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Adaptive Technique to Improve Highway Safety Using WMDP in Vanet

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ABSTRACT: Vehicular ad hoc networks (VANETs) are wireless networks that do not require any fixed infrastructure. Regarding traffic safety applications for VANETs, warning messages have to be quickly and smartly disseminated in order to reduce the required dissemination time and to increase the number of vehicles receiving the traffic warning information. Adaptive techniques for VANETs usually consider features related to the vehicles in the scenario, such as their density, speed, and position, to adapt the performance of the dissemination process. These approaches are not useful when trying to warn the highest number of vehicles about dangerous situations in realistic vehicular environments. The Profile-driven Adaptive Warning Dissemination Scheme (PAWDS) designed to improve the warning message dissemination process. PAWDS system that dynamically modifies some of the key parameters of the propagation process and it cannot detect the vehicles which are in the dangerous position. Proposed system identifies the vehicles which are in the dangerous position and to send warning messages immediately. The vehicles must make use of all the available information efficiently to predict the position of nearby vehicles.

Keywords: Ad hoc network, GPS, OBU, RSU,PAWDS, Security,VANET

I. INTRODUCTION

This Vehicular Ad Hoc network is a sub class of mobile ad hoc networks. VANET provides wireless communication among vehicles and vehicle to road side equipments. The performance of communication depends on how better the routing takes place in the network. Routing of data depends on the routing protocols being used in the network. Ad Hoc networks are collection of self-governing mobile nodes. VANET is the emerging area of MANETs in which vehicles act as the mobile nodes within the network. VANET is the wireless network in which communication takes place through wireless links mounted on each node. Security is one of the major concerns in deployment of VANET. Trust may be one of tools to solve the security related issues[1]. Adapting to the specific environment where the vehicles are located can be beneficial in order to reduce broadcast-storm-related problems and also to increase the efficiency of the warning message dissemination process

II. RELATED WORK

In [2] authors used different schemes to mitigate broadcast storms. The Counter-based scheme uses a counter to keep track of the number of times the broadcast message is received, inhibiting rebroadcast when it exceeds a threshold. presented in In [4], tries to reduce the broadcast storm problem, finding the most distant vehicle from the warning message sender, so this vehicle will be the only allowed to retransmit the message More recently, a

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stochastic broadcast scheme was proposed in [5] to achieve an anonymous and scalable protocol where relay nodes rebroadcast messages according to a retransmission probability. The Cross Layer Broadcast Protocol (CLBP) [6] uses a metric based on channel condition, geographical locations, and velocities of vehicles to select an appropriate relaying vehicle. [7] proposed an adaptive forwarding mechanism to improve message dissemination in VANETs. Vehicles compute the density of neighbor nodes to calculate a forwarding sector in which vehicles are not allowed to rebroadcast.
the message

A. Applications of Ad Hoc Network

The decentralized nature of wireless ad hoc networks makes them suitable for a variety of applications where central nodes cannot be relied on and may improve the scalability of networks compared to wireless managed networks, though theoretical and practical limits to the overall capacity of such networks have been identified. Minimal configuration and quick deployment make ad hoc networks suitable for emergency situations like natural disasters or military conflicts. The presence of dynamic and adaptive routing protocols enables ad hoc networks to be formed quickly.

B. Components of VANET

- On Board Unit(OBU)
- Road Side Unit(RSU)
- Global Positioning System(GPS)
- Radio Transceivers For Message Exchange

On Board Unit

A device which is inside the vehicle which process the data collected from various sensors fitted inside the cars and gives conditions of the vehicles is responsible for communication with outside network. i.e. with other vehicle and infrastructure.

Road Side Unit

Vehicular Ad hoc Networks, also known as VANETs, enable vehicles that are not necessarily within the same radio transmission range to communicate with each other. VANETs also allow vehicles to connect to Roadside Units (RSUs). The latter are connected to the Internet, forming a fixed infrastructure that offers them the capability of communicating with each other and with roaming vehicles. RSUs support cooperative and distributed applications in which vehicles and RSUs work together to coordinate actions and to share and process several types of information. RSUs have so far been used for different roles such as data disseminators, traffic directories, location servers, security managers, and service proxies.

Radio Transceivers for Message Exchange

A radio transceiver both sends and receives radio signals. In order to be classified as a transceiver, the transmitter and the receiver must use the same set of wiring or be located within the same device. In a radio transceiver, the user is able to perform a wide range of functions for both the receiver and broadcaster of signals on radio frequencies. There are several key functions that are critical to the value of a radio transceiver Signal Strength, Part Quality, Warranty, Ease of Use. These units typically cost more than a dedicated signal transmitter or receiver

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since they offer the convenient of multiple functions in one device. It is important to ensure that full value of this purchase is received.

Considering a radio transceiver, it is a good idea to make a list of requirements. Write down all the transmitter and receiver functions that you required and those that would be nice to have. Prioritize them to help in the decision-making process. Not all radio transceivers will have all the functions that you want, so it is important to know what is necessary and what is nice to have before the process begins.

Global Positioning System

The Global Positioning System (GPS) is a space-based satellite navigation system that provides location and time information in all weather conditions, anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites. The system provides critical capabilities to military, civil and commercial users around the world. It is maintained by the United States government and is freely accessible to anyone with a GPS receiver.The GPS project was developed in 1973 to overcome the limitations of previous navigation systems, integrating ideas from several predecessors, including a number of classified engineering design studies from the 1960s. GPS was created and realized by the U.S. Department of Defense (DoD) and was originally run with 24 satellites. Advances in technology and new demands on the existing system have now led to efforts to modernize the GPS system and implement the next generation of GPS III satellites and Next Generation Operational Control System (OCX).

In addition to GPS, other systems are in use or under development. The Russian Global Navigation Satellite System (GLONASS) was developed contemporaneously with GPS, but suffered from incomplete coverage of the globe until the mid-2000s. There are also the planned European Union Galileo positioning system, Chinese Compass navigation system, and Indian Regional Navigational Satellite System.The rest of the paper is organized as follows. Section II reviews the proposed system, Section III shows the Architecture of the Proposed Approach, Section IV reviews the Conclusion.

C. Characteristics of VANET

- High mobility of nodes
- Unbounded network size
- Rapidly changing network topology
- Time Sensitive Data Exchange

D. VANET Communication Process

Vehicle to Vehicle Communication

Inter-vehicle communication (IVC) systems (i.e., systems not relying on road-side infrastructure) have the potential to radically improve the safety, efficiency, and comfort of everyday road travel. Figure I represent IVC. Their main advantage is that they bypass the need for expensive infrastructure; their major drawback is the comparatively complex networking protocols and the need for significant penetration before their applications can become effective. Conclude the article by presenting several projects related to IVC as well as a review of common performance evaluation techniques for IVC systems.

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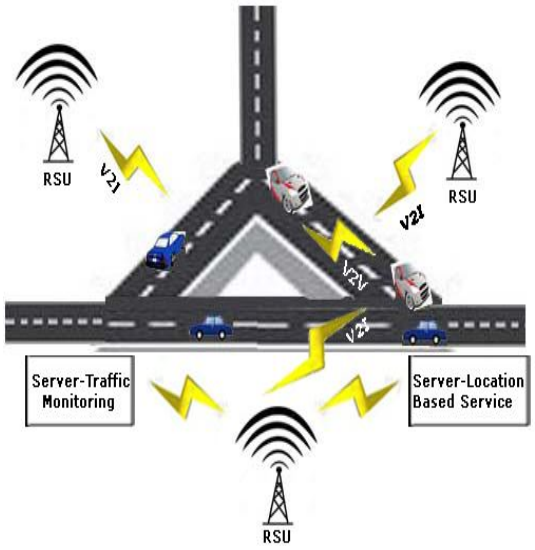

Figure I VANET Communication

Vehicle to Infrastructure/Roadside Communication (V2I/V2R)

Vehicle to Infrastructure provides solution to longer-range vehicular networks. It makes use of preexisting network infrastructure such as wireless access points (Road-Side Units, RSUs). Figure I represent the V2I communication. Communications between vehicles and RSUs are supported by Vehicle-to-Infrastructure (V2I) protocol and Vehicle-to-Roadside (V2R) protocol. The Roadside infrastructure involves additional installation costs. The V2I infrastructure needs to leverage on its large area coverage and needs more feature enhancements for Vehicle Applications**.**

III. PROPOSED ALGORITHM

PAWDS, a Profile-driven Adaptive Warning Dissemination System that dynamically modifies some of the key parameters of the propagation process, such as the interval between notifications and the selected broadcast scheme, to achieve an optimal performance depending on the features of the roadmap in which the propagation takes place. Proposed system is combined with the enhanced Street Broadcast Reduction (eSBR) to improve performance when the dissemination process takes places in real urban scenarios where the signal can be seriously affected by nearby buildings.

Advantages of Proposed System

- Dissemination in all the direction.
- Inform about the dangerous situations to maximum number of vehicles.
- Not only used in highways, it is also used in urban environment.

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II. ARCHITECTURE

In this figure II represent the system architecture. PAWDS, a Profile-driven Adaptive Warning Dissemination System that dynamically modifies. Some of the key parameters of the propagation process, such as the interval between notifications and the selected broadcast scheme, to achieve an optimal performance. The street profile having three different layouts, Simple, Regular, Complex.

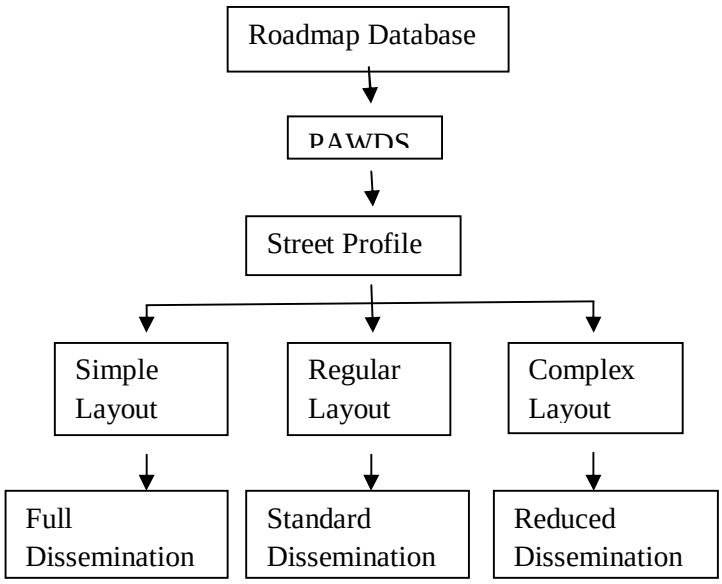

Figure II System Architecture

III. CONCLUSION

This paper proposed a new adaptive approach that allows increasing the efficiency of warning message dissemination processes using the information about the urban environment where the vehicles are moving. It can identifies the vehicles which are in the dangerous position and immediately send warning message to that dangerous position vehicle. This approach make all the available information is used efficiently**.**

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BIOGRAPHY

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