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Fast and Reliable Greedy Routing Protocol (FRGR) for VANET in City Environments

Rajesh Purkait
Department of Computer Science and Engineering Siksha 'O' AnusandhanUniversity, Bhubaneswar, India
Email: rajeshpurkait@soa.ac.in

SachinTripathi
Department of Computer Science and Engineering Indian Institute of Technology (ISM), Dhanbad, India
Email:var1285@yahoo.com

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***Abstract*:**
Recently researchers are showing their interest on ITS (Intelligent Transportation System) in both academic and industry. Lot of research have been done and also doing to improve the domain of routing in a VANET routingprotocols of ITS because VANET is an emerging solution for safety of passengers by routing a safety messages in the dynamically changing vehicular network. VANETs become considerably additionally testing, when they get advantage from smart answers for anticipate the steadiest hubs in the system, to impart among them. A few contributing elements, for example, thickness, delay, speed, area and separation and so on impact on this procedure. Data trade about the street dangers and traffic circumstance with the ability of expanding the detecting range by means of handing-off and steering the security information parcel is made to empower between the two vehicular hubs in VANET correspondence. To get the security data in an exact time required quicker, solid and lossless information transmission between the two vehicles among the enormous number of vehicular correspondence in a city domain. Right now, steering data is utilized to advance the information bundle towards its goal. Proposed convention is the convergence based insatiable directing convention which is actualized into two stages 1) Greedy junction selection and 2) Greedy next hop selection. In first phase, junction will be selected based on the selection of best score among all the neighbor greedy junction. In second phase, greedy next node will be selected within the current and greedy next junction based on node position, speed and movementdirection.

Keywords: VANET, City Environment, Greedy junction, Greedy Next hop, Stability, Local maxima, Range adjustment.

I. INTRODUCTION

Rapid development of Urban modernization increases auto- mobile ownership into new era, as a surge which leads our life into breakneck by congestion, accident and other traffic problems [1]. Wireless communication has an tremendous potential to support the next generation by implementing its application in real time for any situation. The Vehicular Ad-hoc NETwork (VANET) is an exceptional class of Mobile Ad-hoc NETwork (MANET). The vehicle which are proceeding onward the street [2] are being hubs each. Foundation support, high portability and battery-powered wellspring of vitality in VANET are not quite the same as the element in the MANET.

The street and driving guidelines confine the versatility due to the non-arbitrary portability of vehicle which plays as a significant feature of such system and fix the cutoff points [3]. Be that as it may, with the expansion of number of vehicles on the city streets, the degree of the mishap is being improved just as level of wellbeing of the travelers are being diminished step by step.

The VANET can possibly improve solid correspondence and street wellbeing. The primary point of VANET is to plan an Intelligent Transport System (ITS). ITS is a remote innovation applied to the transportation framework with the point of steering data among the vehicles in a clever way for improving street wellbeing[4].It guides the drivers to ensure road safety in a city environment at the right time. The ITS supports several applicationsin VANET ranging from entertainment to safety, such asaccident prevention, traffic flow control, alternate route computation in real time, and provision of internet access to the users for media downloading, and gaming etc.To find the problem of an effective course, from source to goal through a progression of intersection determination and choice of transitional sending hubs through the intersections are extremely testing due to non-irregular development of vehicle, restricted remote assets and the lossy attributes of a remote direct in VANET. Theefficiency of route depends on the junction selection and the nodes within the junctions, participating to send the data into the destination. Hence, the difficulties arise for selection of route.

In VANET, vehicles share encompassing data with neighbors and foundation to make it accessible for different vehicles in a system. This data is imparted in a multi-jump directing worldview. The accessible steering conventions in VANET are sorted into two kinds, for example, 1) topology based and 2) topographical based directing. The rapid vehicles make dynamic system topology where execution of result is poor. For instance, customary topology based directing conventions like, AODV (Perkins et al., 2002) and DSR (IETF, 2007). These conventions can't find, protect and update course intermittently that is sufficient. They use three way handshaking mechanism for connection establishment which takes time, that's why it is not ideal for high dynamic network like VANET [5]. As it is well known that the networktopology frequently changes in VANET due to the vehicle speed and the roadstructure.

The availability of GPS receivers and digital maps in modern vehicles inspire to use of geographic routing with computational algorithms for VANET. Recently, V-V communications in VANET have used a geographic-based steering approach that uses the data about geographic co-ordinates or relative places of vehicles for distinguishing an effective way in the system [6]. The geographic steering conventions are arranged into three kinds, for example, 1) Greedy sending, 2) Improved insatiable sending, and 3) Directional ravenous sending [7]. The directional eager forward steering chooses a vehicle moving towards a goal for accomplishing quick conveyance. Be that as it may, the nearness of obstructions like trees and structures upsets a vehicle to set up direct correspondence with others. It first forms the directing topology by utilizing planarized diagram and afterward forward the parcels by utilizing face or avaricious steering for postponement of information transmission. In dimensional situations with snags, named as correspondence gap, steering circle, misguided course which languish over distinguishing of their fitting neighbor vehicles. In VANET, multi-bounce information transmission is required for significant distance which causes trans-mission delay. Again vehicular systems are exceptionally portable and dynamic. A few times it makes scanty in condition. For instance, the traffic thickness of country territory just as during the night is low whereas the traffic thickness of enormous populace zones just as during times of heavy traffic is high.

In spite of the fact that, to build up start to finish association in a meager domain is troublesome. The high versatility of vehicular systems presents open doors for portability of vehicle to irregularly associate with one another when vehicles are proceeding onward the street. Moving vehicle can convey the message and forward to the following vehicle inside its range closer to the goal. On the off chance that no such vehicle is there, at that point, it is called nearby maxima issue. To beat the neighborhood maxima, some convention like GPSR (Greedy Perimeter stateless directing) [8], GyTAR (Geographical Traffic Aware Routing), VADDA(Vehicular-Assisted Data Delivery in Vehicular Ad-hoc Network) [9] and so on actualizes pause and sending strategy due to transmission defer which emerge of the subject of wellbeing for the traveler by sending a security bundle.

This paper proposes a Fast and Reliable Greedy steering convention for VANET based directing to be a thinking about the traveler wellbeing and dependability in city condition. The primary commitments of this paper are as per the following. 1) Greedy intersection choice: Junctions are chosen dependent on two parameters. One is closeness to the goal and another is expected time to antiquated through the intersection from the valuable intersection. Intersection score will be determined dependent on these two parameters. This base intersection score will be chosen for the voracious intersection. 2) Greedy next jump choice: Existing ravenous sending conventions consider various parameters, for example, separation, thickness, speed and bearing of vehicles. Despite the fact that quick information conveyance with most extreme state upkeep necessity is accomplished through insatiable directing system. The postponement of information conveyance increments if the router(node) determination is done based on separation in the situations like the chose next bounce moves the other way from goal vehicle.

I) After the determination of ravenous intersection point comes into the following jump choice inside the intersection to which information can passes securely and proficiently. Proposed convention is thought of the position, speed and development heading of neighbor hubs to choose the best neighbor hub for sending the information into a ravenous next bounce hub.

II) Major disadvantage of ravenous directing technique is the nearby most extreme issue that emerges because of the correspondence opening. Because of neighborhood maxima issue, existing conventions follow store and convey forward methodology which builds the postponement of information conveyance. It makes serious issue on account of crisis or security message transmission.

III) Handling of nearby maxima by run alteration issue: when vehicle is not finding the eager mode or border mode for next bounce hub for sending the information inside its radio transmission go (R), at that point proposed convention consolidates the instrument to upgrade the radio transmission scope of the specific vehicle by improving the sign quality.

A. PaperRoad Map

The remainder of the paper is sorted out as follows. In Section II, we give a concise depiction of related work. The development of the proposed convention is talked about in Section III. From that point onward, an examination of some current conventions are given in Section IV. At long last, we close the paper with barely any comments in Section V.

II. RELATEDWORK

Since movement, densities of vehicles are the major issues for designing an efficient routing protocol in VANETs. We focus some reference routing protocols in city environment which have been proposed to handle the major issues. We summarize the characteristic of VANET which are related to routing. Geographical Constrains: Movement of nodes in VANETs are constrained accordingly to road map. Radio transmission range for VANET may be several lengthssuch a s from 200m to 300m. It is found that one node can speak with different hubs inside its radio transmission go at open space. In city situation, there will be a radio hindrance (like structure, tree, connect and so on.) which causes the principal signal blurring. Exceptionally elements: Due to high hub development joining and leave of vehicle through the correspondence scope of other hub is progressively visit. So changes of topology in VANET are every now and again. Development Direction Prediction dependent out and about structure and intersection availability.

GPSR is a notable position based geographic defeating convention for interstate situation, where hubs are similarly circulated. Right now every hub keeps up the data of one jump neighbors table by sending the guide parcel in a specific interim. The steering convention of GPSR (Greedy Perimeter Stateless directing) rely upon eager and border modes. It is incomputable for urban or city condition because of the absence of direct correspondence between the two hubs.

GPSR is modified into GPCR [6](Greedy Perimeter Co-ordinate Routing) to deal with the challenges of city scenarios. It does not require any external or global information such as a static street map. It uses the restricted forwarding mechanism to forward the data packet. This gives thepreferenceofjunction(Co-ordinatenode)nodeselectionrather than normal node (Non Co-ordinate node) though it is nearer to the destination.

STAR, A-STAR (Anchor based Street and Traffic Aware Routing) and GSR (Geographical Source Routing) are road based directing convention which is intended for bury vehicular in the city conditions. Various methodologies are utilized so as to improve the information steering in vehicular system, for example, basic avaricious sending, amalgamating the topology-based conventions with position-based conventions and city transport course data. Speed, heading and thickness of a vehicle assume a significant job in information steering. However, the said criteria of the vehicle are disregarded in the previously mentioned conventions. To beat this issue, Jerbiet al.[5] built up another vehicular impromptu directing convention GyTAR, IGyTAR [10] and EGyTAR (Enhanced Greedy Traffic mindful steering) [11] are a crossing point based eager directing convention for city condition. They have made course from source to goal dependent on arrangement of associated crossing point. Two parameters are utilized to choose the intersection. One is changed in vehicular rush hour gridlock data (thickness) and another is the bend metric good ways from the goal. Improved covetous methodology is utilized to advance the parcel towards the chose intersections where "convey and forward" component are utilized to conquer the neighborhood maxima issue at the hour of bundle transmission. Despite the fact that it increments the deferral of information transmission which can impact the wellbeing of traveler. VADD [9], that is confined by traffic model and guide to locate the following street so as to advance the parcel delay for diminishing deferral. It likewise utilized "convey and forward" system to advance the information bundle from source to goal.

Another intersection based multi jump information directing in city condition convention is JARR [12] (Junction based Adaptive Reactive Routing) proposed by Lee and Tee et al. vehicle position, heading, and thickness of next intersection are considered in directing method. To choose the intersection for this convention they have thought about weight of edge as the separation between two intersections, yet they have not thought about the parameter for delay, which is significant for the wellbeing of traveler. GeoSVR [13] is a guide based stateless steering convention proposed by x. yong et al. which is utilized two calculations. Those are ideal sending way calculation and confine sending calculation. Ideal sending way is utilized to explain the nearby maxima and inadequate network. Confined sending is utilized to pick the following bounce for this way for each hand-off hub determination by characterizing the limited sending range. To locate the ideal way, they have appointed the heaviness of every way dependent on thickness that is estimated of street width, implies more extensive street higher thickness. This was not valid forever in light of the fact that thickness is rely on the significance of street and the time (morning, active time, evening, night) moreover.

JBR (Junction Based Routing) [14] is an another intersection based steering proposed by S.Tsiachriset al. This is utilized specific insatiable sending component, where chosen neighbors are separating into co-ordinate (Junction Node), if there is absent, straightforward hubs are chosen for best next jump to arrive at the goal. They have utilized the specific covetous sending method and recuperation methodology for choosing the following jump so as to defeat the neighborhood optima. Yet, it is discovered that development heading isn't considered for hub determination.

III. PROPOSEDPROTOCOL

A. SystemModel

According to proposed convention, we accept that every vehicle furnished with a GPS recipient and knows about its topographical position. Every vehicle distinguishes the neighbor vehicle by sending a reference point message in a specific interim. Guide is disconnected as a coordinated diagram G(V, E). [15] The situation of goal is gotten with the assistance of guide data give by the route framework. Sooner rather than later, vehicle will be outfitted with remote handset gadgets and detecting gadgets. That is the reason, one vehicle can speak with other vehicle inside its radio range. In a city situation of VANETs hundred or thousand number of vehicles are moving into the street through intersection starting with one course then onto the next bearing. Detecting any occasion out and about, vehicle convey in a specially appointed way among themselves (vehicles) for sending the information from source to the goal. In the wake of detecting the occasion it creates a message dependent on the occasions and afterward send this message by thinking about least postponement (before message age time(Tg) + Time-to-live (TTL)), to the ideal area for the security of traveler [15].

The vehicular system can speak to as a chart G (V, J) where V speaks to a lot of vehicles in the system and J speak to a lot of intersections focuses. Every V has the arrangement of hubs as neighbors n(i) in its neighbor table those exist in its correspondence go R. Every V moves in the speed of S along the paths in the street. Information transmission from Source (Sv) and goal (Dv) is set up powerfully in the system. Toward Dv picks an intersection premise of closeness to the selected intersection to the goal and anticipated that time should arrive at the vehicle from current intersection to designation intersection (Dij) as the avaricious (J) which have least score. At that point the following bounce along J from n(i) is chosen based on current position (xi, yi), speed (si) and development direction(mi). On the off chance that there is no other neighbor to arrive at the goal other than current next bounce, implies void zone is made through the J, at that point radio range (R) of the present hub will be expanded by changing transmission power (Pt) however much as could reasonably be expected, and information will be sent toward the goal hub if conceivable.

B. BlockDiagram

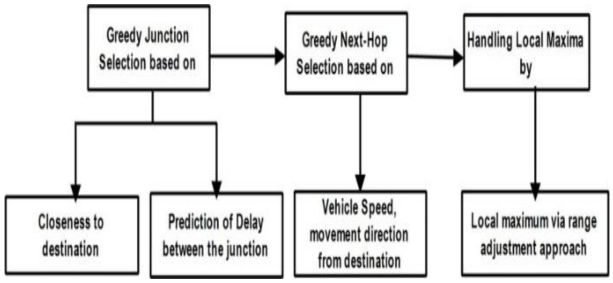

Fig. 1. Block diagram of the Proposed Protocol

C. ProposedSystem:

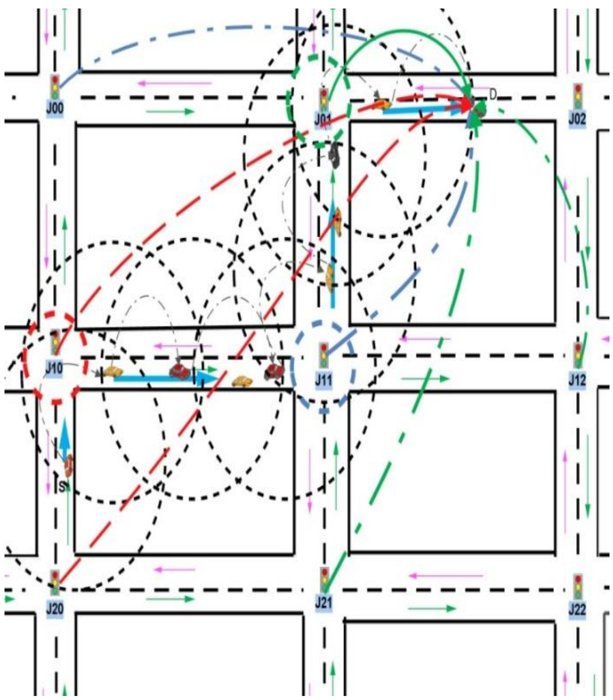

Fig. 2. Architecture for proposed junction selection mechanism

In this segment, we presentthe details ofproposed protocol. Fast and Reliable Greedy Routing protocol (FRGR) is pro- posed for reliable VANET communication. Proposed protocol is the intersection based greedy routing protocol operates in three phases. i) Greedy Junction selection ii) Greedy next hop selection within the junction and iii) Handling of local maxima (Void Zone) by implementing the range adjustment approach.

1. Greedy Junction Selection: In first phase, Junction Se- lection is done on the basis of the closeness to the nominated junction to the destination and expectedTime to reach the vehicle from current junction to nomination junction. The junction with least distance to the destination and less ExpectedTimetoreachthemessagethroughvehiclefromcurrent junctiontonominationjunctionisselectedasanchorpoint.

2. Greedy next hop selection: After selecting the greedy junction, the best next hop node selects within the greedy junction based on positive progress, neighbor distance from destination.

3. Handling of local maxima: At the time ofdata$\frac{D_n}{D}$transmission if it falls into void zone within the nominated junctionwhichisshowninfigure3and4.Inproposedprotocol wehaveimplementedtherangeadjustmentapproach.Inthis approach, we enhance the radioactive range of the particular relay node for that instance of time and again rebroadcast the hello message to find a neighbor.

To find the nominated junction

C= The current junction

N= The subsequent nomination junction

D_N=The distance between nominated junction (N) and Distance (D)

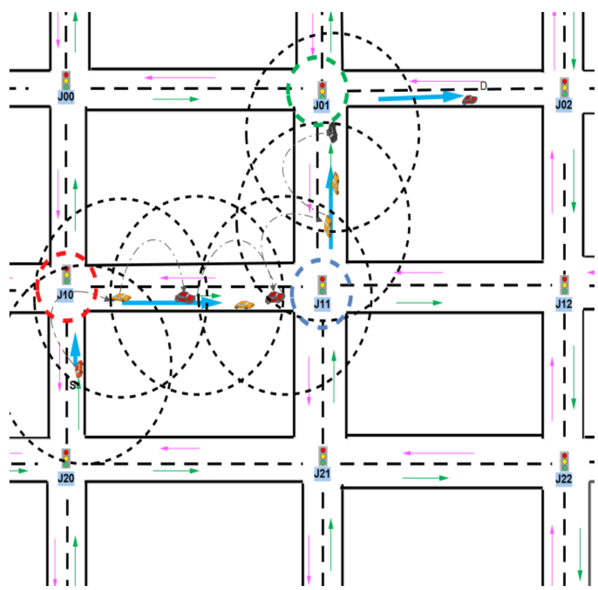

Fig. 3. Architecture for Void zone problem in junction selection mechanism

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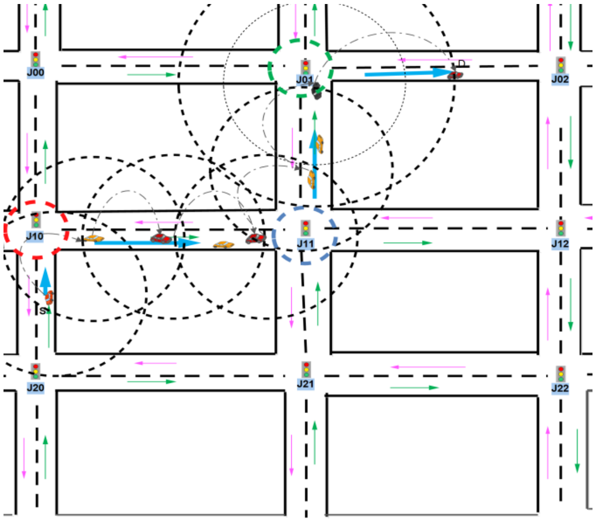

Fig. 4. Architecture to overcome of void zone problem in greedy next hop selection mechanism

D_C= The distance between current junction (C) and distance (D)

$D_p = \frac{D_N}{D_C}$(1)

The closeness of the nominated junction to the destination

L_{ij}= Euclidean distance of r_{ij}

ρ_{ij} =Avg vehicle density onr_{ij}, $\frac{Number\ of\ Vehicle\ on\ the\ Road}{Length\ of\ Road}$

V_{ij}= Avg vehicle velocity on r_{ij}

C = Constant used to adjust expected packet forwarding delay to a more reasonable value. (For one hop packet transmission delay)

R = Communication Range of vehicle / Wireless transmission range

$$D = \left(1 - e^{-R \times \rho_{ij}}\right) \times \frac{(L_{ij} \times C)}{R} + e^{-R \times \rho_{ij}} \times \frac{L_{ij}}{V_{ij}} \quad (2)$$

D_{ij}= Expected packet forwarding delay from $I_i$to I_j

Therefore, score of each junction (S_j) is calculated by

$S_j=\alpha * D_p+\beta * D_{ij}$(3)

α,β=scorecriteriaforvehicledensityanddistancerespectively. It is found, the lowest $S_j$among all the nominating junction. Lowest score of $S_j$will be selected as nominated junction to reach thedestination.

Algorithm 1 Junction selectionMechanism

1. **Procedure** GREEDY JUNCTION SELECTION
2. V [j]=Vehicles are periodically update the information of junction(j) by sending the hello message.
3. Source vehicle select the junction as a current junction(CJ) which is nearer to the destination.
4. (D_{CD}) ⟵ CalculatethedistancefromCJ(Current Junction) to Destination.
5. Find the nominated junction of CJ in NJ [][].
6. **For** each Nominated Junction NJ [][]**do**

   (D_{ND}) ⟵ Calculate thedistancefrom NJ (Nominated junction) toDestination.
7. CL_j ⟵ $\frac{D_{ND}}{D_{CD}}$
8. l_{ij} ⟵ Length between CJ toNJ[][]
9. R ⟵ Radioactive rang ofvehicle
10. d_{ij} ⟵ Average vehicle density on the road from CJ to NJ[][]
11. v_{ij} ⟵ Average vehicle velocity on the road from CN to NJ[][]
12. D_{ij} (Expected packetforwardingdelay) ⟵ $\left(1 - e^{-R \times d_{ij}}\right) \times \frac{(L_{ij} \times C)}{R} + e^{-R \times \rho_{ij}} \times \frac{L_{ij}}{V_{ij}}$
13. S_j(Score of eachnominatedjunction) ⟵ $\alpha CL_j+\beta D_{ij}$

14. **EndFor**
15. Return ⟵ minimum(S_j)
16. **End Procedure**

Algorithm 2 Greedy Next Hop selection within junction

1. **Procedure** GREEDY NEXT HOP SELECTION
2. Choose one Neighbor from its neighbor information list

   NBList$NBList_{Current\ Node}$ ⟵ Neighbor information list (NBList) of currentnode
3. $Current_{nominated}$ ⟵ Distance currenttothe $Nominated_{junction}$
4. $Neighbor_{nominated}$ ⟵ Distance Neighbor totheN$Nominated_{junction}$
5. $Current_{neigh}$ ⟵ Distance Current toneighbor
6. **While** $Current_{node}$= $Destination_{node}$**do**
7. **If** $NBList_{Current\ Node}$ = NULL**then**
8. **If** $Neighbor_{nominated}$< $Current_{nominated}$and $Nodelane(ID)$ = $Presentlane(ID)$ **then**
9. **If** $Current_{neighbor}$<*min***then**
10. *Mindist* ⟵ *Currentneighbor*
11. Nexthop⟵ID of Node
12. **EndIf**
13. **EndIf**
14. **If** destID ==ID of Node**then**
15. Nexthop⟵*node>ID*
16. Return nexthop
17. **EndIf**
18. **End If**
19. **End While**
20. **EndProcedure**

IV. SIMULATIONRESULTS

A. SimulationSetup:

Right now, assess the presentation of the proposed convention by utilizing NS2.35 test system in city like situation. The vehicular portability design is produced by utilizing SUMO (Simulation on Urban Mobility) and MOVE. The yield from SUMO is changed over by utilizing MOVE into input record for the development of hubs in the NS2 test system. The examination depends on a 2000 X 2000 rectangular city zone, which present a lattice design. Show in the Fig.5 which comprise of 17 two path streets with 12 intersections. In every street, a specific number of vehicles are send haphazardly. The underlying conveyance follows the traffic thickness circulation of the guide (for example Accordingly, bury space between the two vehicle become less). At that point the vehicle arbitrarily pick one of the convergences as its goal and move alone the street to arrive at the goal.

Along the road, the average speed of vehicle varies from 3- 15 m/sec; and so on. The vehicle nodes move at random velocity and can be set of keeping certain acceleration change.

For the wireless configuration, we have used the IEEE802.11p at the MAC layer. At the physical layer, we have utilized the shadowing spread model to portray the physical proliferation. We shift the quantity of vehicle from 100 - 200, and set a correspondence scope of every vehicle as 250 m for transmission with a channel limit 2Mb/s. We set the weighted elements (α, β) are to (0.5,0.5) in equ.3. Reproduction result are found the middle value of more than five runs. For investigating the impact of intersection determination and next covetous hub political race inside the intersection, two situations are thought of. In the principal situation, we thought about the choice of intersection, best next hub choice inside the intersection by period beaconing message and transmission of information parcel through those hubs to arrive at the goal.

In the second situation where we have thought about the determination of intersection and next hub choice inside the intersection by period beaconing message and event of neighborhood maxima (Void locale) at the hour of parcel sending from source to goal.

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Proposed convention is recreated both of the situation and its presentation is contrasted and the current convention (GyTAR) which is additionally executed on that situation utilizing store and convey forward system. Proposed convention is assessed the following metrics namely Packet delivery ratio, Avg. delay, and Routingoverhead.

B. ExperimentalRequirements

TABLE I
THE SIMULATION PARAMETERS ARE LISTED BELOW

Number of Vehicles	40-120
Mobility Generator	SUMO and MOVE
Area	$800mX750m$
Communication Range	$Vehicles - 300m,\ RSU - 300m$
Interface Type	$Phy\ /\ WirelessPhy$
MAC Type	$802.11p$
Queue Type	$Droptail\ /\ PriorityQueue$
Queue Length	$50packets$
Antenna Type	$OmniAntenna$
Propagation Type	$Two\ Ray\ ground$
Vehicle Speed	$5 - 15m/s$
Packet Rate	$01 - 10packet/s$
Packet Interval	$0.1 - 1.0Sec$
Routing Protocol	FRGR ,GyTAR
Transport Agent	UDP
Application Agent	CBR
Simulation Time	$80seconds$

C. Experimental Evaluation of proposedapproach

To assess the exhibition of proposed steering convention, we have looked at the presentation of proposed directing convention with GyTAR topography based directing conventions. The system model which is shaped from the recreation model that has various remote hubs which demonstrates the total system that will be reproduced.Scenario of the experiment are shown in the Fig.5.

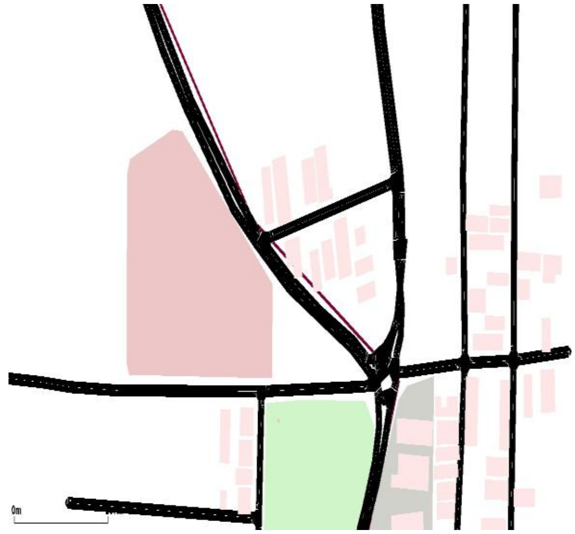

Fig. 5. Simulation Scenario for Proposed Protocol

1) *Impact of Network Density:* Packet Delivery Ratio (PDR):

It is the proportion of information parcels effectively got at the goal to those transmitted by the sender.

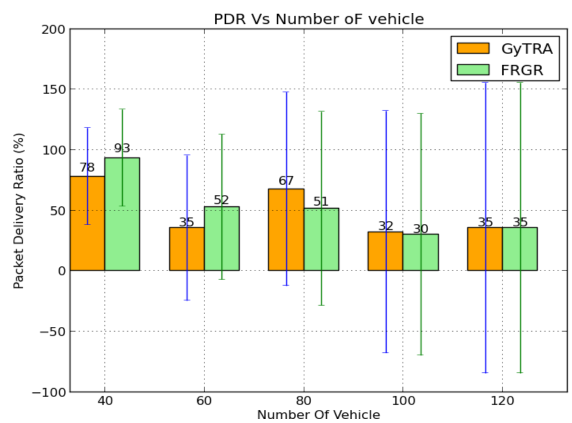

Fig. 6. Packet Delivery Ratio VS Changing vehicle(Nodes) density

Packet delivery ratio is estimated on vehicle mass in GyTAR and FRGR protocols in Fig.6. In case of low density FRGR shows the better result than GyTAR. Though vehicle density (80, 100) packet delivery ratio fall down but itimprovestheperformanceinhighdensityofvehicle (120).

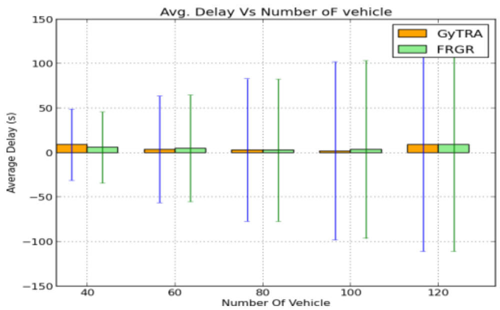

Fig. 7. Average Delay VS Changing vehicle(Nodes) density

Increment of traffic and speed of a vehicle on street side assume on significant job for security of a traveler. Mishaps might be maintained a strategic distance from if the driver is alert about explicit occasions like potential automobile overload, risky street condition (dangerous street cautioning, turning of street intersection, and so on) and those data are to be conveyed with the assistance of vehicle to vehicle correspondence. Here, proposed convention utilize the normal postpone data and figure the what number of information are ventured into the ideal goal before normal defer time. The exhibition of diagram of these convention is appeared in, fig. 7 dependent on the data.

Fig.8 delineates the assessment of directing overhead proportion between two previously mentioned conventions with the increments of vehicle thickness. Right now inclination of FRGR is apparent. GyTAR have all the more steering overhead proportion.Theessence of multi-attributes based junction selection (road density and expected packet forwarding delay) and greedy next hop selection (Speed, movement direction and distance) of FRGR prompts its compelling limitation in term of picking the middle people and productive utilization of system assets which therefore brings about noticeable restricting of control overhead.

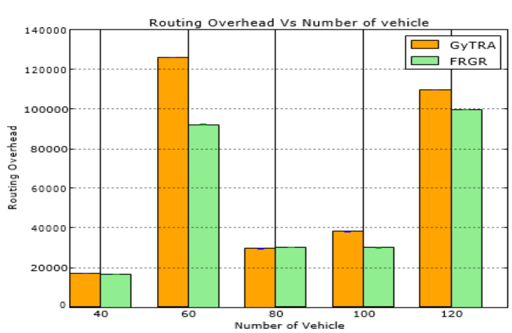

Fig. 8. Routing Overhead VS Changing vehicle(Nodes)density

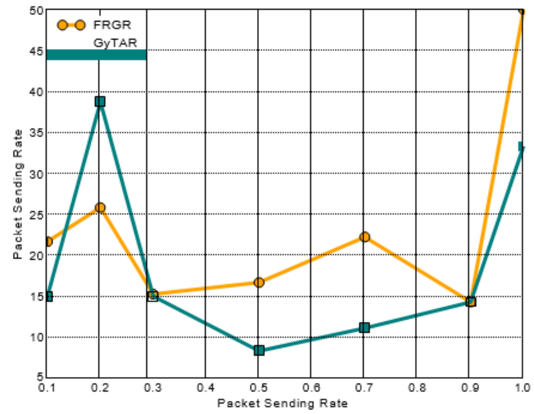

Fig. 9.Packet Delivery Ratio VS Packet sending Rate

2) *Impact of Packet sending rate:*

Here in simulation7 differentpacketsendingrateareconsidered,0.1(10packet/sec) , 0.2, 0.3, 0.5, 0.7, 0.9 and 1.0(1packet/sec)respectively.Number of vehicleis50whichisconstant. Packetdeliveryratiowiththechangesofpacketsending rateofthenetworkhasbeenshowninrespectofadatatransmissionatfigure9.AsshownintheFigure9,whichshowsthatFRGRgivesthebetterresultinpacketdeliveryratiowiththechangesof packet sending rate.

Figure 10 shown the performance of average delay with changes packet sending rate. In case of high packet sending rate proposed protocol shows the better result but with decrement of packet sending rate it shows more delay but itgivesfarbetterresultwhenpacketsendingrateisverylow.

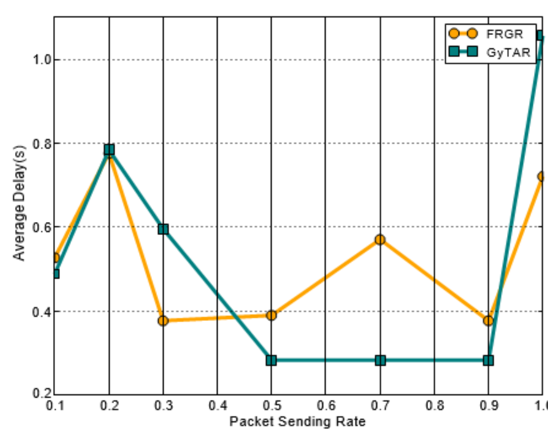

Fig. 10. Average Delay VS Packet SendingRate

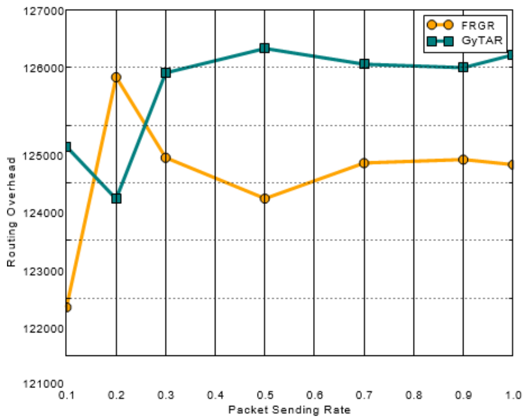

Fig. 11. Routing Overhead VS Packet Sending Rate

Performance of routing overhead with the changes of packet sending rate are shown in Fig.11 where proposed protocol gives high routing overhead in packet sending rate of 5 packets/ sec. but with the changes of packet sending rate our protocol shows far better result than GyTAR.

V. CONCLUSION

Safety of passenger isa challenging issue in VANET. In order to enhanced safety passengers, we will have to exchange 1) the road side information, 2) safety related information in road at urban environment in timely among the vehicle which are moving on the road. To achieve those in the proposed protocol, we have used the strategy of greedy junction selection and greedy next hop selection within the junction. We have also implemented range adjustment approach to overcome the local maxima at the time of data trans- mission. The result obtained from this work which indicates that the presentation of our proposed convention is superior to that of existing different methodologies regarding bundle conveyance proportion, delay, directing overhead in various thickness of vehicles and bundle sending rate. In this manner, apparently proposed convention will be capable for guaranteeing the safe of traveler by executing the quick and solid covetous directing methodology.

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