



Zone Routing Protocol (ZRP) - A Novel Routing Protocol For Vehicular Adhoc Networks

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ABSTRACT

This Paper discusses about the capability of the current routing protocol of MANET for VANET. VANET is derived from MANET and it is a network consisting of vehicles, which can communicate between them wirelessly. In high traffic conditions the message should deliver correctly between the vehicles and the communication is established with the help of Road side Units. A dynamic topology with mobility patterns and different channel time behavior characterize VANETs. The network traffic requirements differ for VANET. In this paper, w Zone routing Protocol(ZRP) is utilized to improve the parameters of VANET like less communication delay and delivering the messages on time compared to AODV and DSR protocols while the vehicles are moving at high speeds. The results are obtained by simulation using a simulation scenario.

•Keywords—MANET, VANET, AODV, DSR, ZRP.

INTRODUCTION

Wireless Sensor Networks give an extension between real world and virtual systems. They have played an important role in communication purposes in the recent years. Wireless systems are grouped into many categories based on the communication and network type. Sensors use batteries to operate and it consumes less power. They are comprehensively divided into two classes, one is infrastructure-aided and other is infrastructure less.

VANET goes under infrastructure-aided system. A system utilizing the infrastructure point interfaces the vehicles on the road. Those points are Roadside Units. They are same like the Access point in a PC system, which acts a state of communication between the system and the vehicles. Vehicular ad hoc networks consist of nodes which associate between them and the mobility of the nodes are well maintained. Vehicular ad hoc systems are utilized in Intelligent Transport Systems (ITS). This framework utilizes GPS for following the accurate position of the car and other inbuilt frameworks for parking assistant and while emergency purposes for sending information. Vehicles can continue ahead the road as quick with nodes interaction..

PROBLEM IDENTIFICATION

Research has been done MANET protocols which can be utilized for VANET. In that study AODV and Dynamic Source Routing (DSR) protocols were employed as the routing protocol and it was good for less mobility network. The delay and the routing load were less, and packet delivery ratio was high. The problem occurred in high mobile ad hoc network which is Vehicular Network where the route discovery process is complex and so the delay and the routing load is increased. It requires high latency time in finding the routes and also network clogging occurs due to excessive flooding. A better routing protocol is needed to reduce delay and routing load in VANET. It should also reduce the latency time.

PROPOSED MECHANISM

In high traffic networks, the process for route discovery employing AODV Protocol becomes complex. This increases the communication delay and routing load. If the route discovery process consists of both pro-active and reactive the timing can be relaxed and also the flooding process can be avoided. Flooding process makes the network unreliable and also result in loss of the packet. In order to overcome the above problems the route discovery process should be completed in a minimal time. The only way to complete the route discovery process with less control packets and time is to use a protocol, which can use zones to find the routes and send the packet. So we use zone routing protocol which is both on-demand and table driven.. For routing the packets within the zone it utilizes Intra-Zone routing, which is table driven and for nodes outside the routing zone it utilizes Inter-zone routing process, which is on-demand. By using this protocol in high mobile ad hoc network the parameters like communication delay and the routing load can be compromised.

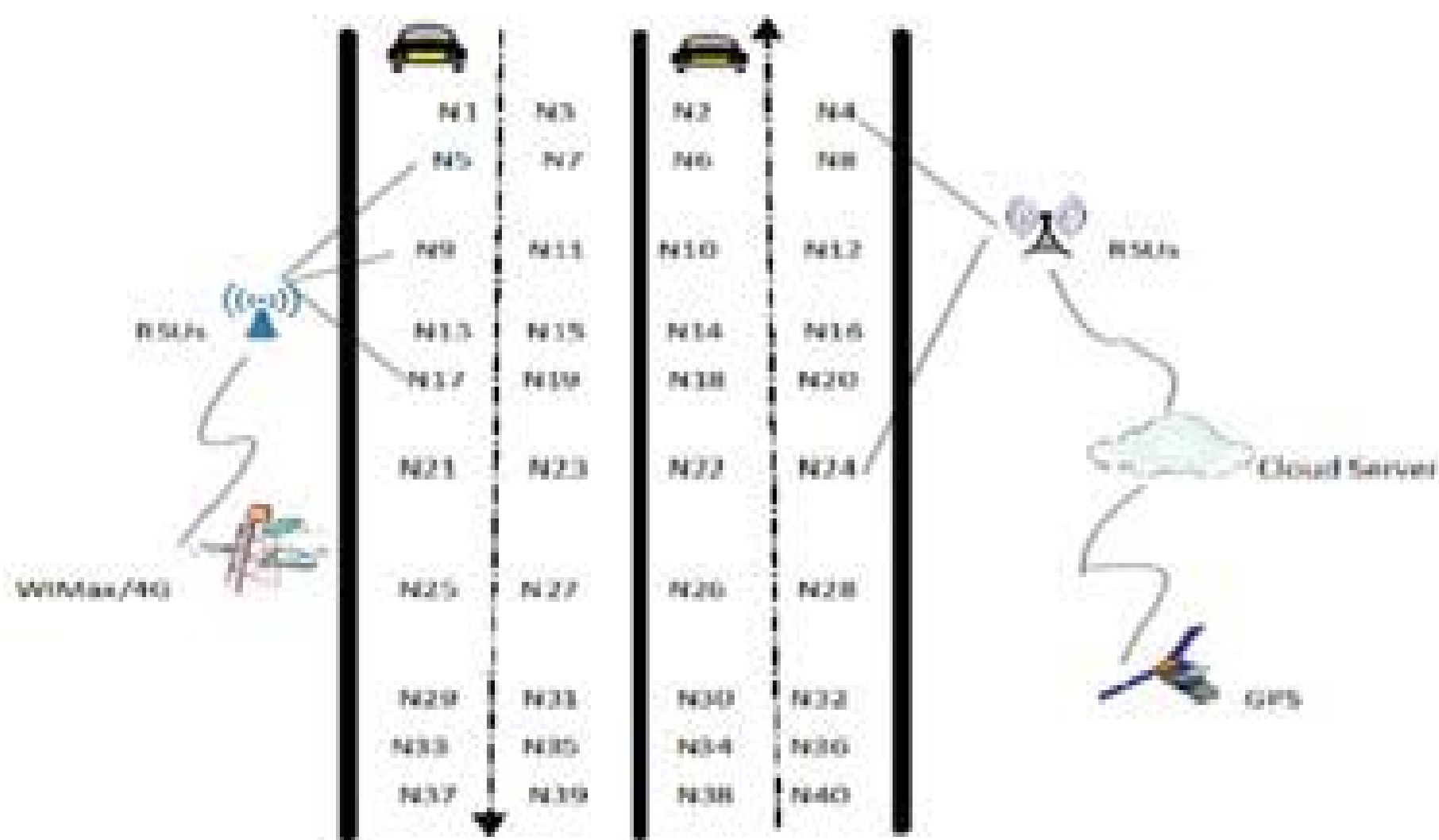


Fig1:Vanet environment

WORKING SCENARIO

Vehicles are represented as nodes from N1 to N40. Zone Routing Protocol is employed for delivering the data efficiently from one node to the destination node. The routing zone for node 1 and node 11 is shown in fig2. Suppose if the nodes from 1 to 10 want to communicate i.e. in its routing zone it uses Intra-Zone Routing Protocol in which it uses the routing table to find the destination-node. In other case if N1 wants to send a data packet outside the routing zone, Inter-zone Routing Protocol is utilized which is On-Demand

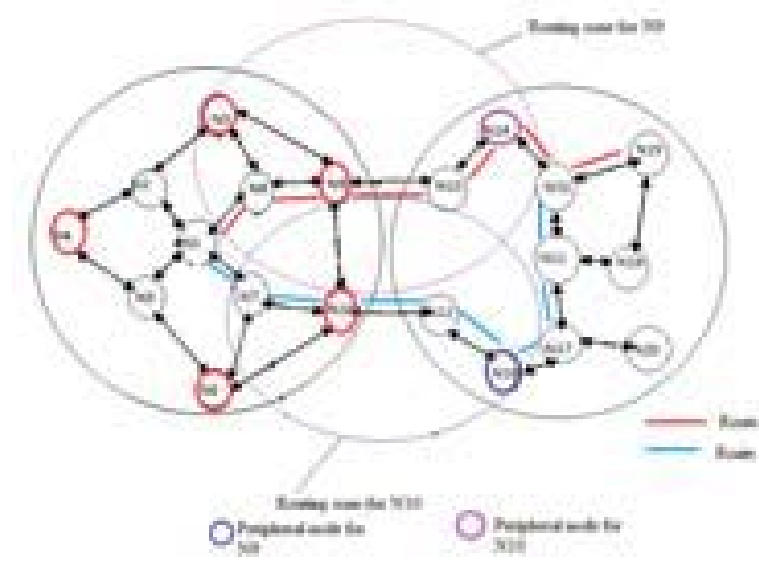


Fig2: Finding the path

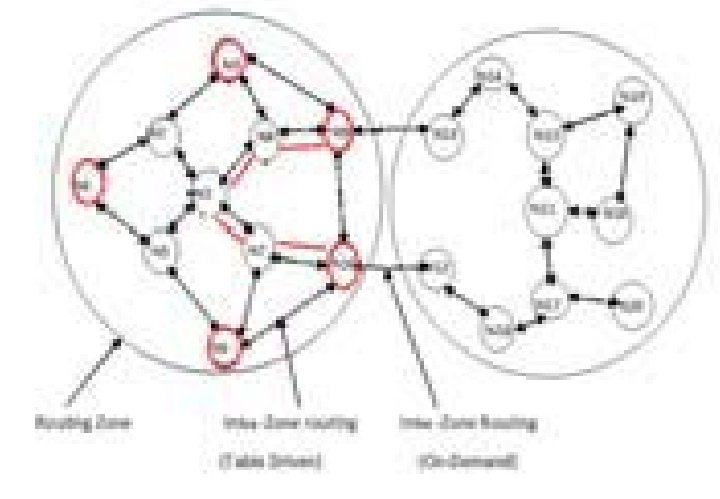


Fig3: Flow of Data Packet

Consider a situation where node 1 wants to send data packet to node19. Here Source node is N1 and destination node is N19. To send the packet to the destination node it has to find the path first. Node goes through its routing table for N19 utilizing Intra-Zone Routing Protocol. Since the node(N19) is not in its own routing zone it initiates the route requests utilizing Inter-Zone Routing protocol. The requests are border casted to the peripheral nodes. Here the peripheral nodes for N1 are N9 and N10. Now N9 and N10 goes through its own routing table for the node N19.

The routing zone for N 9 and N10 is shown in Fig 3. Since the nodes cannot find the destination N19 in its routing tables it needs to send to peripheral nodes utilizing border casting. The peripheral node for N9 is N14 and for N10 its N16. Now the nodes examine their routing table for N19. Since N19 is in the zone of N14 it adds the path from itself to N1 using the route request path. Finally it sends the generated reply route back to the N1. Another path is also generated by the node N16 and sent to N1. Now N1 gets multiple route replies. Among the replies it uses the shortest path to the N19 and sends the data packet. The shortest path is N1-N8-N9-N13-N14-N15-N19.T. In this way, the route discovery process is done and it reduces the delay for N1 and N19 to communicate. Also less control packets are sent compared to AODV to find the path to the destination, which reduces the Routing Load.

CONCLUSION

In this paper, we considered a high mobile ad hoc network scenario and the route discovery process time is relaxed using Zone Routing Protocol. This protocol provides a better communication delay and routing load in high mobility environments compared to AODV and DSR protocols.

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