International Journal of Recent Technology and Engineering (IJRTE)
ISSN: 2277-3878,Volume-7, Issue-6S5, April 2019

DDSRC: Algorithm for improving QOS in VANET

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Abstract: Due to immense improvement in wireless networks, Vehicular Ad Hoc Network (VANET) hasearned appreciable consolidation in data distribution and data transmittal. To aggregate and manage traffic circumstances, Intelligent Transportations Systems (ITS) have arranged plenty of Information Finding Agents (IFAs) which are also known as Road Side Units (RSUs) near to the roads to accumulate and transmit traffic data to the Information Forwarding Agent which is recognized as Traffic Control Centre (TCC) to figure out the transportation details. In this regard, an effective algorithm called DDSRC: Dijkstra's Dedicated Short Range Communication is introduced for traffic infrastructure which is fully unified with TCC and IFAs. In this current architecture, the communication between one vehicles to another vehicle will be obtained through buses, IFAs and TCC. IFAs are depleted to collect the data, whereas TCC is used to detect destination vehicle expeditiously. We also inspect how this type of architecture is benefited for future use.

***Index terms*: VANET,ITS,IFA,TCC,RVC,IVC.**

I. INTRODUCTION

By the evolution in Wireless communication networks, vehicular Ad-hoc network (VANET) has acknowledged extensive contemplation on network distribution and dispatch data. VANET is a mode of Mobile Ad-Hoc Network (MANET)[11] which maintains both Roadside-to-Vehicle Communications (RVC) and Inter-Vehicle Communications (IVC) services. In parliamentary law, to gather present traffic status and to transfer traffic control data to vehicles[4], Intelligent Transportations System (ITS) [1] adequatelyusesdelays between vehicles [5]. Center (TCC). Information Finding Agents (IFAs) used for VANET and traffic delays between vehicles [5]. Center (TCC). Information Finding and Traffic Control 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 [6]. To take care 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 [8].

This paper introduces a novel scheme for identifying shortest pathto obtain very low vitality. The aim is to identify the shortest path from source to destination based on the cost of each path for transmission using Dijkstra's algorithm and DDSRC. In the existing system, delivery delay is increased because of heavy load on sending packets. In this regard constructing shortest pathbecomes complex. For calculating efficient shortest path, the destination information is send to each sink node. The selected shortest path is used for communication between source and destination[3]. 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 [8].

The remaining substance is sorted as follows: Introduction of the VANET and related work is presented in Section1, proposed BUS-VANET system in section 2, results in Section 3, and finally conclusion in section 4.

Revised Manuscript Received on December 22, 2018

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II. PROPOSED ARCHITECTURE

Agents (IFAs) used for VANET and traffic framework which consists of both Information Finding framework which consists of both Information Finding assembling traffic statistical information, transiently buffering data, classifies vehicle instant places and reducing delivery Agents (IFAs)

VANET structure has been recommended by using certain routes and buses which are scheduled to get the execution of data transmittal[2]. 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 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[12][13].

Vehicle Agents (buses) and IFAs were cabled in supporting the network with a higher transmission field like Wi-Max or Wi-Fi. Founded on this inference, an advanced two-line BUS VANET mechanism was introduced 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; with internet accessing capabilities which plays a major role in reference to the TCC directly or indirectly.

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Dedicated Shortest Range Communication (DSRC) 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 300 m to 1000 m. Wi-Fi covers its area up to 5 kilometers[14]. 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. The suggested structure of our BUS-VANET is shown in Figure 1.

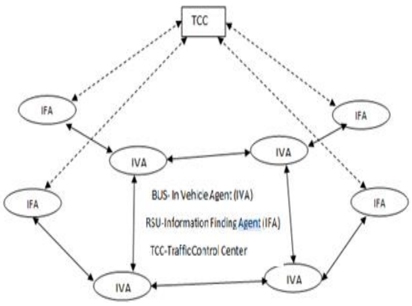


Figure 1: Mobile agent structure

The vehicle which is transmitting the packets can't receive the data from other vehicles, it must wait until it forwards the info to the destination vehicle [8]. The biggest time consuming function is moving phase, because 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 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 main contributions of this report can be summarized as follows:

- A modern BUS-VANET architecture was suggested, which is wholly integrated with traffic infrastructure along with buses and IVAs.
- BUS-VANET manages the registration mechanism and develops a novel strategy (DDSRC) for choosing authorizing node to decrease the count of switches.
- By calculating and analyzing the intent of our BUS-VANET with other two VANET architectures in [1] and [2], we have proven that BUS-VANET has sophisticated work with greater packet transmission rate and shorter transfer delay.

III. PROPOSED ALGORITHM

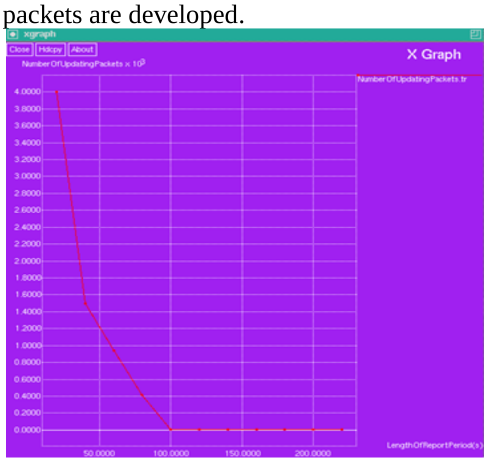
Start AODV ();
Send ROUTE REQUEST (SSN, HC, TTL, DSN);
Receive ROUTE REPLY (SSN, HC, TTL, DSN)
Route_Path_Cost_Analysis ();
{Max Cost= Max TTL Value + Max HC;
Min Cost= Min TTL Value + Min HC;}
Costs of Each route==Collect;
Dijkstra's_Route_correlation (Route 1, Route 2… Route n);
If (Node==Twice && 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 fortransmission)
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

During beginning of the 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 is saved in IFA and every vehicle is defiantly assigned with a unique number for identification.The performance is evaluated in the following ways.

V. 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.



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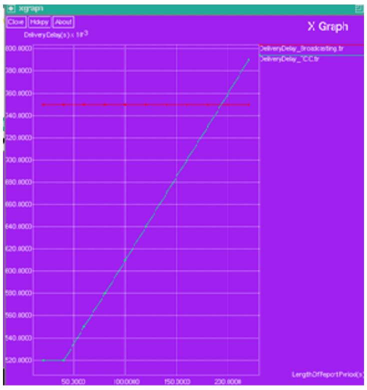
Length of report period(s)	No.of packets Updating
20	4000
40	1500
60	962
80	445
100	10
120	10
180	10
200	10

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

A.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.

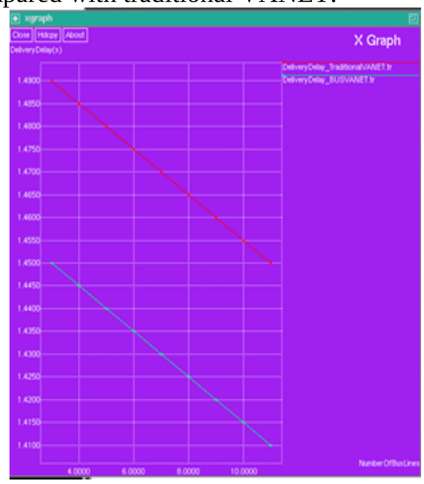


Length of report period(Sec)	Delivery Delay(Sec) at TCC	Broadcasting Delay(Sec)
20	0.52	0.75
60	0.55	0.75
120	0.64	0.75
180	0.73	0.75
200	0.76	0.75
220	0.79	0.75

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

C.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.

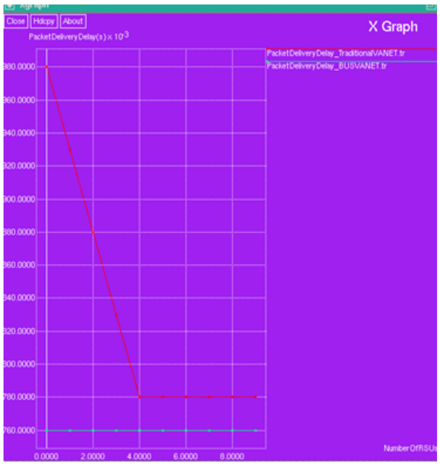


No.Of BUS Lines	Delivery delay Traditional VANET(Sec)	Delivery delay BUSVANET(Sec)
3	1.49	1.45
5	1.48	1.44
7	1.47	1.43
9	1.46	1.42
10	1.45	1.41
11	1.45	1.41

Table 3 : Delivery delay in Traditional VANET Vs BUS VANET

B.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 traditionalVANETS.



No.Of RSU	Packet Delivery delay Traditional VANET(Sec)	Packet Delivery delayBUS 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

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VI. CONCLUSION

The main augmentation of this paper is to conclude that DDSRC is better for sending data to the destination through a shortest route efficiently in order to improve the QoS.

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