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Design Approach for Vehicle To Vehicle (V2V) Dissemination of Messages in Vehicular Adhoc Network

Amita Meshram[1], Smita Kawade[2], Nilima Jichkar[3], Rasika Ingle[4], Supriya Thombre[5]

[1](Department of Computer Technology, India)
[2](Department of Computer Technology, India)
[3](Department of Computer Technology, India)
[4](Department of Computer Technology, India)
[5](Department of Computer Technology, India)

ABSTRACT
Designing a protocol structure which contains the control system, VANET device and the type of communication message structures which will implement the message packets for v2v or v2I infrastructure . The different message packets contain the information required to transfer from one node to another in vehicular network for communication. Design various algorithm required for Control, Alert and Infotainment messages. Time stamping lowering data rate efficient packet delivery and proper communication of required messages. Implementation of proposed algorithms and comparison of them with existing algorithms and study of different factors affecting the working of theses algorithms. Analysis of proposed design approach and improvements in results if required.

Keywords **-** v2v Vehicle to Vehicle, v2I Vehicle to Infrastructure

I. INTRODUCTION

Every year thousands of deaths occur due to traffic accidents, about 60 percent of which could be avoided if drivers were provided with a warning at least one-half second prior to a collision. Because of perception limitations, vehicle drivers cannot react in time to emergency events, hence resulting in a long delay in delivering warning messages and potential automobile crashes (especially multicar chain accidents). As perception limitations are mainly caused by the line-of-sight limitations of brake lights and driver reaction to it. This can be prevent by passing warning messages, control messages through giving information about the current status of vehicle (such as current position of break ,horn, speed, indication, location).

Vehicles with various kinds of sensing devices and wireless communication capabilities help drivers to acquire real-time information about road conditions allowing them to react on time. For warning messages, control messages sent by vehicles involved in an accident enhances traffic safety by helping the approaching drivers to take proper decisions before entering the crash Dangerous zone .

II. Literature review

Anthony Busson, Alain Lambort [2] proposed probabilistic framework based on point process to evaluate the delivery delay of safety message in a string of vehicles. Then they assessed the benefit of using Inter Vehicle Communication (IVC) in reducing the number of collision after an accident .They have also shown that broadcast efficiency is relatively in variant to delays induced by forwarding safety messages.

Yasuharu OHTA, Tomoyuki OHTA [3] proposed a new autonomous clustering-based data transfer scheme using positions and moving direction of vehicles for VANETs. Simulation result gives better performance than other schemes with respect to overload.

In [4] the measurements conducted for vehicular communications analyzed the packet delivery performance of a simple protocol for cooperative relaying in comparison to conventional transmission schemes. Results show that cooperative relaying without diversity combining can outperform conventional schemes with respect to packet error rate if the relay is located between sender and destination and/or the time elapsed between the two diversity packets is short.

In network connectivity is a fundamental performance measure of ad hoc and sensor networks. Two nodes in a network are connected if they can exchange information with each other either directly or indirectly. For VANETs, the connectivity is very important as a measure to ensure reliable dissemination of time critical information to all vehicles in the network. All vehicles in the network should be able to communicate with each other directly or via a multi-hop path. For VANETs

connectivity is directly related to the density of vehicles on the road and their speed distribution. A VANET would surely be connected if the vehicle density is very high. The connectivity degrades when the vehicle density is very low and the speed of the vehicles and the traffic flow are independent and it is known as free flow state[6].

Sok-Ian Sou and ozan K.Tonguz propose a new safety message routing flow mechanism between vehicles and the RSUs and derive the analytical performance of the proposed mechanism .We then validate the proposed mechanism through extensive simulation experiments .The performance sensitivity is evaluated under various offered vehicle traffic flows measured with empirical data. The results show that the proposed scheme is feasible and can substantially enhance vehicle safety on highways [7].

III. Need of Vehicular Adhoc Network

Vehicular ad-hoc networks (VANETs) are distributed self-organizing and highly mobile networks based on wireless vehicle-to-vehicle communication (V2V). The ultimate goal is to decrease the number and severity of accidents by extending the driver's Horizon of perception beyond what is visible locally is possible. However, these active safety applications depend on a certain degree of dissemenation of V2V communications systems.

IV. Objective of Research

One of the main applications of the mobile Adhoc network is a Vehicular Ad Hoc Network (VANET). Vehicular Ad Hoc Networks(VANETs) grown out of the need to support various wireless product that can be used in vehicles .VANETs wireless equipped vehicles form a network spontaneously while travelling along the road. In VANETs communication between vehicle to vehicle on the road, called (V2V) communication and vehicles communicate with roadside equipments, called (VRC) or Vehicles to Infrastructure (V2I) communication. In V2V communication one vehicle communicate with another vehicle without the use of any dedicated infrastructure (base station, access point, etc). In V2V and V2I communications data exchanges between vehicles and between infrastructure and vehicles with a greater radio range classical IEEE 802.11p [1][2] as compared to classical 802.11. On the dissemination of warning and control information allows a vehicles to obtain disseminate information about accidents, congestion and road surface conditions coming from other vehicles. This type of application relay on broadcast algorithm.

Our research focuses on the dissemination of warning messages, control messages through giving information about the current status of vehicle (such as current position of break ,horn, speed, indication, location).These type of information is communicates from one vehicle to another vehicle while travelling on the road. To communicate this type of information from V2V VANET is used. This scheme provides better performance with respect to data rates, delay and time.

4.1 Analysis

We will study different kind of algorithm required for communicate the Control, Alert and Infotainment messages and best of them will be choosen for our method of vehicle to vehicle communication to avoid collisions.(Detailed)

V. Problem Definition

In the near future, automobiles may have factory installed wireless ad-hoc network capabilities to improve traffic flow and safety, in part, because it is more cost effective than continually undertaking massive construction projects, which are proving to have limited success. Consequently, future developments in automobile manufacturing will include new communication technologies to help provide more effective spacing and collision avoidance systems [5].

In order to avoid communication costs and guarantee the low delays required for the exchange of safety-related data between cars, inter- vehicle communication (IVC) systems based on wireless ad-hoc networks represent a promising solution for future road communication scenarios, as it permits vehicles to organize themselves locally in ad-hoc networks without any pre-installed infrastructure. There is a lot of research is going on, in the real time implementation of VANET dissemination of messages between the vehicles or between the RSU and vehicle.

So this system will introduce the control, Alert and Infotainment messages for avoiding accidents on road and will reduce the probability of property losses which results in safety of human life. For communication of ‘]these messages , Output will be shown through NS2. Simulations are carried out using NS2 to evaluate the performance of the envisioned architecture incorporating the proposed mechanisms. Encouraging results are obtained in terms of high data packet delivery ratios and throughput, reduced control packet overhead, and minimized delay and packet drop rates.

VI. Proposed Method

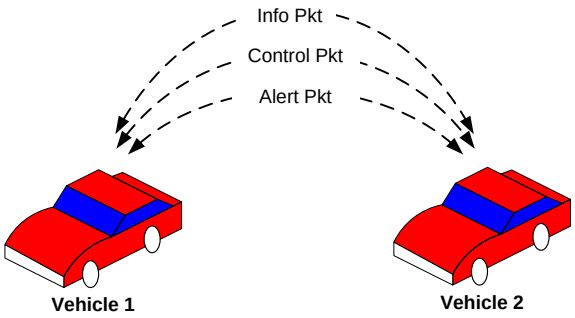

Fig. 1 Plan of Action

In the proposed methodology, designing a protocol structure which contains the control system, VANET device and the type of communication message structures which will implement the message packets for v2v or v2I infrastructure as shown in fig.1. The different message packets contain the information required to transfer from one node to another in vehicular network for communication.

Design various algorithm required for Control, Alert and Infotainment messages. Time stamping lowering data rate efficient packet delivery and proper communication of required messages. Implementation of proposed algorithms and comparison of them with existing algorithms and study of different factors affecting the working of theses algorithms. Analysis of proposed design approach and improvements in results if required.

VII. Expected Outcome & Importance

The outcomes of this work are as follows To make vehicular system more efficient by providing driver assistance through alert messages for giving indications to other vehicles. Infotainment messages such as speed, location for giving Control indications. It also reduces the timestamp and increased the packet delivery by providing proposed system architecture.

This will reduce the overhead of driver and will help in vehicular network to increased the quality of service of the system

VIII. Conclusion

This Proposed method transfer the control, alert and infotainment messages between the vehicles or within the RSU and vehicles to allow the information transmitted through proper communication so that driver can get the prior information or data while driving to decrease the overhead and minimize the traffic collision .From the simulation results proposed scheme provide better performance than other schemes with respect to the overhead and minimize the traffic collision.

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