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Detecting Shortest Path Using Vehicular Routing Protocol

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Abstract: In recent years, mobile computing and wireless networks have enjoyed a tremendous rise in popularity and technology advancement. The design of smaller and more powerful communication devices is rapidly changing the way humans interact and communicate. Amidst the unprecedented growth of mobile computing, Vehicular ad hoc networks (VANET) have emerged as an import Vehicle field in the wireless arena. Mobile ad hoc network is a collection of mobile nodes that communicates with one another via wireless links without the need for any fixed infrastructure. Due to its dynamic nature, a primary challenge of VANET is the design of effective routing algorithm that can adapt its behavior to frequent and rapid changes in the network. This project will present novel scheme for VANET routing enhancement called **the Vehicular Routing Algorithm (VRA)**. VRA is inspired by the ant-colony optimization heuristics to solve complex problems. It utilizes a collection of mobile agents or "**Vehicular**" to perform optimal routing activities. These "**Vehicular**" are simple routing packets that collect and disseminate useful routing information as they travel throughout the network. VRA offers quick adaptation to dynamic link conditions, low processing and memory overhead, low network utilization, and determines unicast routes to destinations within the ad hoc network. By combining the capability of reactive routing with distributed and multipath routing mechanism, VRA displays a satisfactory performance in terms of throughput, packet delivery ratio, delay and overhead. Utilizing the benefits of pheromones, third-party reply model, ring search model, two-way route establishment method, VRA enables optimal path routing, fast route discovery and effective route failure handling.

Keywords: VANET, Automated Traffic lights, Traffic Routing, Ad hoc Network, Automation.

I. INTRODUCTION

Communication between vehicles by means of wireless technology has a large potential to improve traffic safety and travel comfort of drivers and passengers [1]. Vehicular Ad Hoc Network shares some common characteristics with general Mobile Ad Hoc Network (VANET). Both VANET and VANET are characterized by the movement and self-organization of the nodes. They are also different in some ways. VANET can contain many nodes that cannot recharge their power and have uncontrolled moving patterns. Vehicles in VANET can recharge frequently, however can be constrained by the road and traffic pattern [2].The characteristics of the network can affect the routing strategy. There are existing protocols designed for the characteristics of VANET, but further studies are required to evaluate the suitability of existing protocols for VANET. Existing routing protocols are generally categorized in *topological-based* and *position-based* routing. Topological based routing makes use of global path information and link information to forward packets. Position-based routing does not keep global network information but requires information on physical locations of the node. The vehicular transportation network defines what is known today as Vehicular Ad Hoc Network (VANET) [5]. Vehicles acting as nodes in VANET are able to make queries and respond to queries from other participating nodes in the ad hoc network. Node or vehicle mobility may cause frequent topology changes, thereby rendering proactive routing techniques ineffective or severely constrained with respect to network congestion. For a VANET to function effectively the nodes or vehicle should be able to overcome network fragmentation and relay messages to other nearby networks. There are two variations of mobile wireless networks. The first is known as infrastructure networks, i.e., those networks with fixed and wired gateways. The bridges for these networks are known as base stations. A mobile unit within these networks connects to, and communicates with, the nearest base station that is within its communication radius. The second type of mobile wireless network is the infrastructure less mobile network, commonly known as an ad-hoc network.

Infrastructures less networks have no fixed routers; all nodes are capable of movement and can be connected dynamically in an arbitrary manner. Nodes of these networks function as routers which discover and maintain routes to other nodes in the network. Example applications of ad-hoc networks are emergency search-and-rescue operations, meetings or conventions in which persons wish to quickly share information, and data acquisition operations in inhospitable terrains. Since the service discovery in the first type of mobile wireless network is simple, we will focus on the second type of mobile wireless network, especially the ad-hoc network. An ad-hoc mobile network is a collection of mobile nodes that are dynamically and arbitrarily located in such a manner that the interconnections between nodes are capable of changing a continual basis. During the service finding process in ad hoc network, it needs many ad hoc routing protocols; the table driven type protocols and the source-

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initiated on-demand driven type protocols. And we will discuss them respectively [3].

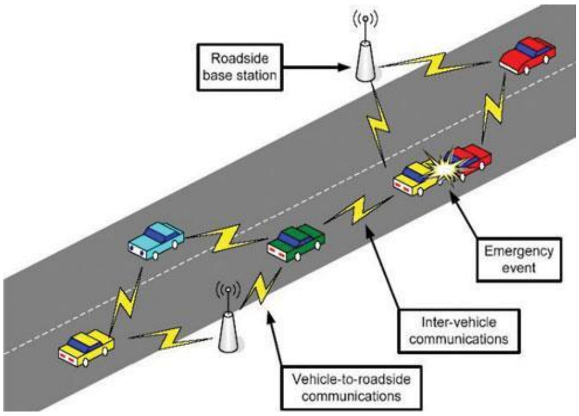

Fig. 1. VANET Architecture

II. RELATED WORK

A huge amount of work is underway to solve traffic problems in metropolitan areas. iTransIT is working on urban traffic management by providing a real time congestion map for city of Dublin [4]. JETS is also working on a prototype implementation to provide a context aware journey time information [5]. This context aware system will index all journey times with the context (time, weather, road usage patterns) in which journey has occurred. FleetNet [6] is an infrastructure less self-organizing traffic information system. Vehicles receive traffic information from other vehicles and analyze the information locally and then transmit information to other vehicles. VGrid [7],[8] integrates Vehicular Ad hoc network along with Grid Computing technology to solve a large number of traffic related problems like lane merging, ramp metering etc.The CarTel project [9] has explored stealing connections from open WiFi stations in Boston and Seattle. A couple of researchers have studied the problem of using VANETs to discover and disseminate congestion information [10],[11]. Marca et al [12] discussed ways of extending an existing centralized GPS traffic monitor to use VANETs. TrafficView [13] addresses the issue of estimating road congestion using a network of vehicle based GPS systems. The TrafficView [13] project focused the congestion of the road directly ahead. The TrafficView project was able to demonstrate that it is possible to monitor vehicle congestion using a real VANET. The idea was extended to both sides of the road by SOTIS [14]. In [15] , we constructed a simple spatial model to reflect traffic density. Source routing was executed based on the spatial model and a predictive location service was developed to track the movement of destination.

III. EXISTING WORK

Greedy Perimeter Stateless Routing (GPSR) protocol is a typical example of the position-based protocol in VANET. This protocol forwards packet using the “greedy algorithm” designed by the developer. Here packets are forwarded greedily to the neighbor with the nearest distance to the destination. When the node itself is the nearest one, then GPSR makes use of a recovering strategy— using the Right-Hand rule to solve the problem of local optimum. In Geographic Source Routing (GSR) protocol, the algorithm first receives the digital map through a GPS device, and then uses the Dijkstra algorithm to find the nearest distance from source to destination on the digital map, and forwards the data packets through this path. The GPSR is a responsive and efficient routing protocol for mobile, wireless networks. GPSR can be applied to Sensor networks, Rooftop networks, Vehicular networks and ad-hoc networks. In VANET, the effective communication time is always very short due to high speed vehicular movements, which causes performance degradation. GPSR protocol is also affected in a similar manner.

Perimeter Forwarding Algorithm Drawback: The Perimeter Forwarding Algorithm uses a longer path to the destination, so the perimeter forwarding algorithm less efficient and cannot be used. Without considering moving direction, the GPSR protocol would lead to wrong packet forwarding decisions and increase packet losses alone.

IV. PROPOSED WORK

We are representing automatic route finding in case of a Vehicular Adhoc Network. In this we use vehicles as a moving node to represent the proposed work. In this proposed work we used a concept of genetic algorithm, traffic and the congestion. The vehicle will perform a automatic route finding by taking the observation of surrounding traffic, external interference. The vehicle will search their path by using effective shortest path routing that is VRA Vehicular Routing Algorithm. In this network, we are taking a specific city area. At each junction there exists a traffic light which route the vehicles accordingly. The major problem is to find the appropriate route path and a network or geographical area. The connectivity problem too depend on these two factors.

To resolve this problem there are some existing methods:-

- Wait for the traffic signal to get green.
- Find the appropriate alternate path.

The proposed algorithm we will use for finding the Shortest path in VANET. In this algorithm we follow the following step:-

Algorithm For Finding Shortest Path

Sending Forward Vehicle

1. Create a FVEHICALpacket
2. Check Neighobour Table
   ENDIF
   IF counter = FANT_ RETRIE
   //Network wide search
   Set wait =wait*
   NETWORK_DIAMETER
   MAXHOP = NETWORK_DIAMETER
   ENDIF
   ENDIF

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6. Store MAXHOP in the counter
7. Increase counter
8. Set expire = wait + CURRENT_TIME
9. Fill in the FVEHICALpacket with relevVehicalinformation
10. Broadcast to one-hop neighbor

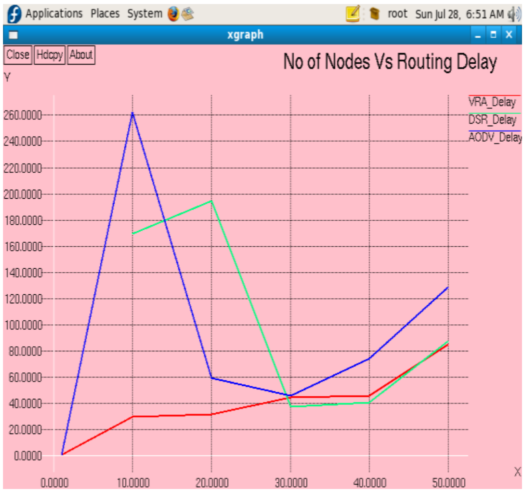

Fig. 2. Implementation For City Area

V.CONCLUSION

VANET is an emerging and attractive technology dedicated to safety and comfort services to the vehicle users. Owing to its high dynamic topology and unpredictable channel distribution, it aspires for a suitable routing protocol algorithm that can generate a near seamless network connectivity among the vehicular nodes.

In the proposed work we represents an algorithm to solve the congestion problem in all path network and to get such a path that will provide efficient data transmission over the network. In the network we divide the whole network into sub-networks and we perform the transmission over the sub goal and to achieve the efficient and reliable data transmission.

VI. FUTURE WORK

In the proposed work we prefer the changes in terms of algorithmic work. We can extended it as the protocol based changed. It means as and when the protocol will be applied all the changes will be applied implicitly. We have worked on urban and city scenario and can extend the work to some other geographic area. The use of internet and Wifi will also increases the security aspects and messages transfer in VANET.

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