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VANETs Using Hybrid Protocol To Increase Performance

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Abstract: Vehicular ad hoc systems are wireless links used to support vehicular safety, traffic monitoring, and efficiently uses all the location information other commercial applications. Within vehicular ad hoc network, the mobility of vehicles will cause the communication links to frequently be broken. Such link failures require a direct response from the routing protocols, leading to a potentially excessive increase in the routing overhead and degradation in network scalability. So we propose a hybrid location-based routing protocol that is particularly designed to overcome this issue. This new protocol combines features of both reactive routing with location-based geographic routing in a manner that available. The protocol is designed to switch to reactive routing as the location information degrades. By performing analysis and simulation we can prove that our protocol has better scalability and has an optimal overhead, even in the presence of high location errors, this makes our protocol an enhanced yet pragmatic location-enabled solution which could be deployed in all possible environments of Vehicular ad hoc network.

Key Words: Geographic Information Systems, Intelligent Vehicle, Wireless Network, Aodv, Rsu, 3G.

I. INTRODUCTION

Importance in Vehicular ad-hoc networks (VANETs) consumes developing last six years, mainly in the context of emerging intelligent transportation systems (ITS). Still, resourceful routing in VANETs leftovers inspiring for many reasons, e.g., the varying vehicle density over time, the size of VANETs (hundreds or thousands of vehicles),and due to wireless channel fading high motion and natural obstacles in city environments (e.g., constructions, trees, and other vehicles. The routing protocols in VANETs can be classified into the following two major categories 1) topology based routing and 2) geographic (position-based) routing. Several investigators have investigated the show of several topology-based routing protocols inside the vehicular atmosphere, and the results have shown that the ad-hoc on-demand distance vector protocol has the best presentation and lowermost routing overhead between all topology founded routing protocols. The common typical between whole topology founded routing protocols is that the presentation degrades as the link possibility growths, representing the scalability difficult.

The main aim for this belief is that, because geographic routing protocols ensure not exchange any link-state information and ensure not found and maintain any routing tables, they should Work below a much reduced routing. overhead. As such, geographic routing grips great potential for exceedingly active atmospheres such as VANETs. In the background of VANETs, the forwarding decision by a vehicle using geographic routing is mainly founded on the location of the endpoint vehicle and the location of all vehicles' one-hop neighbors. The location of the endpoint is stored in the header of the packet that was transferred by the source vehicle. The location of all vehicles' one-hop neighbors is gotten by listening to the beacon packets that are periodically sent among vehicles. Geographical routing also accepts that the distribution vehicle tells the delivery vehicle's location. This condition needs capable position facility organization system that can keep track of the locations of the vehicles inside the network. It should be stated, however, that geographical routing has some problems, in the place errors can severely reduce presentation in position based forwarding schemes, making accurate location information a necessity for most geographic routing protocols. In addition, geographic routing fails in the presence of void regions, where a closer neighbor vehicle toward the destination cannot be found. This case requires a backup procedure (e.g., perimeter or face routing) to overcome the void region. Inappropriately, with present holdup procedures, packets frequently incline to travel on longer paths to their destinations or Get fixed in a loop and be dropped.

In VANETs, not at all solitary routing protocol will best in all scenarios, and as such, a combination method is possible to be high productive. Then, here, we will accept a combination scheme method, wherever we combine features of sensitive Routing with geographical routing. Unique significant development problem of our protocol is to resourcefully create usage of all the position data presented, to decrease the routing overhead, besides to elegantly exit to sensitive routing for instance the position data reduces. Unique original significance of our protocol scheme is that our novel protocol possesses active routing approaches that are a spatial purpose of the position data worth. The leading opinion of the procedure is not to contest otherwise exchange present category protocols then, slightly, to improve then praise existing protocols as position data is completed obtainable to the nodes. It is strong that combination systems of routing events along the appearances accessible here will convert commonly organized as ITS developments it to the instance of huge position errors presented through wireless link locating in the accurate development, wherever custom wrong proponents are unidentified. this paper is to analyses and stimulated our new protocol is to increase the performance to reduce the routing overhead. and to avoid link failure problems.

II. EXISTING SYSTEM

Topology based these routing protocols use links information that exists in the network to perform packet forwarding. They are further divided into Proactive, Reactive. The proactive routing means that the routing information, like next forwarding hop is maintained in the background irrespective of communication requests. The advantage of proactive routing protocol is that there is no route discovery since the destination route is stored in the background, but the disadvantage of this protocol is that it provides low latency for real time application. The various types of proactive routing.

Position based routing consists of class of routing algorithm. They share the property of using geographic positioning information in order to select the next forwarding hops. Position based routing is broadly divided in two types: Position based greedy V2V protocols, Delay Tolerant Protocols. Disadvantage is increase in the routing overhead in vanets, degradation in network scalability and link failure problem.

III. PROPOSED SYSTEM

Our innovative hybrid location-based protocol, HLAR, combines of a adapted AODV protocol by a greedy-forwarding geographical routing protocol. we use AODV augmented with the expected transmission count (ETX) metric to discovery the greatest quality route (in its place of the least hop count). We mention to this adapted method of AODV as AODV-ETX. Typically, in AODV-ETX, in-between vehicles report the directions to their source vehicles. But, we add to AODV-ETX the added functionality wherever in-between vehicles are permitted to in the neighborhood repair damaged directions (a indigenous repair will, in common, too price less power consumption comparative to regenerating a innovative source-to-destination route).so can communicate easily the neighbor and our proposed protocol is to efficiently make use of all the location information available, Signal strength of vehicles are all taken into consideration when clustering vehicles and selecting vehicle gateways. The associated signalling overhead; an event more likely to occur when all vehicles connect directly to the UMTS network. It watches the all the vehicle movements, it provide direct communication with the base station for multiple vehicles.

IV. SYSTEM ARCHITECTURE

In AODV, the network is silent until a connection is needed. at that point the network node that needs a connection broadcasts a request for connection. Other AODV nodes forward this message, and record the node that they heard it from, creating an explosion of temporary routes back to the needy node. when a node receives such a message and already has a route to the desired node, it sends a message backwards through a temporary route to the requesting node. the needy node then begins using the route that has the least number of hops through other nodes. unused entries in the routing tables are recycled after a time. when a link fails, a routing error is passed back to a transmitting node, and the process repeats. much of the complexity of the protocol is to lower the number of messages conserve the capacity of the network.

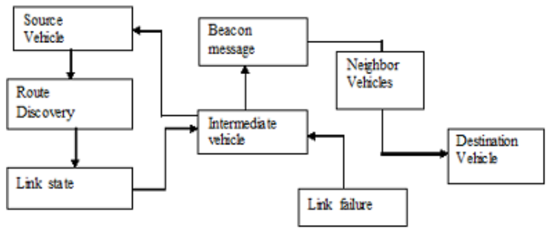

Figure 1: System Architecture

for example, each request for a route has a sequence number. Nodes use this sequence number so that they do not repeat route requests that they have already passed on. another such feature is that the route requests have a "time to live" number that limits how many times they can be retransmitted. In HLAR, in AODV augmented with the expected transmission count (ETX) metric to find the best quality route (instead of the least hop total). we refer to this modified form of AODV as AODV-ETX. Usually, in AODV-ETX, intermediate vehicles report the broken routes to their source vehicles. However, in this paper, we add to AODV-ETX the additional functionality where intermediate vehicles are allowed to locally repair broken routes (a local repair will, in general, also cost less power consumption relative to reestablishing a new source-to-destination route). Note that, to allow vehicles to calculate the quality (ETX) of their shared links, vehicles need to locally broadcast (received only by neighbor vehicles) small beacon packets periodically. These periodic beacon packets include the vehicle's ID and the current location coordinates. These beacon packets also allow vehicles to build their neighbor tables,1 which includes both the neighbor vehicle ID and its current location coordinates. We summarize how our HLAR protocol operates. HLAR initiates the route discovery in an on-demand fashion. If the source vehicle has no route to the destination vehicle, the source includes the location coordinates of both itself and the destination vehicle in a route request (RREQ) packet and then looks up its own neighbor table to find if it has any closer neighbor vehicle toward the destination vehicle. If a closer neighbor vehicle is available, the RREQ packet is forwarded to that vehicle. If no closer neighbor vehicle is available (i.e., void region or neighbor vehicles have no location information), the RREQ packet is flooded to all neighbor vehicles. In either case, the procedure is repeated until the RREQ packet reaches the destination vehicle.2 In HLAR, the RREQ packets include a time-to-live (TTL) field, which will be set by the source vehicle according to the estimated hop count between the source vehicle and the destination vehicle. The TTL field is decremented each time a current vehicle cannot (or does not) use location information in the forwarding decision, and the RREQ packet will be dropped once its TTL field becomes zero. This allows the protocol to avoid unnecessary flooding of the whole network. A destination

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vehicle replies to a received RREQ packet with a route reply (RREP) packet in only the following three cases: 1) if the RREQ packet is the first to be received from this source vehicle; 2) if the RREQ packet contains a higher source sequence number than the RREQ packet previously responded to by the destination vehicle;3 and 3) if the RREQ packet contains the same source sequence number as the RREQ packet previously responded to by the destination vehicle, but the new packet indicates that a better quality route is available.

A. Road Side Unit
The signal within the range its communication link is failure so, we avoid that failure using rsu it's a dedicated short range communication, avoid link failure problem and prevent accident.

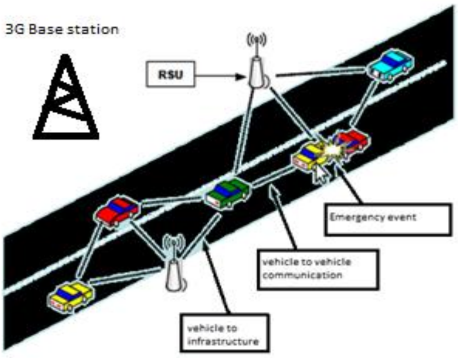

Figure 2: Road Side Unit

Using rsu avoid collision and vehicle to vehicle communication and vehicle to infrastructure.

B. Vehicle to vehicle communication
Vehicle to Vehicle communication method is greatest suitable for short range vehicular networks. It is Fast and Reliable and provides real time safety It does not need any roadside Infrastructure.V2V does not have the problem of Vehicle Shadowing in which a smaller vehicle is shadowed by a larger vehicle preventing it to communicate with the Roadside infrastructure.

Challenges:
(i)In V2V the connectivity between the vehicles may not be there all the time since the vehicles are moving at different velocities due to which there might be quick network topology changes.

(ii)The anonymity problem: The addresses of vehicles on highways are unknown to each other.

(iii)Periodic broadcasts from each vehicle may inform direct neighbors about its address, but the address-position map will inevitably change frequently due to relative movements among vehicles.

(iv)It is the receiver's responsibility to decide the relevance of emergency messages and decide on appropriate actions.

(v)Location based broadcast and multicast are the proper communication methods for collision avoidance in V2V Communication.

(vi)Without any roadside infrastructure, multi hop forwarding must be enabled to propagate the messages or signals

(vii)Hence, V2V communication is not very useful in case of Sparsely connected or low density vehicular networks.

(viii)Stringent delay requirement: A rear-end collision occurs when the Available Maneuvering Time (AMT) is less than the Needed Maneuvering Time (NMT).NMT is dominated by the driver's perception response time, which is determined by many factors, and therefore difficult to change. To prevent a rear-end collision, a vehicle must receive the Message or Signal sufficiently prior to the lead vehicle's initiation of deceleration to provide more AMT.

C. Vehicle to Infrastructure
(i) Vehicle to Infrastructure provides solution to longer-range vehicular networks.
(ii) It makes use of preexisting network infrastructure such as wireless access points (Road-Side Units, RSUs).
(iii) Communications between vehicles and RSUs are supported by Vehicle-to-Infrastructure (V2I) protocol and Vehicle-to-Roadside (V2R) protocol.
(iv) The Roadside infrastructure involves additional installation costs.

D. Third Generation
In modest potential terms, 3G is totally around speed. It permits you to send and receive big quantities of data using a cell phone. In fact, several refer to 3G as "WIRELESS BROADBAND" as it allows very fast browsing speeds. While approximations differ, most predictors agree that 3G will deliver speeds in range of 144KBps to 2.4MBps a staggering increase from the current speeds.

V. SIMULATION RESULTS

We have simulated two common scenarios of VANETs. In the first scenario (highway scenario), we have simulated a multilane highway in which Np vehicles (moving in either direction) are randomly and uniformly distributed along an eight-lane highway of length Lv. In the second scenario (grid scenario), we have simulated an urban environment where vehicles move along a grid of streets. In both scenarios, all vehicles are assumed to have the same transmission range R = 150−250 m, and their speeds are randomly distributed following a Gaussian, Rayleigh, or uniform distribution, with an average speed of 70 km/h.

Table 1
Simulation Parameters

Parameter	Value
Number of vehicles	40-250 vehicles
Transmission range	150-300 m
Data rate	8 kbps
Beacon sampling period	1 sec
Mac layer	802.11b
Bandwidth	2 Mbps
Average velocity	40-100 km/h
Speed distribution	Gaussian, Rayleigh uniform.

In most of the motion models that we adopt, we allow for the most general situation, because we allow vehicles to

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change lanes and to reverse direction. This approach allows us to claim that our key results are generic and not dependent on any specific adopted motion model. For clarity, we summarize all the simulation parameters in Table I. In each simulation run, a group of source and destination pairs are randomly chosen. Each pair uses an 8-kb/s constant bit rate (1-kb packet size) traffic flow to exchange data traffic in each direction. Each simulation run starts with an initialization phase, in which vehicles have zero speed (no mobility) and only exchange beacon packets (no data) to build their neighbor tables and also to initially estimate their link quality (ETX).7 After the initialization step, all vehicles commence movement around the network, and chosen source vehicles sequentially initiate the data flows to their intended destination vehicles.

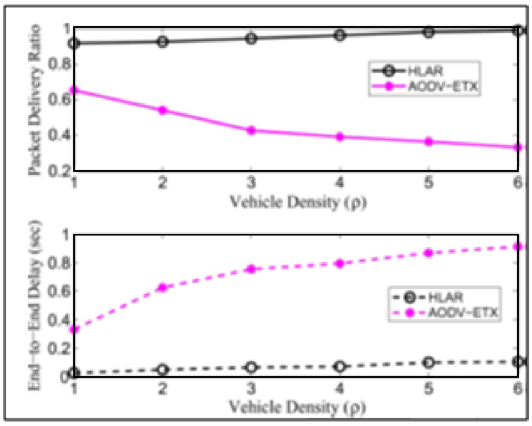

Figure 3 Packet delivery ratio and the end-to-end delay of the HLAR protocol compared to the AODV-ETX protocol as a function of the vehicle density (ρ) in [nodes per 2000 m2].

Within AODV-ETX, to allow vehicles to estimate the link Quality between them and to identify their neighbor vehicles, All vehicles in the network periodically send beacon packets.

In our simulations, these beacon packets are continuously sent at a rate of 1 beacon packet per second, with a TTL of 1. The link quality is estimated from the amount of beacon packets that were received by each vehicle over the last 10s period. These beacon packets are also used by the HLAR protocol to build and update the neighbor tables. In the simulations, we generate the vehicle position by adding to the true location an error that was drawn from a zero-mean Gaussian distribution with σr standard deviation. All simulations that were carried out in this paper are done in OPNET. All simulation results shown are based on the averaged values of 50 trials for each setting, and the duration of each run was 600s.

VI. CONCLUSION

In this paper ,we presented a new hybrid location based ad-hoc routing protocol, HLAR combines the feature of proactive and reactive routing those two protocols are used to improve the performance and using ,road side unit(RSU) it is a dedicated short range communication, within the range if data was damage, the RSU communicate the will help to avoid that breaking links and efficiently to make all information available and easily communicate node then increase the speed using 3G network and avoid collision, Reliability, Minimum collisions Minimum latency and High dissemination speed.

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