A REVIEW ON VEHICLE COLLISION AVOIDANCE SYSTEM IN NETWORKS.

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Abstract - *In most of the automobile system avoiding collision is a critical issue. A "Vehicle Collision Avoidance System" in an automobile system is a safety system that is designed to reduce the chances of collision. To track the objects and to take any action to avoid risk of collision "Vehicle collision Avoidance System" is used. Once the detection is done about the collision these systems provide a warning to the driver either by braking or steering .Collision avoidance is one of the most important issues in controlling vehicles automatically. When vehicles stops on road all of a sudden or when collision avoidance system detects an obstacle, then it should cause the vehicles to stop reliably .Vehicle collision avoidance system provides a great potential for collision avoidance ,thus reducing extremity of accident. As the number of autonomous vehicles has increased, vehicle collision avoidance system has become more applicable in recent years .The job of driving vehicles can be made easier by the use of these system, as well as these system ensures to manage the traffic efficiently with road safety. This paper provides some related work done in past few years.*

***Key Words*: Vanet, V2V, Protocol, ITS, ACO, and DTPOS.**

1.INTRODUCTION

A "Vehicle Collision Avoidance System" in an automobile system has the objective to develop safety features in automobiles so that there is avoidance of collision with vehicles or an obstacle in the way. In bad weather conditions these systems are especially useful. While driving the main objective of these systems is to prevent collision of car due to their carelessness or blind spot. These days vehicular communication is becoming popular. There are special form of networks which enable communication among roads with no need of infrastructure i:e; wireless networks and these networks are known as VANETs. VANETs are basically type of ad hoc networks .These networks are basically used for communication purpose on highways or in the urban environment as they are reliable. For specific need or situation these networks are created from the concept of establishment of a network of cars as they are ad hoc networks. In VANETs fast moving vehicles have fixed movement along the path, so they are known as distributed networks. For safety and comfort for passengers these

networks are used. Safety of passengers is improved by sharing emergency and safety data among vehicles example; safety applications like emergency warning system, road condition and traffic sign violation warning. Traffic efficiency and passenger comfort are improved by these networks. There are some features that discriminate them from other Ad hoc networks (high speed, no battery constraints, and limited movement, reliable).In wireless networking, VANET communication has recently become an increasingly popular research these days. For the passenger's safety and comfort the goal of VANET research has to develop vehicular communication system to enable a quick and efficient distribution of data. Due to collision of vehicles in everyday life, a lot of people die due to accidents . VANETs provide two types of communication, inter vehicle (V2V) communication, vehicle to infrastructure (V2I).In V2V,using short range communication services like Wi-Fi and WAVE, nearby vehicles transmit or receive data .A special electronic gadgets are used by vehicles that allows them to receive or relay messages. In V2I, communication of vehicles is done with nearby road infrastructure unit (RSU) using Wi-Fi hotspot or long range communication technology so that data will be exchanged. Because of Intelligent Transportation System provide strong technical supports for vehicles using wireless channel to deliver traffic safety information, road status information, large scale networks, fast moving nodes, frequent changing topology structure, node shift dynamic regularity enhancement and easily divided networks, VANET are widely used in Intelligent Transportation System(ITS).Some new routing protocols arise at historic moment because of demand and characteristics of VANET network.

1.1 Literature Review

Problems associated with road traffic are due to the increase of number of vehicles on road .For smooth flow of traffic efficient monitoring of vehicles is done .Vehicle collision detection and congestion control are to be done .For collision free traffic many technologies are in action. Vehicle collision Prediction System which is based on VANETs solves the issue of collision avoidance .Intelligent control unit (ICU) and vehicle to vehicle communication is used which predict the probability of collision at highways [1].For the improvement of traffic situation in urban environment ant colony optimization is used. Based on ant colony optimization (ACO)

a Dynamic Travel Path Optimization System (DTPOS) for the prediction of best path to a given destination is used .In this system , number of factors are taken into consideration such as average travel speed, average time taken by the cars for waiting and the number of cars that are stopped in a queue. The DTPOS has the advantage that in urban cases it greatly reduces the average travel time of cars and when compared to similar models where cars select their path without ACO, mean travel time is improved by 47 percent. When the previous path replacement is applied to DTPOS results the percent is improved by 56 [2].

In city area, smart cars can move freely in VANET. Vehicles are defined respective to speed, distance and direction. If accident takes place over the network the information is sent from neighbor node to other node so that information is sent to the entire infrastructure that is connected to the system. Many servers are in the road side that is attached further to the main server. With the help of radio waves after the information is received by the severs by the collision neighbor node the entire vehicle communicate. Wimax update and replicate information in few seconds connected with all servers and information is replicated from all servers to vehicles so that all vehicles change their flow of path from source to destination. Over the network V2V communication is implemented to identify the safe path [3].By using GPS, real time road condition is not achieved and is really tough. A multiple virtual identities for transmitting fake messages using different forged position is created by malicious node. In order to force other vehicles and vehicular authorities to take incorrect decisions a malicious vehicle is implemented which can disseminate false traffic .Trusted Authority(TA) via RSU is authenticated to vehicles to overcome these problems .For the identification of best destination route ,the navigation query is sent to RSU through temper proof device. TA generates a re-encryption key for encrypting the query to requested vehicles. Contacted RSU identifies the shortest path to reach the destination RSU . Using encryption key it sends the encrypted messages to requested vehicles after identification of shortest path. Using its own private key finally it decrypts the message. Each vehicle speed is checked to avoid accident based on predecessor and successor speed of vehicles. Priority is also implemented on the basis of movement of vehicles, high ,medium and low priorities is for emergency vehicles , registered vehicles and unregistered vehicles respectively given by network [4]. Jamming avoidance, authentication, intelligent system approach, collision detection, communication system approach etc. are some security issues and cause accident on roads. For V2V communication an intelligent route identification approach is used in case to avoid the occurrence of accident. By using min and max variants of ACO, an optimal path is selected from existing one. To identify safe path over the network, V2V communication approach is used. Due to collisions the use of Max-Min ant System (MIMAS) is made for finding the optimal path for vehicles to reduce time delay [5].

In VANETs most routing protocols are applicable such as AODV (Ad hoc On Demand Distance Vector Routing) and DSR (Dynamic Source Routing). With modified AODV protocol a

new scheme for V2V communication is used. To the existing AODV hello messages a two metric is added to determine whether the neighbor is front of itself. Protocol determines the direction of destination node and broadcasts messages to its neighbors to TTL set to one at the link failure time. When nodes are received, message is broadcasted at direction flag and if it has the path to destination message is forwarded further and previous node direction is equal to direction flag relative to itself or if it has no path to destination drop it or if the previous node relative to itself is not equal to direction flag. To recover path quickly V2V communication is used [6]. Communication between vehicles must be safe. Secure messaging techniques in highways is used. Using this secure technique future information of other vehicles is provided on roads in IVAN broadcast secure messages. If the distance is less before colliding vehicles, by broadcasting secure warning messages inter vehicular distance are calculated and collision is avoided between vehicles. To improve highway safety broadcasting secure message will improve the nearby avoidance of collision [7].

As Intelligent Transportation System (ITS) has many characteristics such as large scale networks, topology structure frequently changing, fast movement of nodes and easily divided networks, VANETs are widely used in ITS and this brings great security in VANETs .Information type is divided into four categories which is based on different content, security threats in different information type are analyzed, and existing security technologies are summarized then which gives possible research direction [8].Most of the routing protocol are used in VANETs. By forwarding vehicular traffic towards path with higher connectivity probability, many have tried to find connected path through network. This same routing strategy will eventually lead to great amount of data traffic on roads leading to higher congestion and drop ratios on roads. Therefore, VLBR (VANET Load Balanced Routing) protocol is used for balancing the traffic by attaiting congestion feedback from the network and it switches to lowest congested routes. Even in great traffic loads VLBR maintain its high delivery ratio without imposing higher overhead to network [9].

Intruders cannot interrupt the data by use of cryptography as it enhance the data confidentiality and makes it private by making information unintelligible. A two tier approach for communication is used in which communication is based on two tier approach for security. Data is lost using the two tier approach as the size of data is too large for the transfer of one cluster to another cluster. Compression technique such as AODV is used for improving the speed of communication and recovering the data loss [10].Dedicated Short Range communication (DSRC) control channel (CCH) for safety in VANETs is used. From all vehicles this model gives the receiving status and safety messages within the range of transmitter and certain distance respectively. DRSC ha following disadvantages,1)around the transmitter the impact of mobility on density of vehicles,2) speeds of transmitter and receiver on system reliability,3) by modeling the communication range as random variable the impact of fading of channel,4) from the neighboring vehicles its transmission collision and its hidden terminal problem. All

the above specification lead to dense performance degradation and high mobility conditions. Accordingly based on the current average speed of VANETs performance, vehicles are able to estimate the vehicle density and change their transmission parameters [11]

2. CONCLUSIONS

An extensive review of some of the important works relating to this field is done in this paper. The paper describes the main techniques utilized by each author along with their results briefly and with their limitations. A lot of work is being done on Collision Avoidance System .People have started working towards V2V communication facilitating the direction of packets of data and providing ease in the path by use of various algorithm. An extreme care should be taken and a further research should be done to avoid accidents.

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