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Avoiding Discontinuity In Vanet Using Store Carry Forward Approach

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Abstract: Vehicular ad hoc networks has focused mainly on efficient routing protocol design under conditions where there are relatively large numbers of closely spaced vehicles. A Vehicular Ad Hoc Network (VANET) may exhibit a bipolar behaviour, i.e., the network can either be fully connected or sparsely connected depending on the time of day. In sparse vehicular network there are lot of chances to drop the data packets. So there is necessary to avoid the discontinuity in sending the packets during the sparse vehicular network and depending on the scarcity of vehicles or the market penetration rate of cars using Dedicated Short Range Communication (DSRC) technology. For vehicular safety applications, an ad-hoc routing protocol will be needed like Ad Hoc On-Demand Distance Vector Routing (AODV). It is a challenge to use efficient routing protocols for vehicular ad hoc networks (VANETs) because of their highly dynamic properties an application of opportunistic routing, using a carry-and-forward scheme to solve the forwarding disconnection problem in sparse VANETs.

Keywords: Database Routing, vehicular ad hoc Networks, broadcasting, vehicle traffic modelling.

I. INTRODUCTION

The increasing demand of wireless communication and the needs of new wireless devices have tend to research on self organizing, self healing networks without the interference of centralized or pre-established infrastructure/authority. The networks with the absence of any centralized or pre-established infrastructure are called Ad hoc networks. Ad hoc Networks are collection of self-governing mobile nodes. Vehicular Ad hoc Networks (VANET) is the subclass of Mobile Ad Hoc Networks (MANETs). The basic concept of VANET is straightforward - take the widely adopted and inexpensive wireless local area network (WLAN) technology that connects notebook computers to each other and the Internet, and, with a few tweaks, install it on vehicles. This calls for the technologists to come up with various safety applications which can work with VANETs and help reduce various hazards on the roads.

In Section I a brief introduction is given with problem definition. Related work with various secure routing protocols in MANET's technique is illustrated in Section II. Proposed work with detailing is explained in Section III. Performance evaluation and simulation results are described in Section IV. Section V is all about the conclusion of overall paper.

A. Motivation:

Motivation The increasing mobility of people has caused a high cost for societies as consequence of the increasing number of traffic congestion, fatalities and injuries. Vehicular Ad-Hoc Networks (VANETs) envisage supporting services on Intelligent Transportation Systems (ITSs), [2]. As collective monitoring of traffic, collision avoidance, vehicle navigation, control of traffic lights, and traffic congestion management by signalling to drivers. VANETs comprise vehicles and roadside equipment owning wireless interfaces able to communicate among them by wireless and multi-hop communication. In emergency situations, a driver typically relies on the tail brake light of the car immediately ahead to decide his or her own braking action As a result, a single emergency event can often lead to a string of secondary crashes, creating a multicar chain accident. Chain collisions can be potentially avoided, or their severity lessened, by reducing the delay between the time of an emergency event and the time at which the vehicles behind are informed about it. so it vehicle cannot communicate in sparse traffic using store carry forward approach it can be simplified.

B. Problem Definition:

An In VANET the avoiding discontinuity in packet sending VANET and privacy critical factor conduct simulation according to model. In this model when we driving on sparse road there is no chance to continuity in packet sending like "Sparse Traffic", then proposed the store carry forward approach this like phases of our project. Vehicular Ad Hoc Networks (VANETs) are referred to as the networks created by applying the principles of Mobile Ad Hoc Networks (MANETs) - the spontaneous creation of a wireless network for data exchange - to the domain of vehicles. These systems are intended for a broad range of applications, including primary services such as emergency notification in cases of accidents, but also more advanced applications as cooperative driving assistance, cartocar audio/video communications, nomadic Internet access, and so on. In VANETs, a routing protocol governs the way that two communication entities exchange information; it includes the procedure in establishing a route, decision in forwarding, and action in maintaining the route or recovering from routing failure. The main disadvantage of routing protocol is that they require an explicit route establishment phase before the data transmission begins. First of all we send the node from source to destination from the sending node message they generate the secret key and forward message with distributed key when these node cannot able to find another node on sparse road then until node wait for another node i.e. buffer so it is in the store carry forward approach .The project deals with an Intelligent Broadcast Protocol with Implicit Acknowledgement which broadcasts the messages based on the direction of vehicles. In emergency situations, a driver typically relies on the tail brake light of the car immediately ahead to decide his or her own braking action. Under typical road situations, this is not always the best collision avoidance strategy. The protocol exhibits context-aware packet forwarding and can be used for intra-platoon scenarios, where all vehicles within a platoon are assumed to be equipped with DSRC devices. According to the protocol, upon detecting an dense traffic event, a message cannot broadcast by the un detecting vehicle. The detecting vehicle as well as the other intermediary vehicles takes decision whether or not to forward the broadcast packets. This decision is taken by considering whether the message has reached to the back of the platoon. This protocol improves the system performance by reducing and increasing the number of messages and resolving in the dense traffic, decreasing and increasing message redundancy and delivery latency.

C. Related Work

In our study, the proposed vehicular mobility model is directly derived from empirical data collected in a real-world environment. While there are several existing traffic models, most of them are only suitable for simulation studies and are not mathematically tractable. For example, the Random Waypoint (RWP) model was proposed as a generic mobility model for network simulations [5], where mobile nodes randomly select destinations with a randomly chosen velocity. However, such a simplified mobility model cannot capture many rich characteristics of the real vehicular traffic. Consequently, Reference Point Group Mobility (RPGM) was introduced to emulate grouping behaviour of battlefield scenarios [4]; However, in most cases, the over-simplified assumptions necessary to make the analysis tractable often result in models that fail to adequately represent the extreme complexity of the real-world mobility patterns.

In [3], the authors introduce a very detailed analytical two-lane traffic model which can be efficiently used for simulation purposes, but the model seems too complicated and is not suitable for our study. Moreover, unlike most studies which concentrate on evaluating the impact of mobility models on MANET routing protocols in well-connected scenarios [3], [2], we emphasize the fact that VANETs are prone to network fragmentation due to the uneven nature of vehicle traffic and market penetration.

Apart from mobility modelling, the emerging field of Delay Tolerant Networks (DTN)is also synergistic with the problem formulation of disconnected VANETs. The DTN framework [1] is proposed to analyze and interconnect challenged networks where end-to-end routes between mobile nodes may not exist, such as in wildlife tracking sensor networks, interplanetary networks, and military ad hoc networks. In such challenged networks, traditional MANET routing protocols such as DSR [3] or AODV [1] would not work well. Instead, an asynchronous message forwarding paradigm based on store-carry-forward concept is used to achieve interoperability among different challenged networks [2], A number of routing protocols specifically designed to cope with routing in sparsely connected Mobile Ad hoc Networks that fall into the generic framework of Delay Tolerant Networks are as follows: Data Mules [1] are mobile messengers which promote the network connectivity in a sensor network by providing access between the virtual backbone and sensor nodes; Role based multicast approach is proposed to achieve maximum reach ability in a sparsely connected or fragmented network by using the store-carry-forward mechanism [4] However, most of these studies focused on 2-dimensional topology with random way point model where node mobility has less real-world restrictions. Unlike previous studies, we focus on network fragmentation scenarios in VANETs with realistic vehicular mobility models. Also, our main objective in this paper is to establish a comprehensive analytical framework for understanding the fundamental characteristics of disconnected VANETs in addition to studying the feasibility of the store carry-forward approach. We believe that a deeper understanding will facilitate the design of efficient and robust message delivery protocols in intermittently connected VANETs. Although there are a few studies that address similar routing issues in sparsely connected VANETs,

II. PROPOSED WORK

In real time VANET concept there is a various problems are occurred during the driving and travelling the various cars(nodes) like data loss, more delivery time etc. so on this condition there is a solution that this system is implemented by using the Store Carry Forward Approach. In day timing there is number of nodes are available on the road but if we consider the night timing there is a lack of nodes for transferred the data from one node to destination node. So there is a problem while sending the data packet and data loss also occurred. When we want to send the data from source to destination node then the using protocol set the route and set the nearest right path for sending the data. AODV protocol is the most useful protocol in VANET scenario. AODV protocol has capability to do a re-routing between the nodes and set the appropriate path for sending the data. If in some case there is no node for transfer the data packet then the sender node has capability to store the data packet to itself in encrypted form. When the other node is found then stored packet is again transferred to next node in decrypted form by using

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the private and public keys. In this way the data can be stored in secured form by using the Store Carry Forward Approach in this system.

A. Time following Model:

This section, building upon a well-known traffic model[1] in civil engineering, we propose a parameterized traffic model to capture the real vehicular mobility behaviour. In the next section, we apply this model to characterize the vehicular traffic behaviour. Car following model is used in civil engineering to describe traffic behaviour on a single-lane under both free-flow and congested traffic conditions. This model assumes that each driver in the following vehicle maintains a safe distance from the leading vehicle and the deceleration factor is also taken into account for the braking performance and drivers' behaviour.

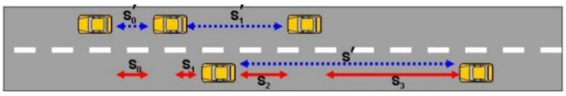

Fig : Car following Model and Comparison of Lane-level and Road-level spacing.

B. Analysis Of Disconnected Networks With Two Directional Traffic

With a conventional routing protocol, it is nearly impossible for vehicles from different clusters to communicate with one another as there is virtually no network connectivity[1]. However, due to the deterministic topology of a VANET (road structure), passing by vehicles travelling in the opposite direction can sometimes help to restore the network connectivity at the expense of additional message delays. To give an example

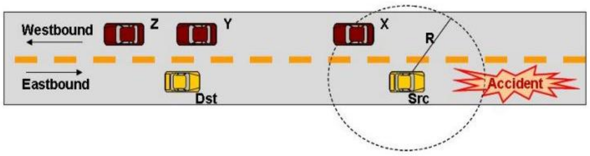

Fig: Basic disconnected network scenario

consider the scenario shown in Figure 8 where the source vehicle Src observes an accident and broadcasts a warning message to vehicles travelling in the same direction. Unfortunately, the target vehicle D stis not within Src's transmission range, R ,so Src is disconnected from D stand we have a disconnected network problem. For such a scenario, the message can still be relayed toDstby using the vehicles travelling in the opposite direction as relay nodes, if Src is connected to either X, Y, orZ. However, it is also possible that there are no vehicles in Src's range in both directions, in which case the message needs to be stored and forwarded to the appropriate relay node at a later time.

In this paper, we refer to the "store-carry-forward" mechanism as temporal relay (or, indirect packet relay) and a normal multi-hop transmission as spatial relay(or, direct wireless transmission). Note that, once the Dst finally gets the broadcast message, it will behave like a new source and rebroadcast the message to other vehicles approaching the accident scene. Based on the scenario described above, there are several fundamental network characteristics and performance metrics of interest; e.g., end-to-end packet delay, number of spatial and temporal relay, etc. In the following, we provide a first-order analysis of a disconnected network.

C. Routing Performance in Disconnected Networks

In this section, we study disconnected VANETs from a networking standpoint and consider their routing performance in terms of the total end-to-end delay, the spatial and temporal hop counts, and the per-gap re-healing time. To the applications, the total end-to-end delay, which is the time taken to deliver the message to the destination, is an important metric which can be used to determine whether the proposed routing mechanism can deliver acceptable performance or not.

For example, the per-gap re-healing time, which is the duration of time the packet needs to be stored at the relay node, is another important metric that allows us to get a better understanding of how a routing protocol should be designed so that it provides enough buffer space for holding the routing messages. In addition, the spatial and temporal hop counts are factors which contribute to the overall end-to-end delay.

In addition to the simulation model described in Section VII-A, we assume that the distance between source and destination varies from 1 km to 30 km. According to the analytical framework presented in Section VI, one can immediately observe that routing delay depends on transmission range, vehicles' speed, and, most importantly, network density and market penetration rate.

D. Hash Function

Using a simple hashing algorithm to get hashed value from string of plain text. The hash value will be attached to packet header for data integrity checking. At the other end of communication, after decryption, the decrypted text will be hashed again to get new hashed value.

This new hashed value will be compared to the value attached within packet header. If they are equal, the data integrity is ensured and decrypted text is accepted; otherwise the packet is discarded.

In either case, an acknowledge packet will be sent back to sender to inform of the status of the packet.

III. PERFORMANCE EVOLUTION

The proposed approach is implements with NS2 simulator. AODV protocol is used for routing purpose with the support of cryptographic operations.

The Ad-hoc network of number of nodes is created with the boundary area of 1500*1500 meter. We compare the performances of DSDV and AODV in various mobility and adversary scenarios with simulation parameters as shown in Fig.

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set val(chan)	Channel/WirelessChannel	channel type
set val(prop)	Propagation/TwoRayGround	radio-propagation model
set val(netif)	Phy/WirelessPhy	network interface type
set val(mac)	Mac/80211	MAC type
set val(ifq)	Queue/DropTail/PriQueue	interface queue type
set val(ll)	LL	link layer type
set val(ant)	Antenna/OmniAntenna	antenna model
set val(ifqlen)	50	max packet in ifq
set val(chan)	Channel/WirelessChannel	channel type
set val(nn)	29	number of mobilenodes
set val(nn1)	nos	number of mobilenodes
set val(rp)	AODV	routing protocol
set val(x)	2000	X dimension of topography
set val(y)	2000	Y dimension of topography
set val(stop)	12.0	time of simulation end

Fig. 1. Simulation Parameters

We present two groups of simulation results. The first one is to compare the routing performances of AODV, and DSDV under different mobility scenarios before the attacks and without store carry forward schemes as shown in Fig.

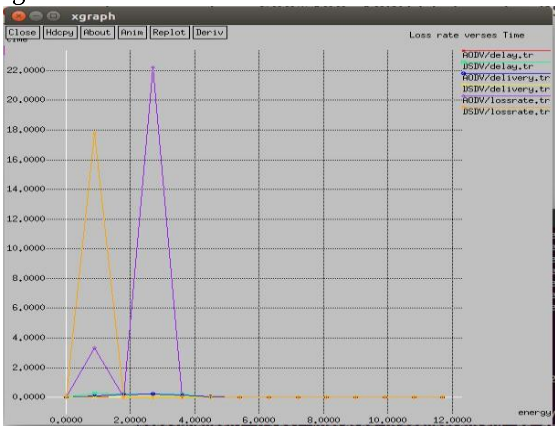

Fig : Performance evolution without store carry forward approach

The first one shows that delay time into without store carry forward schemes it shows high delay in DSDV and low in AODV.

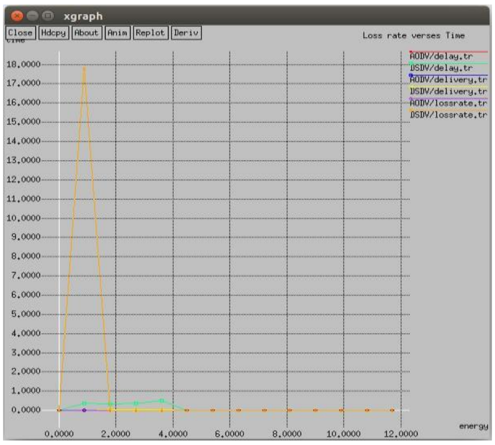

Fig : Performance evolution with store carry forward approach

and also The second one is to compare their behaviours under the packet delivery with different levels and loss rate also packet delivery rate as shown in Fig. We perform four simulation runs for each configuration, and record the performances, including throughput and end-to-end delay.

CONCLUSION

The state-of-the-art survey of the various broadcasting techniques undertaken for building the safety applications for the VANETs clearly suggest that the conventional broadcast techniques used produce a significant amount of unnecessary network traffic and ultimately have very low efficiency. The protocol implemented in the project clearly has an upper hand over the naive broadcasting and flooding technique when it comes to faster propagation of warning messages and generation of network traffic causing a controlled amount of message redundancy and delivery latency. Disconnected network problem appears to be an important issue to resolve in emerging VANET applications. Moreover, our simulation results verify that the store-carry-forward mechanism provides a potential solution to routing in disconnected networks.

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