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DESIGN OF VEHICULAR AD-HOC NETWORK FOR HIGH SPEED HIGHWAY ENVIRONMENT

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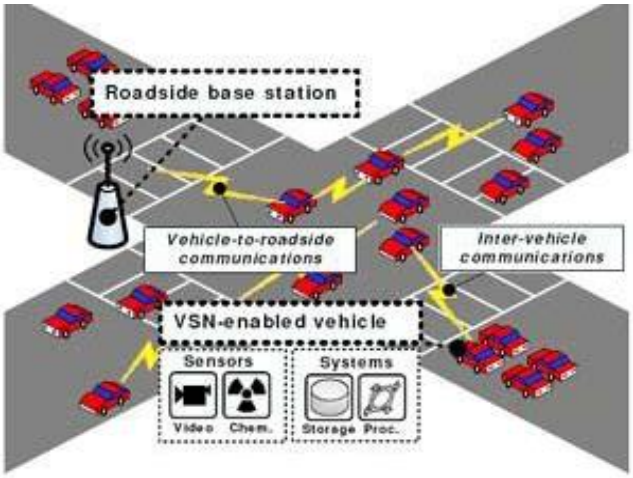
ABSTRACT :

VANET are Characterized as Vehicular Ad-hoc N/W and in this paper Vehicular Ad-hoc Network is design for the Different routing protocols AOMDV (Ad-hoc On Demand Multipath Distance Vector) AODV (Ad-hoc On Demand Distance Vector) and DSDV (Destination Sequenced Distance Vector) Protocols. No. of difficulties involved that are facing for generating the nodes in the VANET and also the generating vehicular Ad-hoc network. In VANET having the vehicles different mobility pattern and also have the different direction and there is no constrains for the speed of the vehicles. In the Vehicular Ad-hoc Network the some vehicles are moving some are in the stationary position and some are in the high speeds so there is the problems of collision occur so in that case there is a need of the system which is used for the purpose of collision avoidance and detection and this is done by GPS (Global Position System) so for this situation there is a need to the network which is suitable for these purpose. The vehicular AD-hoc network is one of the most suitable future of the mobile Ad-hoc Network.

Key words: VANET, Routing Protocols, MANET, AODV, DSDV, Mobility Patterns , GPS , AOMDV

1) INTRODUCTION

The wireless Ad-hoc networks which consisting of the two type of network that is one is mobile Ad-hoc network and second one is vehicular ad-hoc network. In mobile Ad-hoc network the device runs freely and does not depends any devices. And the device more any direction without depend any and the most effective terminology is the subject of MANET is the VANET.



SCENARIO of VANET

2) REVIEW ON ROUTING PROTOCOLS

In this paper we discussed the routing protocols as we as the detection and avoidance method of the vehicular ad hoc network studied there are well known routing protocols AODV and AOMDV and how communication can be done that is V2V and V2I communication in the VANET. The requirement of the infrastructure stands for the communication and for the setup of the network which is provided by the vehicular Ad-hoc network. Some of the promising applications of the VANET consist of the traveler safety as the base stations operators send the message to the vehicle because vehicle here acts as a node which has got the message and having all the information about the road infrastructure likewise Accident prevention is another promising application of the vehicular Ad-hoc network as the nodes having the information for roadsides Units.

2.1 AODV Routing protocols

The AODV protocols is also called as the on-demand routing protocols in which route are only generated when there is a need to route. Means when the demand of route is required then route is calculated which is similar to that of the OSR like root discovery which is not in case to the DSDV. It is the reactive protocols. The OSR is also the reactive protocols. the reactive protocols the networks which have only those routes which are presently doing work means in used that eliminates the conflicts of the network.. Means when the demand of route is required then route is calculated which is similar to that of the OSR like root discovery which is not in case to the DSDV.

2.2. AOMDV Routing Protocols

It is reactive routing protocol, AOMDV protocols extends the AODV protocol achieve the multiple paths. It is not based on the dynamic change of the network means contention and congestion however it is based on the static route of the network. Ad-hoc network are combination of the wireless mobile nodes with no centralized management. Every and each node has finds routs to the it's destination throat meeting with the other nodes. For this reason routing protocols plays an important task in ad-hoc network. AOMDV is used to comput multiple path during the route discovery. When AOMDV generates the multiple paths will select main path depends on the routing establishment time. When main path is not active then only the other path will active otherwise not. The Since VANET environments are highly dynamic; having multipath instead of unipath to the destination is preferable. Ad-hoc on-demand multipath distance vector (AOMDV) routing protocol is an extended version of AODV. AOMDV provide multipath to reach the destination, while AODV only have a unipath to the destination. Despite of their difference, both protocols share the same behavior in several things such as reactive protocol, route discovery mechanism, route maintenance. However, AOMDV in particular has extra RREP and RERR for multipath discovery and maintenance along with a few extra fields in routing control packets.

2.3. Global Positioning System (GPS)

Detection of other vehicles in the vicinity of a moving vehicle is of primary importance to help the driver safely negotiate acceleration, deceleration and parking. In these situations the vehicle must acquire its positional knowledge with respect to others and be able to identify a possible collision. This paper introduces an active alarming system for predicting a collision between two or more vehicles using GPS

and IEEE 802.11 MAC/PHY specification compatible system Recent efforts have been made at developing a cooperative anti-collision system where an ad-hoc wireless communication network is formed among vehicles in proximity. Coupled with positional data from a Global Positioning System (GPS), these devices are relatively cheap to realize and holds the potential for use of allied applications like centralized tracking of vehicles, traffic management and stricter regulation of vehicular speed. A vehicle collision avoidance system based on cooperative wireless communication and GPS can eliminate the drawbacks of the optical based technology even under high speeds or under near-zero visibility.

3) PROPOSED SYSTEM

In this paper we studied the AODV protocols and get the results for the total packet sent , total packet received , packet delivery ratio , average throughput of the network In this paper we introduce system for moving vehicles using Global Positioning System (GPS) and a wireless communication module adhering to the IEEE 802.11

3.1 Proposed System For Collision Avoidance

Existing routing protocols, where each node is required to select the next one or to continue route discovery, result in high delays in reaching the destination . Several routing protocols developed for Ad-hoc wireless networks have been modified and adapted for use in transportation systems. In order to improve the communication between the inter vehicles, and to improve the safety and efficiency of the traffic, this proposed system for collision avoidance is developed.

Processing Information gathered from other Vehicles: All vehicles in a predefined area will receive the before mentioned packet. Each Receiver Vehicle, and for each packet received, system will calculate distance that represents the neighbour vehicle it received the packet from. Then, the Receiver Vehicle will obtain its time from the GPS. In this vehicle distances are calculated and stored in a dynamic table. Possible collisions are detected by running Collision Avoidance algorithm to warn and report Collision between Vehicles to dynamic clustering mechanism. If the distance between two or more vehicle is less, then warning message is generated and broadcasted to the nearby vehicles to avoid the possibility of collision.

3.2NETWORK SIMULATOR SOFTWARE-2

Network Simulator (Version 2), widely known as NS2, is simply an event-driven simulation tool that has proved useful in studying the dynamic nature of communication networks. Simulation of wired as well as wireless network functions and protocols (e.g., routing algorithms, TCP, UDP) can be done using NS2. In general, NS2 provides users with a way of specifying such network protocols and simulating their corresponding behaviors. Due to its flexibility and modular nature, NS2 has gained constant popularity in the networking research community since its birth in 1989.

3.3 Algorithm used for collision avoidance and detection Proximity Based Collision Detection Algorithm

The problem of improving the detection of a device by another device in vehicular ad hoc networks, given a maximum amount of time that they remain in proximity of each other. Our motivation lies in the emergence of a new trend of vehicular applications known as proximity-based mobile applications which enable a user to communicate with other users in some defined range and for a

certain amount of time. The highly dynamic nature of these applications makes neighbor detection time-constrained, i.e., even if a device remains in proximity for a limited amount of time, it should be detected with a high probability as a neighbor. To address this problem, we perform a realistic simulation-based study in vehicular ad hoc networks

ALGORITHM

```
proc checkForCollidingNodes { ref_node time_val } {
        global x y val node_ ns num_collisions num_avoided
        set x1 [$node_($ref_node) set X_]
        set y1 [$node_($ref_node) set Y_]
        set collide 0
        for { set count 0 } { $count < $val(nn) } { set count [expr $count+1] } {
                if { $count == $ref_node } {
                        continue;
                } else {
                        set x2 [$node_($count) set X_]
                        set y2 [$node_($count) set Y_]
                        set dist [findDistance $x1 $y1
$x2 $y2]
                        set found2 0
                                while { $dist < 50 } {
                                set new_x [expr rand()*$val(x)]
                                set new_y [expr rand()*$val(y)]
                                set dist [findDistance $x1 $y1 $new_x $new_y]
                                set found2 1
                        }
                        if { $found2 == 0 } {
                                continue;
                        }
                        set num_collisions [expr $num_collisions + 1]
                        set collide 1
                        puts "Node $ref_node might collide with Node $count at $time_val s"
                        set diff_x [expr ($new_x - $x2)]
                        set diff_y [expr ($new_y - $y2)]
                        #Check the direction
                        if { $diff_x < 0 } {
                                set dir_x "Left";
                        } elseif {$diff_x > 0} {
                                set dir_x "Right";
                        } else {
```

```
                set dir_x "";
        }
        if { $diff_y < 0 } {
                set dir_y "Down";
        } elseif {$diff_y > 0} {
                set dir_y "Up";
        } else {
                set dir_y "";
        }
```

Euclid an Distance Formula

The distance between (x_1, y_1) and (x_2, y_2) is given by:

$$d = \sqrt{(\Delta x)^2 + (\Delta y)^2} = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

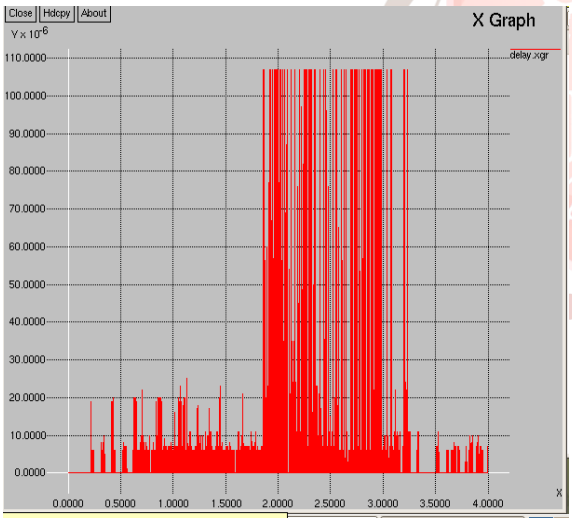


Figure 2Graph For Delay For AODV

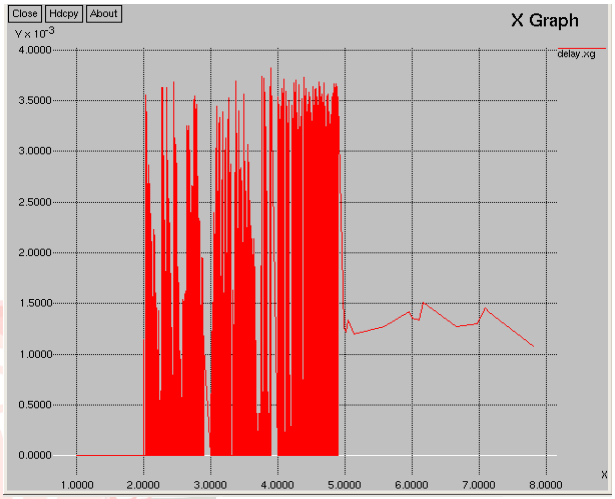


Figure 3 Graph for Delay for collision avoidance and detection

4 SIMULATION RESULT

PARAMETER	RESULTS
Average throughout	2908.8312kbps
Total Packets Sent	1643
Total Packets Received	1066
Packets Delivery Ratio	64.881315 %
Packets Loss Ratio	35.118685%

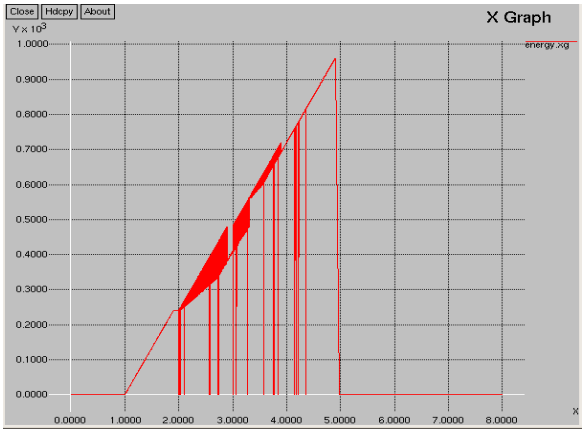


Fig 4 Graph for Energy for collision avoidance and detection

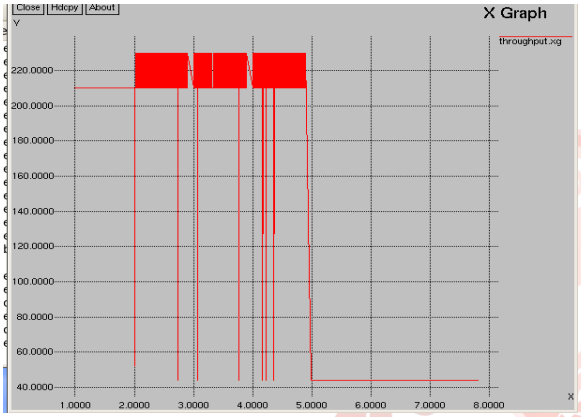


Fig 5 Graph for Throughput for collision avoidance and detection

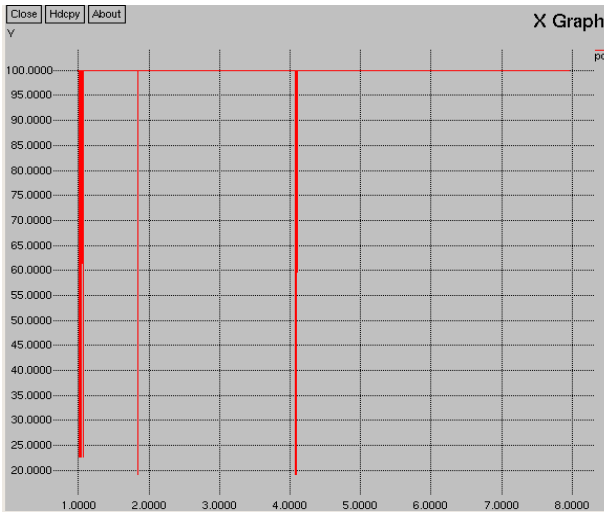


Figure 6 Graph For Pdr For Collision Avoidance And Detection

CONCULSION:

The primary objective of the thesis was to design a Vehicular ad-hoc network for high speed highway environment in this project we studied the AODV routing protocols In this project we detect the collision avoidance and detection by using the AOMDV routing protocols. And having the graph for the delay for Collision avoidance and Pdr

6) ACKNOWLEDGMENT

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