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Review on Vehicular Ad-Hoc Network (VANET) Architectures

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Abstract -An ad hoc network consisting of vehicles has emerged as an interesting but challenging domain where a lot of new application may find their place. Though research in this field is on since last two decades, large-scale practical implementation still require some time. In this paper, a survey of current challenges and potential applications, incorporating medium access control schemes, routing approaches, hardware and spectrum issues, and security and privacy issues for VANETs, is presented. Wireless technology is advancing rapidly with time. People are doing research nowadays mostly in the field of telecommunication. VANET is the most growing research area in wireless communication. With the advancement and maturity of the VANET, there will be a great revolution in the field of wireless communication in terms of fast handovers, network availability, security, safety with the use of advanced applications etc. VANET technology is advancing with the passage of time but there are many issues that has to be addressed to make the network more vigorous. In view of aforesaid, in this paper we have studied and discussed various research works related to the applications, protocols and security in VANET. Moreover, after reviewing the existing works.

Keywords: Mobile Ad hoc Network, Vehicular Ad hoc Network; Inter-vehicle Communication, Routing Protocols

I INTRODUCTION

Vehicular ad hoc network (VANET) is a challenging network environment that pursues the concept of ubiquitous computing for future. Vehicles equipped with wireless communication technologies and acting like computers will be on our roads soon, and this will revolutionize our concept of traveling. VANETs bring lot of possibilities for new range of applications which will make our travel not only safer, but also fun. The concept of VANETs is quite simple: By incorporating the wireless communication and data sharing capabilities, the vehicles can be turned into a network providing similar services to the ones we are used to in our office or at home networks. VANET is considered an offshoot of mobile ad hoc networks (MANET). In many ways, VANETs are similar to MANETs. For example, both networks are multi-hop mobile networks having dynamic topology. There is no central entity, and nodes themselves route data across the network. Both MANETs and VANETs are rapidly deployable without the need of an infrastructure. VANETs have some distinguishing characteristics in many ways [1]. Both MANET and VANET are mobile networks; however, the mobility pattern of VANET nodes follows geometrical patterns. MANETs are often characterized by limited storage capacity, low battery, and processing power. VANETs, on the other hand, do not have such limitations. In VANETs, any node may move at high relative velocity. This makes the lifetime of communication links between nodes quite short. Node density is also unpredictable; during rush hours, the roads are crowded with vehicles. Similarly some roads have more traffic than other roads. Specialized and mixed node deployment patterns and versatile mobility have made the problem more complicated. These network topologies which are highly fluent in nature also involve large variations in node densities and relative node Velocities. Scalability considerations of futuristic networks may require support for several thousands of nodes spanned in very large areas. Quality-of-service (QoS) requirements for such multidimensional and complicated

networks pose another challenging dimension. In addition to this, there are many new and unique applications emerging for VANETs, such as traffic management, emergency response services, infotainment, theft detection, law enforcement, military and commercial fleet, and convoy management [2]. Although many different solutions have been presented by research community to answer the problems, consensus has developed on four major approaches, which are given as:

• Software-defined hardware to adapt according to available resources.

• Provision of efficient MAC scheme for maximum utilization of physical resources.

• Selection of best possible route incorporating runtime changes.

• Designing of network efficient applications.

On the one hand, efficient MAC and hardware will provision maximum physical layer resources for upper layer's data, to provide best QoS. On the other hand, efficient applications and routing will try to use minimum network resources. These two pronged and mutually complimentary strategies, known as cross-layer architecture, have opened up new dimensions and possibilities for researchers. Several academic and industrial projects have been initiated to address these challenges [3]

Challenges -Though, initially it was considered that VANET is a subclass of MANET, most of the research and designs related to MANET were applied to VANET. However, subsequent progress showed significant difference among both classes of networks. VANET paradigm design for communication, privacy, and provisioning coupled with security cannot be compared directly with MANET. To highlight the peculiar VANET issues, a lot of research has already been done [4,5]. However, many challenges are still open to researchers for the optimum solution due to non-implementation of VANET at large scale. In subsequent discussion, key challenges of the VANET are highlighted.

Major Issues in VANET

There are some issues in VANET. These are as follow [3-7]

High Mobility: Due to high mobility every one of the nodes are not interacted appropriately with each other on the grounds that they need to learn about others conduct first as per learn based scheme. It additionally decreases proficiency of the system.

Real-time Guarantee: VANET applications are utilized for hazard warning, collision avoidance, and accident warning information, so applications include strict deadlines for legitimate message delivery.

Privacy and Authentication: It is required to take after the vehicles for the identification of vehicles from the message they send for authentication of all message transmission, which most consumers won't care for others to think about their personal identification. Hence a system needs to be introduced which enables message to be unknown to the common nodes additionally recognition by central authorities in cases like accidents.

Location Awareness: For the best possible location awareness GPS system is required to handle the VANET application. On the off chance that there is no Proper system for location identification, delay is there automatically.

Delay in VANET: In a VANET delay issue ought to be less for the new path identification. In this system vehicle and RSU detect chances of collision between multiple vehicles are not ready to communicate among themselves. The system will gather information about vehicles that are coming in opposite direction and are approaching towards the destination. For this, there are numerous safety applications are available in VANET to decrease the road accident and loss of life of the occupants of vehicles. Collision drives the stick problem. To conquer this problem delay ought to be less [4].

II LITERATURE SURVEY

Although VANET is not a new concept, it still continues to present new problems and problems in science [5]. The primary purpose of VANET is to help the network to set up and manage the communication network between vehicles without the use of central or monitoring stations. Some of the major uses of VANET are in critical medical situations with little support, although it is important to share relevant knowledge to save lives. the people. However, despite the large application, VANET has its problems and new issues. The disadvantage of VANET housing is that it puts a lot of load on the car. Each vehicle is part of the network, and network communication is often performed according to its own privacy rules. [17-19]

Kashif Naseer Qureshi et.al (2018). In this paper, we suggest a vehicle cloud computing perfect for a car-based network. The perfect delivers information services for vehicle security and improves data communication or system operation. In adding, this article also debates various services in the future perfect, counting data combination, safety, and discretion or reserve organization. Finally, untried marks show that model has a good performance on the network.

Ahmad Arsalan et.al (2019) In NDN, message among unlike nodes is made by content name instead of IP address. On the other hand, SDNs provide extra regulator or efficacy in system management by separating facts or monitoring aircraft. VANET connectivity consists of two parts (i) V2V (Vehicle to vehicle) (ii) V2I (Vehicle to infrastructure). In V2V, the connection among diverse buses is carried only by the car, while in V2I, communication is possible through the unit (RSU). When each car is covered by the same package, there is a hurricane problem. With the help of NDN and SDN in VANET, the storm problem was solved. In this article, we have introduced a new technology called Broadcast Storm Advance Mechanism (BSAM) to alleviate hurricane problems. The planned technique is appraised through simulation. The results showed a better BSAM response than the local VNDN given the average number of interesting pages and the late postponement.

Charu Guleria et.al (2018) the future device attentions on rejection of facility doses. The main point of this article is to notice DDoS attacks and reduce them. job contains of 2 steps, the first being the attack topology and the network connection. The second step is to detect and reduce DDoS attacks. Existing methods are compared to those proposed to mitigate DDoS attacks in VANET. To compare and analyze the solutions proposed by various researchers. Providing solutions to such problems, solutions are used to identify and mitigate DDoS attacks through a financially sound approach. The system situation was shaped using NS-2. Simulation fallouts show that this method is healthier in footings of system package loss, high traffic and system access.

S. Jadhav et.al -By sharing information urgently with other vehicles on the network, they can improve road safety. However, due to the constant availability of vehicles, providing a successful VANET transmission service is difficult. Therefore, we propose a method that uses weak reason, with the assistance of the logical reason case in MATLAB software, selects the advanced series, and uses network manipulation to decrease response. With the help of malicious reason, best advancing nodes are designated to send additional messages. By mixing system coding with advancements built on weak logic, we greatly reduced the number of transmissions required, and increased the efficiency of messaging in the VANET system.

Emad Alizadeh et.al (2018) in this article, we use VIKOR (MCDM) to select the best route from existing routes. The VIKOR algorithm aids target users to select best way by means of markers such as road length, road delay, signal quality and vehicle speed. Simulation results show that this method can improve amount or lessen end-to-end delay. In this article, Mohamed Khalil et al. (2018) to prevent Sybil attacks in VANET. The proposed plan of the proposed proposal uses a symmetric integration of keyboards between street corners (RSUs) and road vehicles, with no authorized vehicle providing multiple signals on the network. . The contract does not require staff to be managed from the roadside (RSU) or certification authority (CA), and utilize the minimum message of the RSU, making the plan effective and efficient.

Pramod Mutalik et.al (2017) Globalization has transformed most people into cities. As urban life changes rapidly, and as space and housing increases, the number of vehicles on the road increases, resulting in more traffic accidents. So, by the way, the safety of drivers and vehicles is important. These challenges have led to the advent

of mobile ad hoc networks. VANET is a life-saving application. In this article, we will mainly discuss the protocols, architecture, and features used for package-to-package delivery in various communication models.

Zhongyi Shen et.al (2018) Extending sensor sharing is an important technology for improving road safety and transportation efficiency in car-based networks. Advance on the characteristics of the car to extend the visibility of the environment. However, frequently shared messages will cause a loss of channel and affect the system's reliability. The local sensor distribution algorithm is proposed to reduce the information overload distribution. The distribution process is divided into several sections and the decision is made according to the update period for each section. Simulation results show that location-based algorithms perform better than pure sensor distribution in terms of delay and reliability.

David A. Schmidt et.al (2019) Suicide prevention systems (IDSs) play a key part in identifying or mitigating doses on host schemes. Within these schemes, car-specific network (VANET) networks are chiefly hard to protect due to the unique characteristics of the car customers and the ongoing need for interconnected cyber physical systems. Currently, it is necessary to have VANET-defined IDS that can meet these requirements. An ID based on spline function has been shown to be effective in old-style system programming. By investigative multiple lines and testing their goals, the capabilities of IDS based on splines can be determined.

Hui Zhang et.al (2017), We offer information transfer workshops based on the car network. An index-based monitoring system is proposed to determine the monitoring profile. In order to minimize the size of control information, the segmentation based algorithm is proposed, which is suitable for propagating the candidates. Simulation results show that, in comparison to other existing schemes, such schemes can already be deployed very quickly.

AdemarT.Akabane et.al (2017) the concept of a particular network is technically studied because the network contains only local information in order to analyze their structure. Their levels, relationships, and differences are important criteria for much research. Among the three measures taken, the location of the network center itself is most widely used in many areas such as wireless networks, wireless device networks or network backlash. However, surprisingly, there has not been much research on this method in car service networks (VANETs).

Beom-Su Kim et.al (2018) in this paper, we propose an active link plan and a path for UAV personal care networks. Simulation results show that, compared to traditional routing protocols in personal care networks, the proposed scheme can prove higher packet transfer rates and shorter delay delays.

Xiao-Tao Liu et.al (2017) this paper proposes a practice-based GPCR protocol (CA-GPCR) to enhance the development of GPCR mobility in urban settings. To select the latest global a-hop node during the GPCR protocol termination phase, we considered two factors: the size of the free buffer queue and the distance between the aimed node and the target node.

Meriem Houmer et.al (2018). Our goal is to provide the security or secrecy of the VANET scheme to prevent assailants damaging or damaging our system. To confirm this goal, we use a sapling system named dose tree to manipulate attacker's strategy. In addition, we added an attack case to the attacking tree to create a protective shield to protect the attack.

Navinder deep Kaur et.al (2017) The Indirect Interrupt Indicator (MAODV) vector is an active protocol that defines all possible paths among basis node and the target node maintained during facts transmission. In the event of a disrupted route, the data packets, which are set up along a multi-lane road with multiple routes to the destination, will be processed via the route. In the real world, shades in MANET are allowed to broadcast anywhere.

Mona Sayed Mohmmed Ali et.al (2018) this paper proposes RREQ redistribution by selecting nodes supported in the path selection field, thus adjusting the Ad-hoc VoD Distance Vector (AODV), thus reducing headaches. Using the NS-2 network simulation software, the performance of AODV optimization (MOADV) was performed and compared to AODV. In order to measure the MAODV surface area, the number of RREQs, the number of packets dropped, the reduction delay and access were tested. Simulations show that the number of RREQs sent has dropped from 5% to 16%, which is an improvement in network performance.

Usharani C M et.al (2019) The thesis uses AODV (adhoc on-demand distance 1 vector) monitoring, EE-MAODV optimization (AODV optimization efficiency) for QOS (service quality) route 1 route finding 1 and energy use, maintenance, and network deployment Perform maintenance simulations of 1 simulator 3. This article requires note 1 deployment and execution examples for example, such as end-to-end delays, transmission package 1 (PDR), 1 overhead management and energy consumption. The proposed strategies are compared to the basic AODV monitoring system to make modular and highly scalable manufacturers.

S AnuRanjana et.al (2017) the car-based self-assembly network is based on MANET, and is connected to the wireless sensor network of all vehicles and routes of vehicles. This article discusses VANET security in a very lightweight environment. The drive on the road is connected to the sensor nodes and provides connections between the vehicles and is connected directly to the central environment. We have introduced a new way to share information on VANET networks securely through the cloud.

III CONCLUSION

Vehicle message skill has developed the key to scheming future vehicles. VANET provides message services between vehicles or road construction. In this study, we discussed the potential requests and issues complex in the design of steering procedures in VANET and investigated and examined a large number of steering procedures. We also future a protocol classification method founded on VANET features and divided these procedures into two categories: (1) vehicle-to-vehicle routing protocol and (2) vehicle-to-vehicle steering protocol. This education discusses features, steering metrics, or routing values of all protocol designated from a class of like methods. This information may reflect the latest research on the VANET routing protocol. In determining the VANET routing strategy to be used under given conditions, the organization of most important steering values can abridge task of system designers. We trust that our study will be valuable to research community and will be an entry material for individuals wishing to engage in VANET research and applications. Through this comprehensive study, we can conclude that the most important distinction between the various VANET protocols is method of classifying or forming steering among source pair and target pair. Many routing protocols have been proposed to speech the most critical problems in VANET technology. Most of these protocols cannot address very lively topologies and often disconnected networks, which is considered a major challenge. We focused on some issues related to these agreements and suggested similar solutions. Due to environmental constraints, location-based routing and geographic transmission are generally more efficient than other VANET routing protocols. In addition, substructure based steering protocols are most suitable for VANET message.

REFERENCES

1. .Ahmad ArsalanRana Asif Rehman Distance-Based Scheme for Broadcast Storm Mitigation in Named Software Defined Vehicular Networks (NSDVN) 2019 16th IEEE Annual Consumer Communications & Networking Conference (CCNC) Year: 2019 ISBN: 978-1-5386-5553-5 DOI: 10.1109/ IEEE Las Vegas, NV, USA, USA
2. .Charu GuleriaHarsh Kumar VermaImproved Detection and Mitigation of DDoS Attack in Vehicular ad hoc Network 2018 4th International Conference on Computing Communication and Automation (ICCCA) Year: 2018 ISBN: 978-1-5386-6947-1 DOI: 10.1109IEEE Greater Noida, India, India
3. S. JadhavManoj M. Dongre Geeta Devurkar Fuzzy logic based data dissemination in Vehicular Ad Hoc Networks 2017 International conference of Electronics, Communication and Aerospace Technology (ICECA) Year: 2017 ISBN: 978-1-5090-5686-6 DOI: 10.1109/ IEEE Coimbatore, India
4. Emad Alizadeh Khalilollah Raeisi Lejjy Esmaeil Amiri Improving Routing in Vehicular Ad-hoc Network with VIKOR Algorithm 2018 9th International Symposium on Telecommunications (IST) Year: 2018 ISBN: 978-1-5386-8274-6 DOI: 10.1109 IEEE Tehran, Iran, Iran
5. .Mohamed Khalil Marianne A. Azer Sybil attack prevention through identity symmetric scheme in vehicular ad-hoc networks 2018 Wireless Days (WD) Year: 2018 ISBN: 978-1-5386-5633-4 DOI: 10.1109/ IEEE Dubai, United Arab Emirates

6. .PramodMutalikVenakangouda C PatilA survey on vehicular ad-hoc network [VANET's] protocols for improving safety in urban cities 2017 International Conference On Smart Technologies For Smart Nation (SmartTechCon) Year: 2017 ISBN: 978-1-5386-0569-1 DOI: 10.1109/ IEEE Bangalore, India
7. .Zhongyi ShenXin Zhang Dacheng Yang A Location-Based Extended Sensor Sharing Algorithm in Vehicular Ad Hoc Networks 2018 International Symposium on Antennas and Propagation (ISAP) Year: 2018 ISBN: 978-89-5708-304-8 IEEE Busan, Korea (South), Korea (South)
8. .Zhongyi ShenXin Zhang Dacheng Yang Performance Analysis of Extended Sensor Sharing in Vehicular Ad Hoc Networks 2018 International Symposium on Antennas and Propagation (ISAP) Year: 2018 ISBN: 978-89-5708-304-8 IEEE Busan, Korea (South), Korea (South)4
9. David A. Schmidt Mohammad S. Khan Brian T. Bennett Spline Based Intrusion Detection in Vehicular Ad Hoc Networks (VANET 2019 SoutheastConYear: 2019 ISBN: 978-1-7281-0137-8 DOI: 10.1109/ IEEE Huntsville, AL, USA, USA
10. Ademar T. Akabane Richard W. Pazzi Edmundo R. M. Madeira Leandro A. Villas Applying egocentric betweenness measure in vehicular ad hoc networks 2017 IEEE 16th International Symposium on Network Computing and Applications (NCA) Year: 2017 ISBN: 978-1-5386-1465-5 DOI: 10.1109/ IEEE Cambridge, MA, USA
11. .Beom-Su Kim Ki-Il Kim ; Bong Soo Roh HyungSeok Choi Hierarchical Routing for Unmanned Aerial Vehicle Relayed Tactical Ad Hoc Networks 2018 IEEE 15th International Conference on Mobile Ad Hoc and Sensor Systems (MASS) Year: 2018 ISBN: 978-1-5386-5580-1 DOI: 10.1109/ IEEE Chengdu, China
12. .Xiao-Tao Liu Bin-Jie Hu Zong-Heng Wei Zhi-Xiao Zhu A congestion-aware GPCR routing protocol for vehicular ad-hoc network in urban scenarios 2017 IEEE 9th International Conference on Communication Software and Networks (ICCSN) Year: 2017 ISBN: 978-1-5090-3822-0 DOI: 10.1109/ IEEE Guangzhou, China
13. .Meriem HoumerMoulay Lahcen Hasnaoui Abdeslam Elfergougui Security Analysis of Vehicular Ad-hoc Networks based on Attack Tree 2018 International Conference on Selected Topics in Mobile and Wireless Networking (MoWNeT) Year: 2018ISBN: 978-1-5386-4248-1DOI: 10.1109/ IEEE Tangier, Morocco
14. .Navinderdeep Kaur Analysis of MAODV MANET routing protocol on different mobility models 2017 2nd IEEE International Conference on Recent Trends in Electronics, Information & Communication Technology (RTEICT) Year: 2017 ISBN: 978-1-5090-3704-9 DOI: 10.1109/IEEE Bangalore, India
15. Mona SayedMohmmed Ali Ghassan M T AbdallaMohammed Ali Hamad Abbas Modified Ad hoc On-Demand Distance Vector (MAODV)Protocol 2018 International Conference on Computer, Control, Electrical, and Electronics Engineering (ICCCEEE) Year: 2018 | ISBN: 978-1-5386-4123-1 DOI: 10.11 IEEE Khartoum, Sudan
16. .Usharani C M B A Sujatha Kumari Routing an Electric Vehicle for Optimum Energy Consumption with EE-MAODV Using NS3 2019 International Conference on Intelligent Computing and Control Systems (ICCS) Year: 2019 ISBN: 978-1-5386-8113-8 DOI: 10.1109/ IEEE Madurai, India, India
17. .S Anu Ranjana C L Stefi Sterlin W V Benita B Baron Sam Secure and concealment in cluster based framework on vehicular networks 2017 International Conference on Information Communication and Embedded Systems (ICICES) Year: 2017 ISBN: 978-1-5090-6135-8 DOI: 10.1109/IEEE Chennai, India
18. .Omar A. Hammood Mohd Nizam Mohmad Kahar Muamer N. Mohammed Enhancement the video quality forwarding Using Receiver-Based Approach(URBA) in Vehicular Ad-Hoc Network 2017 International Conference on Radar, Antenna, Microwave, Electronics, and Telecommunications (ICRAMET) Year: 2017 ISBN: 978-1-5386-3849-1 DOI: 10.1109/ IEEE Jakarta, Indonesia
19. .Kuldeep Narayan Tripathi S. C. Sharma Ashish Mohan YadavAnalysis of Various Trust based Security Algoithm for the Vehicular AD-HOC Network 2018 International Conference on Recent Innovations in Electrical, Electronics & Communication Engineering (ICRIEECE) Year: 2018
20. ZhangTianjiao Zhu Qi Game-based TDMA MAC protocol for vehicular network Journal of Communications and NetworksmmYear: 2017 DOI: 10.1109/IEEE
21. .Runping Yang Xia Sun DMAODV: A MAODV-Based Multipath Routing Algorithm 2015 14th International Symposium on Distributed Computing and Applications for Business Engineering and Science (DCABES) Year: 2015 ISBN: 978-1-4673-6593-2 DOI: 10.1109/. IEEE Guiyang, China

22. .Priyanka Kumbarwar ; Puja Padiya Result analysis of optimized MAODV-BB tree based protocol in MANETs 2016 International Conference on Signal Processing, Communication, Power and Embedded System (SCOPES) Year: 2016 ISBN: 978-1-5090-4620-1 DOI: 10.1109/ IEEE Paralakhemundi, India
23. Menaka Pushpa Arthur An SVM-based Multiclass IDS for Multicast Routing Attacks in Mobile Ad Hoc Networks 2018 International Conference on Advances in Computing, Communications and Informatics (ICACCI) Year: 2018 ISBN: 978-1-5386-5314-2 DOI: 10.1109/IEEE Bangalore, India