



AN INTELLIGENT PACKET ROUTING SCHEMES IN HETEROGENEOUS 3G-VEHICULAR AD HOC NETWORKS

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ABSTRACT:

In today's wireless networking domain, various wireless technologies are unit utilised for sharing information and providing information services. 3G and VANETs have recently attracted huge attention. Information delivery is especially difficult attributable to the distinctive characteristics of VANETs, like quick topology modification, frequent disruptions, and rare contact opportunities. In this paper, An integration of VANET and 3G networks mistreatment mobile gateways is introduced. A packet will either be delivered via multi-hop transmissions within the VANET or via 3G. We will maximize the delivery quantitative relation of packets and meantime to attenuate the delivery delay by our planned system.

Keywords: VANET; Data Forwarding; 3G.

1. INTRODUCTION:

The transport unexpected Network (VANET) has received significant attention in recent years, and also the connected standards and applications [1][2] are unit promoted in several countries. A VANET could be a specialised Mobile unexpected network (MANET) that connects vehicles and wayside facilities. The VANET provides each Roadside-to-Vehicle

Communication (RVC) and Inter-Vehicle Communication (IVC). Information packet routing plays a very important role to change any application in IVC. As a result of the similarity between VANETs and MANETs, several analysis efforts study the practicability of existing routing protocols in transport environments. The study shows that standard topology-based routing protocols in MANETs [3][4][5] have poor

performance in VANETs as a result of high node quality and large-scaled environments.

In this paper we tend to contemplate knowledge gathering in VANETs. every vehicle could generate sensory knowledge packets which are destined to a central server for knowledge analysis and creating choices. we tend to contemplate a VANET with Associate in Nursing infrastructure with wayside access points (APs) that are connected to the net. Because the central server is additionally connected to the net, it's ample for every vehicle to deliver its packets to 1 of the APs. it's fascinating for the data gathering application that the central server will collect knowledge packets from the vehicles with high success rate and low latency.

2 Related Work

The performance of a geographical forwarding strategy is influenced by the choices of next forward nodes. In PDGR [8], consequent forward node ought to be near and moving toward the destination. In GPCR [9], a node that's situated within the space of a junction is a lot of preferred to be consequent forward node. In MOPR [10], an extra demand for increasing affiliation stability needs to be glad, that consequent forward node ought to be inside the transmission vary of the present forward node when a brief fundamental quantity. Another forwarding strategy known as flight forwarding wherever the whole forward path is such that by a flight. A flight (or known as anchor path) is solely recorded by a

sequence of geographical positions (or known as anchor points). ways like galvanic skin response [11] and VVR [12] choose the shortest street path because the forward flight. In GyTAR [13], information forwarding is on a street path with the very best traffic density. VADD [14] selects a street path with the shortest forward delay. In GVGrid [15], the whole geographic region is logically divided into regular grids, and a forward flight is recorded by grid symbol numbers. automotive [16] often forwards packets to road-side units for reducing packet loss over mobile nodes. In another automotive protocol [17], a route request packet is flooded into the network, and the shortest route to the destination is recorded into a sequence of anchor points. Forwarding primarily based approaches got to alter the cases once there's no any appropriate next forward node (local highest or network hole problem). In GPSR, the forwarding section tunes into perimeter mode to detour spherical any network hole. In conveyance environments, creating a detour may take long hops. another approach is predicated on carry and forward [18]. once a current forward node couldn't realize an appropriate next forward node, this node buffers packets till encountering an appropriate one.

3 THE VADD MODEL

In this section, we tend to 1st provide the assumptions, the summary of Vehicle-Assisted knowledge Delivery (VADD)

A. Assumptions

We assume vehicles communicate with one another through short range wireless channel (100m-250m). The packet delivery data like supply id, supply location, packet generation time, destination location, expiration time, etc, is

specified by the information supply and placed within the packet header.

A vehicle is aware of its location by triangulation or through GPS device, that is already fashionable in new cars and can be common within the future. Vehicles will notice their neighbors through periodic beacon messages, that conjointly enclose the physical location of the sender.

We assume that vehicles are unit equipped with pre-loaded digital maps, which offer street-level map and traffic statistics like traffic density and vehicle speed on roads at different times of the day. Such quite digital map has already been commercialised. the most recent one is developed by MapMechanics [2], which incorporates road speed knowledge Associate in Nursing indication of the density of vehicles on every road.

Yahoo is additionally engaged on desegregation traffic statistics in its new version of Yahoo Maps, wherever real traffic reports of major US cities are out there. we tend to expect that additional elaborate traffic statistics are going to be integrated into digital map within the close to future.

Note that the price of fitting such a transport network can be even by its application to several road safety and commercial applications [25], [27], [29], that don't seem to be restricted to the planned delay tolerant knowledge delivery applications.

B. VADD summary

VADD relies on the concept of carry and forward. The most important issue is to pick out a forwarding path with the smallest packet delivery delay. though geographical forwarding approaches like GPSR [13] that continuously chooses consequent hop nearer to the destination, area unit terribly economical for knowledge delivery in circumstantial networks, they'll not be appropriate for sparsely connected transport networks.

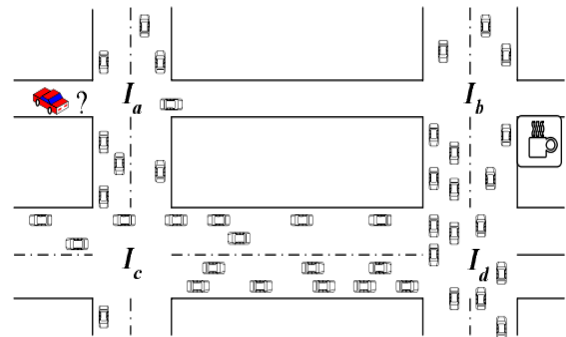


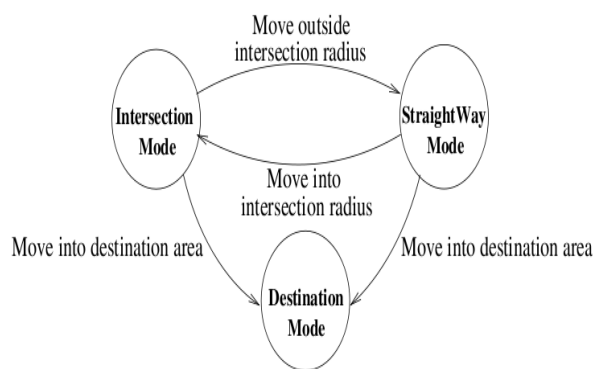
Fig. 1. Find a path to the coffee shop

As shown in Figure one, suppose a driver approaches intersection Ia State and sends message of invitation to the coffee bar (to build a reservation) at the corner of intersection Ib . To forward the request through $Ia \rightarrow Ic$, $Ic \rightarrow Id$, $Id \rightarrow Ib$ would be faster than through $Ia \rightarrow Ib$, despite the

fact that the latter provides geographically shortest attainable path. the rationale is that in case of disconnection, the packet has got to be carried by the vehicle, whose moving speed is considerably slower than the wireless communication.

In sparsely connected networks, vehicles ought to attempt to build use of the wireless communication, and resort to vehicles with quicker speed otherwise. Thus, our VADD follows the following basic principles:

- 1) Transmit through wireless channels the maximum amount as attainable.
- 2) If the packet has got to be carried through bound roads, the road with higher speed ought to be chosen.
- 3) attributable to the unpredictable nature of transport ad-hoc networks, we have a tendency to cannot expect the packet to be successfully routed on the pre-computed optimum path, so dynamic path choice ought to unceasingly be dead throughout the packet forwarding method.

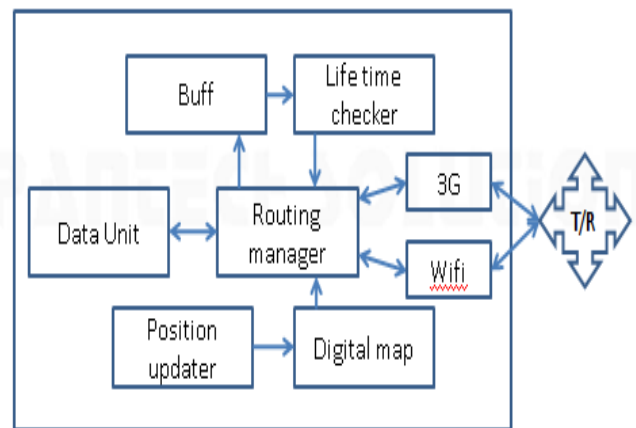


4 PROPOSED SYSTEM

In this paper, we tend to think about a sensory information gathering application of a VANET within which vehicles manufacture sensory information, that ought to be gathered for information analysis and creating selections. we tend to introduced a completely unique design that integrates 3G/UMTS networks with VANET.

We formulate the 3G-assisted information delivery as associate improvement downside during which the target is to maximise the utility underneath the 3G budget constraint and also the main call variables characterize which packets at which period slots to delivery via 3G.

5 ARCHITECTURE:



6 Modules

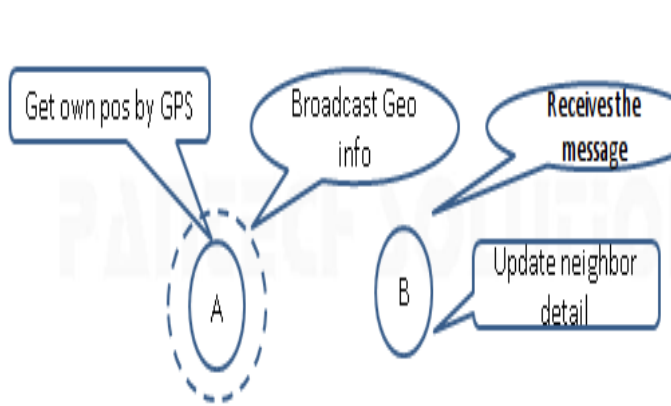
- ✧ Neighbor node discovery
 - Sorting location information
 - Sorting neighborhoods of neighbors
 - RSU prediction technique
 - Digital map processing

- ⤴ TTL based Data transmission
 - Buffered packet verification
 - Packet & 3G budget scheduling

- Digital map contains location information especially the details of RSU where its available
- Each vehicle can predict when it will be inside/outside of RSU coverage area.

Neighbor Node Discovery:

- ⤴ Sorting location information



Digital Map Processing (Ex...)

Checks own position/speed/direction
100,10 / 100(m/s)/ 200,10

RSU name	Pos(x,y)/ coverage	Vehicle info	Time to reach
1	0, 10/ 1km	100,10/10 (m/s)/200,10	∞
2	10000,100 0/1km	100,10/10 (m/s)/200,10	1000s
3	200000,50 0/ 1km	100,10/10 (m/s)/200,10	20000s

- ⤴ Sorting neighborhoods of neighbors
 - Each node can know about neighbor node by sharing the beacon information
 - Each nodes adds the no of neighbors details into the beacon, while broadcast
 - From beacon info, each node can update the details about neighborhoods of neighbors

RSU Prediction

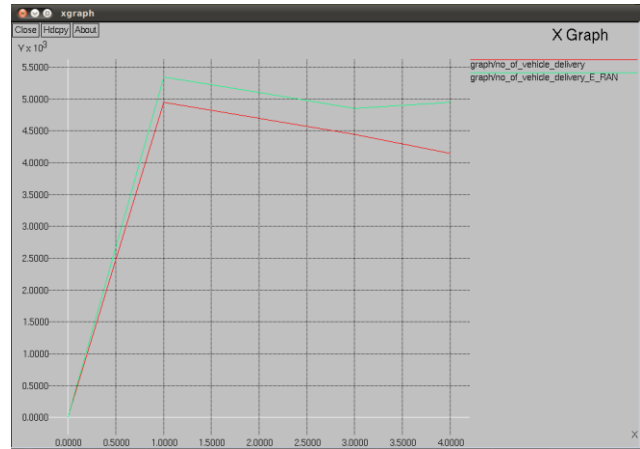
- ⤴ Digital map processing
 - In our project, we are considering each node has digital map.

TTL based Data transmission:

- ⤴ Each node can generate it's own data packet with limited life time
- ⤴ Generated packets will deliver to the destination as v-v communication when dest... node available within coverage.
- ⤴ If dest... node not available within

range source node will checks 3G budget availability. If node has more budget slot then it will transfer the data through the 3G.

- ✦ If 3G budget is limited then it checks the life time of the packet and utility function (whether it will reach to dest... within limited time).
- ✦ If its not satisfactory then data will be deliver through 3G otherwise DSRC(V-V) mode or AP.

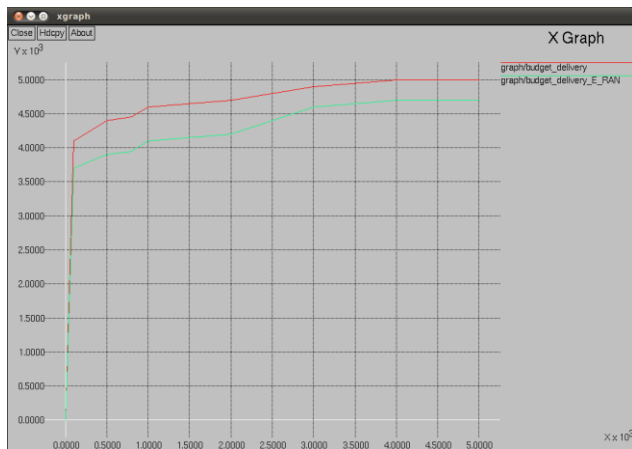


No. of VEHICLES vs DELIVERY

The above figure states the diffearence between proposed method and the E_RANDOM method with rerspect to the No.of Vehicles and DATA DELIVEY. Here X-axis is No.of vehicles and Y-axis is No.of packets.

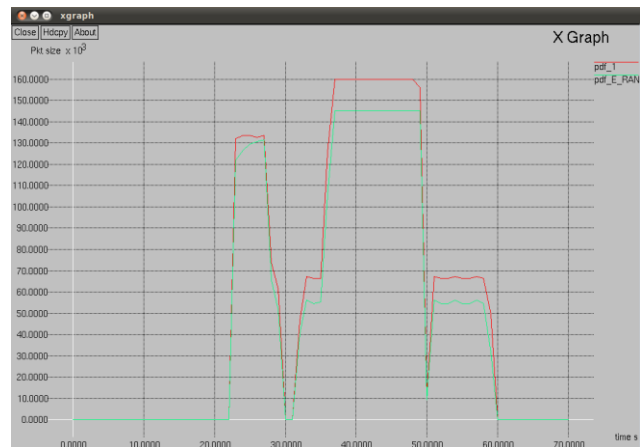
From this we can conclude that as the no.of vehicles are increasing data delivery is reducing in E_RANDOM compared to proposed model.

7 Results



BUDJET vs DELIVERY

The above figure states the diffearence between proposed method and the E_RANDOM method with rerspect to the DELAY and DATA DELIVEY. Here X-axis is BUDJET and Y-axis is No.of packets.



PACKET DELIVERY RATIO

The above figure states the diffearence between proposed method and

the E_RANDOM method with respect to the TIME and DATA DELIVERY. Here X-axis is TIME in seconds and Y-axis is No. of packets.

8 Conclusion

We have observed that some percentage of data packets fail to be delivered when there is a large number of vehicles in the network and many APs are deployed using the routing algorithm.

So from the above results we can conclude that it is highly useful to exploit 3G to further improve the data delivery performance in a VANET.

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