International Journal of Engineering Research and General Science Volume 3, Issue 3, May-June, 2015
ISSN 2091-2730

A Survey based study of Routing Protocols for VANET

[1]Preeti Soni , [2]Amit Kumar

[1]Email id- vermapreeti0008@gmail.com , [2]Email id- amitkumardcr@gmail.com

[1,2]Dept. of ECE, SITM –Sonipat DCRUST, Haryana, INDIA

[1]Contact no. 8527840008

Abstract –The VANET vehicles must be equipped with a radio transceiver and computer control module, so that they can be used as a network node. The wireless network coverage range of each vehicle may be limited to a few hundred meters; each node can be either a transceiver or a router. The paper presents a survey based study of routing protocols for VANET

Keywords— GPSR, Ad hoc On-demand Distance Vector (AODV), VANET, GPS, GPSR, DSR, SDMA

I. INTRODUCTION

Ad hoc network is a kind of distributed wireless multi hop network composed of a group of nodes with routing function, and it does not rely on any of the default network infrastructures. In ad hoc network, the transmission range of nodes is limited. When the source node sends data to the target node, it usually requires other auxiliary node, so routing protocol is an indispensable part of the ad hoc network.

Traditional data aggregation schemes for wireless sensor networks usually rely on a fixed routing structure to ensure that data can be aggregated at certain sensor nodes. However, they cannot be applied in highly mobile vehicular environments. VANET has some different characteristics such as regularity and predictability. This area we exhibit a percentage of the presumptions thought seriously about and Goals and characteristics. When we begin clarifying the working of our protocol, we exhibit a few suppositions. All hubs have earlier information of the time required for Processing and system Delay. Every hub is outfitted with GPS gadget and can precisely focus the directions of a hub. Hubs have proficiency of completing basic numerical operations and era of prime numbers. [25]

❖ Goals

Enrolled underneath are the fundamental objectives of our work

(1) Security and protection: Avoid any sort of data spillage to noxious hubs

(2) Efficiency: to attain Security and security without trading off different variables.

(3) Intrusion discovery: To identify the vicinity of malignant hubs.

❖ GPS Based routing

Area added routing alludes to the utilization of area data for routing instead of IP locations. With the assistance of GPS, one can acquire the directions of a specific hub and hence course just in a specific bearing. In doing in this way, the movement in the system is lessened.

Routing in VANET has the following problems to be analyzed:

- Traffic information such as section travel time, density and flow rate must be analyzed.
- Traffic congestion, Road conditions and information can be exchanged between vehicles, including speed, acceleration, direction, and position, which can greatly improve the vehicle safety.
- Proposed approach uses the vehicle-to-vehicle, vehicle-to-passenger and vehicle-to-infrastructure communication to ease congestion is specially based on beacon messages.
- Total profit is collected as the driving time and waiting time of vehicles.

II. LITERATURE REVIEW

VANET has been a dynamic field of innovative work for quite a long time yet most would agree that, with the late emotional upgrades in communication and computing technologies it is just in the most recent decade that this field has truly picked up a ton of force. Indeed, VANET exploration has pulled in a considerable measure of consideration from scientists working in different fields including gadgets, organizing, security, programming designing, car, transportation, etc.

Recent results covering VANET-related issues incorporate regions, for example, routing, Quality Service (QoS), TV, security attacks and dangers, limit, impact and obstruction, the impacts of transmission power on protocol execution and force control algorithms, clogging control, and administration disclosure. It is past the extent of this work to survey each of these themes. Rather, we present, examine, and audit late research comes about that have been accomplished in the most dynamic VANET regions which incorporate routing, TV, QoS, and security. Moreover, the reason for selecting these particular zones likewise comes from the way that they are the ones with the most dynamic enthusiasm from the VANET research group as confirm by the quantity of publications we found during our literature review on VANET.

Routing

Routing VANET has been examined and researched generally in the previous couple of years [26]. Since VANETs are a particular class of specially appointed systems, the regularly utilized impromptu routing protocols at first actualized for MANETs have been tried and assessed for utilization in a VANET situation. Utilization of these location based and topology-based routing protocols obliges that each of the taking part hubs be appointed an extraordinary location. This suggests that we require an instrument that can be utilized to allot special locations to vehicles yet these protocols don't promise of avoidance of allocation of duplicate addresses in the network [25].

Therefore, existing disseminated tending to algorithms utilized as a part of versatile specially appointed systems are considerably less suitable in a VANET situation. Particular VANET-related issues, for example, system topology, portability designs, demographics, thickness of vehicles at diverse times of the day, quick changes in vehicles arriving and leaving the VANET and the way that the width of the street is regularly littler than the transmission run all make the utilization of these traditional ad hoc routing protocols inadequate.

A. Proactive routing protocols

Proactive routing protocols utilize standard separation vector routing systems (e.g., Destination-Sequenced Distance- Vector (DSDV) routing) or connection state routing techniques (e.g., Optimized Link State Routing protocol (OLSR) and Topology Broadcast-taking into account Reverse-Path Forwarding (TBRPF)). They keep up and overhaul data on routing among all hubs of a given system at all times regardless of the possibility that the ways are not at present being utilized. Course redesigns are intermittently performed paying little respect to network load, transmission capacity requirements, and system size. The fundamental downside of such methodologies is that the support of unused ways may possess a noteworthy piece of the accessible transfer speed if the topology of the system changes every now and again. Since a system between autos is to a great degree dynamic proactive routing algorithms are often inefficient. [27]

B. Reactive routing protocols

Reactive routing protocols for example, Dynamic Source Routing (DSR), and Ad hoc On-interest Distance Vector (AODV) routing actualize course determination on an interest or need premise and keep up just the courses that are presently being used, subsequently lessening the weight on the system when just a subset of accessible courses is being used whenever. Communications among vehicles will just utilize an extremely set number of courses, and thusly receptive routing is especially suitable for this application situation. [28]

C. Position-based routing

Position-based routing protocols [27] oblige that data about the physical position of the taking part hubs be accessible. This position is made accessible to the immediate neighbors as intermittently transmitted signals. A sender can ask for the position of a collector by method for an area administration. The routing choice at every hub is then in light of the destination's position contained in the packet and the position of the sending hub's neighbors. Thus, position-based routing does not require the foundation or upkeep of courses. Samples of position based routing algorithms incorporate Greedy Perimeter Stateless Routing (GPSR) [28] and Distance Routing Effect Algorithm for Mobility (DREAM) [29]. Karp et al. [28] portray a position-construct routing protocol situated in light of a ravenous sending instrument in which packets are sent through hubs geologically closer to the destination than the past hub. Consequently the position of the following hop will dependably be closer to the destination hub than that of the present hop.

The “perimeter routing” method of GPSR (avaricious edge stateless routing) that hunt down backup ways to go that may not be geologically closer is not considered since in an expressway situation the width of the street is frequently littler than the scope of transmission. In this manner in this situation there is no chance to get for a course to move far from the destination and still think that its way back.

Existing ad hoc networks utilize topology-based routing where courses are built up more than a settled progression of hubs however which can prompt broken courses and a high overhead to repair these courses. The uncommon conditions and prerequisites for vehicular communications, including regular topology changes, short network time and situating frameworks have defended the improvement of committed routing answers for remote multi-bounce communications in light of geographic positions. The utilization of Global Positioning System (GPS) innovation empowers sending to be decoupled from a hub's character and in this manner the position of the destination hub is utilized instead of a course to it which obliges activity stream by means of an arrangement of

neighbors [29]. Hence position-based routing gives a more adaptable and proficient sending system proper for exceedingly unstable impromptu systems found in VANETs Position based routing constitute three center segments: beaconing, area administration and sending (geographic unicast and geographic broadcast)

Four recent important activities in position-based routing include: Naumov et al. [30] depict a late development protocol called Connectivity Aware Routing (CAR) for VANETs. It is a position based routing plan equipped for discovering joined ways in the middle of source and destination sets. Leontiadis et al. [31] portray a topographical deft routing protocol suitable for vehicular systems which misuses the topology of VANETs and geological routing data.

Hartenstein [32] depicts a position-based routing plan which utilizes an exceptional identifier, for example, an IP address which is utilized to recognize a vehicle alongside its present position (GPS coordinate). This plan just obliges that a vehicle knows its own particular position and that of its one-hop neighbors. Accepting a bundle contains the destination position, the switch advances the packet to a hub closer to the destination than itself. Given the generally high speeds of the expansive number of vehicles included, this plan is both versatile and adaptable regarding system topology.

D. Beaconing and location service

Vehicles occasionally telecast short packets with their identifier and current geographic position. Endless supply of a signal, a vehicle stores the data in its area table. The asking for vehicle issues an area question message asking for the recognizable proof and arrangement numbers and bounce limit when it needs to know the position of an obliged vehicle not accessible in its area table. This message is rebroadcast to adjacent vehicles until it achieves the obliged vehicle or as far as possible is come to. In the event that the solicitation is not a copy, the obliged vehicle answers with an area answer message conveying its present position and timestamp. Endless supply of the area answer, the starting vehicle upgrades its location table. [31]

E. Forwarding

A geographic unicast transports packets between two hubs through various remote hops. At the point when the asking for hub wishes to send a unicast packet, it decides the position of the destination hub by taking a gander at the area table. A ravenous sending algorithm is then used to send the bundle to the neighboring vehicle, specifying the base remaining separation to the destination vehicle and this procedure rehashes at each vehicle along the sending way until the packet achieves its destination.

A geographic broadcast conveys information packets by flooding, where vehicles re-show the packets if they are situated in the geographic range dictated by the packet. The utilization of cutting edge television algorithms help to minimize overhead by diminishing the event of show tempests. Information and control bundle sending must be without circle and towards the destination or target region area. Having packets sent over the most limited way towards the destination is not a necessity because of the high system unpredictability [32].

F. Protocols for dedicated short-range communication(DSRC)

Recent research on devoted short-run communications protocols, in particular Coordinated External Peer Communication (CEPEC) [34] and Communications Architecture for Reliable Adaptive Vehicular Ad Hoc Networks (CARAVAN) [33] utilization mapping and timeslot allotment to diminish the event of refusal of administration attacks or attacks that weight the constrained data transfer capacity accessible in vehicular systems.

Communications in a vehicular system are powerless to foreswearing of administration attacks by sticking the communications medium or exhausting the restricted remote transfer speed that is accessible. These attacks are conceivable because of the DSRC standard particular that a vehicle must hold up to transmit until it detects that the channel is unmoving, permitting a pernicious vehicle to always transmit clamor to keep transmission from inside of detecting scope of the assailant vehicle.

Blum & Eskandarian [33] present the Communications Architecture for Reliable Adaptive Vehicular Ad Hoc Networks (CARAVAN) as an answer for these sorts of communications attacks. Convoy uses Trusted Computing Platforms, spread range innovation and a mystery pseudorandom spreading code to confirm the respectability of the product and equipment of the sending vehicle before permitting the vehicle to transmit messages. Train incorporates another connection layer protocol called Adaptive Space Division Multiplexing (ASDM) that dispenses timeslots to vehicles to expand against sticking security. ASDM incorporates unique elements that enhance existing Space Division Multiple Access (SDMA) protocols regarding transfer speed usage by part the roadway into discrete cells that can contain at most one vehicle. A mapping capacity is then characterized that doles out each of the cells a timeslot. No two cells inside of a predefined scope of one another will have the same timeslot.

Yang et al. [34] propose a cross-layer protocol called Coordinated External Peer Communication (CEPEC) for shared communications in vehicular systems. The CEPEC protocol organizes the elements of physical, MAC and system layers to give a reasonable and sans handoff answer for uplink bundle conveyance from vehicles to roadside unit. With CEPEC, the street is sensibly apportioned into sections of equivalent length and a handing-off head is chosen in every section to perform neighborhood packet gathering and total bundle handing-off. Hubs outside the scope range of the closest roadside unit can even now get access through a multi-bounce course to their roadside unit.

Like CARAVAN, CEPEC dispenses timeslots to vehicles in two stages: first and foremost, the roadside unit allots the timeslots to the fragments. Second, intra-section timeslot distribution happens where the Segment Head (SH) appoints timeslots to individual vehicles inside of the fragment. Results demonstrate that the CEPEC protocol furnishes higher throughput with ensured reasonableness in multihop information conveyance in VANETs when contrasted and an absolutely IEEE 802.16-based protocol.

III. CONCLUSIONS

In their methodology the physical layer is part into two recurrence groups with radio ranges that are chosen in light of the necessities of the messages conveyed in every band. Sporadically happening cautioning messages put a premium on system network since they are of enthusiasm to vehicles a long way from the message source. These messages are generally rare and subsequently require less transfer speed. Intermittent messages, then again, are just of enthusiasm to vehicles near to the message source, however there are countless messages and they must be generated frequently.

The system protocol incorporates message sending principles and a technique that influences the advantages of differing radio reaches to speed conveyance of sporadic messages. The consequences of reenactment studies exhibit that with these new elements, CARAVAN produces message proliferation latencies that are like or better than less secure, right now proposed between vehicle communication protocols.

REFERENCES:

[1] VANETs in city environments. In *Proceedings of 2nd internationalconference on computer, control and communication, IC42009* (pp. 1–5), February 2009.

[2] Mohandas, B., & Liscano, R. (2008). IP address configuration inVANET using centralized DHCP. In *Proceedings of 33rd IEEEconference on local computer networks*, Montreal, Canada, October2008.

[3] Füßler, H., Mauve, M., Hartenstein, H., Käsemann, M., &Vollmer, D. (2002). *A comparison of routing strategies for vehicularad hoc networks* (Technical report, TR-02-003). Departmentof Computer Science, University of Mannheim, July 2002.

[4] Karp, B., & Kung, H. (2000). Greedy perimeter stateless routingfor wireless networks. In *Proceedings of ACM international conferenceon mobile computing and networking (MobiCom 2000)*(pp. 243–254), Boston, MA, August 2000.

[5] Basagni, S., Chlamtac, I., Syrotiuk, V., & Woodward, B. (1998).A distance routing effect algorithm for mobility (DREAM). In*Proceedings of ACM international conference on mobile computingand networking* (pp. 76–84), Dallas, TX, October 1998.

[6] Naumov, V., & Gross, T. (2007). Connectivity-aware routing(CAR) in vehicular ad-hoc networks. In *Proceedings of 26thIEEE international conference on computer communications, Infocom2007*, Anchorage, Alaska, 2007.

[7] Leontiadis, I., & Mascolo, C. (2007). GeOpps: geographical opportunisticrouting for vehicular networks. In *Proceedings ofIEEE international symposium on world of wireless, mobileand multimedia networks (WoWMoM 2007)*, Helsinki, Finland,2007.

[8] Hartenstein, H. (2001). Position-aware ad hoc wireless networksfor inter-vehicle communications: the fleetnet project. In *Proceedingsof the 2nd ACM international symposium on mobile adhoc networking & computing*, Long Beach, CA.

[9] Blum, J., & Eskandarian, A. (2006). Fast, robust message forwardingfor inter-vehicle communication networks. In *Proceedingsof IEEE intelligent transportation systems conference(ITSC'06)* (pp. 1418–1423).

[10] Yang, K., Ou, S., Chen, H., & He, J. (2007). A multihoppeer-communication protocol with fairness guarantee for IEEE802.16-based vehicular networks. *IEEE Transactions on VehicularTechnology*, *56*(6), 3358–3370.

[11] Biswas, S., Tatchikou, R., & Dion, F. (2006). Vehicle-to-vehiclewireless communication protocols for enhancing highway trafficsafety. *IEEE Communication Magazine*, *44*(1), 74–82.

[12] Chen, Y., Lin, Y., & Lee, S. (2010). A mobicast routing protocolfor vehicular ad hoc networks. *ACM/Springer Mobile Networksand Applications*, *15*(1), 20–35.

[13] Chen, Y., Lin, Y., & Lee, S. (2010). A mobicast routing protocolwith carry-and-forward for vehicular ad hoc networks. In *Proceedingsof the fifth international conference on communicationsand networking in China 2010 (CHINACOM 2010)*, China, Beijing,August 2010.

[14] Zhu, J., & Roy, S. (2003). MAC for dedicated short range communicationsin intelligent transport systems. *IEEE CommunicationsMagazine*, *41*(12), 60–67