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DADCQ Protocol and Attacks in VANET - A Literature Review

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***Abstract*—** VANET provides the information in the dynamically changing environment in the rapidly changing topological environment so as to provide the seamless flow of data between the vehicles in the in ad-hoc environment. Basically VANET is the subset of MANET. For effective routing from the source vehicle to destination vehicle in the dynamic environment the broadcast protocol must withstand this dynamically changing topology of the network. The mobility of network in urban scenarios is highly variable so the protocol must be able to adapt changes as per the topology of VANET. Also the delay in network communication can cause loss of data packets which may be very dangerous from the driver's point of view in VANET. The loss of data packets may occur due to large amount involved in the communication or another reason may the different types of attacks such as DDoS attack or eavesdropping attacks which will reduce the efficiency and security of the network to a great extent and harm the communication model. This paper focuses on the detection of the attacks such DDoS and Eavesdropping attacks and its effect to the protocol parameter such routing efficiency and mean delay. After detection of these attacks a novel solution is adopted from improving routing efficiency and mean delay of the protocol so as to make network reliable and more secure.

***Keywords*—**VANET, DADCQ, Attacks, Broadcaststrom

I. INTRODUCTION

As about the important part of the Intelligent Transport System is the Vehicular Ad-hoc Network (VANET) which are deployed on a large scale in the wireless communication systems and mobile ad hoc networks and is very important in the roadside safety of drivers and the other vehicles in the urban as well as high scenario. VAENT consists of Road Side Unit (RSU) and On Board Unit (OBU) which is with the driver. To ensure the proper safety of the vehicles on the urban and high way there should be proper transfer of messages between the various vehicles travelling on the road.

The Road Side Unit (RSU) aims to provide the safety for the diver and also provides very high speed transfer of the data and information sharing to the driver for his safety. The main purpose of the VANETs is to provide the real-time information sharing of the road and safety messages those are sent by the various vehicles present in the VANET network. So by this way we can very safely avoid the accidents on the road not also this but by providing the accurate information about the traffic we can also save the energy consumption of the vehicles present in the VANET network. Talking more about VANET networks these are also capable of providing the services like news, FM and entertainment which provides the fun to the driver along with the safety messages along with the information of the network.

However there are some challenges to the VANET network such as VANET network do not provide the sharing of the high mobility of the vehicles in the network and also these networks do not share dynamic topology of the network. And so because of this missing information there is a lot challenge to the safety of the driver. So to tackle with this problem unmanned aerial vehicles (UAVs) can be used to make the cooperation with the VANET network.

If we consider the unmanned aerial vehicles (UAVs) are less affected by the fading effect and line-of-sight (LoS).These UAVs plays a very important role and also are very cost effective where there is difficulty in deploying the network plays a very key role in the operations of the network. According to the recent studies of the network which states that the line-of-sight (LoS) can cause the of 10dB to 20dB and can also reduce the range of communication in the network. Study says if the height of the vehicle tall this loss of signal can be up to 20dB so it is very important to consider these factors for the driver's safety. Another issue with the VANET is the distribution of nodes or the vehicles present in the network this distribution pattern can vary in the large manner in high way and the urban scinearios.If we consider the highways which have only one dimensional path i.e. they do not having the crossings for the longer duration of time there distribution pattern can also vary.

And whereas if we consider the urban scenario nodes appear to be uniformly distributed in two dimensional and also have the road crossings which shows a large number of combinations. Now the main thing is that the broadcast protocols should be able to work efficiently in both the highways and the urban schemes. Another major problem with the wireless network is the loss of the packets during the transmission and reception of the signals in the network. If the different transmitted signals interfere with each other in the network then there may occur the phenomenon called as collision and this will cause the loss of the data of the network's the important aim is to design a protocol which could provide a reliable information due the varying density of the nodes and the accurate design of the protocol can also bring down the fading and collisions of the signal in the network which on the contrary will add to the consumption of the energy and the resources of the network and also provide the accurate information and the safety messages to the drives which in turn will reduce the accident in the network.

Another important issue is that the there should not be blind transmission of the information in the network by the protocol that means there should be as threshold function for the protocol whether to transmit or not to transmit or whether to retransmit the data to the destination because just blindly transmitting the data in the network will lead to the to flooding of the network which in turn will cause the congestion of the network and again it may lead to the disastrous situation for the drivers present in the network. If we blindly retransmit the data then the flooding of the network will occur and which will cause the Broadcast Strom Problem in the network. When the host receives the broadcast message for first time has the compulsion to rebroadcast the data or the message which implies that it costs the 'n' transmissions in a network of the 'n' host. As we know CSMA/CA network have the following drawbacks of the flooding:

a. Redundant Rebroadcasts of the messages

When the host node makes a decision to rebroadcast the message the all the neighbouring nodes have already that message present with them.

b. Contention in the network

If host node has broadcasted the message and received by the neighbouring nodes present nearby then if many of these nodes decide to rebroadcast the message then the strong contention in the network will occur and it will finally lead to jamming.

c. Due to the absence of the back off

Due to the absence of back of mechanism & RTS/CTS dialogue and also the absence of CD the collision will likely to occur and will damage the resources of the network and lower down the efficiency of the network thus degrading it severely. Basically the wireless protocols are being classified into two types

Statistical Broadcast Protocols and Topological Broadcast Protocols

Statistical Broadcast Protocols are the protocols in which these protocols measure the value of locally available variables in the network which may be one or two and based on these values these statistical broadcast protocols decides whether to rebroadcast or not and also which the help of the cutoff threshold value. These statistical broadcast protocols use the distance method which measures the distance of the closest neighbor from which the node or the vehicle has received the broadcast message. And if the distance is greater than the threshold value then these protocols rebroadcast the message once again. The main is to develop the threshold function which should give the full reach ability so that problem of rebroadcasting should be solved and so the performance of the protocol will increase and ultimately the efficiency of the network will also increase and there will be less congestion in the network and there will be optimum utilization of the resources of the network.

The topological broadcast protocols are the protocol which uses the topology of the network for forwarding the messages in the network so these protocols do not use the network parameters such as spatial distribution, distance of the nearest present nodes in the network, node density, rebroadcasting algorithm so are less reliable for the transmission of the data in the network. There are various simulator tools available for for the VANET simulation OMNeT++, QualNet, NS-2, SWANS, JiST/SWANS etc.Our simulation results are done on NS-2.The NS-2 network simulator NS-2 is an open source software which has the capability to support the wired and wireless networks. The NS-2 is developed in C++ but interaction of the programmer is done by writing the TCL scripts.NS-2 many inbuilt routing protocols and also the implementation of the IEEE 802.11 MAC Layer protocol for the effective development of the programs on the TCL scripts.

It is possible to design a statistical protocol, as we do in this work that shows high efficiency while achieving desired reach ability. The key to accomplishing this is in the design of the threshold value. If the threshold value is too aggressive, the protocol will give low coverage. If it is too conservative, the broadcast efficiency will be low. An optimal value of the threshold must be found that gives the best efficiency possible without sacrificing reach ability. Further, the optimal value of the threshold varies with node density, distribution pattern, and channel quality. A main objective of this work is to demonstrate how to design a threshold function that is adaptive to a wide range of these factors. This threshold function is then used in the proposed DADCQ protocol. The contributions of this work are summarized as follows:

II.RELATED WORK

Multihop broadcast in VANET mainly supports two types of broadcast applications. One type is safety applications such as Collective Collision Avoidance (CCA) where in the event of an emergency an alert message is propagated as quickly as possible into oncoming traffic. Broadcast protocols for these applications are usually designed to propagate messages in one or two directions with high reliability and minimum latency. Examples of these proposals are [5], [6], and [7].The focus of this work is the second type of VANET broadcast application such as traffic data dissemination. These applications require data to be disseminated to a large area as efficiently as possible, with less stringent reliability and delay requirements than CCA-type applications. Protocols to support these applications are more like traditional MANET broadcast protocols, except they must handle high node mobility, variable node distribution, and poor channel quality of VANET environments. Multihop broadcast protocols can generally be classified into statistical and topological protocols by the type of information used to select forwarding nodes. The fundamental statistical methods (stochastic, counter, distance, and location), are described in [1]. Several protocols have been built using these methods that are adaptive to node density. Several papers have addressed the need to make stochastic broadcast adaptive to density [8], [9]. Density adaptive versions of counter are given in [10], [11]. Density adaptive versions of both counter and location methods are given in [4]. We described a method using the link between continuum percolation and wireless broadcast to make stochastic broadcast adaptive to density in [12]. For VANET in particular, several proposals for broadcast protocols have been made. Tonguz et al., have proposed forwarding node selection algorithms based on the fundamental statistical methods mentioned above [13], [14], [15].Of these, we have found p-persistence gives the best performance so we use it as part of our evaluations here. A more comprehensive study of these methods in highway scenarios is rolled into a scheme called DV-CAST[16]. DV-CAST has been shown to have performance issues in urban environments, so the authors propose a variant called UV-CAST designed for urban environments [17]. Our work focuses on building a multihop broadcast protocol that performs well in a wide range of node distribution patterns. Bako et al. adopted a stochastic broadcast method originally proposed in [18] for VANET [19]. From that body of work we use Advanced Adaptive Gossiping (AAG) in our evaluations. AAG is a hybrid protocol that uses two hop topological data to set forwarding probabilities used as in a traditional stochastic broadcast algorithm. p-persistence and AAG are described.

III.METHODOLOGY

In the following sections, we will present the design of an adaptable multihop broadcast protocol built around a statistical broadcast method. We begin with the basic distance method heuristic, then build in adaptability to node distribution pattern and channel fading intensity to create the DADCQ protocol. The behavior of distance method protocols is largely determined by a particular protocol parameter called Dc. The following sections will develop a function to map locally measured variables to experimentally determined good values for Dc. This function is referred to throughout the paper as the threshold function. To reduce design time, we use a high-level simulator called WiBDAT [25] (discussed further below). Results than a full network simulator such as ns-2 (which in turn produces less accurate than real-world experiments), so all values of Dc presented below are approximations only. Further, the functional forms and function parameters selected to model those values of Dc (e.g., (1)) are themselves only approximations, typically chosen to balance computational and curve fitting complexity with accuracy in fitting the estimated values. The result is that the final threshold function for Distribution Adaptive Distance with Channel Quality (DADCQ) is clearly only a rough model of the “true” optimal values of Dc. In the simulation results section, we use JiST/SWANS, a full network simulator, to verify the protocol in as accurate an environment as possible and gauge the performance of the threshold function built using these approximations. It is important to note that this tool produces less accurate [23].

As earlier discussed about the distance method now in this section we will look in the details of the distance method, how DADCQ utilizes it for forwarding the data in the network and how the problem of the rebroadcasting is solved in the network. DADCQ protocol utilizes the distance method so as to the selection for the forwarding nodes present in the VANET network. As said the distance method uses the finest distance from transmitting node to receiving node prejudice between re-broadcasters node and the non re-broadcasters node in the network. The distance method urges to the notion that if the node has received the message from the neighboring another node there is benefit in terms coverage which achieved by rebroadcasting.

Algorithm is simple is as following

a. Initialize D=1 if a message is received set d to the distance to sender D= min {D, d/r} so set a random back off timer.

b. If message is received during back off timer, repeat When the back off expires rebroadcast if D >Dc.

The process to any broadcast protocol that is the statistical one is the value of the decision cutoff threshold that is the value of Dc. If the value of the Dc is set too high value then the reach ability of the network may be degraded to the larger of its extent. And if the value of Dc is set too low value then the DADCQ protocol will not be able to prevent many nodes from the process of the rebroadcasting ultimately it will lead to broadcast storm problem in the network.

So there is range of values selected for the decision cutoff threshold Dc. If this Dc is less than the minimum required critical value required for the DADCQ protocol then the reach ability is almost unity in all simulation scenarios. Near the critical value reach ability quickly jumps from one to zero which gives the indication that the reach ability is of highly variable nature for the protocol. If the node density is high then we can adjust the value of D_C to a more value to eliminate the surplus of transmissions. So D_C should be the function of local node density N that is the number of nodes present in the region that can be termed as the local node density. For this we need to find the minimum value of D_C at the many values of the global density which is termed as 'λ'.

This value of optimal value is the value for which the reach ability remains satisfactory. Then we must plot the optimal values and we need to find the suitable estimate function D_C (λ).Then substitute the local node density for the global node density 'λ' to get the value of D_C (N).Now we should test the value of D_C (N) to get the acceptable reach ability of the network. So adjust the value of D_C as required for the network reach ability. As the density of the node increases the value of the threshold becomes more powerful to prevent the unwanted rebroadcasts in the network. So the general form of the threshold function is as defined

$$D_C(N) = D_{max} - \beta e^{\alpha N} \qquad (1)$$

The values of the variables D_{max}, β & α depends upon the external factors such node distribution pattern and channel quality.

IV.ADAPTATION TO DISTRIBUTION PATTERN

For the distance method, adaptivity to node distribution pattern means that the rebroadcasting threshold, Dc, somehow varies as needed when the distribution pattern changes. We observed that a good functional form for Dc is given in (1), which depends on three parameters: D_{max}, β & α. We applied the design procedure described to find good values for these parameters in two different scenarios: once with nodes uniformly distributed in the entire field, and once with nodes uniformly distributed along a line. In each scenario, we ran WiBDAT simulations at several node densities to find the largest value of Dc that provided at least 99 percent reachability in 95 percent or more of the simulation runs. Next, we fit (1) to these measured values by hand selecting a value for Dmax then performing a least-squares fit to calculate β & α.Table 1 shows the calculated values of the function parameters found using this method. Fig. 1 compares the threshold curves for 1D and 2D distributions visually. Clearly, the threshold value must be less aggressive (lower) when the network is confined to one dimension. The parameter that differs significantly between the two scenarios is the exponential rate multiplier . Since the 2D threshold curve is more aggressive, if it is used in linearly oriented networks, reachability will not meet the required target. On the other hand, the 1D threshold curve is more conservative, so while it should provide adequate reachability in both 1D and 2D networks, the broadcast efficiency in 2D networks will be lower than it could be if a better threshold function were used. Ideally, we would like a threshold curve that provides optimal performance in both cases.

V.MODELING FADING IN THE NETWORK.

As discussed earlier fading of the signal can affect the performance of VANET networks very badly so fading of the signals should be minimized and it should be kept to a very lower value so as to achieve the maximum reach ability of the signals to each every vehicles present in the network. Fading in the VANET can be modeled ad the Rician Fading. Fading signal is nothing but the line-of-sight which is scattered among the multiple paths our need is to find the function that so that the fading can be quantified and it should adapt to the threshold value. For our network simulations we have used Rician Fading function and here in this k indicates the relative strength of the line-of-sight signal in Rician fading. When the value of K=0 then is called as the Rayleigh Fading and whereas if the value of k=∞ then the all the vehicles present in the network can communicate and there is no effect of fading in the network.

Table.1. Values for K, $D_{max,}$ α & β for 1D & 2D network

Network	K	D_{max}	A	β
1D	0	0.541	-0.060	2.44
1D	4	0.544	-0.060	2.34
1D	8	0.580	-0.060	1.80
1D	12	0.600	-0.060	1.40
2D	0	0.588	-0.060	6.00
2D	4	0.625	-0.060	5.60
2D	8	0.688	-0.060	5.00
2D	12	0.700	-0.060	4.88

VI.SPATIAL DISTRIBUTION IN VANET

Spatial Distribution is nothing but the science of analyzing how the nodes are in the network and how they form the pattern in the network. In the VANET we have both the distributions such as 1D distributions and the 2D distributions so we a function which will directly adapt to these 1D and 2D scenarios such as function quadrant function which will achieve the task in the network. The method addresses the problem by the examination for the frequency patterns of the nodes in the network. Further there are 2 types of the quadrant functions quadrant census and quadrant sampling census.

This technique of the census divides the network into the equal size cells and it counts the number of points present in the network. Which gives rise to the n_m array count m indicates how many cells have m nodes in them. If we consider the example such as n_6 = 14 which shows that 14 cells contains 6 contains in them. As various study of wireless broadcast protocol shows that the when the area is being measured and the number of sample points are small so the sampling seeks be a better than the census.

We can choose any sample size and any radius ‘r’ for the transmission. Here we have chosen sample size as 40 and the radius as r=8 for our simulation results. So selecting the values for the number of samples in the network and the cell size is difficult one and it also shows that it does not have a one size fits to the all solution. Here the sample size is chosen as 30 and a circular cell and radius r=5 where r is the radius of transmission. The process of calculating the frequency values for nm is as follows:

1. Initialize nm =0 for m= [0, N].
2. Generate random point, y within the node’s transmission area, set=0.
3. For each neighbor and the node itself, if it is within r/5 of x, y increment m.
4. Increment nm.
5. Repeat steps 2-4 for 30 times.

Once frequency array is computed then we need to create a single value to represent the result. And if the distribution is 2D is uniformly random then the values in nm will follow a Poisson distribution is that the mean is equal to the variance. The quadrant function is indicated as follows:

$$Q = \frac{V[n]}{E[n]} \quad (2)$$

The main conclusions of the study may be presented in a short Conclusion Section. In this section, the author(s) should also briefly discuss the limitations of the research and Future Scope for improvement.

VII.DESIGN OF QUADRANT-BASED THRESHOLD

In case of VANETs we have considered the both distributions 1D distributions and 2D distributions so we need a mathematical function that will directly become accustomed to these 1D and 2D scenarios of the network and such as function which is capable of doing is Quadrant function which will accomplish the task in the network. This method addresses the problem by the evaluation of the frequency patterns of nodes. Basically we have 2 types of the quadrant functions

i) Quadrant census and
ii) Quadrant sampling census.

So the technique of census which divides the entire network into cells of equal size and it then counts for the number of points which are present in the network. So by doing this it gives rise to the array nm count where ‘m’ indicates how many cells have m nodes in them. Let us consider the example as n8 = 28 which shows that 28 cells contains 8cells in them.

The study of wireless broadcast protocol has shown that when the area is being measured and the number of sample points are small so the sampling seeks be a better than the census. So we can have selection of any sample size and of any radius ‘r’ for the transmission in the network. Here we have chosen sample size as 40 and the radius as r=8 for the simulation results. So selecting the values for the number of samples in the network and the cell size is difficult one and it also shows that it does not have a one size fit to the all solution. Here the sample size is chosen as 30 and a circular cell and radius r=5 where r is the radius of transmission. The process of calculating the frequency values for nm is as follows:

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4. Increment nm.
5. Repeat steps 2-4 for 30 times.

VII. ADAPTATION TO CHANNEL QUALITY

Finally, this section incorporates adaptability to channel quality into the proposed protocol. The design described in the previous section assumes that the wireless channel and the medium access control protocol deliver messages between nodes located within transmission range of each other with perfect reliability. In practice, wireless signals in the system interfere with themselves and with each other in unpredictable ways, leading to apparently non-deterministic message reception. When two nodes transmit messages at the same time, the wireless signals may interfere and cause one or both of the messages to be lost at a destination node. Fading, the phenomenon where multiple parts of the same signal traveling along different paths interfere with each other, degrades communications even when only a single node is transmitting. Multihop wireless broadcast protocols must be able to operate effectively even when communication reliability is poor. What follows in this section is the design of a decision threshold function that is adaptive to both node distribution pattern and channel quality, culminating in the Distribution-Adaptive Distance with Channel Quality (DADCQ) protocol.

IX. P-PERSISTENCE

The first protocol we will use for comparison is ppersistence, originally proposed by Tonguz et al. [13]. Ppersistence is interesting because it utilizes three different statistical methods simultaneously. Foremost, p-persistence uses the counter method with a threshold value of one. When a node receives a message, it first sets a backoff timer and waits to see if the message is received again. If it is, the retransmission is canceled. If not, the node rebroadcasts. Calculation of the backoff period involves two other statistical methods. First, nodes decide if they are high priority re-broadcasters according to a fixed probability p. In the evaluations that follow, we follow Wisitpongphan et al. [15] and use p=0.5. Nodes that do not elect themselves as high priority rebroadcasters set a backoff time of T= NsT, where Ns and T are protocol parameters. Finally, nodes that elect them to have high priority use one-hop distance to the sender to bias the backoff timer, similar to the distance method. Specifically, the backoff time is calculated as T = Ns (1-d/r), where d is the distance to the node from whom the message was received and r is the transmission radius.

X. DOUBLE-COVERED BROADCAST

Double-Covered Broadcast [3] is based on Multipoint Relaying (MPR). MPR is a dominant pruning broadcast algorithm used as the broadcasting mechanism in thepopular Optimized Link State Routing (OLSR) protocol. In dominant pruning, forwarding nodes, beginning with the source, select which of their neighbors should bethe next forwarding nodes (this stands in contrast to selfpruning, where nodes decide for themselves whether or not to rebroadcast). This forwarding node list is attached to each data message, so when a node receives a message, it first checks if it is in the forwarding node list. If it is, it calculates which neighbors should also be forwarding nodes and retransmits the message. Otherwise, it does nothing.

XI. OVERHEADBEACONING

Next, we will describe the mechanism for communicating topological information between nodes, called beaconing.

The algorithm is very simple, but results in efficient transfer of information in the network. Nodes broadcast a short message every Tb seconds called a beacon. Unlike the multihop broadcast messages that get propagated to the entire network, beacons are broadcast from a node to its neighbors only and are never retransmitted. Nodes send beacons at a constant fixed rate, so in any interval of Tb seconds, every node in the network will send exactly one beacon. The timing of beacons is in no way synchronized between nodes, except that all nodes use the same value of Tb. Individual nodes set a timer for Tb seconds and track all the beacons received from neighbors during that time. At the end of the interval, they compile all the beacons and transmit their own beacon, which may contain information from the most recently received beacons. The information contained in beacons depends on the propagation algorithm. P-persistence requires no additional information and so does not send beacons at all. DADCQ needs to calculate N and Q, so nodes transmit their current location in the beacon. Nodes estimate N by simply counting the number of beacons received in an interval and calculate Qusing the relative locations of all the received beacons. The topological protocols used here, AAG and DCB, require two-hop neighborhood information, sothey transmit their ID and their most recent list of neighbors in the beacon. With DADCQ, beacons contain a location, which we define to be 12 bytes. We assume network layer addresses are 4 bytes long, so in AHBP and DCB, beacons contain 4 bytes for the node's address and 4N bytes for the addresses of all the node's neighbors. Additional bandwidth is used by MAC and network layer packet framing. If the network is static, the beacon interval Tb can be very long and nodes will still have reasonably accurate topological data. However, if nodes are mobile, the beacon interval needs to be reduced so that beacons received near the beginning of an interval are not stale by the end of the interval. VANETs of course are not static, so Tb needs to be short enough that vehicles maintain accurate information.

We have found that a good value of Tb for DADCQ is 30 seconds while for AAG and DCB is 1 second. The difference stems from the varying temporal nature of the external data needed by the protocols. AAG and DCB use topological information, so they need up-to-date data on the identities of nodes in their two-hop neighborhood. DADCQ requires measurements of the node distribution pattern in the form of N and Q. We find node distribution pattern changes more slowly than network topology, so overhead messaging in statistical protocols such as DADCQ can be lower than in topological ones like AAG and DCB.

Finally, it is currently unknown whether the overhead messaging used by multihop broadcast protocols in VANET will be unique to the broadcast protocol or whether it will be shared across many components in the platform. If this information is available from other subsystems, then beacons should not be considered additional overhead of the broadcast protocol. If the information is not available, either because other systems do not use the same amount of information (e.g., two-hop topological data) or other systems use different transmit power, then beacons should be understood as overhead. Evaluations that follow present results to accommodate both perspectives.

XII. ATTACKS IN VANET

VANET is facing many attacks and these attacks are discussed in the following subsections:

1) DENIAL OF SERVICE ATTACKS:
DOS attacks can be done by the [9] network insiders and outsiders and give the network not available to real users by flooding the control channel with high sound of naturally generated messages and stops the network connection. As a result OBU and RSU are unable to process the capacity sufficiently.

2) BROADCAST TAMPERING:
An inside assault may inject [9] false safety messages into the network to cause damage such as causing an accident by suppressing traffic rules or manipulating the flow of traffic around a chosen route.

3) SYBIL ATTACK:
This attack, [6] forges the identity of multiplevehicles. Those identities can be used to cast any type of attack on the system. These false identities also create an illusion that there are additional vehicles on the road and spoof the positions of other nodes in the network.

4) MESSAGE SUPPRESSION ATTACK:
An attacker selectively drops packets from the network, and these packets may hold critical [8] information for the receiver. The attacker suppresses these packets and may use them again when required [8]. The goal of this attack is to prevent registration and insurance authorities from learning about collisions about the vehicle and/or to avoid delivering collision reports to RSU.

5) ALTERATION ATTACK:
This attack happens when an attacker alters an [8]existing data. An alteration attack includes delaying the transmission of the information, replaying earlier transmission, and also altering the actual entry of the data transmitted.

CONCLUSION

We have proposed the DADCQ protocol for multihop broadcasting in VANET. VANETs exhibit wide variability in node density, distribution pattern, and channel quality. In response, we have shown how to design a broadcast protocol utilizing the distance heuristic that is adaptive to these factors. In the past, the distance method has been made adaptive to a range of node densities, but not to be efficient across a range of these three factors simultaneously. DADCQ adopts the quadrat method of spatial analysis to characterize the distribution pattern at each node. The resulting metric, the Q statistic, is combined with local node density Na nd the Rician fading parameter K to create adecision surface used by the distance method. The algorithm can be applied before the verification time delay overhead is minimized and will enhance the security of VANET. In future we are going to apply this algorithm for multiple invalid request send from multiple vehicles at the same time and detect the attacks in the early manner.

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