ENHANCED ROUTING PROTOCOL TO IMPROVE DATA TRANSFER RATE AND QOS IN VANET

A Dissertation proposal submitted in fulfilment of the requirements for the Degree of

MASTER OF TECHNOLOGY

in

COMPUTER SCIENCE AND ENGINEERING

By

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TOPIC APPROVAL PERFORMA

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1	Project Novelty: Potential of the project to create new knowledge	7.40
2	Project Feasibility: Project can be timely carried out in-house with low-cost and available resources in the University by the students.	7.80
3	Project Academic Inputs: Project topic is relevant and makes extensive use of academic inputs in UG program and serves as a culminating effort for core study area of the degree program.	7.20
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ABSTRACT

The vehicular ad-hoc networks are the unstable networks in which mobile nodes can join or exit the network whenever they want. The routing, security and quality of service are the three major issues of the networks. The routing protocols are used to establish path from source to destination. The routing protocols are mainly categorised into reactive, proactive and hybrid. The reactive routing protocol AODV is the best performing routing protocol in terms of various parameters. The link failure may occur in the established path from reduce efficiency of the network. In the base paper, node connectivity parameter checked for the path recovery from source to destination. In the proposed improvement the quality of service parameter will be added further to reduce possibilities of congestion. The proposed improvement leads to increase throughput, reduce packet loss, increase efficiency and reduce jitter.

DECLARATION STATEMENT

I hereby declare that the research work reported in the dissertation proposal entitled "ENHANCED ROUTING PROTOCOL TO IMPROVE DATA TRANSFER RATE AND QOS IN VANET" in partial fulfilment of the requirement for the award of Degree for Master of Technology in Computer Science and Engineering at Lovely Professional University, Phagwara, Punjab is an authentic work carried out under supervision of my research supervisor Mr. Md. Ataullah. I have not submitted this work elsewhere for any degree or diploma.

I understand that the work presented herewith is in direct compliance with Lovely Professional University's Policy on plagiarism, intellectual property rights, and highest standards of moral and ethical conduct. Therefore, to the best of my knowledge, the content of this dissertation represents authentic and honest research effort conducted, in its entirety, by me. I am fully responsible for the contents of my dissertation work.

Signature of Candidate

Pooja Joshi

11610253

SUPERVISOR'S CERTIFICATE

This is to certify that the work reported in the M.Tech Dissertation proposal entitled "**ENHANCED ROUTING PROTOCOL TO IMPROVE DATA TRANSFER RATE AND QOS IN VANET**" submitted by **Pooja Joshi** at **Lovely Professional University, Phagwara, India** is a bonafide record of her original work carried out under my supervision. This work has not been submitted elsewhere for any other degree.

Signature of Supervisor

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Gratitude cannot be seen or expressed. It can only be felt in heart and is beyond description. Often, words are inadequate to serve as a model of expression of one's feeling, specially the sense of indebtedness and gratitude to all those who help us in our duty.

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Finally, I would like to thank my parents and my family members for their constant support. I whole heartedly thank them all for their encouragement and support all the way from home from their hearts. I dedicate all my success to each one of them.

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LIST OF ABBREVIATIONS

SR. NO.	ABBREVIATION	STANDS FOR
1.	**VANET**	VEHICULAR ADHOC NETWORK
2.	**QOS**	QUALITY OF SERVICE
3.	**MANET**	MOBILE ADHOC NETWORK
4.	**DSRC**	DEDICATED SHORT RANGE COMMUNICATION
5.	**WAVE**	WIRELESS ACCESS IN VEHICULAR ENVIRONMENTS
6.	**GPS**	GLOBAL POSITION SYSTEM
7.	**AODV**	ADHOC ON DEMAND DISTANCE VECTOR ROUTING
8.	**LAR**	LOCATION-AIDED ROUTING
9.	**DGR**	DIRECTIONAL GREEDY ROUTING
10.	**GSR**	GEOGRAPHIC SOURCE ROUTING
11.	**A-STAR**	ANCHOR-BASED-ROAD AND TRAFFIC AWARE ROUTING
12.	**GyTAR**	GREEDY TRAFFIC AWARE ROUTING
13.	**CAR**	CONNECTIVITY-AWARE ROUTING
14.	**VADD**	VEHICLE ASSISTED DATA DELIVERY
15.	**ARBR**	ADAPTIVE ROAD BASED ROUTING
16.	**MIBR**	MOBILE INFRASTRUCTURE BASED VANET ROUTING
17.	**DV-CAST**	DISTRIBUTED VEHICULER BROADCAST

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Checklist for Dissertation-III Supervisor

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- ☐ Front pages are as per the format.
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CHAPTER 1

INTRODUCTION

VANET is a technology that is used in establishing a connection among moving vehicles and road side units. It is a fragment of Mobile Ad-hoc Network (MANET). VANET have following applications: (i) road safety (ii) seamless communication between nodes. VANET uses wifi, wifmax, Bluetooth for communication between source and destination nodes and also among intermediate nodes. VANET is basically used to ensure the safety of a moving vehicle.

1.1 Introduction

With the boom in the field of remote trades, its applications are being recognizable in light of auto with auto correspondence and uses benchmarks, for example, Dedicated Short Range Communications (DSRC) and Wireless Access in Vehicular Environments (WAVE). Both the models are depicted in IEEE 1609.1-4 and 802.11p freely.

With the extension in the area of wireless communication understudies and moreover auto organizations is extending around there. Everything considered, with 60–100 introduced sensors with their relating microchips, the contemporary automobiles are the best flexible enrolling stages that one could dream for. They are extremely versatile and they have a tremendous measure of embedded handling power. For security applications, auto wanders are similarly using VANET, at the present point the amount of potential applications have instantly stretched out past prosperity and now fuses distinctive sorts of employments as well. As every one of the node in vehicular impromptu system is in moving state which prompt change in topology powerfully. Because of this dynamic change in topology a few components like end to end delay, parcel conveyance proportion; jitter builds which prompt terrible connection. Due to the significance of this issue, there have been a few arrangements, proposed to comprehend

it. In this paper, we will portray a portion of the current arrangements and break down each of these arrangements, distinguish their qualities and impediments.

1.2 Communication in VANETS

One of the guideline zones of research examinations of correspondence among the vehicles and road side units more especially the vehicular exceptionally named framework (VANETS). In this framework each one of the vehicles and parts of roadside establishment related with each other without requiring a concealed structure, send and get information and give forewarning about current action condition [5]. Now a day's Wi-Fi IEEE 802.11 based advancement is generally used for sending VANETs. Every last one of the vehicles related with the remote structure interface can utilize either 802.11b or 802.11g. Both these rules are used to get media. These standards are extensively valuable standards and they don't fit properly in the essentials of high interesting framework. In this circumstance starting at now delineate the DSRC (Dedicated short-expand correspondence) has been proposed as the correspondence standard for VANET. It is used as a piece of those phases where short medium range correspondence benefits that are offered at low dormancy and high data rate. IEEE 802.11 standard infers that vehicles speak with in restricted range while moving [6]. These sorts of systems are extremely ideal designs conventions keeping in mind the end goal to build the compelling information packet trade, and lessen the transmission time and system use.

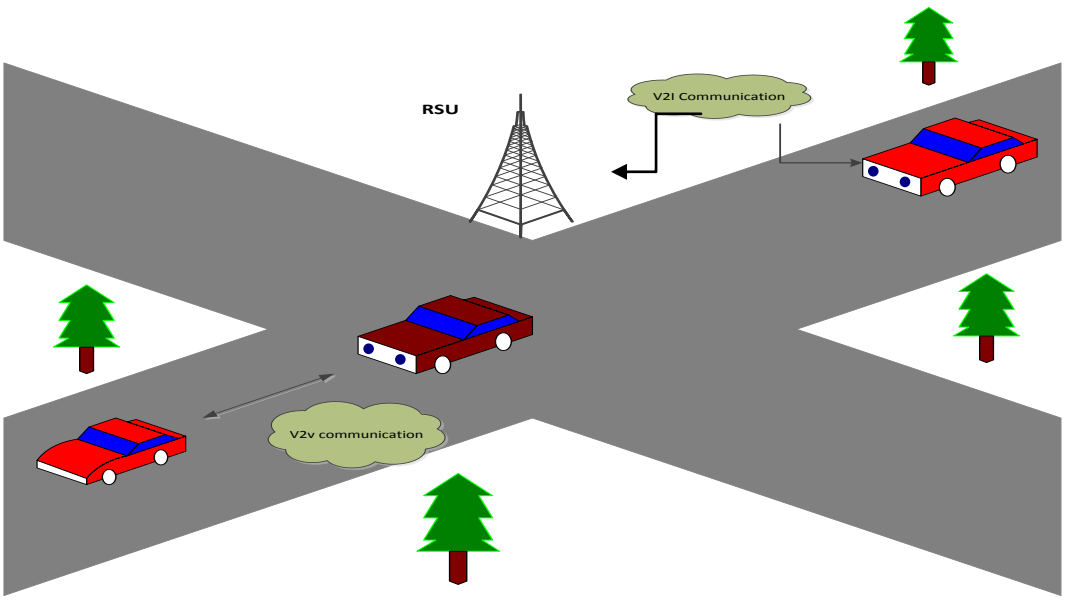

Figure 1.1: Communication in VANET

1.2.1 V2V communication

Corresponding to this, sending the concerned reference design together with the advance in heterogeneous correspondence the development between the vehicles. In the vehicular systems conceivably have two sorts of correspondence situations: auto to auto correspondence and other is auto to foundation situation. There are such enormous quantities of hotspots along the road such issue territories can work freely at home or office by the help of web gets to provider or fused worked. Vehicles can speak with different vehicles specifically without correspondence foundation; every one of the vehicles participate and forward data for the benefit of each other [9]. Blend of these sending cases is additionally conceivable. Later on design for canny transportation framework considers every one of the vehicles functioning as dynamic hubs that are in charge of gathering and sending basic data. Every one of the vehicles would have the capacity to gather and process data by methods for insightful sensor and to trade data with different hubs in worldwide communication framework.

1.2.2 In-vehicle communication

In-vehicle correspondence can be utilized to trade the data between various segments like vehicles. This framework generally utilized as a part of current vehicle that are available in today period. Mostly two application territories for in-vehicle correspondence it can be recognized into two sections: in the vehicle system of sensor, actuator and controller and second is high rate multi-media correspondence for comfort applications for instance traveller stimulation [8].

1.2.3 Vehicle to roadside communication

In vehicle to road side correspondence is also called a vehicle to establishment correspondence. In meantime vehicles pass on from the vehicle to a settled system. This correspondence in the two structures is unidirectional or bidirectional settled framework [10]. Convey structure reinforce the unidirectional exchange of information from rsu to the node. In this system the entire vehicle grants distributed with the base station. Base station makes planning with the corresponding node by using the physical synchronization and medium access. The Base station changes the excessive load and gives the entrance control in appropriate channel. Bidirectional advances additionally separate into the cell phone framework and little range framework. Existing cell foundation like GMS and UTMS and give data required framework constantly accessible. The little neighbourhood can give high information rates easily. Dependent upon the kind of air interface and establishment, the range in which VRC is possible varies from a few meters for remote neighbourhood to numerous kilometres for open radio structures.

1.3 VANET CHARACTERSTICS

Vehicular system have some exceptional conduct and qualities, recognizing them from different sorts of system. As contrast with different systems vehicular system have one of a kind and appealing highlights as take after:

- Unlimited transmission control: In the specially appointed gadgets control issues is primary compelling yet on account of this system nodes/vehicle give constant energy to figuring and specialized gadgets.

- Computational limit high: Operating vehicles can bear the cost of noteworthy registering, correspondence and detecting abilities.
- Predictable versatility**:** In the portable system where it is difficult to anticipate the vehicle portability, vehicles have extremely unsurprising developments that are constrained to roadways. Roadways data is regularly accessible from situating frameworks and guide based advances. As GPS depicts the normal speed, present speed and direction. The upcoming position of the vehicle can likewise be discovered with the help of this.
- High mobility**:** Vehicular systems work to a great degree dynamic. In the event that take the scenario of highways, relative speed of a node is up to 300 Km/h may happen while thickness 1-2 vehicle in 1 Km on opposite side where comparative accelerate to 60 Km/h and thickness of nodes is high particularly in congested scenario [11].
- Partitioned arrange**:** Vehicular system will be often grouped and dynamic nature of movement may bring gaps among the vehicles in highly populated situations in a few detached bunches of nodes.
- Network topology and availability: In the vehicular system situations are change from area to area. In the dynamic situations vehicle move and change their position frequently. System topology changes frequently as the connection between the nodes associate and disengage all the time. As the system is associated it profoundly rely on the two factors the scope of remote connections and the division of member vehicles, where just a small amount of vehicle out and about could be outfitted with remote interfaces. .

1.4 VANETs applications

VANETs applications situations exceptionally tremendous learning and planning stage is extremely troublesome may turn into an extremely dreadful activity. They are grouped into in such a path; for example, set of convention will execute for the applications from a provided class. The advantages of grouping them as take after:

- Develop a couple of uses models to address a generous number of employments with same properties having a place with similar class for application diversion and endorsements.
- Documentation of key execution estimations correlated to each perceived applications class, as standards for surveying whether sketched out application part can encounter essential necessities instructed by application classes.
- Generate frameworks organization tradition stacks for every class of employments, with the possibility of upgrading reusability of essential automated frameworks organization traditions.

1.5 VANET Protocols

In VANET, routing protocols are used for finding the best path from sender to the target node. These routing protocols help in providing best and efficient path for data transmission. Different protocols are used according to the need of the network. Protocols are classified into five categories: Topology based routing protocol, Position based routing protocol, Cluster based routing protocol, Geo cast routing protocol and Broadcast routing protocol.

1.5.1 LAR Protocol

Area based directing conventions have attributes alongside plan engineering which make vehicular correspondence additionally difficult. There are three general classes of systems as cell, ad-hoc and half breed. Cell organizes bolsters infotainment, for instance, most recent news, data of region. This depends on vehicle to framework worldview. As the current framework is available and bolster extensive variety of vehicular applications. Yet a downside is that the prerequisite of settled framework organization. It is tackled by ad-hoc systems where earlier frameworks are not required. It is more appropriate for vehicle to vehicle correspondence. Be that as it may, it likewise faces issues because of system parcelling and steering join disappointments and quick topology changes.

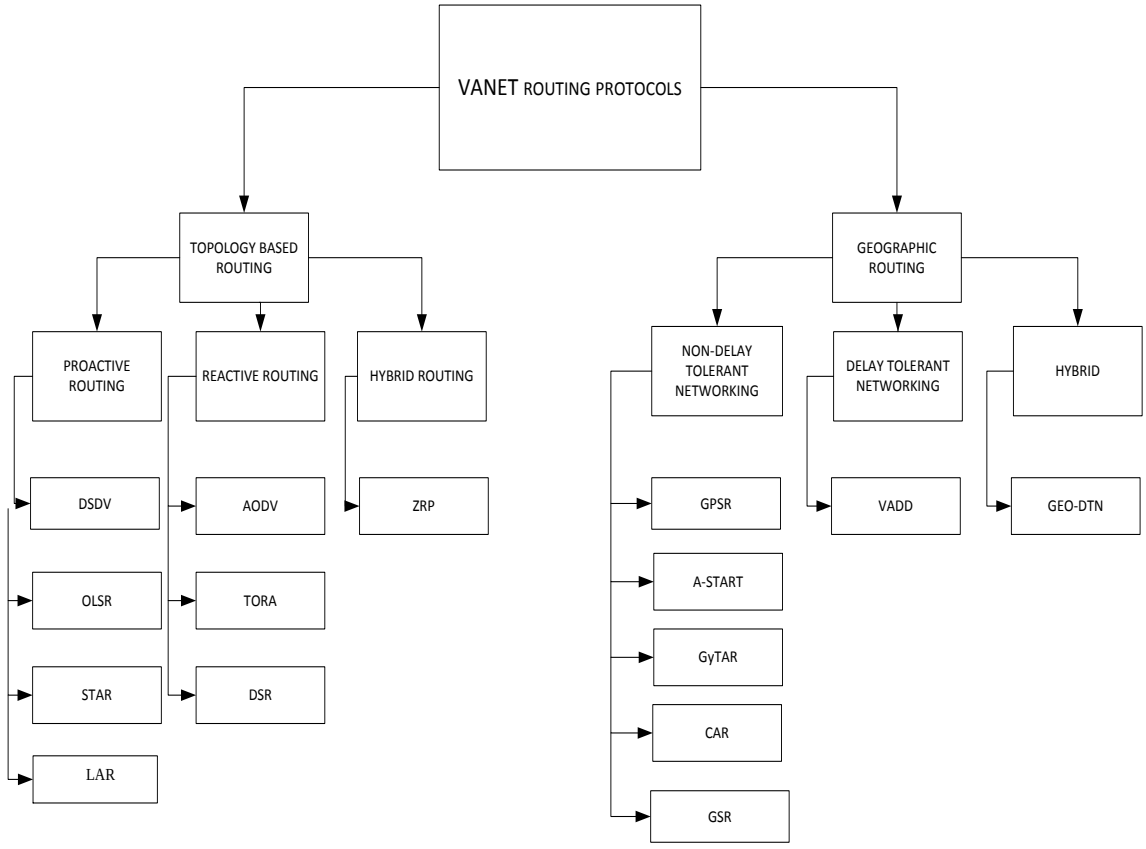

Figure 1.2: VANET TAXONOMY

The arrangement of this issue is the sending of the entrance focuses along the street and in the event that there is no issue with respect to vitality utilization. In crossover correspondence, cell arrangement depends on unified design which gathers activity data from street through access point/station. Then access point forms procured data and make handy for drivers. The dynamic idea of vehicular correspondence, fast of vehicles, and versatility brings about debased execution in conventional steering conventions. Customary specially appointed directing conventions [11], [12], [13], [14] tended to the issues of portable improvised system and are material for MANET applications. They experience the ill effects of high portability and unstable nature of vehicular correspondence. It has been proven that position-based steering conventions are more suited to very powerful and portable system. Following are the sending methodologies:

- Greedy forwarding- As per the situation delineated in Fig.1, if ravenous sending methodology is utilized at that point, source hub advances the bundles to a hub nearest to the goal 'D'. For this situation 'S' sends packet to 'A'.
- Improved avaricious sending for this situation, source hub initially counsels its neighbour table and registers new anticipated position of every one of its neighbours in view of heading and speed and after that it chooses a hub nearest to the goal. 'S' registers new expected position of its neighbours and assume at time T2, vehicle 'B' takes over 'A', then 'S' chooses 'B' as its next hop rather than 'A'.
- Directional covetous sending approach considers all those nodes that are approaching towards goal. It chooses a hub which is moving towards goal and is nearest to the goal. Along these lines, it chooses vehicle 'B' as its next jump.
- Predictive directional avaricious sending: In this system, sending nodes keep the data of its 2-bounce neighbours. Before sending the packet, sending node counsels its neighbour table and processes anticipated position of every one of its neighbours and after that chooses a hub whose one-jump neighbour is moving towards the goal and is nearest to the goal. For this situation, 'S' chooses vehicle 'An' in light of the fact that its one-bounce neighbour 'C' is moving towards goal 'D' and will transmit the data packet to 'D'.

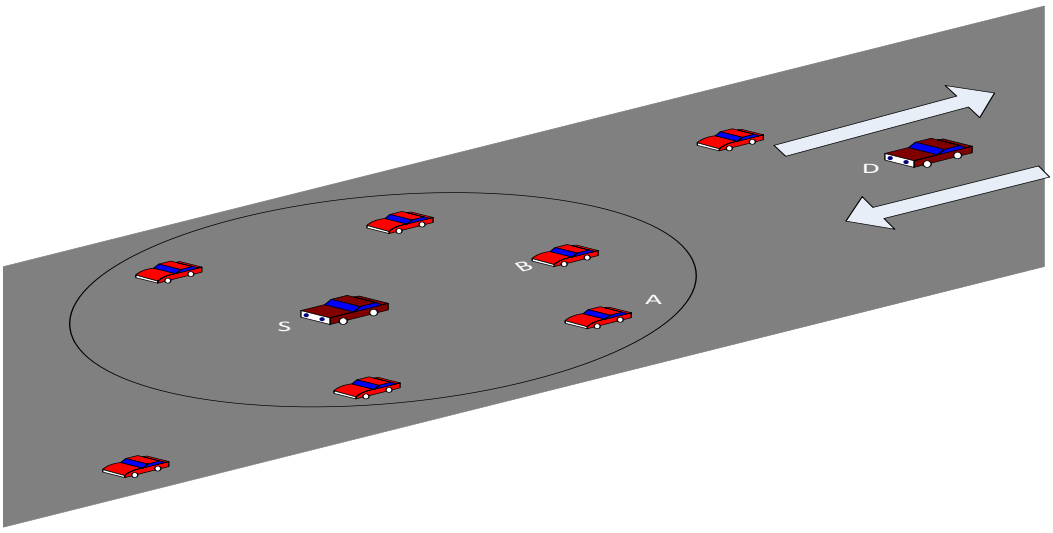

Figure 1.3: LAR Working

1.5.2 DGR (Directional Greedy Routing)

DGR diminishes jump tally amid steering by picking the hub moving towards the goal range. Further, PDGR (Predictive Directional Greedy Routing) upgrades the Directional Greedy Routing convention by foreseeing the portability of the vehicle and getting this versatility data from movement example and road design.

1.5.3 GSR (Geographic Source Routing)

GSR utilizes Dijkastra's most limited way calculation on a guide from GPS framework. It figures most brief way on each of the intersections and by utilizing eager sending technique along the way to next intersection until the point that goal is come to. In spite of the fact that, for this situation no continuous activity data is utilized for way determination of the following hub may stop at nearby most extreme and for recuperation it select another vehicle outside that street utilizing avaricious sending. GSR is mix of position based and topology based steering and it is receptive area benefit. It has high overhead on arrange because of utilization of reference points however more versatile and appropriate for scanty system.

1.5.4 A-STAR

A-STAR is the position based directing plan called as Anchor-based-road and Traffic Aware Routing. It utilizes city transport courses to recognize a grapple way for bundle conveyance with high network. By considering number of transport line on street, it gives activity attention to better basic leadership towards chose way as more vehicle thickness lets down the odds of neighbourhood most extreme circumstance. On the off chance that nearby most extreme happens then street is set apart as out of administration and recalculation of way happens.

1.5.5 GyTAR (Greedy Traffic Aware Routing)

It proposes for city conditions which depend on crossing point and makes utilization of geological steering convention. It has two sections: intersection determination and sending information between two intersections. Computerized maps are utilized to distinguish the position of intersections and furthermore to locate the most brief way towards goal by means of Dijkastra's most limited way calculation.

1.5.6 EGySTAR

It is the changed variant of GySTAR steering convention. It chooses intersection progressively as it depends on vehicular movement thickness toward the goal and separation to the goal. It takes out impediment of GySTAR by considering the bearing of the vehicles previously choosing the following intersection. The score is appointed to every intersection in like manner and intersection having most astounding score is chosen as next goal intersection has higher vehicular activity moving in bearing of goal.

1.5.7 CAR (Connectivity-Aware Routing)

It uses beacon signals for establishing connection with neighbour. For finding the active location of destination this protocol uses guards: standing guard and travelling guard here standing guard contains temporary state information and the later one contains information of velocity vector. The upside of CAR is that it is substantially more reasonable for VANET than GPSR and GSR as far as information conveyance proportion and system throughput. Moreover, CAR gives the most minimal postpone contrasted with the GPSR and GSR.

1.5.8 VADD (Vehicle assisted data delivery)

VADD relegates cost to edges between every two crossing points by proposing defer model to appraise information conveyance delay in various streets. VADD is furnished with computerized guide and movement insights, for example, activity thickness and vehicle speed on streets at various circumstances of the day. As per the data, VADD convention proposed a defer model to appoint cost to each edge. With these

cost, VADD processes the briefest way from the source to the goal by a credulous ideal sending way determination calculation.

1.5.9 ARBR (Adaptive Road Based Routing)

It utilizes two components to expand packet conveyance proportion and to diminish the deferral. Initially, a top notch steering way amongst source and base station hub is found and information parcels are sent along that found way. After that Path upkeep is performed by refreshing steering data of course answer bundle in halfway

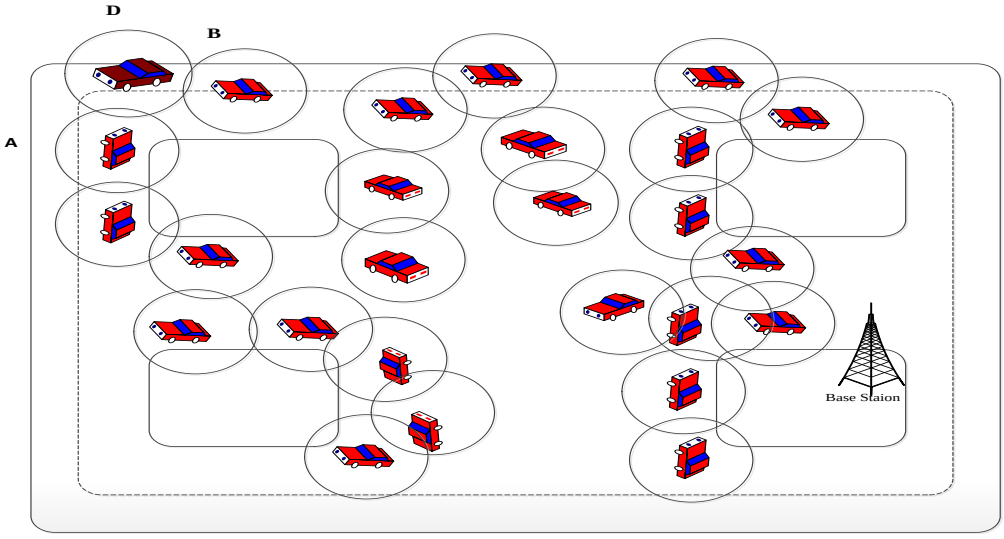

Figure 1.4: ARBR Protocol

1.5.10 MIBR (Mobile Infrastructure Based VANET Routing)

It assume that source node know its destination point through GPS. After that road segments are selected one after the other segment. The quality of transmission of each segment is considered and the next segment having minimum hop count to the destination is considered. For estimation of minimum hop count first estimate hop count of each road segment. MIBR estimates the density of each road segment based on the bus line information for road segment selection, and prefers buses to ordinary nodes as the forwarding node. A routing protocol MIBR is developed. Both the transmission quality of each road segment and different transmission abilities of various vehicles are considered in the algorithm.

1.5.11 DV-CAST (Distributed Vehiculer Broadcast)

It is a conveyed communicates convention that depends just on neighbourhood topology data for taking care of communicates messages in VANETs. DV-CAST can deal with the communicate storm and disengaged organize issue at the same time. The calculation depends just on GPS data of the one-jump neighbours and does not need any brought together nodes or roadmaps. DV-CAST convention comprises of three noteworthy segments: neighbour location, communicate concealment, and store-convey and forward components.

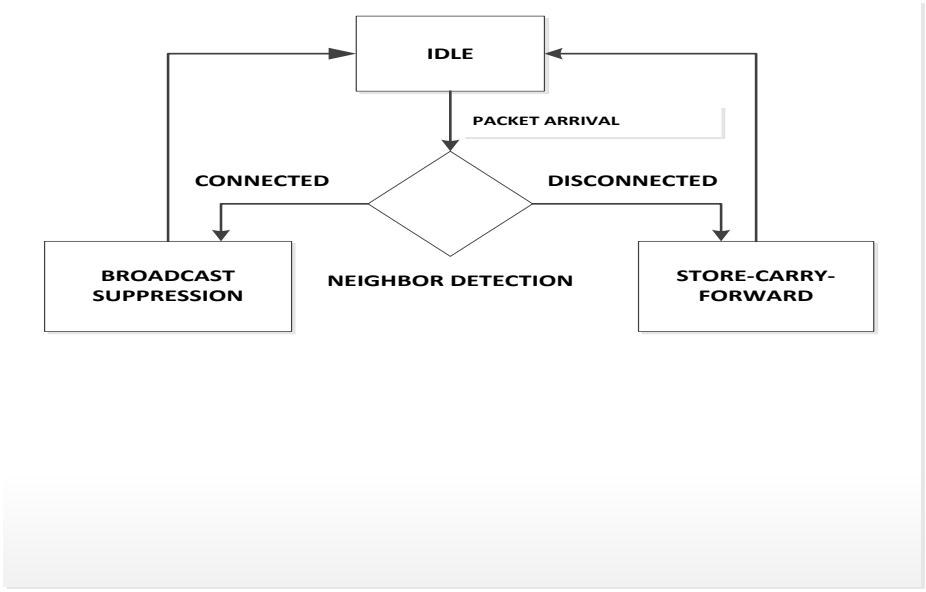

Figure 1.5: DV-CAST Protocol

CHAPTER 2

REVIEW OF LITERATURE

Kaur et al. (2016) represents a viable routing system assumes an indispensable part, to upturn the Quality of Service parameters. To deal with this Ant Colony Optimization (ACO) and been connected, and to complete the analysis Opportunistic Network Environment (ONE).Simulator is being utilized to learn about bundle drop, overhead proportion, normal inactivity and throughput. We examined essentially four execution measurements (overhead proportion, normal dormancy bundles dropped and the throughput) signs that our proposed approach is more successful and reliable in correlation of existing directing calculation. The objective of refining the QoS in these frameworks is finished using ONE test framework. A meta-heuristic figuring, Ant Colony Optimization (ACO) is associated with procure coordinating set-up and the proliferation is finished in ONE test framework. To make the re-enactment more illustrative an honest to goodness city plots with the test system has been coordinated.

Kumar et al. (2012) speak to a paper in light of the VANET vehicular specially appointed systems are up and coming remote system condition for astute transportation framework. In the VANET, applications expand based on the information push correspondence demonstrate where data has been spread to some set of vehicles. There are large numbers of VANET applications. Their correspondence convention requires a deliberate writing overview. In this paper mostly characterize the VANET applications in view of the different telecom information dispersal conventions are reviewed independently and their essential qualities are uncovered.

Patil V.P (2012) proposes that the vehicular specially appointed system is a sort of portable spontaneous system where nodes are obliged to travel along the street. In VANET, gadget share information with each other through the assistance of radio gadgets and alongside the RSU named as base stations. Vehicular systems expect to make the route knowledge sheltered, effective and charming. Vehicle activity clog is imitated

as postponements while voyaging, it likewise have various negative impacts and make a noteworthy issue in the general public. There are such a large number of system has been given to manage this issue. In this paper recommend more creative way to deal with manage this movement blockage issue utilizing the attributes of vehicular specially appointed systems (VANET). This framework is produced and tried utilizing the AODV convention is specially appointed portable system to manage the issue of vehicle activity blockage in vehicular system. Movement blockage can be measured on following examples like parcels communicate level of bundle conveyed and level of activity occupied and overhead to deal with the issue of information activity in the system. In the fundamental reproduction demonstrates the area of vehicle movement clog in VANET is illustrated [15].

Aswathy et al (2012) represent a paper on vehicular impromptu system are unique sort of versatile specially appointed system (MANET). It considers the street vehicles as the nodes of the system. With the assistance of VANET give us numerous applications as a smart transportation framework. In the dynamic system, designs and nodes development attributes separates VANETs from other sort of specially appointed systems. A frequent change in topology abbreviates the viable time of directing. Directing in the VANET is very confused errand. AODV (specially appointed on request remove vector) generally utilized as a part of the topology based steering convention for VANET. Amid the procedure of course disclosure process AODV communicate course message (RREQ). It creates numerous idle courses between a sender and target node. The principle plan of this paper is to enhance the execution of AODV by improving the current convention by making constant groups and carrying out routing by bunch head and entryway nodes [2].

Rakesh Kumar et al. (2011) speaks to a paper on vehicular specially appointed system is subclass of portable unarranged system which gives recognition to clever transport framework (ITS). As per the overview it is exceptionally important to utilize the ITS with the assistance of VANET steering convention. In paper additionally talk about the preferred standpoint and drawbacks, uses of various directing conventions for vehicular specially appointed systems. This paper additionally investigates the inspiration

driving the outlined and follows the development of this directing convention. This paper additionally demonstrates the forbidden examination with different steering conventions for VANET [12].

Luo et al. (2010) presents an area based responsive directing convention. It is used for enhancing packet conveyance proportion and throughput. This convention utilizes transports, as a key part in course choosing and packet sending. The idea of utilizing transports as the portable framework is to enhance the system network in VANET. It is assumed that source node know its destination point through GPS. After that road segments are nominated one by one. The transmission quality is considered per segment and the subsequent segment having minimum hop count to the destination is considered. For estimation of minimum hop count first estimate hop count of each road segment. The traffic on the road is estimated according to the number of buses on road, more the number of buses more congestion will be present and more hop counts will be there. So the street with least number of transports is considered. So the sending neighbour is chosen by the "transport first" which expresses that if the neighbour table contains any transports on the following street section, pick the one which is closest to the intersection after the following intersection else pick a normal auto which is nearest to the intersection after next. On the off chance that the neighbour table does not contains any vehicles on the following street section, and parcel is presently on a transport: pick a transport with least separation to the following intersection, else pick a vehicle which is nearest to the following intersection.

The primary favourable position of utilizing MIBR is that it accomplishes the most astounding packet conveyance proportion when contrasted and GPSR convention on the grounds that the distinction of transport and customary auto is considered and transports are given higher needs to wind up noticeably the following jump in some circumstance. Furthermore, the algorithmic multifaceted nature of MIBR is low, and the sending is simple in light of the fact that no static hubs or RSUs are required. The single point of failure can occur while estimating the number of buses present on the road because number of buses decides the traffic on the road.

Tonguz et al. (2010) proposed an appropriated communicate convention that depends just on nearby topology data for taking care of communicates messages in VANETs. DV-CAST can deal with the communicate storm and detached system issue at the same time. The calculation totally depends on the GPS data of the one-jump neighbours and does not involve any brought together hub or maps. DV-CAST convention comprises of three noteworthy segments: neighbour discovery, communicate concealment, and store-convey and forward components**.** The single point of failure is also possible due to the continuous transmission of hello packets because these hello packets can lead to network overhead when the nodes present in the network are more in number.

Lui et al. (2008) introduced a multicasting routing protocol called geographic source routing. This protocol provides benefit for drivers in understanding the current traffic conditions for congestion avoidance and make optimal routing. GSR eliminates the broadcast storm problem by using the improved directed broadcasting. The impact of activity controls is additionally dissected and a bundle sending system is presented which is likewise appended with the convention. GSR provides help for drivers to acquire real-time traffic conditions and possibilities of any designated areas. Initially, driver should tell its destination. After knowing the details of destination, the on-board system will compute the effective route to reach the destination. Vehicular node will broadcast the querying packet to direct neighbor. The querying packets include the details of vehicle location, vehicle ID, destination name, destination point and a scaling factor F. F is primarily 0 and the source distance from destination is denoted by R. When packet is received by direct neighbor the value of F is incremented by 1.

The advantage of GSR is that on the basis of binary selective flooding algorithm; enough road traffic status can be collected by vehicle and then it is displayed by using the on-board screen. This technique does not result in communication storm though it is adaptable to regulator the limit of multicasting. Notwithstanding, DSR can be utilized when a given road does not have enough network since it can discover different courses.

The single point of failure in GSR is its frequent route breaks. This proposed protocol provides a slightly lengthier path to the destination node. The reason is that DSR chooses any node with frequent movements, this leads in frequent route breaks. The main

drawback of DSR is that DSR consumes more bandwidth for routing overheads. It creates bigger packets because during the route discovery phase the source route is present in the headers, which leads in substantial bandwidth overload.

Farooq et al. (2008) speak to a paper on properties and audit the fundamental example of system routing calculation from base up configuration has been motivated by aggregate conduct of social creepy crawlies, for example, ants and honey bees. The class of bio-enlivened directs calculations to incorporates a generally extensive number of computations for the most part created amid a year ago's and for the most part propelled by subterranean insect state conduct. It represents the greater part of occasion of swarm knowledge calculation for directing. The attributes acquired by the organic frameworks of motivation normally enable this calculation with qualities, for example, self-sufficiency, self-association, adaptively, power and versatility a bit much properties to manage the difficulties of present and cutting edge systems. In this paper characterize the diverse classes of wired and remote systems. Every class talk about the qualities of insect and honey bee settlement motivated calculation. In this paper additionally demonstrate the particular highlights and talk about the general advantages and disadvantages in relationship to the best in class [3].

Zhao et al. (2008) introduce a tradition which grasped convey and-forward for data transport from a moving vehicle to a static objective. The most vital issue is choosing a sending way with least deferral in conveying the parcel starting with one bounce then onto the next. VADD convention endeavours to keep the low information transmission delay by sending bundles through remote channel. In VADD, when a parcel needs to helped through streets, the street with higher speed is chosen. Most astounding pace shows that there is less number of hubs introduce out and about which result in least deferral. VADD allocates cost to edges between every two convergences by proposing postpone model to gauge information conveyance delay in various streets. VADD is outfitted with modernized guide and action estimations, for instance, development thickness and node speed on roads in various conditions of the day. VADD convention proposed a postpone model to dole out cost to each edge. With these cost, VADD processes the briefest way from the source to the goal by a credulous ideal sending way

determination calculation. The Disadvantage of VADD is that can't uninhibitedly choose the active street to forward the packet at every crossing point.

Lee et al. (2007) presents a routing protocol for wireless datagram networks. This protocol use routers position and a destination address of packet to make decisions for forwarding data packets. It utilizes eager sending calculation to forward information bundles starting with one jump then onto the next. GPCR utilizes the idea of intersection hubs to control the following street portions that bundles ought to takes after. It contains two stages: a confined eager sending and a recuperation stage. There are three noteworthy feeble purposes of GPCR. To begin with, the intersection hubs are chosen at first and afterward in like manner the information transmission is finished. Because of this, the overhead of the convention increments. Second, to perceive that intersection hub, which is broken present inside GPCR, makes it extremely hard to stay away from the nearby maximums and subsequent bounce decrease. Third, in spite of the fact that the intersection hub identification calculation is exceptionally compelling, however at times sending to a hub at an intersection isn't essential and counter-gainful in light of the fact that multiple occasions intersections are not basic.

Naumov et al. (2007) proposed a position based steering plan which is intended for between vehicular correspondences in a city. In this convention, all hubs contain data about their moving bearings and speeds in the intermittent HELLO reference points. At the point when a hub gets a HELLO signal, it includes the sender data of that reference point in its neighbour table, at that point evaluates its own particular and the neighbour's speed vectors, and sets the lapse time for the section in the neighbour table. The section terminates after a period when the places of the present hub is assessed and the neighbour end up plainly isolated by over 80% (configurable) of the normal scope extend, or after two HELLO interims. Another HELLO reference point from the neighbour refreshes the section. In the meantime, if the speed vector data evaluates the accessibility of a hub, the beaconing rate can be made versatile.

CAR uses beacon signals for establishing connection with neighbour. For finding the active location of destination this protocol uses guards: standing guard and travelling guard here standing guard contains temporary state information and the later one contains

information of velocity vector. The upside of CAR is that it is significantly more appropriate for VANET than GPSR and GSR as far as information conveyance proportion and system throughput. What's more, CAR gives the most minimal postpone contrasted with the GPSR and GSR. The burden of utilizing CAR is HELLO beaconing with a settled period (with and even without jitter) may have a few downsides, for example, squandered transfer speed, deferring of information, expanded system clog.

Tahar et al. (2007) speaks to a paper on a specially appointed vehicular system where vehicles such as auto, cars, bus can expect as nodes of the system. As of late for driver comfort and street security, the between vehicle communication ended up noticeably, expanding a subject of valuable research. On VANETs steering convention have an awesome result where AODV is a standout amongst the supreme prevalent directing convention committed to improvise system it can utilize the flooding methods to find the goals and potentially increase the load in the system. To defeat this issue utilized the multi point hand-off calculation in the AODV convention keeping in mind the end goal to lessen the quantity of messages communicated amid the flooding strategies. In the ns2 recreation directed utilizing parameters that estimated the truth, for example, road topology, and dynamic versatility with fast and high movement thickness. This re-enactment demonstrates the broadened AODV utilizing MPR lessens the heap and execution superior to anything the standard if there should arise an occurrence of AODV utilizing MPR decreases the heap and perform superior to the standard in the event of movement with lively speeds [4].

Haerri et al. (2005) proposed that the vehicular specially appointed system (VANET) is an occasion of MANETs that sets up remote association among the diverse nodes. According to the abilities and necessities directing convention and different strategies must be adjusted. In the past research, routing implementation is extraordinarily needy to the approachability and solidness to the remote connections, this procedure does not give the exact outcome to quantify this issue utilize the VANETs. In the directing calculation have just been broke down and look at in the past reproductions and correlation have quite often been finished by arbitrary movement. However, we play out these outcomes on the sensible urban vehicular movement designs. In his paper we

assess AODV and OLSR execution in sensible urban situations. This paper additionally contemplated the diverse conventions under the changing measurements, for example, hub portability and vehicle thickness with shifting movement rates. In this paper likewise demonstrate the grouping impacts made via autos conglomerating at crossing point's impact sly affect assessment and execution measurements. Fundamental goal is to give a subjective appraisal of the pertinence of conventions in various vehicular systems.

Karp et al. (2000) have presented Insatiable Perimeter Stateless Routing that utilizations geology to accomplish little per-hub directing state, little steering convention message multifaceted nature, and greatly strong bundle conveyance on thickly sent remote systems. GPSR produces steering convention activity in an amount autonomous of the length of the courses through the system, and in this way creates a steady, low volume of directing convention messages as portability increments, yet doesn't experience the ill effects of diminished power in discovering courses. GPSR keeps state corresponding to the quantity of its neighbours, while both activity sources and middle of the road DSR switches store state relative to the result of the quantity of courses learned and course length in jumps. GPSR's advantages all originate from geographic steering which utilize just quick neighbour data in sending choices.

The advantage of using this protocol is that it can overcome the problem of local maximum by using the perimeter mode in this mode right hand rule is used for routing the path from source to target node. The single purpose of disadvantage is the upkeep of planar charts at every hub presents a huge overhead. While all hubs need to keep up the planar chart constantly, this data is just utilized by hubs confronting the nearby least marvel.

Table 2.1: COMPARISION TABLE

Protocols	**Forwarding Strategy**	**Recovering Strategy**	**Mobility Model**	**Digital Map**	**QOS Parameters**		
					Delay	Packet Delivery Ratio	Scalability
GPCR[17]	Greedy Approach	Flooding	VanetMobsim	No	Less	Average	Good
GSR[18]	Greedy Approach	Flooding	M-Grid	Yes	Less	Average	Good
CAR[19]	Trajectory	Node Awareness	MTS	Yes	Less	Average	Good
GPSR[20]	Greedy Approach	Flooding	Ns-2	Yes	Less	Good	NA
VADD[21]	Opportunistic	Store and forward	Ns-2	Yes	More	Good	NA
ARBR[22]	Opportunistic	Node Awareness	Opportunistic Network Environment simulator	Yes	Less	Good	NA
MIBR[23]	Opportunistic	Store and forward	VANETMobsim	Yes	Less	Average	Good
DV-CAST[24]	Opportunistic	Store and forward	RWP	No	More	Good	Poor

CHAPTER 3

PRESENT WORK

3.1 PROBLEM FORMULATION

The vehicular ad-hoc network is the distributed network in which vehicle nodes can enter or exit the network when required. Due to high mobility of the vehicle nodes security, routing and quality of service are the three major issues of the network. To establish a secure and efficient route from sender to target node various routing protocols are used. These routing protocols are classified into reactive, proactive and hybrid. The AODV is the reactive type of routing protocol in which source will broadcast the route request packets. Then the nodes adjacent to target will acknowledge that request with the route reply packets. The source selects best path from source to target based on the total number of hop counts and sequence number. The path which has selected is shortest and reliable. Due to high node mobility there is very chances of link failure which reduce quality of service. In the base paper, technique is proposed for the path recovery on the basis of node connectivity. The node which has high connectivity will be selected as best node for the path recovery. To maintain quality of service in the network, buffer size parameter will be added to reduce the probability of congestion in the network

3.2 OBJECTIVES OF THE STUDY

The aim of the study is:

- To analyze and improve the network reliability by enhancing the AODV protocol
- To Propose enhancement in path recovery algorithm to maintain quality of service in the network
- The novel technique will be based on addition of congestion control parameter which increase network reliability and throughput
- To implement proposed technique and compare results with the existing problem.

3.3 RESEARCH METHODOLOGY

The VANETs is the specially appointed systems which are the self arranging kind of system. The self arranging implies that any versatile node can join or leave the system when they need. The nodes are sent in the system and a way is built up as indicated by AODV convention from source to destination. There are some nodes in the path having much movement than other nodes. Due to these nodes link failure problem occurs. So link failure problem is responsible for performance degradation and low reliability of the network. In the technique of base paper, the parameter of node connectivity is considered to recover path from source to destination. The mobile node which has maximum energy is selected as the best node for the path recovery. In this research, the congestion control parameter called buffer size will be considered which also reduce chances of congestion in the network.

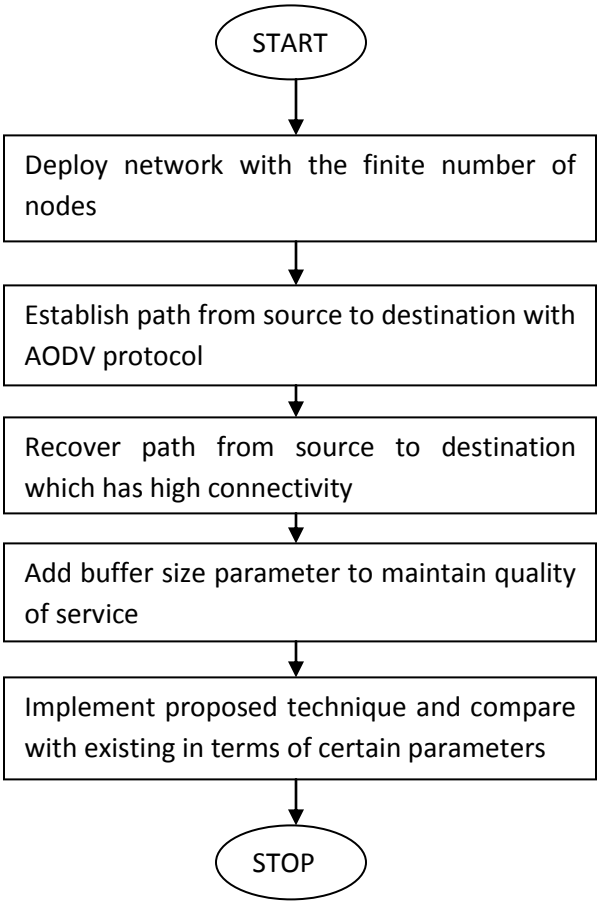

Figure 3.6: Proposed Flow chart

CHAPTER 4

RESULTS AND DISCUSSION

4.1 EXPECTED OUTCOMES

Various expected outcomes of this research are as follows:-

- This research work is based on the maintenance of quality of service in the network. The buffer parameter will be added which will help in reducing the chance of congestion occurrence which leads to increase network throughput.
- The proposed improvement can be further compared with other algorithms which maintain quality of service, this leads to test the reliability of algorithm.

CHAPTER 5

CONCLUSION AND FUTURE SCOPE

The vehicular Ad-hoc systems are the decentralized sort of system in which portable nodes join or leave the system when required. Due to dynamic nature of the network, routing is the major issue which reduces network efficiency. The routing protocols are broadly classified into reactive, proactive and hybrid. The AODV protocol is the reactive routing protocol which establish path from source to target node on the basis of hop count and sequence number. In the base paper, the improvement in AODV protocol is proposed for the link recovery in case of link failure. The recovery node will be selected on the basis of connectivity; the vehicle node which has maximum node connectivity is selected as the best recovery node. In this research work, the parameter of congestion control will be added which also maintain quality of service.

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