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A Brief Review on Vanet Design Principles

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ABSTRACT—Nowadays It is important to have detailed information before we start a journey in a particular route or road. The information like safety in the target road, traffic live updates, other resources availability. To have updated live information about all these it is mandatory that every vehicle in that road must be connected with each other or connected with some common data centre. So that front vehicle or the data centre will share the trustworthy information with newly entering vehicles in that route or road. Nowadays vehicles are continuously connected with the internet, so it will be easier for the vehicles to continuously upload or share the data they collect. The data centres will receive a lot of data, sometimes repeated data too. Hence data centres must pre process such data and store it to avoid possible redundancy. Once the data is processed appropriate messages can be sent to upcoming vehicles in that route or road. Hence the new vehicle user can take his decision of entering or choosing that route for his journey. In this context data sharing is not only the priority instead of data security, data sending for new vehicles on time is far more important. Data centres must be with sufficiently high infrastructures so that processing of data, generating responses, and sharing the information with other vehicles is also done within the stipulated time.

Keywords—safety, traffic live update, trustworthy, data centers, data processing, data sharing.

I. INTRODUCTION

In the introduction we can provide overview information about key design principles for the development of Vehicular Ad-hoc Network. The proposed paper has the target of creating a robust and effective VANET as per requirements, along with a perfect framework. Through these VANETS as a priority task 1 we must address the dynamic nature of traffic in a particular road. Since vehicles will be moving at high speed, vehicles may also change directions all of sudden, and the vehicles will keep changing the possible topology. Because of possible dynamic changes occurring in a traffic the protocols we include must be very fast, accurate, also the infrastructure must be fast enough and high quality.

Safety and privacy are critical factors during the VANET design process. Privacy for the data related to vehicle movements, driver information, vehicles positions, and some other valuable information must be kept safely. Sometimes data needs to be verified against the gentility of it, which must be done on time. Unauthorized data needs to be processed and

rejected so that data congestion will never happen. Data redundancy needs to be addressed for space complexity. The framework must be included with intelligence for providing possible alternative routes in case traffic congestion has already taken place. Since data centers will be continuously working, data centers can be operated with solar energy as a renewable energy resource. To perform all these activities we need 5G communications which will be available sooner. Since the world of automotives is developing driverless vehicles in such situations it will be very much required for an intelligent system to take care about avoiding possible traffic collisions too. Since a lot of data will be generated every time unit the framework must be intelligent to solve possible repetition of the data.

As per recent study by the IoT tracker service, the internet connected dependent auto industry will grow by an additional 300+ percent by 2024, encompassing more than 145 million vehicles. This marginally enhances the scale and difficulty of currently operational vehicle ad hoc networks, often known as VANETs. Along with operational problems, the fast growth of vehicle connectivity has created major security and data confidentiality concerns about the development and extension of VANETs design. VANET design technology has various advantages, like a reduction in the number of accidents, a safer driving and travelling experience, and the simplicity of different payment methods for tolls, parking, refueling and among others. Users on the road use a variety of applications for quality and reliability, traffic control, navigation system, caution, comfort, maintenance, musical exchange, and network

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gaming.

II. LITERATURE REVIEW

Below mentioned are the literature reviews or the work done so far in the field of the development of VANET Design,

1. The author [1], discussed about the way of developing link model taking help of Wiener algorithm for analyzing link availability for the required stable steps, unstable states too for the purpose of demonstration. This author proposes an important idea known as the Link correlation which describes the result of different connections arrangements in system configuration to send a data along with reduced asset utilization and increased output. Because of the proposed idea an opportunistic metric, for routing, of the regular transmission charges over defined multi-hop path (ETCoP) which will get executed on the model which acts as a reference for the selection of a relaying hub in case, of intra streets. To address possible problems occurring at crossing point Metric can likewise help. In the end street-centric opportunistic protocol for the routing based on ETCop in VANETs (SRPE). With help of Simulation SRPE has overcomes the traditional conventional procedure in context, for the ratio of data delivery.

2. [2] Here author proposes social relation opportunistic, steering algorithm which is used for portable social networks. The proposal also defines interconnection between social relation with node profiles among the various hubs. The routing issues are addressed by SROR algorithm with search and forward techniques. Routing and scheduling are substeps adapted in to solve networking design issues. Here author has the aim to accurate results for QoS metrics. The proposed algorithm exhibits more efficiency than traditional approach even though characteristics are dynamically unstable.

3. Author [3] explains Traffic issues monitored Wireless Sensor Networks will be monitoring traffic issues, required medical care, machine oriented examination. The primary objective is to reduce the usage vitality and increase the lifetime of the system for sending information in (1-D) 1-dimensional line arrangement. BIg number of genuine testing demonstrates that proposed arrangement i.e ENS_OR definitely increases system's execution on vitality also provides remote availability in the areas of examination in comparison with remaining existing Wireless sensor networks algorithms.

4. Author [4] discusses Mobile Interpersonal; Organizations are kind of working system that processes loads of moving nodes with their social parameters. Number of social-mindful calculations need to be performed, and introduced to solve steering problems in MSNs. The calculations in thid paper generate a tendency to send messages to concerned nodes along with standard parameters, continuing with this we are unable to complete execution idea. This article proposes a conveyed standard Community Aware Opportunistic algorithm. The main goals are those which need to be proposed for a community model; it changes a MSN to executable system that includes group homes. CAOR will be calculating the lesser assumed conveyance rescheduling; of ; nodes via the Dijkstra algorithm for achieving the standard steering output. Apart from this ;number of vehicle being distant from exactly particular quantity of nodes in size, the computational charges will be reduced Along with this support charges ;of contact data are enormously reduced. The major benefit of CAOR is Optimal route performance.

5. In paper [5] author focuses VANETs can be understood by using this paper. In which productive steering conventions and QoS plans are outlined. The topology alters in an Opportunistic; Network which consists of different of versatile hubs According to VANETs there is more trouble in community detection than predefined circumstances. Main difficulty is identifying covering groups. Community detection algorithm is applied for social science, graph theory and complex networks. Reliability and flexibility are high in this algorithm due to overlapping of community detection for opportunistic networks.

6. In the paper [6] author explains, the following paper, a novel deadline;-sensitive usage-dependent steering model has been introduced to apply usage-dependent directing to cyclic MSNs. A cyclic ;MSN refers to a different kind of flexible network where mobile users intermittently move and interact with one another using their distributed short-range specialized devices. The purpose of this paper is to incorporate a time-dependent usage model into the Mobile Social Network routing system. The maximum usage for every message delivery can be achieved by implementing a single copy routing algorithm called DOUR (deadline based opportunistic "utility-based routing model) and a} multi-copy routing" algorithm known as m-DOUR within this framework. Both offer a favorable equilibrium in terms of benefits, postponement

7. Author explains in [7] primarily novel components of the urban VANET are analyzed, which have various types and developments like grapes which will be the result of activity lights. Herewith, the idea; of using data transmission as a;

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versatile basis to enhance system availability. We introduced a novel steering algorithm named Mobile Infrastructure Based; VANET* Steering convention. This method fully invents transports and converts it into a key segment for further selection.So packets can be sent successfully. Highest transmission rate can be reached by MIBR. BY enhancing transmission range MIBR protocol enhances network connectivity also.

8. In the paper [8] the author explains a novel hybrid location-based steering method which specifically handles noticed problems. The proposed method mixes all its subsystems of reactive ;steering with geographic direction dependent tracking. Regular procedure permits easier exit from reactive o steering as the area data gets worsen. We analysed by investigation then simulation, that proposed method is able to adapt and exhibits more throughput, EVEN THOUGH THERE are huge errors.

9. Author explain on paper [9] that Hybrid approach called H- EC is introduced for managing a various opportunity systems. H- EC concentrated on complete data's robustness for code-dependent control approaches while maintaining the performance advantages of replication[methods..When proposed methodology compared against similar technique's parameters like latency and transmission ratio, H-EC algorithm is more robust in nature even in worst situation. H-EC performs well during low delay situations also.

10. Author Chander Prabha in his paper [15] explains that analysis and reproduction method is targets execution of studying correlation with socially connected control methods under various parameters configurations. Erroneous transmission of data and network drops are analysed in o an opportunistic system. Social data is important for the purpose of decreasing erroneous transmission of data and network drops. The execution steering of opportunistic tribes are identified by next execution in social data. Regularly occurring network drops are addressed by enhancing quality of the usocial data with the proposed ACO method,where topology decides opportunistic networks.

III. FUTURE SCOPE OF VANET DESIGN PRINCIPLES

The future scope of Vehicular Ad-Hoc Networks (VANETs) design principles holds great potential for advancing intelligent transportation systems and enabling various applications. Here are some key aspects of VANETs design principles that have significant future implications:

1. Communication Technologies: VANETs will continue to benefit from advancements in communication technologies. The integration of 5G and beyond, as well as the upcoming 6G networks, will offer higher bandwidth, lower latency, and improved reliability. These technologies will enhance (V2V) and (V2I) communications, enabling more efficient data exchange and supporting emerging applications.

2. Connected and Autonomous Vehicles (CAVs): The rise of CAVs will heavily rely on VANETs for enabling communication among vehicles and between vehicles and the surrounding infrastructure. Future VANET design principles will need to accommodate the unique requirements of CAVs, such as low-latency communication, high-density networks, and robust security mechanisms.

3. Edge Computing and Fog Computing: VANETs generate massive amounts of data that refers real time processing. Parameters of Edge computing and fog computing are computing and storage capabilities are brought closer to the network edge, will play a crucial role in enhancing VANETs. These technologies will enable faster response times, reduce network congestion, and improve overall system efficiency.

4. Security and Privacy: VANETs involve the exchange of sensitive information, and ensuring the security and privacy of this data is of paramount importance. Future VANET design principles will focus on robust security mechanisms, including authentication, encryption, intrusion detection systems, and secure data aggregation techniques. Privacy-enhancing technologies, such as pseudonymization and data anonymization, will also be crucial to protect the identity and personal information of users.

5. Artificial Intelligence Machine Learning: The AIML techniques will enhance intelligence capability and decision-making capabilities of VANETs. ML algorithms can be used to analyse vast amounts of data generated by VANETs and derive meaningful insights. AI-based techniques, such as intelligent traffic management systems and predictive aintenance, can optimise traffic flow, reduce congestion, and improve overall road safety.

6. Energy Efficiency: Energy efficiency is a critical aspect of VANET design principles, especially as vehicles rely on limited power sources. Future VANETs will emphasise energy-aware protocols, intelligent power management strategies, and the integration of renewable energy sources. Energy harvesting techniques, such as utilising solar or kinetic energy from vehicles, may also be explored to power VANET devices.

7. Standardisation and Interoperability: As

VANETs continue to evolve, establishing common standards and ensuring interoperability among different vendors and stakeholders will be crucial. Standardisation efforts will enable seamless communication and collaboration across heterogeneous networks and diverse applications.
In summary, the future scope of VANETs design principles encompasses advancements in communication technologies, integration with CAVs, edge and fog computing, security and privacy measures, machine learning and AI techniques, energy efficiency considerations, and standardization efforts. These aspects will collectively contribute to the development of efficient and intelligent transportation systems, leading to improved road safety, reduced congestion, and enhanced user experiences.

IV. CONCLUSION

The future scope of Vehicular Ad-Hoc Networks (VANETs) as per statistician outcomes of video transmission over vehicular QoS will be increased. Performance quality can be analysed under different groups of variables distances for transferring data. Results of experiments proves that for high mobility VANETS proactive protocols are not suitable instead GPS dependent hybrid protocols suits better. In comparison with results of previous and proposed works results, proposed methodologies performs well.

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