SURVEY ON DELIVERING HAZARDOUS EVENT MESSAGES TO DISTINCT VEHICLES

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Abstract - *For the detection of a hazardous event, a warning message can be transmitted to the nearby vehicles. The communication between networks and vehicles is very crucial. A new cluster head selection technique can be introduced for the distribution of messages in the network. Intelligent Transport System (ITS) is the fastest growing area in the transportation field. The messages can be distributed by using multi-hop transmission protocol. The direct communication between vehicles to vehicles is much crucial so a Road Side Unit (RSU) is developed for the transmission of messages in the VANET. Vehicular ad-hoc network (VANET) is the fastest growing area in wireless networks. By using probabilistic cluster head selection technique more accurate clusters can be selected and it reduces the latency of distribution among messages in vehicles.*

***Key Words*: Intelligent Transport System, Road Hazard Warning messages, cluster head selection techniques.**

1. INTRODUCTION

For the detection of a hazardous event like when a traffic jam is occurs or an accident or a heavy flood they can block the road. At this situation a Road Hazard Warning (RHW) messages can be transmitted to the nearby vehicles. These messages can be increase the traffic awareness of drivers. Although a route can be proposed at this situation. It is very helpful to the peoples who are far apart from the hazardous event and to make another route to travel.

The communication ie., to exchange the information between vehicles to vehicles can be done through an ITS (Intelligent Transport Systems) station. A VANET (Vehicular Ad-hoc NETwork) can be used to communicate the vehicles and the ITS station. In VANET, a navigation system that can maps the GPS (Global Positioning System) positions. For short range and high speed communication among nearby vehicles VANET's are used. For increase the traffic awareness of drivers ITS must be used and it is the main characteristics of Intelligent Transport System.

Hybrid Cellular-Vanet Configuration (HCVC) is used so that it can act as a gateway to the ITS station. The proposed infrastructure can transmit data by using point to point (ptp) transmission. HCVC can easily transmit data rather than Cellular Unicast Configuration (CUC) and Cellular Broadcast Configuration (CBC). And is also reduces the time delay to sent one data from another.

2. RELATED WORK

Not the carelessness of drivers accident arises on roads. Road hazards can include animals, rough roads, standing water, debris, snow, ice, or objects that have fallen from a construction site or another vehicle. At this situations a warning messages can be transmitted to the vehicles in that route. It is very useful that people can change their route to travel. These messages are called Road Hazard Warning (RHW) messages. A vehicular ad-hoc network (VANET) is used for this purpose. For the communication between vehicles it requires some efficient routing protocols. The main advantage of using VANET is that a navigation system that can maps the GPS (Global Positioning System) positions. So that the driver can change the route when such hazardous events occurred.

A greedy approach is used to find a good rote to travel. Most of these cases Dijikstra's algorithm can be used. Many of the protocols like unicast routing protocol, quality-of-service protocol, etc…are used. But all of them have some disadvantages to sent data packets in the VANET. To overcome these problems a carry and forward mechanism can be proposed. A Road Side Unit (RSU) is proposed so that a message from a source vehicle that can deliver message to the nearby RSU and these RSU can capture that message and deliver to the destination vehicle. For dense and sparse conditions RSU can be more beneficial. A CAN-DELIVER (Carry and forward mechanisms for Dependable mEssage deLIvery in VanEts using Rsus) approach can be proposed for this purpose. The main advantage of using RSU is that the delay of sending data packets (here messages) is less when compared to sending messages in VANET's [1].

By using multiple transmission hopes, messages can be delivered to distant vehicles in VANET. With a low density of ITS stations, multi-hop transmissions may not be able to forward messages. Also combining with the RSU units in the road it can easily sent the data packets. Cluster head selection techniques can be used to increase the performance of a network. In the proposed method probabilistic cluster head selection can be used. VANET provides inter vehicular communication (IVC) [7].

Multi-hop transmission is critical challenge in urban transportation environment. To disseminate emergency messages an Urban Multi-hop Broadcast Protocol (UMBP) can be proposed. UMBP includes a lower emergency message transmission delay and also the message

redundancy can be reduced. It can efficiently select the neighboring node. UMBP can be defined as the terms of message propagation speed and one hop delay [11].

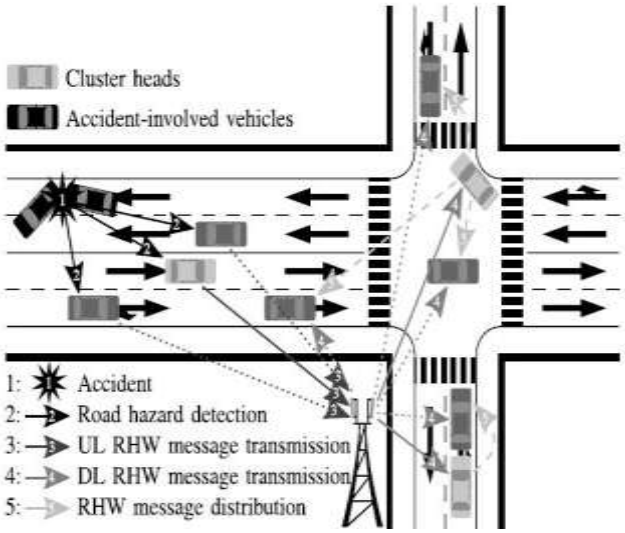

Figure 1: Detailed architecture of proposed system

Figure 1. Shows the detailed implementation of the proposed system. There are three configurations can be studied they are Cellular Unicast Configuration (CUC), Cellular Broadcast Configuration (CBC), and Hybrid Cellular-VANET Configuration (HCVC). When an accident or any other incident can be occurred the neighboring ITS station can transmit data to the vehicles that moving to that direction. Large amount of cellular resource is required for the delivering of RHW messages in the CUC configuration. And the major drawback of CBC configuration is that it cannot be used in upper link (UL). To overcome these disadvantages HCVC configuration can be used [2] [7].

There are three types of cluster head selection mechanism can be proposed. (LID) lowest id algorithm can select the minimum id numbers of vehicles and they can be grouped. In Highest degree algorithm they have to reduce the number of clusters and highest number of clusters is selected. In weight based algorithm a weight can be assigned to each vehicle and according to that weight the cluster can be formed. In both these three cases the VANET load is high. To overcome this problem a probabilistic cluster head selection technique can be proposed. Either the weight or the lowest id can be mixed up with the probabilistic algorithm. The weight must be either 0 or 1. It produces a ping pong effect ie., the message handed back to the original cell [2].

Distributed Vehicular Broad CAST (DV-CAST) protocol another protocol used to transmit data packets in a network. They can solve the broadcast storm problem as well as disconnected network problem. At the same time multiple nodes can transmit data and then it fails, this problem is known as broadcast storm problem and it can be occurred in the medium access control layer. Store-carry-forward mechanism can be used in DV-CAST [3].

In Quality of Service (QoS) protocol a link expiration time (LTE) can be used. It gives the stability of the link between two adjacent vehicles and the life time of the route between the vehicles. Here the cluster head can be selected based on the vehicles geographic positions with a less time to live (TTL) value. The protocol can service the vehicles according to their priorities. Vehicles like ambulance, police vans, etc… can assign higher priorities. They can form as an integrated network in VANET [4] [5].

The proposed method is an enhanced version of VANET integrated network. In dynamic clustering method, according to vehicles velocity, vehicular distance, and vehicular movement clustering within VANET was been performed. Based on these three measurements there was a drastic changes in the network. It can be evaluated by using different parameters such as data packet delivery ratio (DPDR), control packet overhead (CPO), delay parameters, throughput, and packet drop fraction [6].

All the weather hazard data's are collected on the central ITS station. By using a Lidar sensor in the vehicles, the weather hazards like fog, snow, rain, etc… can be detected and the warning message can be transmitted to the ITS station. It gives a Car-to-X (C2X) infrastructure communication. Lidar sensor can identify the atmospheric contents according to the changes in the wavelength and intensity of the signal [8].

Decentralized Environmental Notification Messages (DENM) are also used to sent messages due to hazardous event. It can be defined on the transport layer and networking layer. But the security related information's are not included in the DENMs. Cooperative Awareness Message (CAM) can be also used for this purpose. [9] [10].

A peer to peer network can be proposed for a mobile ad-hoc network (MANET) in weight based algorithm. Using NP hard problem the cluster head can optimally chosen. In weight based distributed algorithm, the weight of each node can be balanced so that the traffic in the network can be reduced. WCA is a linear model. At the same time not only the weight the load balanced factor (LBF) changes in the node can be computed. It cannot degrade with the MAC function. According to the system needs the WCA algorithm can adjust the weight factors for the flexibility of transmission [12].

By using hierarchical structure and flat structure the routing can be done in mobile ad-hoc network (MANET). But the disadvantage is that more nodes can be selected in a single network, by this, they can increase the time delay to send the packet from source to destination. From all these protocols and mechanisms the probabilistic cluster head selection mechanism can easily select the neighbouring nodes and sent data packets through VANET by using multi hop transmission protocol with HCVC configuration [13].

3. CONCLUSIONS

On comparing with other mechanism, cluster head selection technique is more efficient to select the nearby vehicles. And also, it is easily to deliver the RHW messages and is also to reduce the latency of distribution. Using Smart Phone Ad-hoc Network (SPAN), phones talk directly through a transparent neighbour and route discovery mechanism. By using SPAN, every people can locate the disaster event in the road. These systems are mostly critical for users who are far from the ITS stations and want to communicate using their vehicles onboard units.

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