Analysis of Quality of Service in VANET

Akshat Srivastava¹, Sahil Verma¹*, Kavita¹, NZ Jhanjhi², M N Talib³, Atul Malhotra¹

¹School of Computer Science and Engineering, Lovely Professional University, Phagwara, India
²School of Computer Science and Engineering SCE, Taylor’s University, Malaysia
³Papua New Guinea University of Technology, Lae, PNG, Papua New Guinea

Abstract: VANET as Inter-vehicle communication is becoming a promising area of research, standardization, and growth with the ever-growing number of vehicles equipped with computer technology and wireless communication tools. Due to its erratic portability and the interrupted availability of a network, VANET is relatively incomprehensible for strong end-to-end communication. In Vehicular Network the main advantage is that it communicates by using nodes. Because of its simple and basic method of communication, MANET is used most often in the military, just like data sharing between different computers. VANET and some modifications are identical to MANET. VANET encompass the mobile nodes which are indicated as (MN). The vehicle networking system has drawn significant interest from academia and industry since its establishment. Its technology is used for military purposes by several foreign manufacturing and government sectors, it also enables a wide range of applications, including collision prevention, security, blind crossing, dynamic route planning, traffic condition monitoring on a real-time basis, etc but there are certain loopholes or drawbacks like frequent network drop, high mobility which affected the overall QoS. In this paper, there are brief analyses on Quality of Service which include certain Routing Protocol like DIVERT, FBAODV, DSR and also to decrease the congestion control, there is a comparative study of the different protocol which evaluates in increasing the throughput and network efficiency.

Keyword: QoS, VANET, MPR, DIVERT, Security, Cluster, CH, ICH, AODV, DSR, FBAODV.

I. Introduction

Vehicle ad hoc network (VANET), which is a rising subject in industry or in academics which offer seamless content distribution technique and transport collisions which used in complicated road networks, is now becoming a subject for researchers today. VANET is a new class of wireless networks that facilitates communications between vehicles to infrastructures and in between vehicles. This technology offers a wide variety of applications and services ranging from security and traffic control systems to business and marketing services. The Internet offers real-time applications which require minimal potential end-to-end delays. VANET protection, emergency and Multimedia applications needed. Examples of these devices include speech and Video conferencing. A lot of bandwidth and special connections are needed for these applications to reach the necessary speed and a minimum delay. The direct deployment of these high-speed networks is not cost-efficient. A new initiative to run such apps is then necessary and no additional network upgrade costs are needed thus maintaining the requirement...
for a limited extension delay. For e.g. the end-to-end delay for video applications is typically less than 250ms.

VANET comprises only automobiles, we have to pick the appropriate vehicle as a registry service, For example, determine if a vehicle is a service directory by its moving features and select the car inside the two contact radius connection directory to be the bridge between at the same time two service directories. However, the role of vehicles Network mode switches very frequently, leading to change the service directory frequently and affect service The success rate of discovery for the VANET category that includes RSU and vehicles can be configured as a service directory

VPNs provide a cost-effective, secure way to allow users to behave as it is on a single network on physically different networks [4]. The Layer-2 (L2) and Layer-3(L3) VPNs are graded according to their protocol levels. For two business nodes and connections, Layer-2 VPNs may provide stable point-to-point transport services. When the value of L2 is small, the cost of L2 connections increases dramatically. L3 VPNs link end-users using a routing network supported by MPLS. MPLS-based VPN can be used to simplify the end-to-end infrastructure that supports dissimilar networks with data, voice, and video services [5].

There are two major classifications of data Traffic:

- Traffic Descriptor
- Traffic Profile

**Traffic Descriptor**

Traffic descriptor is the qualitative value defining the flow of data. There are three parameters which define the traffic descriptor [6].

- What type of service is required?
- Traffic parameter in direction of data flow
- QoS parameter requested

**Traffic profile**

A traffic profile, based on connection data collected during a specified period, is just the same: a traffic profile on your network. It comprises a Constant bit rate and variable bit rate.
I. Literature Review

| S.No | Title                                                                 | Author                  | Issue/Problem                                                                 | Finding and Result                                                                 |
|------|------------------------------------------------------------------------|-------------------------|--------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| 1    | Improving QoS in VANET Using MPLS                                       | Mahmood Fathy           | Packet loss and throughput in urban areas, where lots of roadside unit exist, the unreliability of V2V communications | To improve QoS in terms of end-to-end delay, MPLS is introduced.                     |
| 2    | Improvement of QoS in VANET with different mobility patterns.           | Dorge, P. D, Dorle, S, Chakole | Random Pattern Allocation of the Vehicle, Low Performance, Delay in Packets while transmission. | Dynamic Source Routing Protocol is used to Enhance the Performance in Path Allocation like ADOV, UDP, CBR |
| 3    | Optimization and QoS Protocols in VANET                                | K.R. Jothi and A. Ebenezer | Unable to select Routing Path for data forwarding                               | Ant colonization is introduced for maintaining optimal path.                        |
| 4    | Service discovery middleware based on QoS                               | Zhong, T                | Unstable Network Topology                                                       | Middleware Framework to increase the stability of the node.                         |
| 5    | Design of single and Multipath Routing                                 | Anjum                   | A network that is randomly distributed and can communicate among themselves over the wireless channel | Traffic control using AOMDV and modified routing protocol were among AODV and AOMDV the second one is improvised by packet delivery ratio, packet loss ratio. |
| 6 | An Advanced Fitness Based Routing Protocol for Improving QoS | B.Suganthi P. Ramamoorthy | Communication channels like Network formation and Neighbour discovery contain congestion which reduces the QoS. | FBAODV is introduced which establishes various connection nodes with the help of RREQ. |
|---|---|---|---|---|
| 7 | Road Traffic Congestion Management Using VANET | Cynthia Jayapal, Sujith Roy | Traffic Management inefficiency and Traffic Analysis System | By using GPS and RSU Smart App is developed which reduced the road congestion using Graph and Alert msg |
| 8 | Vehicular Content Distribution Using Parked Vehicles | Guihai Chen, Jiannong Cao | Roadside parking sometimes contains packet delay and file drop while communicating with V2V. | Paskcast is introduced for sharing the sequential contact and local information for better reliability. |
| 9 | DIVERT: A Distributed Vehicular Traffic | Iulian Sandu Popa, and Cristian Borcea | Vehicular Re-routing and congestion control as the central server to perform intensive computation. | Distributed Re-routing avoids congestion and offloads a real-time Networking message exchange. |
| 10 | Performance Improvement of Cluster-Based Routing Protocol | Ahmad Abuashour And Michel Kadoch | Network instability and frequent link failure | Cluster-based life-time protocol is introduced which provide route stability , average throughpout in a bidirectional segment. |
II. Related Work

In this Section what are the existing terminology and routing algorithms are taken is to be explained. The different congestion control and Roadside accident measures are elaborated in this portion.

- **Destination-Sequenced Distance Vector routing**

Destination-Sequenced Distance Vector Routing is the Bellman-Ford algorithm for the table-driven routing of ad hoc cell networks.[10] The sequence numbers for every entry on the routing table are usually used, even if there is a link; otherwise, an odd number is used. The number is created by the goal and the issuer will apply this number to the next update. Routing information is shared among nodes by sending complete dumps rarely and more often by sending smaller incremental updates [14].

The Requirement of paths to all network destinations demonstrates that less delay is possible during the process of configuring paths. the systematic approach of upgrading the cable network protocol with sequence number names, which is adaptable to the ad-hoc wireless networks. [11] All the Wireless Network protocols available will therefore be useful with less changed ad hoc wireless networks.

Routing Protocol is classified into three different categories:

1. **Proactive Protocol**: These protocol types are called table-driven protocols whereby the routing table keeps track for all nodes. In the routing table, packets are transmitted via the predefined road. The packet transmission is done transitory, but the overhead routing is bigger because of this before transmitting the packets, routes must be specified.[13]
   Example: DSDV, OLSR.

2. **Reactive protocol**: These types of protocols are also referred to as on-demand protocols on request when routes are not defined for routing. A source node invites the route discovery phase, wherever a transmission is needed, to determine the new route.
   Example: DSR

3. **Hybrid Protocol**: It is a combination Proactive and Reactive Protocol and takes the advantages of both the proactive and reactive protocol.
Example: ZRP

- **Dynamic Source Routing Protocol**

The Dynamic Source Routing Protocol (DSR) has been developed as a simple and effective routing protocol for multihop wireless mobile node ad hoc networks[5]. This protocol is essentially followed during the building process by flooding the RouteRequest packets in the network. It is an on-demand protocol built to limit the bandwidth used by ad hoc wireless network control packets by eliminating the periodic table-update messages available in the table-driven method.

Major Advantage of Dynamic Source Routing Protocol is that DSR uses a reactive strategy that reduces the need to constantly inundate the network with table-based notification notifications. The intermediate nodes often make good use of route cache information and reduce the overhead power.

Whereas in some scenarios like if in DSR the node is damaged the relation would not restore a path management process locally. The link initialization time is more time-consuming than in table protocols. While the protocol works well in static and low mobility conditions, it quickly deteriorates in efficiency with increasing mobility.

![Fig. 2: DSR Path Architecture and Route Selection](image)

Route Discovery is a mechanism to which allow the node to discover the destination in Ad hoc network. For Example Node A required to send the packet to a destination node B. route discovery is used only if A wants to send a packet to B and does not know the path where he wants to send
Route Maintenance is a mechanism in which node A will have the ability to detect the path of the destination node while using a source route to B.

- **Optimized Link State Routing**

  OLSR is the protocol for connection state routing. The trouble with the connection to the state routing protocol is to receive multiple copies of the same link-state (LS) ad, which add unnecessary network overhead. The multi-point relay (MPR) is selected with hello messages [7]. A node MPR is a set of I-hop neighbors' through which all their 2-hop neighbors are heard the second step, pick the non-selected node and node that covers the largest number of N2 nodes and select until all nodes are protected [6]. OLSR uses messages from Hello and TC. The Hello messages are used to calculate the I-Hop neighbors and the 2-Hop neighbor. Nodes that can be reached from the I-hop neighbors are the 2-hop neighbors of the network.

![Fig 2. OLSR Network node](image-url)
Table 1. Optimal Path Selection

| Multi-Point Relay | Selector set for optimal Path |
|-------------------|------------------------------|
| B                 | D, H, I, A                   |
| E                 | F, K, J, I, A, L             |
| I                 | B, A, E, M                   |
| A                 | G, B, E, I                   |

The sequence number of the MPR selector set is greater than the sequence number of the message sent, which is then discarded. The routing tables are designed using one-hop, two-hop and topology tables details [12].

- **Advance Fitness Based Routing Protocol**

As in many Routing Protocols, the main working of protocol is to provide feasible and secure routing which include AODV, Fisheye state routing algorithm (FSR). These above protocols are able to detect or discover the routes in the communication Network by simply maintaining the secure path between source and destination node. Whereas there are some proactive routing protocols that do not require any route discovery and path of the destination is stored in the backup. But the major drawback of these protocols is that they are unable to keep track or maintain the data path which may lead to reduce the latency and bandwidth. For Solving these problems Advance fitness-based routing protocol with the computation of RSSI-received strength signal[11]. As there are certain stages that need to be followed for successfully implementing FBAODV the first stage is Network formation which comprises of different network packet data stored in packet second stage is Neighbour discovery which helps the network layer to find the appropriate path for forwarding data packet the third stage is Fitness function estimation which helps the node to find each node position and calculate its mobility and node speed for QoS validation last step is Routing process is this the routing process will validate the packet by checking the throughput time, delay, priority bit and error rate of the packet.[12] The network consists of a set of wireless hubs, including access points and fixed roadside walls. By considering the infrastructure costs it defines the connectivity between mobile knots.
The route response to the source node is forwarded. In general, if VANET nodes continue to travel, a linking break can occur. If the node receives no support over a certain time, the relation breakage above can be established, and the entry of the next table is indicated as void[11]. This role involves the FBAODV Protocol, which is built by using the standard AODV protocol, to route packets in VANET. It defines the paths depending on demand and retains the paths in the correspondence. In VANET, there are restricted routes that can establish the link between the vehicles more convenient for this communication through the reactive Protocol. This work implements the AODV fitness protocol, which guarantees the freshness of roads and passes hi messages for the identification and tracking of the neighbourhood connexions. These are some comparative data packet charts which show the performance of different routing algorithms using packet delivery ratio and size of the data packet.

![Fig 3. Performance evaluation of packet delivery ratio with the data packet](image)

| Data packet | 10 | 15 | 20 | 25 |
|-------------|----|----|----|----|
| GSR         | 55 | 54 | 53 | 55 |
| VACO        | 75 | 68 | 83 | 88 |
| EGSR        | 83 | 80 | 78 | 72 |
The above data set represents the chart with the data packet rate which lies in x-axis and packet data ratio in the y-axis which represent that the FBAODV is smoother as compared to the rest of the routing protocol. On comparing the above protocol it has been observed that the packet is uniform in the rate of the network which is after being evaluated by vehicular velocity[12].

- Cluster-based Life-Time Routing

The cluster-based Routing protocol is used to increase the throughput in the bidirectional segment and also increase the route stability, Cluster-based lifetime routing work by selecting the cluster head which was selected on the basis of maximum lifetime of all the vehicles that are located within the cluster area. The segment is a two-way route, for every line. Which is divided into many clusters equal to half the trans-Standard vehicle task range[13]. We believe that all Cars have predefined cluster management knowledge and identity as per the vehicle or car has to be allocated one Cluster, dependent on position and with each unit of time per vehicle the cluster has a unique ID which helps the vehicle to recognize the CH. Cluster section, which also displays the cluster boundaries Between clusters and Multiple clusters. If any vehicle enters a cluster zone at any time (entered the cluster edge lines between the clusters), that means that it is a part of that cluster where the vehicle enters and is expected to send a HELLO message to Cluster Head[14]. Any vehicle entering a preset cluster environment having Relevant cost-benefit, called Life-Time (LT), should be measured regularly. Each vehicle's Life Time depends on the vehicle's current speed and the distance from the predefined directions. The highest LT vehicle is selected as a Cluster Head and then continues as the CH until it exceeds the directional stage of the threshold, which ensures that no new selections of the vehicle take place until the existing CH hits the predetermined directional threshold. The directional point is defined as a point away from the cluster's directional edge. The CBLTR protocol attempts to distribute packets across the chosen CHs within the section. The routing table for each HC is established and the corresponding HC Identifier (HCID) and related positions are stored within each HC. The contents of the CH routing table containing the CH Identifier, its position, the LT and the expiry time, To keep the content of the routing table updated, the expired time is used. Whenever the Vehicles enter in the intersection of cluster zone, The Cluster Head will send the HELLO packet or message to Intersection cluster head (ICH) it determine the real-time optimal path for the packet to travel and follow the desired destination, then Software Designed Network(SDN) provide the routes to candidate between the
present crossing and the intersection of destination every candidate route contain the unique ID which consists of weight and the intersection point of the node. If the intersection cluster zone does not have vehicles, the present Cluster Head will follow the law of holding that is Store-and-forward. Packets within the CH buffer and step on until inside its transmission radius, it hits another CH and closer it the crossroads of the destination, not every vehicle needs protocols to know all details about the topology. Just selected CH vehicles to need the knowledge of topology and other CMs only need to share their details regularly with CH. One form of control is HELLO message overhead communications we're talking about in this post. All CM should inform CH by sending a message about its identity additionally, HELLO message may incorporate additional parameters including current position, place, speed, and LT. HELLO, messages become increasingly huge. a problem that damages mobile and restricted efficiency resources networks. In comparison, repeated HELLO messages affect the network adversely by filling the buffer size of the network.

Intersection Dynamic Routing for Grid

Intersection Dynamic Routing Protocol works on Software Defined Network(SDN) that helps the candidate to gather all the fragments of traffic data and find the solution by calculating the average throughput for each fragmentation separately and periodically[11]. Intersection protocol also helps the candidate to provide ICH of the requested route between the pair of the intersection. It is used to select the candidate for the next candidate segment or the fragment of the node; These selections are based on the source and destination location of intersection.11]
Software-Defined Network (SDN)

Software-defined networking (SDN), a network management technique that allows the complex, programmatically efficient design of networks more efficiently to boost the efficiency and visibility of the network, making it more cloud computing-like than a conventional network management approach[13]. Through dissociating network packets (the data plane) from the routing mechanism, SDN aims to centralise the network knowledge in one of its network components. The control plane consists of one or more controls that are called the knowledge brain of the SDN network. But in terms of safety, scalability and elasticity[12].

When ICH enters the packages, the ICH decides which of the packets can follow the real-time path to meet the destination demanded. The decision on routing takes account of the maximum average minimum output for SCSR between the present ICH crossing and the destination. The crossroads. SDN supplies an SCSR to the ICH. Present crossroads and crossroads of the path. Every vehicle has its distinctive characteristics where the path of the candidate involves a series of crossroads that can manage the CH for entering into the Cluster gateway. It will then determine the necessary number of interactions from this to the Destination target and preserve the intersections in some other buffer known as minseg[14]. As just to look for routes below the minimal Number and the overall number of intersections max-seg junction, the good routes The restriction contained in the buffer cons valid. Secondly, the validity of the routes is tested in the buffer, Both cons valid segments should be for each route. We have allocated greater than the predefined threshold value where one binary value for each larger segment Efficiency of the transmission as opposed to the predefined meaning, and for any section, it does not, a binary value will become zero. Finally, the binary sum is compounded and stored for future use. The routes that crossed the previous route in Cons1 is Valid whereas, In the cons2 valid buffer, two restrictions are stored that will be managed by CH. Weight for each path to be measured by Cluster gateway and for each section on the path, we calculate the average throughput and then the path is stored in the valid route and buffer, also the value stored in Routerset Buffer which is the ideal route in the route, with the maximum route weight in RouteID. Choose the least average route weight.

$$SCSR= (R_1 , R_2 , ......, R_n )[14]$$

Where :

- SCSR: Set of Candidate shortest route
- Rn: for route weight
- n: Max no of Routes

For each intersection, the ICH will forward the packets to Its Optimal route first and then at a crossroads intersection, which will be considered by ICH to recalculate the optimum path.
The passage to the road then provides the result of throughput for the desired destination and finds the Optimal route for the first segment. Recognizing the path at each intersection in real-time will help the CH to provide the optimal route that will be created by the node. The throughput in a grid topology is determined by multiple weights in the current optimal route of the first segment by weight of the first segment of the next optimal route at the next crossing intersection. Traffic trends have shifted greatly within the business data centre. In contrast with the client-server applications, in which the bulk of communication is between a single client and a server, applications today access various databases and servers, creating a flurry of machine-to-machine traffic "East-West" before the data is returned to the end-user device in the classic north-south pattern of traffic.

**Cluster-Based File Transfer**

Cluster-Based File Transfer Protocol is used to tackle the file transfer problem in a vehicle to vehicle(V2V) by evaluating the transmission capacity of the resource between the vehicle who wants to transfer the file and destination vehicle which is further evaluated. The cluster will the vehicle to form the fully-distributed system. In this system, there are certain assumptions followed which is assumed by the candidate like the vehicle will travel only in bi-directional highway and also all the vehicle will be equipped with the Global Positioning System and should be aware or know their geographical locations.

There are certain boundaries which were encountered during the study of file transfer problems as there are Vehicle Mobility Model which hold the mobility pattern and certain restrictions and there are connection time prediction models [15]. Which provide the communication range with each node.

**Mobility pattern model for Vehicle**

- The speed range is defined by maximum speed and a Minimum velocity [13].
- Definition of safety gap is measured in two neighboring vehicles. In fact, Safety distance should be kept for vehicles on the same lane Just for protection. If there are two opposite gaps the rear vehicle should be slower than the SD ones, down to the distance at the SD between them [13].
- An automobile drives in a single highway lane only.

**Vehicle-to-Vehicle Communication**

Here we examine the potential for transmission of the Physical layer of contact between cars. Take into account in the DSRC engagement characteristics that have been obtained by Signaling the intensity by its initially obeyed protocol that will be preceded by Rice Delivery distribution, but Enlargement of the distance between two cars can be explained
by Rayleigh Distribution which obeys signal power and help the cluster to link between two vehicles. To make it better Simulate the fading signal envelope in the motorways region of networking[16]. Evaluating the potential for coordination between two vehicles and forming a cluster if necessary needs location, pace and direction of movement Its vicinity. We assume, thus, that all cars in the GPS are given for the VANETs under investigation. Furthermore, every vehicle routinely broadcasts Hello messages to gather knowledge about the location and pace your next cars or vehicle [17].

If the vehicle could not retrieve the correct file with CFT Absolutely from the associated utility vehicle the vehicle would then create a linear time between them. Clustering and collaborating alongside other cluster vehicles Download file [15]. There are many ways to set up a VANET cluster. The biggest challenge is how to locate peculiar vehicles with similar features as members of the ring. The following steps are taken in the current scheme Build a cluster.

Step 1. The application vehicle transmits an application packet Move of a cooperative register, then a nearby vehicle in the field of contact is able to help with sending Back to ACK. Back to ACK is the Acknowledged flag which provides feedback if the ACK receives the programmed car. It can request simple data such as distance and speed Cation, the car next door. Then, the right thing is the next car is invited to join the cluster. The next vehicle is a part of the cluster where the cluster-head is the device vehicle [17].

Step 2. The next car that binds to the cluster the request packet which is used for a cooperative file begins to be broadcast Switch to the cluster and calls their neighbors node for communication. Then there was the recently added cluster Member essential knowledge is Transmitted to the car cluster head.

There are different sections of Cluster where CFT performance is investigated by calculating the average connection time, the maximum file that the data can forward or the volume of data that are transmitted. CFT is elaborated as the vehicle that travels on the bi-directional highway with single lane or two-lane, the major parameter is that the length of the vehicle is calculated by km and we use the IEEE 802.11b mechanism for the MAC protocol and vehicle to vehicle communication protocol. There are some problems while implementing the solution as there are hidden terminal problems which are solved by RTS that is Request to Send and CTS that is a Clear to Send mechanism [18][1].

**Distributed Vehicular Traffic Re-routing**

Divert which stand for Distributed Vehicular Traffic Re-routing is used to reduce the congestion control as in previous studied protocol and algorithm like AODV, DSR etc. are proactive re-routing system that is unable to meet the fully decentralized architecture is not suitable for congestion control DIVERT is a hybrid device which uses a registry that is accessible through the Internet to create an accurate global view of the traffic.[15] Central Server acts as a supervisor for
gathering and analyzing location reports. Congestion of traffic and re-routing of traffic alerts (i.e., modified road network travel times) for Vehicles. However, a substantial proportion of the redirect is discharged. Vehicle estimation and thus re-routing of traffic is in real-time, it becomes reasonable for traffic re-routing. To re-route in partnership decisions, sharing of vehicles in the same area VANET messages. DIVERT also maintains privacy control for traffic analysis that is used for improvement of the device safety policy, where VANET localizes every vehicle to detect the street density and records data anonymously with certain likelihood only highway traffic density. Three elements of DIVERT separate from the other. Firstly, we use cellular and VANET to the full. Scalable re-routing connectivity [18][24]. Connectivity. Thus, each Vehicle will reliably acquire global travel awareness and may share route planning concurrently increased reliability of choices for nearby Vehicles. Second, the path is measured in a distributed manner VANETs. VANETs. It is thus more scalable because it reduces the central server estimation pressure. Fourth, we planned and assessed the process to strengthen the protection of each vehicle and upload only its location report if it is poor zones of sensitivity [19].

- **Re-Routing and Traffic Guidance**

Services such as INRIX [15] offer real-time, time-specific traffic information for drivers to pick other roads that are less time-consuming. Links for Google and Microsoft's Bing will predict congestion and congestion period of quantitative predictive statistical data of the patterns of traffic. Different smartphone navigation applications use this information to smartly convert navigation system telephones. These facilities, however, share the same problem: they provide when congestion arises the same route for potentially producing impacted vehicles. Another congestion on the field [16]. The above dilemma can be overcome by assigning complex traffic to a driver. Optimum routes [12][23] or optimum routes for the user. DTA algorithms but cannot measure the balance easily enough to inform vehicles in due course about their current routes to deter the traffic jam. DIVERT is planned to be, on the other hand, efficient and rapid in determining whether, while not ideal, when congestion signs exist, cars can be re-routed and for these automobiles the computation of alternative options.

- **Information Sharing in VANET**

VANET shares the traffic sharing information for transportation intelligence systems for the above dilemma can be overcome by assigning complex traffic to a driver. Optimum routes [12] or optimum routes for the user. DTA algorithms but cannot measure the balance easily enough to inform vehicles in due course about their current routes to deter the traffic jam. DIVERT is planned to be, on the other hand, efficient and rapid in determining whether, while not ideal, when congestion signs exist, cars or Vehicles can be re-routed and for these automobiles the
computation of alternative options. However, since they use ad hoc networks in the automobiles, the aforementioned methods only offer a partial view of the circumstances of transportation, which might lead to an incorrect routing [16][22]. Often, manage vehicles literally as packets. Listen often to the advice that denies human experience. Directed and written. Furthermore, these systems respond to real-time data. Include greater without any visibility into potential circumstances and congestion weakness from one location to another location [14].

- **Security in Privacy of Location Services**

As DIVERT goal is to provide the minimum and minimize the amount of information with privacy sensitivity is to be uploaded to the server. A substantial number of works struggle with the preservation issue. Privacy of the user with regards to location resources [LBS]. For e.g., DSRC's middle layer specifies device and message handling intelligence services. DSRC-based VANETs are designed to safeguard driver privacy [18]. A vehicle may change its anonymous key inside to avoid malicious tracking. A few minutes' delay. DIVERT aims at preserving the driver's privacy from a central server and not the other drivers in VANET, which is separate from all these activities. DIVERT will use existing technologies for driver-to-driver safety [20]. Many processes have extremely efficient solutions. Precise notifications of place in real-time and accomplishment. Security of data. These processes, however, need a reliable central agent like a proxy server for Place reporting. Our system for secrecy works in a distributed and probabilistic mode without any assistance. Trusted businesses. Trusted institutions. This distributes the possibility of location surveillance. over VANETs, which we contend is consistently stronger than a single centralized agency, rather than trusting [19].SCMS is also based on the corporation assumption of isolation to defend against insider threats the various server components are spread among different components. Organizations that don't cooperate. On the other hand, the safety of the position is fine security even if it does not carry this belief [20]. The security and privacy have significant role with the location aware services [25]. QoS based routing in wireless network [26-28] such as VANET plays an important role as of smart transportation. Security and privacy issues with UAVs, [29-30] environment while forming MANET is critical as well.

**IV. Conclusion**

In this paper, we present different optimization techniques that are cost-effective and efficient in improving overall performance in VANET. First; an FBAODV protocol which uses RSSI complex computation for network formation using neighbor discovery, this protocol uses fitness function that helps the network to construct topology which helps in discovering node by re-routing algorithm. QoS parameters such as throughput, delivery ratio, energy consumption are evaluated
and then calculated based on these value network connections that are established and follow the protocol. The second one is to provide a seamless environment by applying Cluster base lifetime protocol, it is a topology segment which holds the cluster head for electing maximum lifetime of cluster head and re-elected. CBLTR protocol boosts the average throughput by selecting the new mechanism of choosing new Cluster Head when the old one is broken or not in the range of the network. The third one is IDVR which stand for Intersection Dynamic Routing, this protocol helps the network by providing the grid-based scenario which proposed ICR. ICR selects the optimal path and provides a route based on the vehicle current location and finds the maximum throughput from minimum average efficiency, IDVR increases the network overall efficiency by increasing the throughput, minimizing the impact of an end to end delay packet. The fourth one is DIVERT which stands for Distributed Vehicle Traffic Re-routing, it is a hybrid system that is able to identify the vehicle using Global Positioning System. It balances the privacy of the user by encrypting the data packet and re-routing technique.

In VANET, there are different algorithms that have been proposed; there is one by Cluster-Based File transfer which helps the candidate to share their file in run-time while moving on a single lane highway. The cluster-based scheme works when any vehicle requested a file from their neighboring node then CFT established a connection and calculated the connection time while predicting the content file distribution to evaluate the capability of the cluster gateway and its members for transferring the file successfully. In this paper, there is a comparison of the routing protocol that helps in minimizing the delay and help to increase the overall QoS in VANET.

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