence. Among these techniques slotted 1-persistence provides better data dissemination than other two protocols.

In slotted 1-persistence, message can be generated in accident/hazard occurred direction and disseminate data to all vehicles in message originated direction. The vehicles are slotted based on time slots and message is disseminated to each slots. Source vehicles can disseminate data to most distance vehicle in particular direction. The source vehicle can

transmit message to all vehicles, upon the receipt of an echo it stops retransmission. In this case, broadcast storm will occur; i.e. collisions and contention of data will occur. Suppression technique is used to reduce the broadcast storm. It divides the scenario into three dense, sparsely connected and sparsely disconnected scenarios. In [1], optimized slotted 1-persistence is used to reduce the broadcast storm. In this method, clustering concept is used for data dissemination. Based on this technique, we proposed an adaptive optimized slotted 1-persistence to disseminate data in urban scenario. Normally DV cast is used for data dissemination in highway scenario.

Ramon S Schwartz et al [2] proposed adaptive multi-directional data dissemination protocol for both urban and highway scenario. It works based on the distance sector on the roads. In [3], WantaneeViriyasitavat et al proposed a distributed gift wrapping algorithm for data dissemination using UV cast protocol in urban networks. It uses store-carry-forward method to data dissemination and to reduce the broadcast storm it uses the intersection based broadcast storm. In [4], Dinesh Sharma proposed a GEDDAI method which is used to disseminate data in urban scenario. It forms the zone of interest in the road and disseminates data in the zone of interest.

III. PROTOCOL DESCRIPTION

Our UDV protocol aims to achieve efficient data dissemination with high delivery ratio and low delay in dense and sparse network. For this purpose, we can take the following approaches: The first approach is adaptive optimized suppression technique in dense network of urban road. This approach deals with the broadcast storm problem when relaying data from one vehicle to other vehicle. The second approach is in sparse network, we take the store-carry-forward approach to deliver messages, when multi-hop connectivity is not available to vehicles.

A. Concept explanations

Message dissemination direction: In an urban road consists of two lanes, the vehicles move in both the direction of the road. In case of accident or hazards occurs means message d can be generated by the nearby vehicle to the hazard/accident. Simply the vehicle moving towards the accident/hazard occurring direction can generate message so this direction is known as message dissemination direction.

Vehicle cluster: In an urban network, vehicle cluster vc can be defined by a group of vehicles moving in both of the directions in a two lane road and can be form a cluster. Cluster can be formed on the basis of communication range and vehicle density.

Cluster front vehicle: The cluster front vehicle cf is the first vehicle in the vehicle cluster vc which is located opposite to that of the message dissemination direction d.

Cluster tail vehicle: The cluster tail vehicle ct can be the last vehicle in the vehicle cluster vc which is located in the message dissemination direction d.

Radio Gap: In an urban network, consider two vehicle clusters vc1 and vc2 in message dissemination direction d, and cluster tail ct1 of cluster vc1 then the radio gap is defined by,

$$\text{Radio gap} = D(\text{vc1}, \text{vc2}) - \text{CR}(\text{ct1})$$

Where D is the distance between vehicle clusters vc1 and vc2, CR is the communication range of ct1.

B. Requirement and assumptions

Vehicles are able to know their position in the road, using global positioning system (GPS) then only UDV protocol works properly. We consider the urban scenario, where only vehicles can generate and disseminate data. So, vehicles are equipped with radio device which consists of IEEE 802.11p. In four intersection road, the vehicle cluster of message dissemination direction d consists of cluster tail ct. ct can rebroadcasts the message to the vehicle in the same cluster. The other three sides of the road also have clusters, those clusters have cluster front vehicle cf which is not in message dissemination direction d it can receive message from the cluster tail ct in message dissemination direction d.

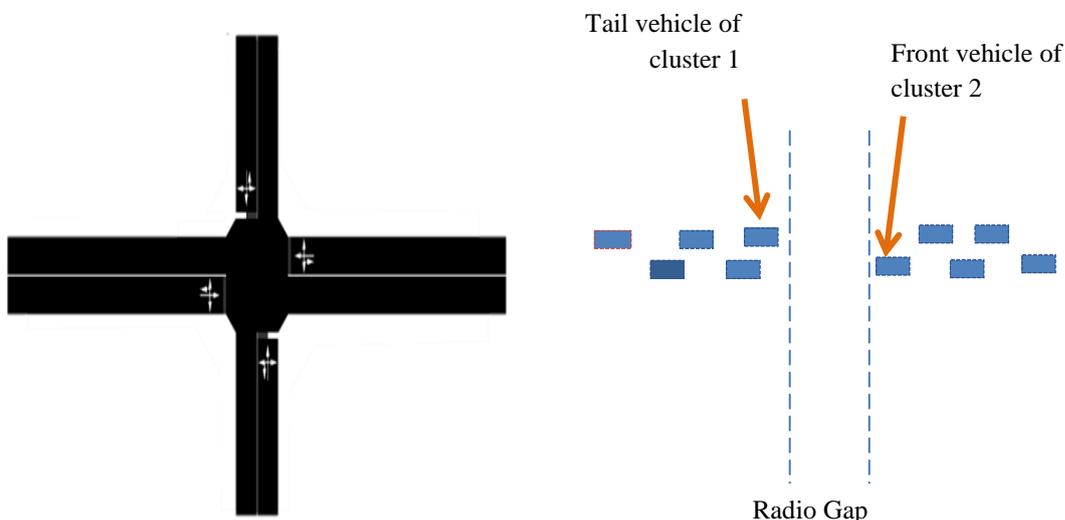


Fig 1: Protocol Explanation

C. Adaptive optimized slotted 1-persistence

The suppression technique used in this work is based on optimized slotted 1-persistence and slotted 1-persistence [1]. This approach is used to increase the delivery ratio and decrease the number of collisions during a rebroadcast. Different time slot priorities are used to reduce the broadcast problem and additional time delay is assigned for time slots to deal with the synchronization problem. If vehicle i propagate anew message to the vehicle j which is farther from the message dissemination direction d , it allots a time slot to dissemination it means rebroadcasts the message. If the sender is farther from the message dissemination direction, simply it ignores the message and it suppresses any previously scheduled rebroadcast for that message.

For scheduling a message, vehicle j initially calculates the percentage distance PD_{ij} . PD_{ij} is calculated by distance between the vehicles i and j with respect to the communication range R .

$$PD_{ij} = \left[\min(D_{ij}, R) \right]$$

$$AD_{ij} = D_{ij}/R$$

Where D_{ij} is the distance between the vehicles i and j . As the result, AD_{ij} (Aggregate distance) value vary within the interval $(0, 1]$ with the larger distance being closer to 1. The vehicle j first calculates that distance between two vehicles with respect to the estimated transmission range R and it calculates the aggregate distance AD_{ij} . For instance, in message dissemination direction d cluster tail ct broadcasts the message to the cluster front vehicle cf of the nearby cluster. Similarly the last cluster in the message dissemination direction has cluster tail ct which forwards the message to the cluster in opposite and adjacent directions of the four intersection road. Already mentioned communication range can be established by vehicle's communication range and its density. The time slot number S_{ij} assigned to vehicle j is then defined by the following equation

$$S_{ij} = \lceil NS * (1 - AD_{ij}) \rceil$$

Where NS is the total number of the slots used. If vehicles are uniformly distributed within the transmission range of vehicle i , they will be equally distributed among the NS time slots reserved. S_{ij} vary within the time interval $[0, NS-1]$. In a two lane road, message could be generated in the any one of the directions. So vehicles moving towards the accident prone area have given a high priority and the vehicles are opposite to the accident prone have given a low priority. This prioritization is to reduce the broadcast storm. The modified formula is as follows:

$$S_{ij} = \lceil NS * (1 - AD_{ij}) \rceil \text{ if } v_i = hp_{dir}$$

$$S_{ij} = \lceil NS * (2 - AD_{ij}) \rceil \text{ if } v_i \neq hp_{dir}$$

Where v_i and hp_{dir} are vehicle and high priority directions respectively. For high priority directions the time slot is assigned like $[0, NS-1]$ and for the low priority directions the time slot is assigned $\lceil NS, (2 * NS) - 1 \rceil$.

Finally the time the vehicles have to wait before rebroadcasting at time slot S_{ij} is calculated as follows:

$$T_{sij} = S_{ij} * st$$

Where the slot time st is a value larger than the one - hop delay that includes the medium access delay, transmission delay, propagation delay. In usual flooding approach, all vehicle should rebroadcast simultaneously after receiving the message and those vehicles are assigned to different time slots clearly breaks the synchronization problem. The time slot st provides an opportunity to cancel their transmissions, since the message has already been rebroadcast. Synchronization problem has arisen not only for the small vehicles but also for the large amount of vehicles. To deal with the synchronization problem, an alternative for the slotted 1-persistence technique called micro slotted 1-persistence flooding has been proposed. The proposed scheme functions in the same way as the slotted 1-persistence scheme but with a small additional delay, i.e. micro slots within each slot to break the synchronization. In order to observe with the current MAC and PHY layers of the IEEE 802.11p standard, we propose the use of the small additional delay but only in networks layer and maintain the MAC layer unaltered. The Extra delay ED_{ij} is our second optimization is defined as follows:

$$ED_{ij} = D_{max} * (1 - AD_{ij}) \text{ if } v_{dir} = hp_{dir}$$

$$D_{max} * (2 - AD_{ij}) \text{ if } v_{dir} \neq hp_{dir}$$

Where D_{max} is maximum delay allowed. The above equation describes that vehicle moving high priority direction has received small delay than the low priority direction. The extra time delay that vehicles have to wait before rebroadcasting is expressed as follows:

$$T_{ij} = (S_{ij} * st) + ED_{ij}$$

The result of the above equation is that for each road direction each time slot is stretched with an equal fraction of D_{max} . By giving extra time to earlier time slots, it is assured that there is no collision between different time slots and no changes in time slot st . The complete suppression mechanism described in this section is shown as fig: In addition to this, echo is used similar to acknowledgement. After receiving the echo from any vehicle, the vehicle which rebroadcast the message is cancelled. However due to our separation of priorities for each direction, the most distant vehicle can be positioned in the low priority direction and thus assigning to late time slots. Vehicles might cancel their rebroadcast mistakenly upon the receipt of an echo which is closer to the sender (in the high priority direction) and block a further propagation of the message. To stop this behavior, define that vehicles can only cancel their rebroadcast when receiving an echo from other vehicles in the farther distance in the message dissemination direction. We consider only new messages, we keep track of the most recent message IDs in a list, namely the last m message IDs received. Schedule rebroadcast function manages the new messages which calculates the proper waiting time T_{sij} and places the message in the sending queue. Consequently the cancel rebroadcast function removes the message corresponding to the echo from the queue.

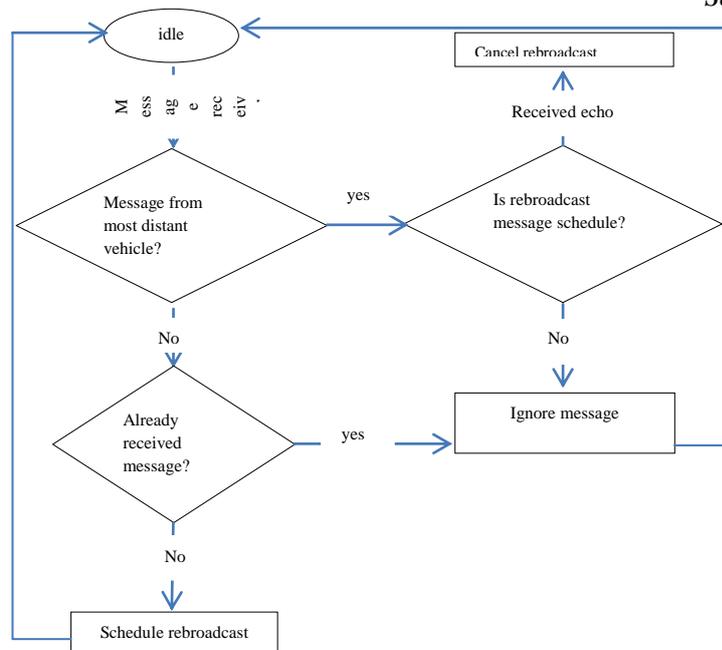


Fig 2: The adaptive optimized slotted 1-persistence

D. The UDV protocol

The UDV protocol is designed to work with the urban network. The Clustertailct vehicle stores all messages that received and rebroadcast the messages using the FromTail is set to be true. After establishing the connection the tail is responsible for carrying the messages. The cluster tail also senses the tail in other clusters by sending the hello packets. The hello packets are used to recognize the vehicles within the communication range and also tail vehicle in the other clusters. The tail vehicle in the message dissemination direction rebroadcasts message to the vehicle in the same cluster and tail within the other clusters. In sparse network, store-carry-forward mechanism is used. Non tail vehicles store all the message sent by the tail vehicle and rebroadcasts the messages using adaptive optimized slotted 1- persistence to reduce the broadcast storm.

Message Direction Connectivity Timer: Message Direction Connectivity Timer (MDCT) is the maximum time allotted for rebroadcast a particular message from one vehicle to other vehicle farther in the message connectivity timer.

Electing tail vehicle: A vehicle exceeds the MDCT value without receiving a message retransmission from a vehicle farther in a message dissemination direction. Those vehicles are said to be tail vehicle. The transition from non-tail to tail is initiated by the reception of the message from the vehicle farther from the message dissemination direction. This is the indication of the cluster tail can established the connection with the other clusters. Tail has stored some messages and it needs to forward it to the other clusters. The vehicles in the new clusters follow the protocol and rebroadcast them. After receiving the echo from one of the vehicles in the farther direction, the tail makes transition. But there is no receipt of echo means that there is no vehicle in the new cluster received. Note that the tail does not have stored message, it simply makes the transition to non-tail state as soon as a message from the vehicle farther in the message dissemination direction is received.

Every time the tail receives the message, the tail not only stores the message but also retransmits the message using FromTail is set to be true. By doing like this, all the vehicles in the range can have the copy of the message. If the tail fails or turns off the road, eventually another vehicle becomes the new tail of the cluster. Since such vehicle would have the copy of the message, so it rebroadcasts the message to all the vehicles whenever the message connectivity timer is reestablished. The most important statement relating to broadcast efficiency is that the message tail is always required. Because tail has always have the highest priority in the message direction in order to avoid retransmission and redundancy. This priority is assigned by the cluster tail have first time slot using adaptive optimized slotted 1-persistence and assigning later priorities (by giving additional time slots when compared with the tail) to the other vehicles.

Defining cluster tail and cluster front vehicles: The complete knowledge of the network topology is attained by sending hello messages to every vehicle periodically. These messages are event-driven messages which are triggered by hazard events. But hello messages introduce the network load, contention, collision when not properly co-ordinated. Simply UDV requires only the knowledge of whether the vehicle is cluster front, cluster tail or relay vehicle in the cluster. To reduce the network contention, collision in the conventional hello message we introduce a suppressed periodic hello message mechanism. The vehicle is said to be cluster front vehicle which is in message direction if it does not receive a hello or event driven message longer than the period defined by MDCT. Cluster front also similar to that of cluster tail but it is located opposite to the cluster tail vehicle. Here MDCT value is different for cluster tail and front. The cluster tail and front vehicles of the message dissemination direction approach are similarly followed by the opposite and adjacent sides of the urban network. In UDV cast protocol, the hello messages are not stored and it is used to gather network topology. If an event-driven message is scheduled to be rebroadcast in the suppression mechanism, any previously scheduled hello message is cancelled.

E. Message Format

The vehicle ID and message ID of event-driven and hello messages to enable vehicles to distinguish the different broadcasts and identify the rebroadcasts. For example vehicle ID is the MAC address and message ID can either be a sequence number or timestamp of the message generation time. Timestamp is used to allot message expiration and prevent old message from being disseminated. Message size limit of application dependent is fixed for the list of stored messages and it can be remove the oldest message when the limit is reached. In addition to time, the expiration mechanism can also be based on distance to prevent irrelevant message originated form hundreds of kilometers away.

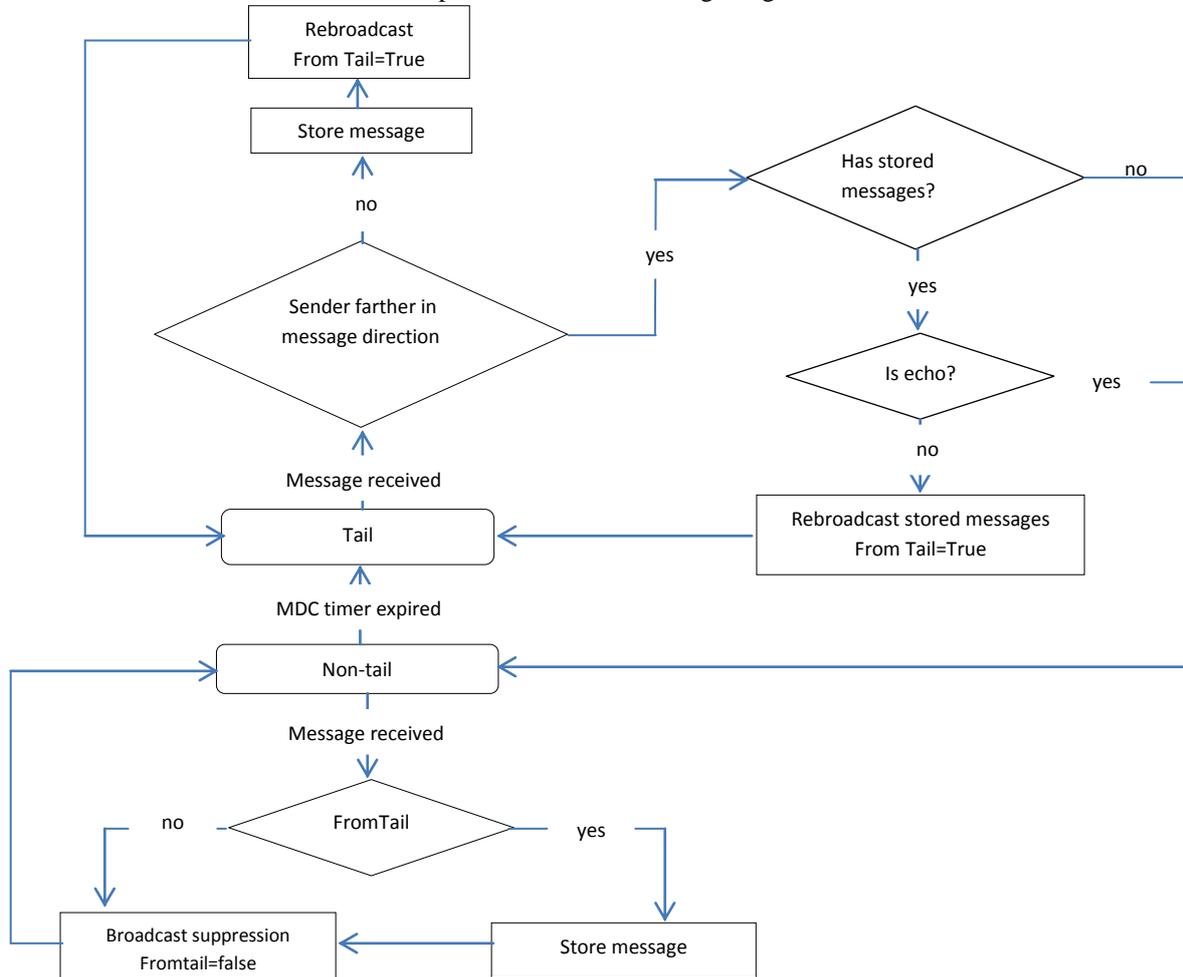


Fig 3: Message Direction Connectivity Timer

A message could be considered expired when it crossed particular distance say 10 kilometer away from the event. For the suppression technique, both message dissemination direction and network topology of the sender is required. Message dissemination direction indicates the message must be propagated and the network topology indicates the vehicle is calculated the distance with respect to sender and assigns the timeslot accordingly. The message header structure is therefore defined by the following values: [vehicle ID, Message ID, timestamp, distance propagated, message dissemination direction, sender coordinates, FromTail flag].

F. Performance evaluation

Performance evaluation of UDV protocol is carried out by Omnet++ 4.1. We consider four protocol versions UDV and DVcast, slotted 1- persistence technique and adaptive optimized slotted 1- persistence technique. Our goal is to evaluate the UDV in various scenarios and compare it with the existing DVcast protocol. Also focus on the dense and sparse network on the urban traffic. It accesses the store-carry-forward method in the sparse network models employed in UDV and DVcast protocols.

Mixim framework is used for the simulations and adjust and available implementations of the IEEE802.11p framework.

Physical Layer	Frequency band	5.9 GHz
	Bandwidth	10 MHz
	Transmission power	50mW
	FSPL exponent α	3.5
Link layer	Bit rate	6 Mbits/s
	CW	[15,1023]
	Slot time	13 μ s

	SIFS	32 μ s
	DIFS	58 μ s
Suppression mechanism	St	5 ms
	NS _{std}	3
	NS _{adpopt}	6
	D _{max}	1 ms
	Hello Size	24 bytes
Scenarios	Hello frequency	1 Hz
	Message size	2312 size
	Message frequency	0.5 Hz
	# runs	50

We consider the following metrics:

Delivery ratio:The percentage of message generated by the farthest vehicle in one end of the road which fully propagated to the vehicle in the extreme opposite end of the road. Ideally, dissemination protocol must achieve a delivery ratio percentage close to 100%.

Network load:Two parameters are used to define the network load. The total number of transmissions and the total number of receptions performed on average by random vehicle. These values are normalized by the total simulation time. In order to be efficient, protocols must have a low number of transmissions and receptions during their dissemination.

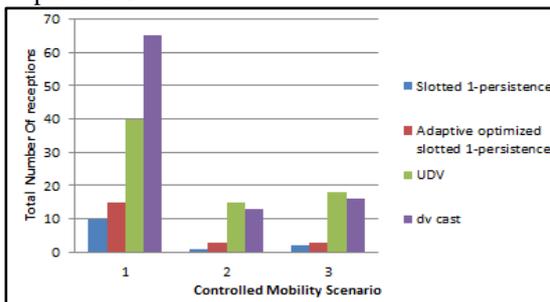
Delay: the total time taken for message dissemination from one end to the other road length. This parameter is considered importantly because emergency information must be disseminated earlier as possible.

Mobility scenario:

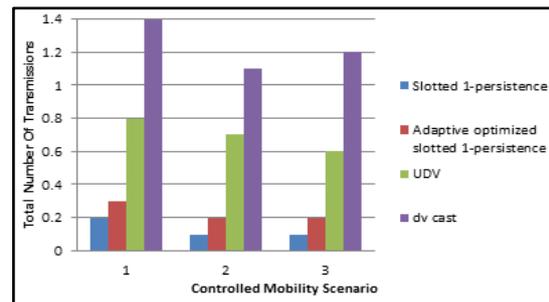
In mobility scenario, three types of scenarios are considered they are: well connected, sparse network, sparsely connected network with radio gaps in all directions. Fig 4 (a) and (b) shows the total number of receptions and transmissions for every scenario. In every scenario the performance of DV cast is higher. The performance of Adaptive optimized slotted 1-persistence is higher than the slotted 1-persistence. Fig 4 (c) shows the delivery ratio for every scenario. In scenario 1, all protocols perform nearly 100% except DV cast protocol. In scenario 2, Adaptive optimized slotted 1-persistence and UDV performs nearly 100% except slotted 1-persistence and DV cast protocol, it limits to only 15%. Store-carry-forward method shows in scenario 3, nearly 90% delivery ratio is achieved by Adaptive optimized slotted 1-persistence and UDV cast protocol. Fig 4 (d) shows the delay(s) for every scenario. In scenario 1 and scenario 2 shows slightly higher delay for Adaptive optimized slotted 1-persistence and UDV cast when compared with slotted 1-persistence and DV cast. But in scenario 3 which is store-carry-forward method which shows the highest delay for Adaptive optimized slotted 1-persistence and UDV cast protocol when compared with slotted 1-persistence and DV cast.

G. Traffic simulator:

To simulate the urban scenario, we used two simulators SUMO and QuadstoneParamics 6. SUMO has been preferred to the later stage of this work because of its facilities to export vehicle traces to other software such as network simulator. QuadstoneParamics is used to distribute vehicles and regulate the vehicle speeds. Three scenarios are considered well connected scenario (scenario 1), sparsely connected scenario (scenario 2), hybrid (combination of both well connected and sparsely connected, scenario 3). Fig 5(a) and (b) shows the performance of the protocols with respect to network load. DV cast protocol performs higher number of receptions when compared to any other protocols. In scenario 1 and scenario 3, high densities are considered so DV cast performs the higher amount of receptions. But in scenario 2 only sparse networks are considered. So vehicles cannot have the store-carry-forward mechanism and no multi-hop-connectivity between vehicles. The number of receptions and transmissions are equal in UDV and DV cast and the performance of slotted 1-persistence and adaptive optimized slotted 1-persistence are very low. Fig 5 (c) shows the delivery ratio of three scenarios. In first scenario, adaptive optimized slotted 1-persistence and UDV cast protocol performs the very high delivery ratio. Slotted 1-persistence and DV cast shows the very poor delivery ratio. Scenario 2 shows the sparse network, there is no multi-hop connectivity between vehicles. All protocols show the very poor delivery and vehicles sent hello messages periodically so messages can collide with each other. UDV gives only 10% of delivery ratio it is better than other protocols.

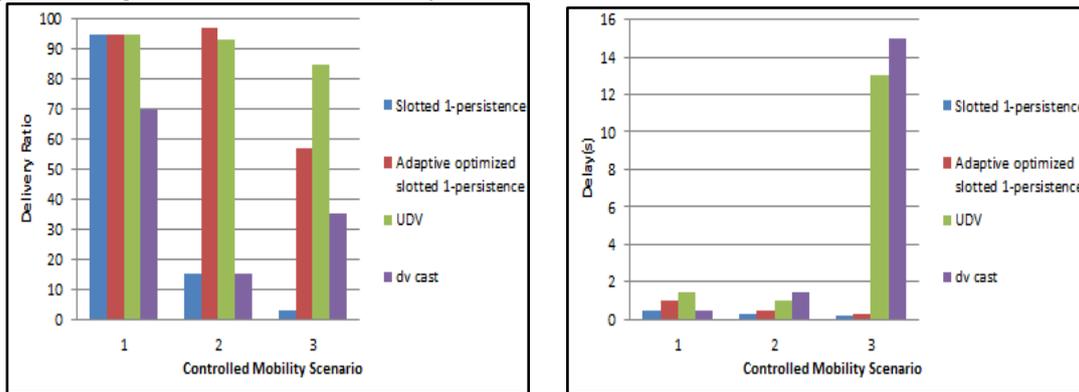


(a) Total Number Of Receptions Vs Scenario



(b) Total Number Of Transmissions Vs Scenario

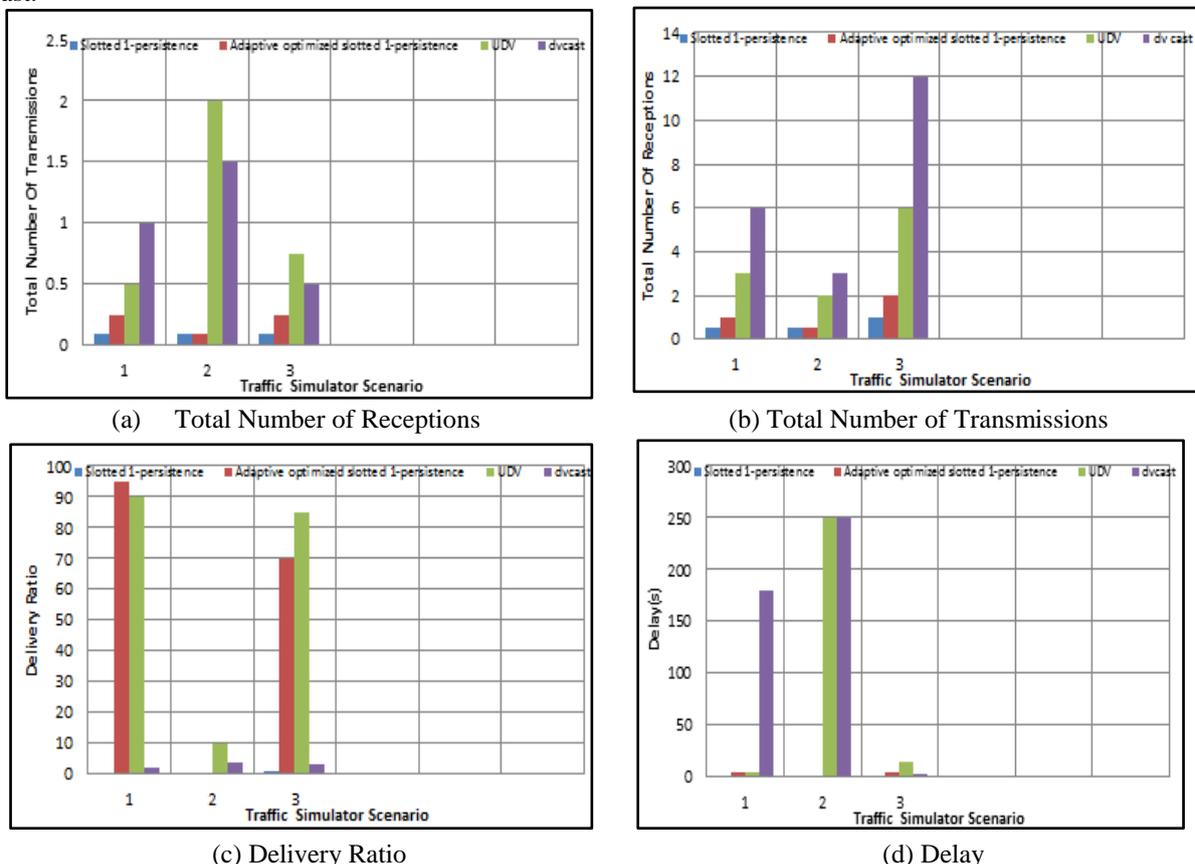
In scenario 3, UDV and adaptive optimized slotted 1-persistence gives the very high delivery ratio whereas DVcast and slotted 1-persistence gives the 5% and 2% delivery ratio.



(c) Delivery Ratio Vs Scenario (d) Delay Vs Scenario
Fig 4: Performanc evaluation for mobility scenario

Effects of total number of time slots:

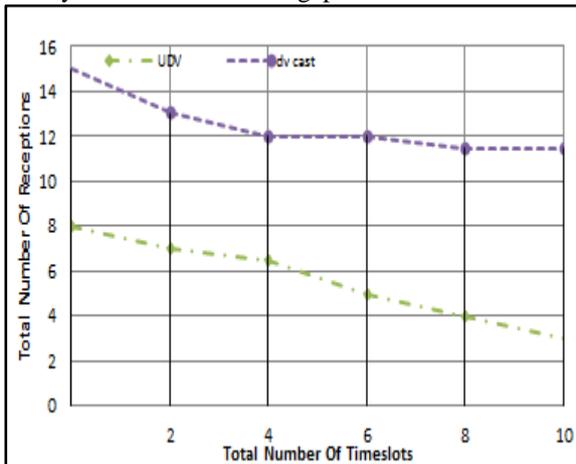
We analyse the result of total number of time slots(NS) by choosing varying values. This parameter works well in UDV and DV cast protocol as it assigns the number of vehicles assigned to each vehicle and so the number of vehicles rebroadcasting simultaneously. The NS value vary from 1 to 10 and we run both UDV and DV cast protocol. UDV always relies on equal numberof time slots for each road direction. Here we choose the traffic sceanrio 3 for simulation that contains wide variety of situations.Fig 6 (a) and (b) shows the total number of transmissions and receptions. For both transmissions and receptions, the values are gradually slow down. In receptions, UDV value and DV cast value decreases it means that total number of receptions and transmissions are decreased due to collisions.Fig6(c) shows the delivery ratio of UDV and DV cast protocol. We know that DV cast protocol will not work well when network load is high. Initially it goes to peak value when it reaches the value 4 it comes down nearly to zero. The delivery ratio of UDV is nearly 80% in congested scenario. It remains constant throughout the scenario.Fig 6 (d) shows the end-to-end delay. In UDV , the delay rate is decreased when NS equal to 6. Because of collisions ,the farthest vehicle in the sender the farthest vehicle in the sender succeeds in rebroadcasting is higher,which decreases multi-hop end-to-end delay. After the value 6 the delay starts to increase. Earliest time slots are not utilized since they are not assigned to vehicles. Store-carry-forward mechanism is used instead of earliest time slots which gives higher delivery ratio. The delay of UDV is higher than the DV cast.



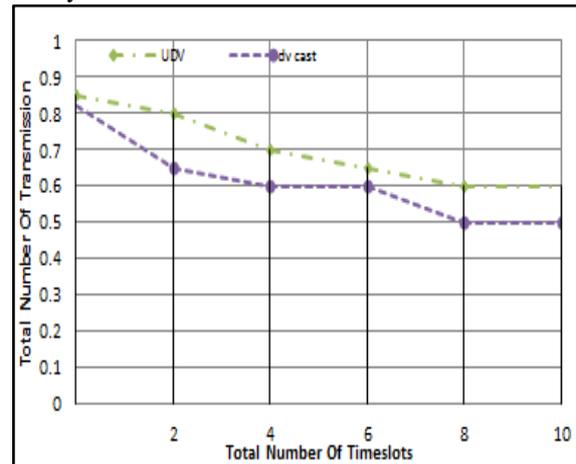
(a) Total Number of Receptions (b) Total Number of Transmissions
(c) Delivery Ratio (d) Delay
Fig: 5 performance evaluate on for traffic simulator scenario

Effect of hello messages:

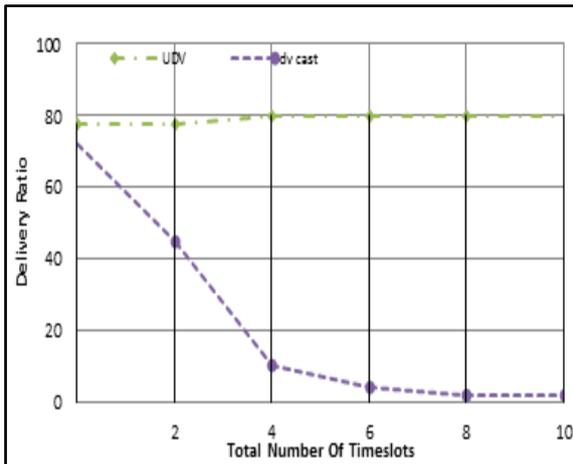
The final evaluation phase deals with the effect of the hello messages in UDV protocol. UDV along with unsuppressed hello messages employed our final simulation. We remove the usual mechanism provided by UDV. We apply the mechanism provided by DV cast to UDV protocol. So we insert an equivalent hello messages employed DV cast and it contains vehicle ID, message ID, timestamp and the sender co-ordinates to derive which vehicles are cluster front vehicle and tail. Hence we compare UDV, UDV with unsuppressed hello messages and DV cast protocol. Higher number of transmissions and receptions are given by UDV with unsuppressed hello messages shown in fig7(a) and (b). DV cast also shows higher in transmissions and receptions. Fig 7 (c) denotes the delivery ratio of UDV, UDV with unsuppressed hello messages and DV cast. Delivery ratio is higher in UDV and 5% reduces in UDV with unsuppressed hello messages. DV cast delivers the message very poor. Fig 7(d) denotes the delay value and delay is higher in UDV and UDV with unsuppressed helloworld messages. Some messages could travel successfully in road path. But some could not deliver successfully because some radio gaps and so increased end-end delay.



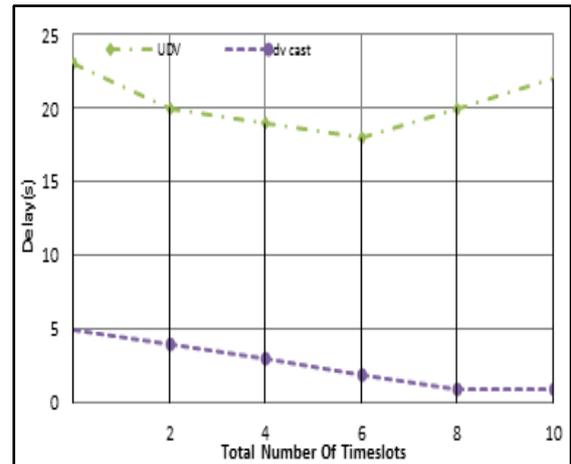
(a)Number of Timeslots Vs Number of Receptions



(b)Number of timeslots Vs Number of Transmissions

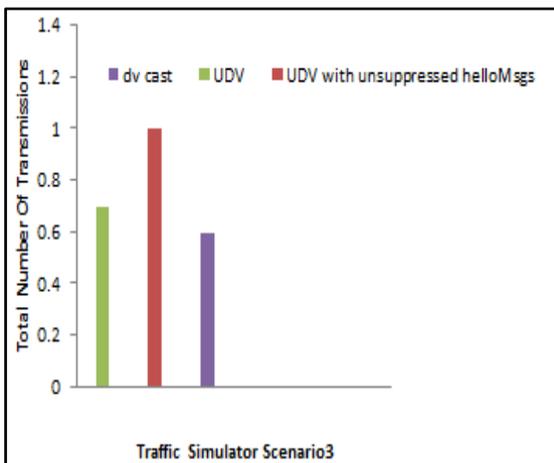


(c)Number of Timeslots Vs Delivery Ratio

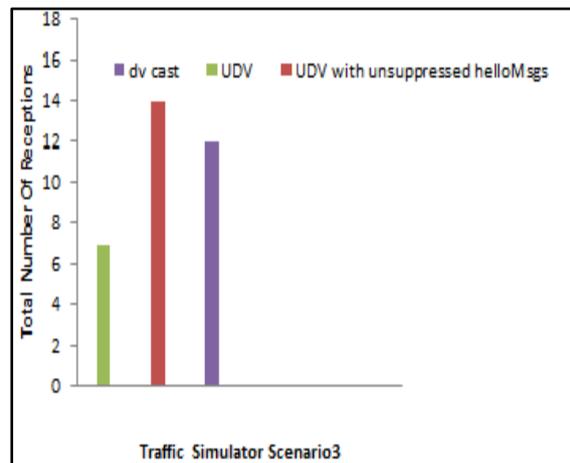


(d)Number of Timeslots Vs Delay

Fig 6: performance evaluation for traffic simulator scenario 3 for different total number of time slots



(a)Total number of transmissions



(b) Total number of receptions

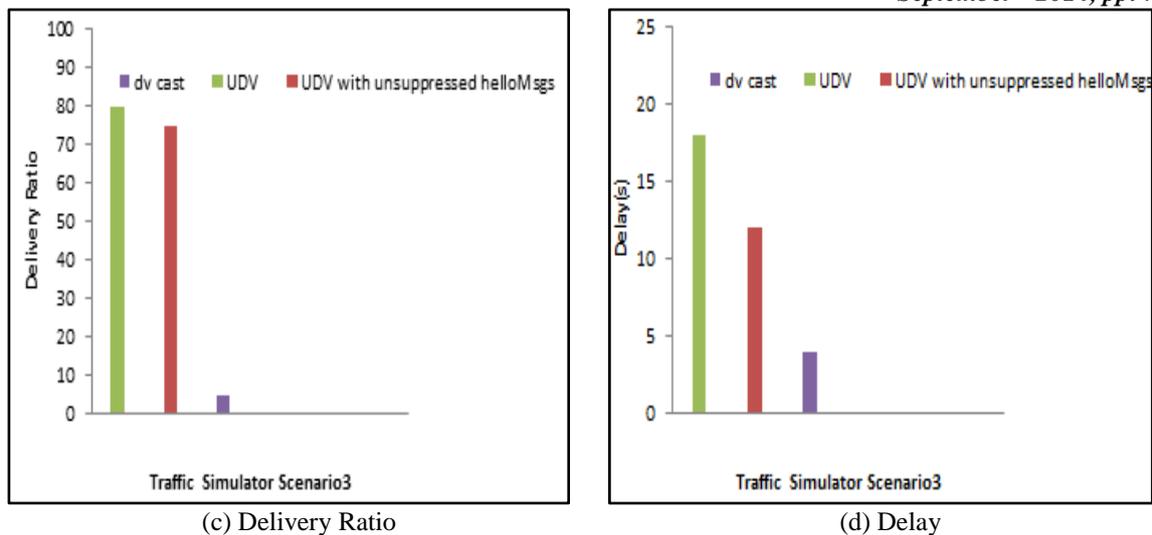


Fig 7: performance evaluation for traffic simulator scenario 3 for uncompressed hello messages

IV. CONCLUSION

In our paper, we proposed a data dissemination protocol in dense and sparse network. In dense network we employ UDV protocol and in sparse network we use store-carry-forward method. We have proposed adaptive optimized slotted 1-persistence for urban network which is an improvised form of slotted 1-persistence. UDV cast protocol is a slightly altered form of DV cast protocol. Normally DV cast protocol is used for highway traffic network, here DV cast protocol is altered to UDV cast protocol which is used to urban network. Our future enhancement is to reduce end-to-end delay in highly dense network.

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