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ROUTING OPTIMIZATION IN VANET

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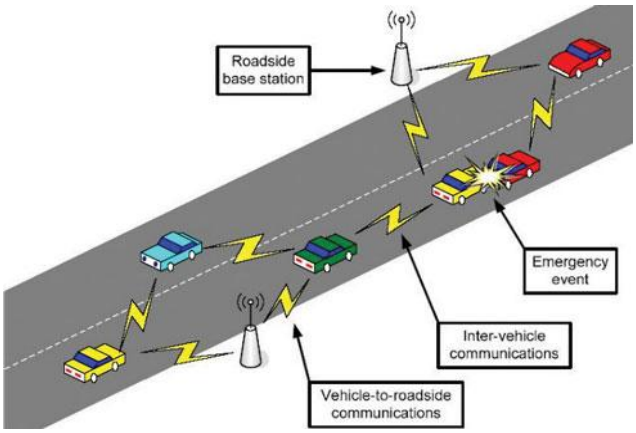
Abstract: *The optimized link state protocol (OLSR) is a table driven protocol, practical routing protocol is initially developed for mobile ad-hoc networks (MANETs).Vehicular ad-hoc network (VANET) is sub class of the MANET that consists of vehicle to vehicle communication and vehicle to roadside communication. The OLSR is used for the VANET but the standard configurations are not sufficient for the VANETs due to limited coverage of Wifi and the high mobility of the nodes generate frequent topology changes and network fragmentations so there is need of modified OLSR .Modified OLSR can be obtained by the optimization so optimum parameters to tune OLSR by aggregating the response performance metrics generated in a realistic VANETs simulation. The results show that OLSR having optimum parameters help to achieve better performance in urban environment as compared to the ordinary OLSR.*

Keywords: *VANET, Routing Protocols, OLSR, Optimization.*

I. Introduction

Vehicular Ad hoc Network (VANET) is a special type of Mobile Ad hoc Network (MANET). In VANET every vehicle acting as node behaves like a router to exchange data between different nodes in the network. VANETs are designed to provide communication of vehicles. In VANET two types of communication is possible i.e. vehicle-to-vehicle and roadside – to - vehicle communication. In VANET there are permanent network nodes which are used in the form of roadside units. [1] These types of networks are designed to purpose of safety, to handle the traffic on roads, location based services and driver guidance.



In VANETs storage capability and power consumption are not limited and the position of the nodes can be determined by using Global Positing System. Vehicular Ad hoc Networks (VANETs) allow vehicles to form a self-organized network has not needed for a predesigned infrastructure. There is limited coverage range for each vehicle's wireless network that exists from 100 to 300 meters so end-to-end communication across a larger distance is possible. In VANET to transmit a message form a source node to destination node requires messages to deliver through several nodes.

II. ROUTING PROTOCOLS

The main goal of routing protocols in ad-hoc network is to create optimal path (minima hops) between source and destination with least amount of overhead and minimum bandwidth utilization so that packets are delivered in a prescribed time manner. The Dynamic Source Routing Protocol (DSR)[9] and the Optimized Link State Routing Protocol (OLSR)[10] are unicast routing protocols initially designed for MANETs and VANETs also adapted these unicast routing protocols. DSR is one of proactive routing protocol which searches for a route only when it has need. Each node maintains the known routes in its routing table. A route contains full source and destination nodes, consists all the nodes that used to deliver the message in the route. OLSR is also a proactive (table driven) routing protocol, which maintains efficient routes between any two nodes in the network. At the time of accessing OLSR protocol,

initially HELLO messages are generated for sustain the routes. A significant number of unicast routing protocols use a position-based technique to provide vehicle-to-vehicle communication. There are many Position-based approaches that used information about the geographic coordinates or relative positions of nodes to generate an efficient route through the wireless network. Like most of VANET unicast routing approaches, position-based routing allows for unicast communication, but that are also used to deliver messages to all nodes in a geographic area, called geocasting [2].

Like other position-based routing protocols used in vehicular network, Connectivity-Aware Routing (CAR) protocol searches a route to a destination, but a unique characteristic of CAR has a unique characteristic is ability to maintain a routing table (cache) of successful routes between various source and destination nodes. This characteristic was appreciated by observations of other position-based routing protocols and their inability to utilize information gathered about disconnected paths after those disconnections are detected. CAR also searches out positions of destination nodes, maintains routes as those positions change and generates geographic marker messages.

III. OLSR (OPTIMIZED LINK STATE PROTOCOL)

Optimized link state routing (OLSR) protocol practical routing protocol initially designed for MANETs. It is an optimization link state protocol in that it reduces the size of run package as well as the number of manages packets transmission required. OLSR reduce the control dense traffic by using Multipoint relay, which is the basic plan used in OLSR. MPR has node's one-hop national which is selected to forward the packets. As a substitute for of pure flood of the network, packets are just forward by a network's MPR. This delimit of the network slide, thus being more efficient than pure link state routing protocols. OLSR protocol is more suitable for large and dense movable networks. Since of the use of MPRs, the larger and denser network, efficient optimized link state routing is achieved. MPRs help to given that shortest path to a target.

The main requirement for all MPRs is that assert the link information for their MPR selectors. The network topology is maintained most of time by switch link state information. If more reactivity to topological change is compulsory, the time period for switch of link state in turn can be concerted. The Optimized Link State Routing Protocol is developed for vehicular ad hoc networks and it works as on demand, practical protocol, i.e., connections topology in turn with other nodes of the network rapidly. Every node selects a set of its national nodes as multipoint relays. In OLSR, simply nodes selected as such MPRs which are responsible for forwarding manage traffic, future for dispersal in the form of entire network. MPRs provide an efficient machine for flooding control traffic by tumbling the number of transmission required. The nodes those are selected as MPRs should have a special accountability when they are announcing about link state information in the network.

The required condition for OLSR is to provide shortest path to all destinations so that MPR nodes declare link-state in sequence for their MPR selectors. Added accessible link-state information may be utilized for redundancy. The nodes which are selected as multipoint relays by some national node will broadcast this information once during their manage messages. Then that node announces to the network, that it has reached skill to those nodes which have selected it as MPRs. In route calculation, MPRs are used to form the route table to given node to any end in the wireless network. In addition, the protocols uses the MPRs to effectively efficient routing of manage messages in the network.

IV. OPTIMIZATION

Optimization is the act to achieve the best probable result under given conditions. In design, creation, protection, engineers have to take decisions. The goals of all such decisions are either to curtail effort or to make best use of benefit. The effort or the benefit can be usually uttered as a function of certain design variables. Hence, optimization is the process of finding the setting that gives the maximum or the minimum value of a function. It is obvious that if a point z correspond to the least amount value of a function f(z), the same point correspond to the maximum value of the function −f(z). Thus, optimization can be taken to be minimization. There is no single method available for solving all optimization harms professionally. Hence, number of methods has been residential for solving diverse types of problems. Optimum in quest of methods is also known as numerical programming techniques, which are a branch of operation research.

V. RELATED WORK

Lorenz T. Biegler and Ignacio E. Grossmann [2] This paper explains about general classification of mathematical optimization problems, which are followed by a matrix of applications that are shown in the areas in which these problems have been typically applied in process systems engineering. Then we provide

a review of solution methods of the major types of optimization problems for continuous and discrete variable optimization and nonlinear and mixed-integer nonlinear programming. We also review their extensions to dynamic optimization and optimization under uncertainty.

Zuriati Ahmad Zukarnain, Nori M. Al- Kharas[4] The limitation of the ordinary OLSR could produce the greatest amount of the generated routing overhead which in turn results to a highly degradation in the overall VANETs performance. This paper examines about the Particle Swarm Optimization which is used to find optimized parameters to tune OLSR by aggregating the response performance metrics generated in a realistic VANETs simulation. The simulation results show that OLSR with optimized parameters achieved efficient performance in urban environment as compared to the ordinary OLSR.

C. Jeyalakshmi, Dr. R. Sukumar [5] In this paper, we examine the payback of Optimized Link State Routing(OLSR) Protocol is used for publication in secretive mines. Due to system failure, node and link failure in the past few years a volatile improvement for the use of wireless routing protocols for message needs in the secretive environment. Most study point to that it is not possible for dependable routing underground like mines. In this paper, we examine the analysis of the OLSR Protocol. The routine consequences shows that OLSR protocol work expertly since the protocol flows in wireless multi-hop scenario the message flood in OLSR protocol is optimized to work efficiently in small bandwidth. Besides, OLSR routing can widely trim down operating cost caused by link-state flooding using two technique Multipoint Relays and Link-state Reduction.

Petteri Kuosmanen [6]. Mobile ad hoc networks are networks in which routing is based on multi-hop path from a source to a destination node. The networks have many constrain because of insecurity of radio border and its limitations e.g. available bandwidth. Some terminals also have confines about battery energy in use. There are many applicable protocols for ad hoc networks, but main puzzling problem is that enormous number of different protocols. Each of these protocols is intended to perform its task as well as like according to its design criteria. The protocol is to be selected must cover all states of a precise network and never is allowed to munch through too much network income by protocol overhead traffic.

Jamal Toutouh, Jose Garcia-Nieto[7] In this paper, we have addressed the optimal parameter to tuning with the OLSR routing protocol is to be used in VANET by using an automatic optimization tools. For this task, we defined an optimization strategy that is based on coupling optimization algorithms, which are validated optimized configurations found by comparing them with each other and the standard tuning in RFC 3626 and to study their performances in terms of quality of services(QoS)

Sugendha , Bandana Sharma[8] The core negative aspect of OLSR is the necessity of maintaining the routing table for all the probable routes. Such a negative aspect is negligible for those scenarios which have small amount of nodes, but for large crowded networks, the overhead of control messages could use supplementary bandwidth and add more in network congestion. Performance of OLSR depends on the choice of its parameters. The recognition of topological changes can be tuned by changing the time intermission for broadcasting HELLO messages. Thus, computing the finest configuration for the parameters of this protocol is decisive before deploying any VANET.

VI. TECHNIQUES USED

Table: Optimization techniques used [8]

[1] AUTHORS	**[2] YEAR OF PUBLICATION**	**[3] TECHNIQUE**	**[4] PERFORMANCE MATRICS**
[5] Jamal Toutouh et al	[6] 2012	[7] Particle swarn [8] optimization,Genetic algorithm [9] (GA)	[10] 1.Packet Delivery [11] Ratio(PDR) [12] 2.Normalized Routing [13] Load(NRL) [14] 3.Average End-to-End **[15]** Delay(E2ED
[16] Omar Abdel [17] Wahab et al	[18] 2013	[19] Ant colony [20] Optimization	[21] 2. Packet Delivery [22] Ratio(PDR) [23] 3.maintain the network [24] stability [25] 4. Reduce **[26]** Communicat-ions overhead

[27] Kunal V. Patil, [28] M.R. Dhage	[29] 2013	[30] Genetic [31] Algorithm	[32] 1.Packet Delivery [33] Ratio(PDR) [34] 2.Normalized Routing [35] Load(NRL) [36] 3.Average End-to-End **[37]** Delay(E2ED

VII. CONCLUSION

Disadvantage of the intrinsic design of routing protocols in MANETs, many researchers have conduct diverse technique of optimization to overcome the energy efficiency problem occurs in the VANET. In this paper, the state-of-art routing method of existing solution is categorized and discussed. The optimization technique is best solution to obtain optimum parameters which make the network more reliable and less energy consumption. As the modified OLSR and optimum parameters obtained from optimization achieved better performance.

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