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Performance Analysis of MANET Routing Protocols in a VANET

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Abstract: *Vehicular Ad Hoc Network is (VANET) created by a digit of affecting vehicles that are capable of with wireless lines. It is a variety of Mobile Ad Hoc Network (MANET) in which message takes position between moving vehicles on the road. VANETs are diverse in life as they make available wireless message among affecting vehicles (V2V) and vehicle to Road surface Units (RSU). It has become an stimulating area of research as it is expected to advance intellectual Transport System (ITS). To utilize efficient message among vehicles, routing is the key reason which needs to be explored .This paper be going to analyze the presentation of AODV and GPSR routing procedures in a VANET in a range of scenario below different transfer situations with deference to Packet Delivery Ratio (PDR) and standard End-to-End Delays (E2ED).Imitation is execute using NS-2.35 in grouping with VanetMobiSim. It has been establish that AODV executes better with deference to PDR and GPSR go one better than AODV with regard to E2ED. Also, the presentation of equally the routing protocols varies from one picture to a different and transfer variety. The presentation of both AODV and GPSR is enhanced by using IEEE 802.11p as a substitute of IEEE 802.11.*

Keywords: *MANET, VANET, ITS, routing, AODV, GPSR,NS-2,VanetMobiSim.*

1. INTRODUCTION

Vehicular Ad hoc Network is (VANET) an capable apparatus expected to realize messages between vehicles, flawless network connectivity on the road to recovery, road safety, essential alerts and contacting relieves and activity. It allows vehicles to correspond with each other even when they are out of vision by creation use of multihop routing. VANET allocates some characteristics with MANET like self organization of nodes but it is different from MANET due to high mobility of nodes, frequent topology changes and constrained pattern due to limited roads, restrictions of bandwidth due to the presence of a central manager, disconnection problems owing to the frequent fragmentation in the networks and indication declining caused by objectives that figure impediments between the communicating nodes. Other than the unique characteristics of VANET, a large number of commercial and public applications, availability of traffic data and popularity of Global Positioning System (GPS) motivate VANET classification. To manage communication between vehicles which are out of radio range of each other, routing protocols are necessary So, the performance of VANET depends on the routing protocol used. A large number of routing protocol have been planned by a variety of associates but as stated, intend an capable routing procedure for all VANET functions is very difficult. These protocols are divided between a variety of category to be exact topology based routing, location based routing, come together based routing, geo cast routing and transmit routing protocols.

2. RELATED WORK

A numeral of topology and location based routing protocols have been optional and analyzed by lots of associates. Associated survey of topology based routing protocol presentation is existing in. Only an expansion to the related work is accessible here AODV, DSR, and Geographic Source Routing (GSR) have been evaluated in city atmosphere. The result explain that GSR executes enhanced than both AODV and DSR with deference to delivery rates and latency. AODV, DSR and LAR have been estimated in

city and main road picture using IDM based tool VanetMobiSim to produce reasonable mobility traces. It is establish here that position based routing protocols are found to perform better than topology based routing protocol. In the performance of AODV and GPSR has been compared in city scenario by using TIGER maps and reality vehicular traces with IEEE 802.11 MAC standards. MMTS has been used as the mobility model for VANET and no position service has been used in GPSR to know the position of destinations. Rather coordinates of target have been provided from the simulator's inclusive information. Here, AODV performs better than GPSR in terms of packet delivery ratio while delay is more in AODV than GPSR. In [9], AODV, DSR and GPSR have been compared in urban scenario using NS-2 and MITSIM to imitate reason able transfer association. A total of 400 nodes have been imitation using 802.11 wireless LAN measures. The outputs have been evaluated over a range of message reserve between 200 and 1600 metres. It has been found that both DSR and AODV occurrence from higher latency and lower packet delivery ratio than GPSR with respect to the increasing distance between starting place and end.

Benefits of Proposed Solution:

Benefits of VANETs into following classes:

1) Safety oriented,
2) Commercial oriented
3) Convenience oriented
4) Productive Applications

Safety Oriented Benefits: It includes observe of the adjacent road, similar to vehicles, exterior of the road, road curvatures etc.

The Road safety benefits can be classified as:

1) Real-time transfer: The real time transfer data can be stored at the RSU and can be existing to the vehicles whenever and anywhere required. This can play an imperative role in solving the difficulty such as transfer jams, keep away from congestions and in urgent situation alerts such as accidents etc.

2) Co-operative Message Transfer: Slow/Stopped Vehicle will replace messages and co-function to help last vehicles. Though reliability and latency would be of main concern, it may mechanize things like emergency braking to avoid possible accidents. equally, disaster electronic brake-light may be an extra function.

3) Post Crash Notification: A vehicle concerned in an accident would transmit warning messages about its situation to behind vehicles so that it can take conclusion with time in hand as well as to the main road patrol for tow absent maintain as represented.

4) Road Hazard manage notice: Cars notifying other cars about road having earthquake or in sequence regarding road feature notification due to road curve, sudden effortless etc.

Technology Used:

***Simulation Environment*:** This section is the major portion of the thesis, it is important to setup simulation environment to observer protocols behaviour over VANET. Quantitative analysis is conducted to with the help of NS-2 tool.

Network Simulator: Network simulator (Version 2), wide referred to as NS-2, is just a discrete event driven system imitation tool for studying the active personality of communication networks. It's an open source solution built in C++ andOtcl programming languages. Ns-2 provides extremely modular Platform for wired and wireless simulations supporting totally different network component, protocol (e.g., routing algorithms, TCP, UDP, and FTP), traffic, and routing category. In common, NS-2 presents consumers with the simplest way of specifying network protocols and simulating their corresponding behaviors and Result of the simulation is provided within a trace file that contains all occurred events.

To test new concepts researchers resort to one of two underlined techniques i.e. either testing new concepts in real time environment or testing them in simulated environment. Creation of real time environment might not be forever possible. In such cases authors need to depend on the simulation tools. Just in case of mobile ad-hoc networks it's been observed that around hour of work is completed using simulation tools. Ns-2 is most generally used tool among various available simulation tools.

Advantages:

Known time and position: As most vehicles in VANETs are expected to be equipped with GPS receivers, the location of a node with time would be available. This would simplify implementation of various security protocols.

Limited physical access: Access to a VANET node is limited to its driver or authorized personnel as a physical locking mechanism is present in every vehicle. This highly aids the physical security of VANET nodes.

Periodic maintenance and inspection: In most cases, cars receive periodic maintenance, which can be used for regular checks and updates of firmware and software. In case public key cryptography is implemented, it can also be used for

updating certificates and keys, along with provision of fresh Certificate Revocation Lists (CRLs).

Central registration: Another advantage of the VANETs is that, unlike other ad hoc networks, all the nodes (i.e., vehicles) are registered with a central authority and already have a unique identity in the form of a license plate. There is an existing infrastructure that maintains records of all vehicles. This existing setup could be leveraged to enhance security of VANETs by setting up a vehicular PKI and make the registration authorities act as Certification Authorities (CAs). However, this would also require a change in their working setup that will require effort both in terms of time and money.

Honest majority: We can safely assume in a VANET network that majority of nodes will be honest and law abiding as the existing setup will continue with the same set of drivers on the vehicles. This makes easier to detect and isolate malicious nodes with polling and voting mechanism helping to implement the same. Another reason for less number of malicious nodes is that few people like modifying or assembling their own car unlike PCs where tinkering is quite prevalent.

Existing law enforcement infrastructure: Unlike other ad hoc networks here, there is an existing agency that can catch and apprehend wrong doers. This will serve as a major deterrent to attackers. Although it would require additional training on part of law enforcement officers to adapt themselves to this technological network, it is still a major deterrent. Node limited to a certain physical region: Vehicles will be limited to roads in a VANET network and as most roads are mapped it will be easy to pinpoint node locations.

Limitations:

When developing an application for use in VANET it is vital to be aware of the limitations that are present in this environment. The main challenges are capacity restrictions, limited connectivity and competing alternative technologies. In this section we describe these challenges in detail and provide hints on how to overcome them. The focus of this discussion will be on the limitations of pure vehicle-to-vehicle communication.

3. METHEDOLOGY

The scope of Vehicular Ad Hoc Network (VANET) and its related research studies are still in progression phases. The limited sensible deployable alternatives under diverse assignments are purely simulation based before their actual implementations. The list of all major projects along with some related developments could be found in .The collaboration of imminent research objectives and its related scope in this proposal are also collapsed into same influence of simulation environment for generating some authenticated and well to implement outcomes. For this purpose, the adopted methodology for future explore results (exclusively virtual evaluates) for my work will be based on simulations near to the real time packages before any actual implementation.

4. CONCLUSIONS & FUTURE WORK

we terminate that AODV is by far the most excellent protocol amongst all the four measured protocols given that it out executes all the other protocols in all three limitations conversed above but lags after in pattern wait case as it uses thought of Route Request and Route Reply. The DSR protocol has assets very close to AODV but it falls short in performance by not much margin and can be considered as a good routing protocol. OLSR and DSDV being the proactive protocols are comparatively less effective in routing, even though they show enhanced concert in delay but are less consistent protocols as packet loss is reasonably important aspect in these two protocols. As a result of which reactive protocols are more in existence since they use lesser amount of energy to generate the routing path and AODV is most extensively used of all the active protocols now a day. Hence the future work is to enhance in packet delivery ratio, throughput, decrease in delay, routing above your head using diverse algorithms.

REFERENCES

[1] Raj Bala and C. Rama Krishna, "Performance Analysis of Topology based Routing in a VANET", accepted in 3rd International Conference on Advances in Computing, Communications and Informatics, Delhi, India, 24-27 Sept. 2014.

[2] J. Bernsen and D. Manivannan, "Routing Protocols for Vehicular AdHoc Networks that Ensure Quality of Service", in proc. 4th International Conference on Wireless and Mobile Communications, Aug. 2008, pp.1-6.

[3] C. Lochert, H. Hartenstein and J. Tian, "A Routing Strategy for Vehicular ad hoc Networks in City Environments", Intelligent Vehicles Symposium, June 2003, pp. 156-161.

[4] B.N. Karp and H. T. Kung, "GPSR: Greedy Perimeter Stateless Routing for Wireless Networks", in Proc.6th Annual ACM/IEEE International Conference on Mobile Computing

and Networking (MobiCom '00), Boston, Massachusetts, Aug. 2000, pp. 243–254.
[5] M. Mauve, A. Widmer and H. Hartenstein, "A Survey On Position- Based Routing in Mobile Ad Hoc Networks", IEEE Network, vol. 15, pp.30-39, Nov/Dec 2001.
[6] W. Kiess, H. Fussler, J. Widmer and M. Mauve, "Hierarchical Location Service For Mobile Ad-Hoc Networks," SIGMOBILE Mobile Computing Communication Rev., vol. 8, pp. 47–58, Oct. 2004.
[7] W. Y. Lin, M.W. Li, K.C. Lan and C. H. Hsu, "A Comparison of 802.11a and 802.11p for V-to-I Communication: A Measurement Study", in Quality, Reliability, Security and Robustness in Heterogeneous Networks, Springer, 2014, vol. 74, pp. 559□570.
[8] "VANETs, Wikipedia Article," [Online] Available: http://en.wikipedia.org/wiki/VANET [March 29, 2013].
[9] C. A. T. H. Tee and A. C. R. Lee, "Survey of Position based Routing for Inter Vehicle Communication System", in proc. 1st International Conference on Distributed Framework and Applications, Oct. 2008, pp. 174-182.
[10] U. Nagaraj, M. U. Kharat and P. Dhamal, "Study of Various Routing Protocols in VANET", International Journal of Computer Science and Technology, vol. 2, pp. 45-52, Oct.-Dec. 2011.
[11] C. Perkins, E. B. Royer and S. Das "Ad Hoc On-Demand Distance Vector Routing", July 2003, [Online] Available: www.ietf.org/rfc/rfc3561.txt [Jun. 1, 2013].
[12] B. Ramakrishnan, R.S. Rajesh and R.S. Shaji, "Analysis of Routing Protocols for Highway Model without Using Roadside Unit and Cluster", International Journal of Scientific & Engineering Research, vol. 2, pp. 1-9, Jan. 2011.
[13] E. Fonseca, A. Festag, "A survey of Existing approaches for secure Adhoc routing and their applicability to VANET", NEC Network Laboratories, March 2006
[14] A. Husain, R. S. Raw, B. Kumar and A. Doegar, "Performance Comparison of Topology and Position Based Routing Protocols in Vehicular Network Environments," International Journal of Wireless and Mobile Networks vol. 3, pp. 289-303, Aug. 2011.