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Research Article

An Efficient Algorithm for Enhancing QOS in VANET

[1]Parimala Garnepudi, [2]Suneetha Vesalapu, [3]Vidyullatha P, [4]A V R Mayuri, [5]R Prathap Kumar

ABSTRACT

The Vehicular Ad Hoc Network (VANET) has gained apparent unity in information appropriation and information communication as a result of enormous improvement in distant enterprises. Intelligent Transportation Systems (ITS) have arranged a large number of Information Finding Agents (IFAs), also known as Road Side Units (RSUs), along the roadways to monitor and oversee traffic conditions. Despite the fact structure of VANET is schemed depending on expected passages and also by recognizing how many coaches are shown. In this report, we offer an effective TCC and IFAs are fully integrated into the algorithm for traffic infrastructure. Communication between one vehicle and another will be difficult under the existing design. obtain more assistance by the presence of buses and also grant the efficient usage IFAs and TCC. IFA's is depleted to make certainty of the data which it has collected, TCC, on the other hand, is utilized to quickly detect the destination vehicle. We also look at how this sort of construction might be beneficial in the future.

Keywords: VANET, ITS, RSU, IVA, IFA, TCC, IVC, DSRC

I. INTRODUCTION

By the evolution in Wi - Fi communication networks, VANET has acknowledged extensive contemplation on network distribution and dispatch data. VANET is almost like a MANET that includes both roadside-to-vehicle (RVC) and inter-vehicle (IVC) services. In parliamentary law to gather present traffic status and to transfer traffic control data to vehicles, Intelligent Transportations System (ITS) adequately uses VANET and traffic framework which

[1]Department of CSE, VFSTR Deemed to be University, Vadlamudi
[2]Department of CSE, Lendi Institute of Engineering and Technology, Vizianagaram
[3]Department of CSE, Koneru Lakshmaiah Education Foundation, Vaddeswaram
[4]School of Computing Science and Engineering, VIT Bhopal, Bhopal
[5]Department of CSE, VFSTR Deemed to be University, Vadlamudi

In parliamentary law to gather present traffic status and to transfer traffic control data to vehicles, Intelligent Transportations System (ITS) adequately uses VANET and traffic framework which consists of both Information Finding Agents (IFAs) and Traffic Control Center (TCC). Information Finding Agents (IFAs) used for assembling traffic statistical information, transiently buffering data, classifies vehicle instant places and reducing delivery delays between vehicles [5]. Mostly these IFAs is deployed at constant places, for example, at road crossings. Traffic Control Center (TCC) is a very reliable firm which mainly accumulates prevailing data of vehicles without disclosing their positions to other vehicles. By using traffic and vehicle information which is collected IFA; TCC can boost up the traffic controlling system [6]. To take care of, plenty of vulnerable situations like accident alerts, identifying traffic jams, discovering natural calamities like earthquakes, volcanic eruptions this kind of traffic infrastructure is very useful [7].

Routing in VANETs is a trending and challenging area for research. Because of lack of central coordination in VANET, high mobility of nodes and with dynamic topology, establishing the route became a big challenge [14]. This paper offers a novel scheme for identifying shortest path and obtains very low vitality. With a very low computational burden on each node of WSN this kind of scheme will evolve the network lifetime. Mainly for finding shortest path we use Dijkstra's algorithm and a central sink node.

The aim is to identify the shortest path from source to destination based on the cost of each path for transmission. We see which path gets very less cost that passage is better than other passages. Dijkstra's and Prim's algorithms are two fundamental classifications which are practicable to represent the results for the current graphs [7]. In the existing system, identifying the precise path for fixed nodes is finely constructed and in some conditions for discovering distance between dynamic topologies these methods was not able to hold the load, due to heavy load on sending packets from source to destination, there will be an increase in complexity up to a certain level and identification of shortest path will be delayed. So delivery delay will be more in this position.

For calculating efficient shortest path we send information to each sink node and we consider which route is shorter one that route is discovered as a decision route which is selected for sending information. By using these algorithms we will gain extensive quantity of data which leads down the network energy level according to this system low energy utilization is mandatory.

II. PROPOSED ARCHITECTURE

VANET structure has been recommended by using certain routes and buses which are scheduled to get the execution of data transmittal. Though, no one takes preference of the current traffic framework. Maintenance of buses is really heavy and sending data to information finding agents is not secure and thus getting a destination location efficiently is not improved with long-established VANET. Thus, our main motto is to plot advanced VANET design(see Figure 1) which is fully integrated with In Vehicle Agents (IVA) and Information Finding Agents (IFA) and accumulates foundation of traffic to maintain sophisticated services on data transmission. IFAs is used to take care on scarcity of In Vehicle Agents (i.e., Buses) sometimes to make sure of service coverage while Information Forwarding Agents are really useful in identifying destination vehicle helpful expeditiously.

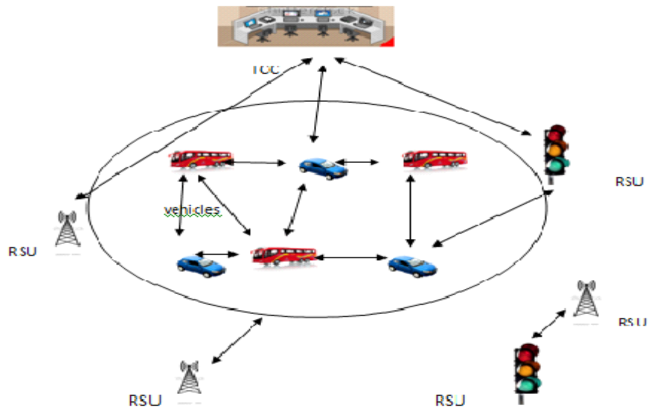

Figure 1: Mobile Agent architecture

In present days Wi-Fi services were becoming very normal for travelers for accessing the Internet on urban transportation. Certain states like Texas, Nevada, and California were contributing Wi-Fi services on city buses, rails for free of cost [8]. A system named WiRover was placed in some coaches of trains in Wisconsin city since April 2010. WiRover lends Wire less hotspots, where travelers can able to connect to the Internet wirelessly [9]. We consider that In Vehicle Agents nothing but buses and IFAs were cabled in supporting the network with a higher transmission field like WiMax or Wi-Fi. Founded on this inference, we introduce advanced two-line BUS VANET mechanism which is merged with traffic framework. IVAs and IFAs are immense-level nodes, which act like moving strength to save the data, although the low-level category contains of ordinary vehicles. A high-category node constructs a linked topology; internet accessing capabilities play a major role in reference to the TCC directly or indirectly. IFAs and In Vehicle Agents had two categories of networks: Dedicated Shortest Range Communication (DSRC) [15] device for developing a connection between one vehicle to another vehicle and Wi-Fi services also provide temporary hotspot in vehicles while traveling. DSRC is the transmission protocol, which is used in VANET where its connection distance is from 400 m to 900 m. Wi-Fi covers its area up to 5 kilometers. The less category nodes are assembled with DSRC device. The schedule and route of each IVA and the deployment of every IFAs information is disseminated to all vehicles. Figure 2 depicts the proposed structure of our BUS-VANET.

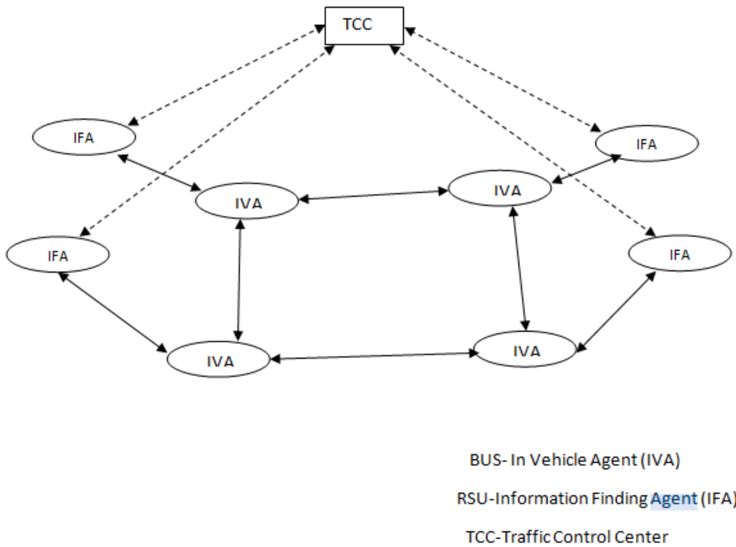

Figure 2: Proposed mobile agent structure

Correlating established VANET with our proposed BUS-VANET contribute more material and adequate data transmission services. Equally, we have known earlier, more than one vehicle will act as intermediate nodes to forward data delivery in VANET. If the vehicle which is transmitting the packets can't transmit the data to other vehicles, it must wait until it forwards the info from the source vehicle to destination vehicle [10]. The biggest time consuming functions of the conveyance is the moving phase, due to the cause of the vehicle acceleration is relatively lesser than the generation speed of wireless transmission. Therefore, distant transmission area of IVAs and IFAs can reduce the feasibility of relocating and decreases the discontinuation of information. The target localization in our advanced plan is discovered rapidly through the association of IVAs, IFAs and TCC. Every vehicle will archive its whole data with nearby IVA or at IFA. The data piled up by an IVA or IFA were broadcasted to TCC and the target vehicle is detected very rapidly. Since an independent vehicle will not pass on its trajectory information to other vehicles, because every vehicle contains its own unique id, password and trajectory information which are very confidential and they throw their whole information to another vehicle which is already registered with IFAs by this operation the vehicle information is saved.

The summary of this work is as follows:

- It suggest a modern BUS-VANET architecture which is wholly integrated with traffic infrastructure along buses and IVAs. We need the support of IFAs and TCC which is kept up by ITS previously to upgrade the performance of VANET.

- Based on suggested BUS-VANET, we manage the registration mechanism to get the public presentation of communication and develop a novel strategy for choosing authorized vehicle to decrease the switches from ordinary vehicles to high-level vehicles. We prepare a novel pattern for making the target position conveniently. To determine a destination location, we use Dijkstra's algorithm.

- By calculating and analyzing the intent of proposed architecture with architectures in [1] and [2], the proposed method has shown greater packet transmission rate and shorter delay.

The remaining substance is sorted as follows: Introduction of the VANET is presented in Section1, related work in section2, and proposed BUS-VANET system in section 3, and finally results in Section 4.

III. PROPOSED ALGORITHM

Proposed DA-CAC Algorithm

```
Start AODV ();
Send ROUTE REQUEST (SSN, HC, TTL, DSN);
Receive ROUTE REPLY (SSN, HC, TTL, DSN)
Route_Path_Cost_Analysis ();
{
Max Cost= Max TTL Value + Max HC;
Min Cost= Min TTL Value + Min HC;
}
Costs of Each route==Collect;
Dijkstra's_Route_correlation (Route 1, Route 2… Route n);
If (Node==Twice && Route==Shortest)
{Loop identified;
Bump off the Route from the angle;
}
GatewayBasedRouteCount If (Route==ContainsGatewayNode);
Then HD (Node Closest to Gateway) //Closest Adjacency Condition (CAC) Node
If (NodeCountInShortestRoute>=2) // Dynamic path convergence (Frequently used Nodes in shortest Route is chosen for
transmission)
Shortest Route Node;
WakeUp==CAC Node Based Route Elements;
If battery is less==Update Route// analyze the battery level of each client
Else Route is ok;
RecommendedCACShortestPath (High Energy Nodes, Closest to Gateway, Loop free, low load);
Prefer shortest Route to the node seeking transmission;
This data is used to renovate the routing table;
Exit;
}
```

IV. RESULTS

At the beginning of simulation, the network simulator initializes present network by accommodating the positions of IFA, vehicle(s) and the position of all other units needed in proposed scheme. The information regarding to the vehicle and the present day is saved in IFA and every vehicle is defiantly assigned with a unique number for identification.

The following graphs represents the efficiency of the algorithm in different cases like in between infrastructure and vehicle, vehicle to vehicle, and vehicle to infrastructure. in performance evaluation five graphs are generated those are number of updating packets, delivery delay vs length of report period, delivery delay vs number of bus lines, packet delivery delay vs number of road side units, delivery rate Vs number of bus lines.

Number of updating packets:

In this graph we observe less the report time, more precise data is recorded in TCC and low transmission delay is obtained. On another hand, high report time takes additional time to find the destination location, but very low control packets are developed. Here we change time period from 50 to 200s for observing this kind of changes in delay and when we increase the time period to 200s we can find the variations in updating of packets(from figure 3 & Table 1).

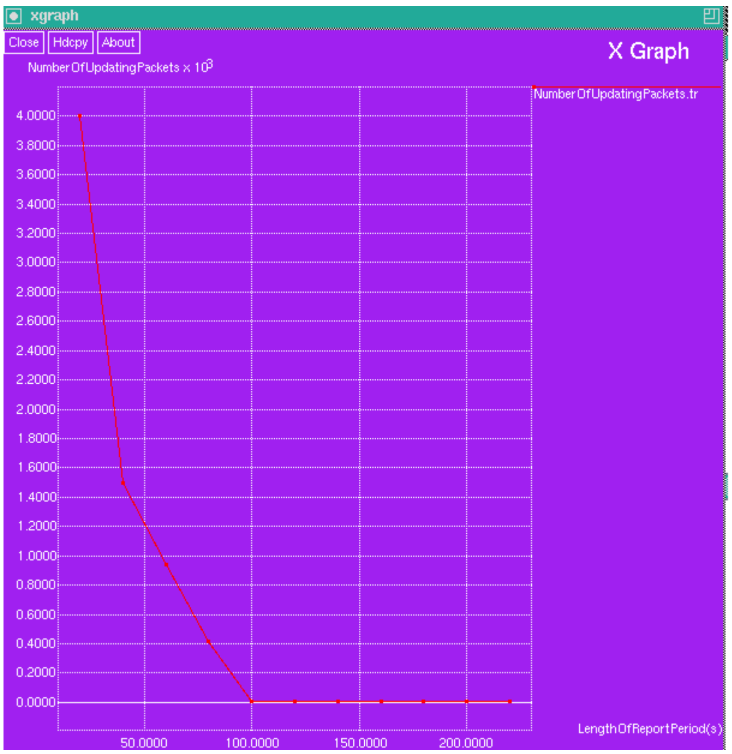

Figure3: No. of updating packets at different time intervals

Length of report period(s)	No.of packets Updating
20	4000
40	1500
60	962
80	445
100	10
120	10
180	10
200	10

Table 1 : No. of updating packets at different time intervals

Delivery delay Vs length of report period:

Here we compare the stability amidst transmission delay and TCC. The TCC identification scheme is saved with 24% delay time by comparing with broadcasting when 50s is set as report time. If the report time is 200s TCC identification scheme works better when compared with 9% shorter delay broadcasting(from figure 4 & Table 2).

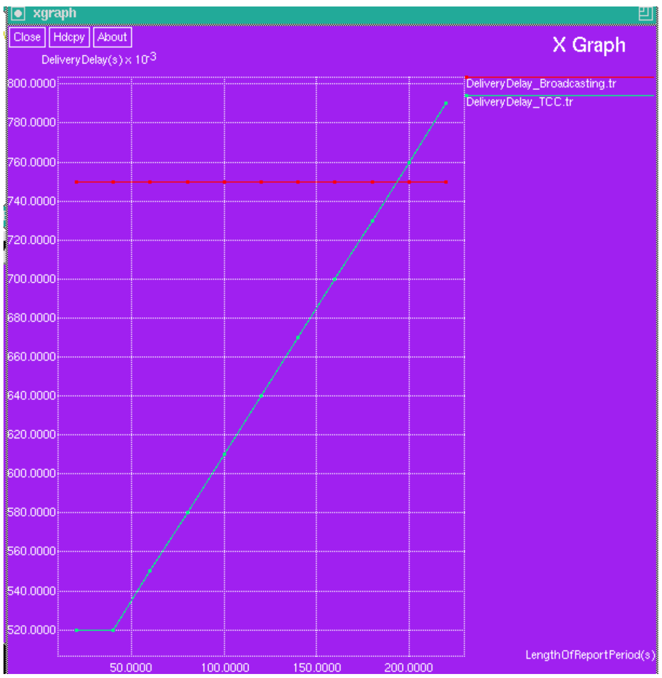

Figure4:Delivery delay at Traffic Control center(TCC) Vs Broadcasting Delay

Length of report period(Sec)	Delivery Delay(Sec) at TCC	Broadcasting Delay(Sec)
20	0.52	0.75
60	0.55	0.75
120	0.64	0.75
180	0.73	0.75
200	0.76	0.75
220	0.79	0.75

Table 2 :Delivery delay at Traffic Control center(TCC) Vs Broadcasting Delay

Delivery delay Vs number of bus lines:

In our BUS-VANET it consists less transmission delay and high delivery rate. In our BUS-VANET we take 4 bus lines comparing to traditional VANET in this process our proposed BUS-VANET delivery delay is reduced more while compared with traditional VANET(from figure 5 & Table 3).

Figure 5 : Delivery delay in Traditional VANET Vs BUS VANET

No.of BUS Lines	Delivery delay - Traditional VANET(Sec)	Delivery delay - BUSVANET(Sec)
3	1.49	1.45
5	1.48	1.44
7	1.47	1.43
9	1.46	1.42
10	1.45	1.41
11	1.45	1.41

Table 3 : Delivery delay in Traditional VANET Vs BUS VANET

Packet delivery rate Vs number of IFAs:

In traditional VANETS we have used only 3 bus lines compared with proposed BUS VANET in our proposed we used 5 bus lines because of this we observed the delivery delay is more in traditional VANETS(from figure 6 & Table 4).

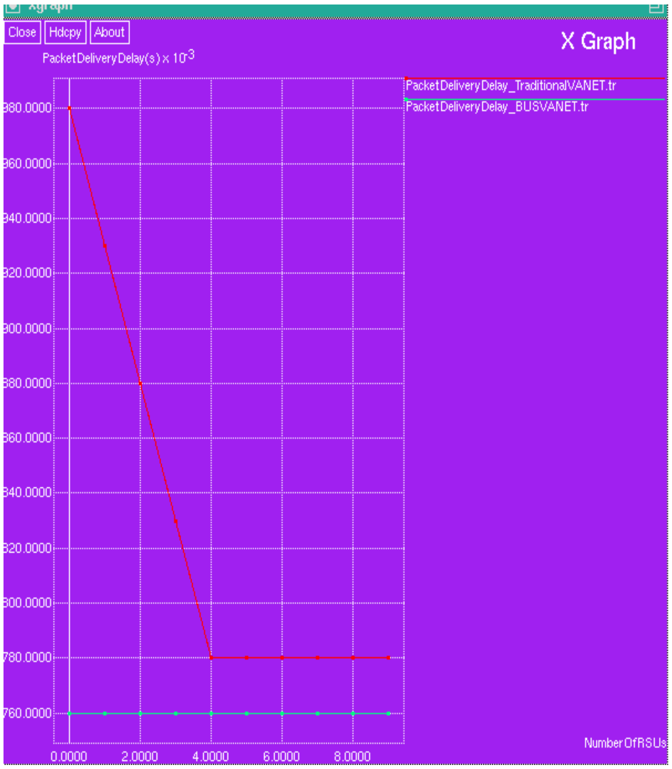

Table 6: Packet Delivery delay in Traditional VANET Vs BUS VANET

No. of RSU	Packet Delivery delay - Traditional VANET(Sec)	Packet Delivery delay - BUS VANET(Sec)
0	0.98	0.76
1	0.92	0.76
2	0.87	0.76
3	0.82	0.76
4	0.77	0.76
5	0.77	0.76
6	0.77	0.76
7	0.77	0.76
8	0.77	0.76
9	0.77	0.76

Table 4: Packet Delivery delay in Traditional VANET Vs BUS VANET

V. CONCLUSION

This paper addresses the communication architecture between onevehicle to another vehicle which obtain more assistance by the presence of buses and also grant the efficient usage IFAs and TCC. IFA's is depleted to make certain of the data which it has collected, whereas TCC is used to detect destination vehicle expeditiously. Performance of the proposed algorithm is verified with different QOS metrics like packet delivery delay and delivery rate.

REFERENCES

[1] "Vehicular Ad hoc Network(VANETs): A Review" Divya Chadha1, Reena2 Assistant Professor, MICT&BM, Maharishi MarkandeshwarUniversity,Mullana, Ambala, Haryana, India1 M. Phil Scholar, M.M.I.C.T&B.M, Maharishi Markandeshwa University, Mullana, Ambala, Haryana, India2 in IJERCCE vol. 3 Issue 3 , March 2015.

[2] "Enhancing VANET Connectivity Through Roadside Units on Highways" Sok-Ian Sou and OzanK.Tonguz, Member, IEEE TRANSACTIONS ON VEHICULAR TECHNOLOGY, VOL. 60, NO. 8, OCTOBER 2011.

[3] A Secure and Efficient Communication in VANET DebasisGiri and DurbadalChattaraj Department of Computer Science and Engineering, Haldia Institute of Technology Haldia-721657, India in IEEE 2010.

[4] "Providing Ubiquitous Communication using Road-Side Units in VANET Systems: Unveiling the Challenges", Arindam Ghosh, Vishnu Vardhan, GlenfordMapp, OrhanGemikonakli, Jonathan Loo Department of Computer and Communications Engineering Middlesex University London, United Kingdom.

[5] "An Intelligent Secure Traffic Management System Based on Vane" , Abinaya.E1, Sekar., Abinaya.E1, Sekar in IOSR Volume-9,Issue 1 Jan2010.

[6] "Way To Green : Intelligent Traffic Control With VANET" JiniKuriakose,Aromal C M,Gayathry K.V International Journal of Computer Engineering and Technology (IJCET) Volume 5 Issue 12, December 2014.

[7] Will a Driving Restriction Policy Reduce Car Tips? A Case Study of +-Beijing, China, Lanlan Wang, Jintao Xu, Xinye Zheng and Ping Qin.

[8] Air Pollution Due to RoadTransportation in India: A Review on Assessmentand Reduction Strategies",Shrivastava R. K., SaxenaNeeta andGautamGeeta Department of Mathematics, S.M.S. Govt. College, Gwalior (INDIA), Department of Mathematics , I.T.M. , Gwalior (INDIA) .

[9] "Air quality benefits of odd-even vehicle ationingprogramme in Delhi:" An analysis of week 1 Environment Pollution (Preventio and Control) Authority for NCR January 8, 2016.

[10] QoS-aware Node Selection Algorithm for Routing Protocols in VANETs Ahmad Mostafaa , Anna Maria Vegnib,∗ , AsithaBandaranayakea , Dharma P. Agrawala, Available online at www.sciencedirect.com, Procedia Computer Science 40 (2014) 66 – 73.

[11] **"VANETs QoS-based routing protocols based on multi-constrained ability to support ITS infotainment services",** Michael Oche, Abubakar Bello Tambuwal, Christopher Chemebe, Rafidah Md Noor & Salvatore Distefano, Springer series, 27 October 2018.

[12] M. H. Eiza, T. Owens, Q. Ni, and Q. Shi, "Situation-aware QoS routing algorithm for vehicular ad hoc networks," *IEEE Transactions on Vehicular Technology*, vol. 64, no. 12, pp. 5520–5535, 2015.View at: Publisher Site | Google Scholar

[13] G. Li, L. Boukhatem, and S. Martin, "An intersection-based QoS routing in vehicular ad hoc networks," *Mobile Networks and Applications*, vol. 20, no. 2, pp. 268–284, 2015.View at: Publisher Site | Google Scholar.

[14] **"Vehicle Direction based B-MFR Routing protocol for VANET",** MrsParimala Garnepudi[1],DrVenkatesulu D[2,],FICTA,NIT Suratkal,Jan 2020.

[15]. "DDSRC: An algorithm for improving the QOS in VANET",Garnepudi Parimala, Siva Nageswararao, .S., , International Journal of Recent Technology and Engineering, 2019, 7(6), pp. 1327–1331