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EFFICIENT TECHNIQUE TO AVOID ACCIDENTS IN ROADWAYS

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Abstract

In recent years, road safety has become very important. Vehicular ad hoc network is the only way to make communication between the moving vehicles. Safety message is broadcasted to the neighbour vehicles. Safety message contains information about the type of vehicle and distance from the neighbour vehicle. A moving vehicle receives information about all the neighbour vehicles that are around it.

Keywords: OBU, RSU, DSRC, MDSRC

1. Introduction

Vehicular Ad Hoc network is a sub class of mobile ad hoc networks. VANET provides wireless communication among vehicles and vehicle to road side equipments. The performance of communication depends on how better the routing takes place in the network. Routing of data depends on the routing protocols being used in the network. VANETs are receiving growing attention from the research community and from the transportation industry because of their great potential to improve traffic safety on roads. Ad Hoc networks are collection of self-governing mobile nodes. VANET is the emerging area of MANETs in which vehicles act as the mobile nodes within the network. VANET is the wireless network in which communication takes place through wireless links mounted on each node. On Board Unit(OBU) is a device which is inside the vehicle which process the data collected from various sensors fitted inside the cars and gives conditions of the vehicles is responsible for communication with outside network. i.e. with other vehicle and infrastructure. Road Side Unit(RSU) support cooperative and distributed applications in which vehicles and RSUs work together to coordinate actions and to share and process several types of information. VANETs also allow vehicles to connect to Roadside Units. Vehicles communicate to each other through RSU.

2. Communication between vehicles

Request to send/clear to send (RTS/CTS) was the first technique used for communication between vehicles. When a vehicle needs to communicate to the neighbour vehicle first it sends RTS, the vehicle receiving RTS sends CTS in response, after CTS is received then it broadcasts the message to the neighbour vehicle. By using this technique hidden terminal problem occurs. When two or more vehicles tries communication with the same vehicle then hidden terminal problem occurs. To overcome from this problem, communication between vehicles is done through road side unit using Dedicated Short Range Communication (DSRC). A message exchanged through road side unit is stored for security purpose and for future verification about any vehicle that has been moved across the road side unit. Safety messages are sent and received when the vehicles come under the dedicated range. Safety message can be any type of information such as the type of vehicle, distance and location of the vehicle. Vehicle collision is avoided by receiving intimation about the neighbour vehicles. By reducing the RSU's job network traffic is reduced. When large numbers of vehicles come under the coverage range then end to end transmission delay might occur. To reduce the transmission delay communication between vehicles is done directly between the vehicles using Modified DSRC (MDSRC). Dedicated range is set in the On-board unit that is fixed in the vehicle by the manufacturer. Vehicles are considered as nodes in vanet.

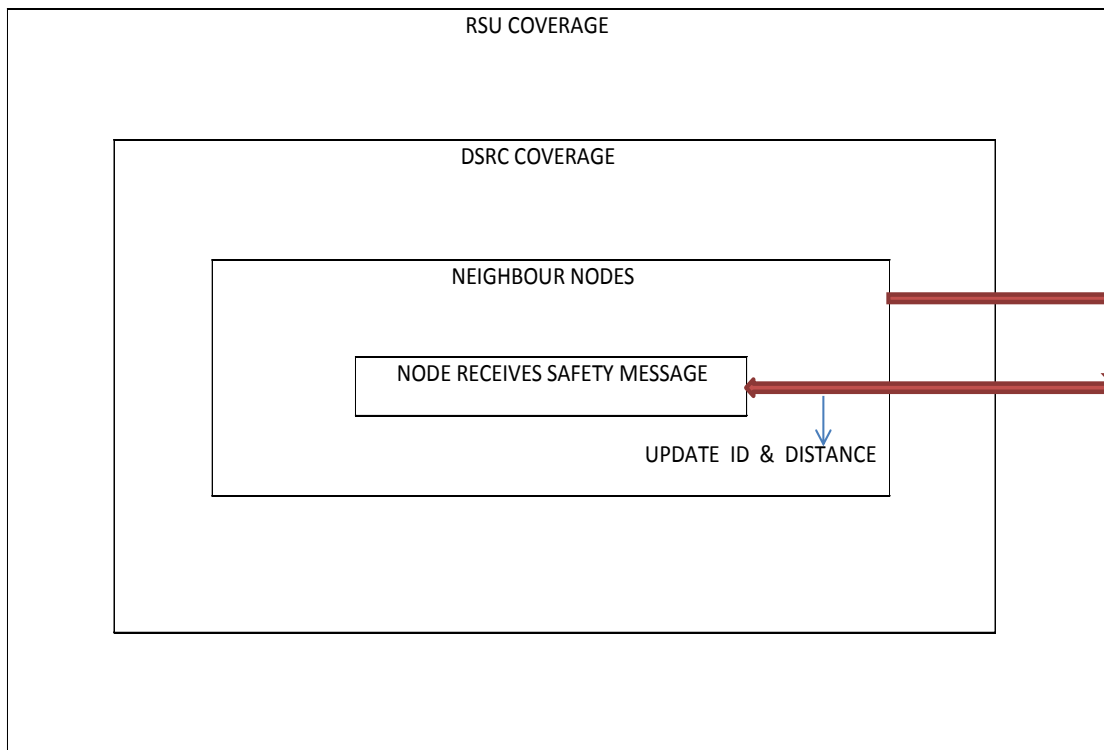


Fig.1 Architecture Diagram

Road Side unit has a very large coverage in kilometers but communication between vehicles is required only for vehicles that are within 300 to 1000 meters. So dedicated range is set by using the dedicated short range communication.

3. Implementation

When nodes come under the coverage range of the On-board unit the safety messages are updated in the OBU. All the messages are updated in the OBU. The OBU designed by the manufacturer such that contains the type of vehicle information. All the neighbour nodes are updated with the safety messages and vehicle collision is avoided before it happens. Using simulation nodes detection and safety message broadcast without route interferences is implemented. Fig 2 shows the discovery of neighbour nodes. All the nodes are mobile. Communication between the nodes is done by the On-board unit. The on-board unit gets the safety message updated when it comes under the coverage area. Single hop communication is done between the sender and receiver. Sender and Receiver nodes are the neighbour nodes under the coverage range. No intermediate node between the sender and receiver.

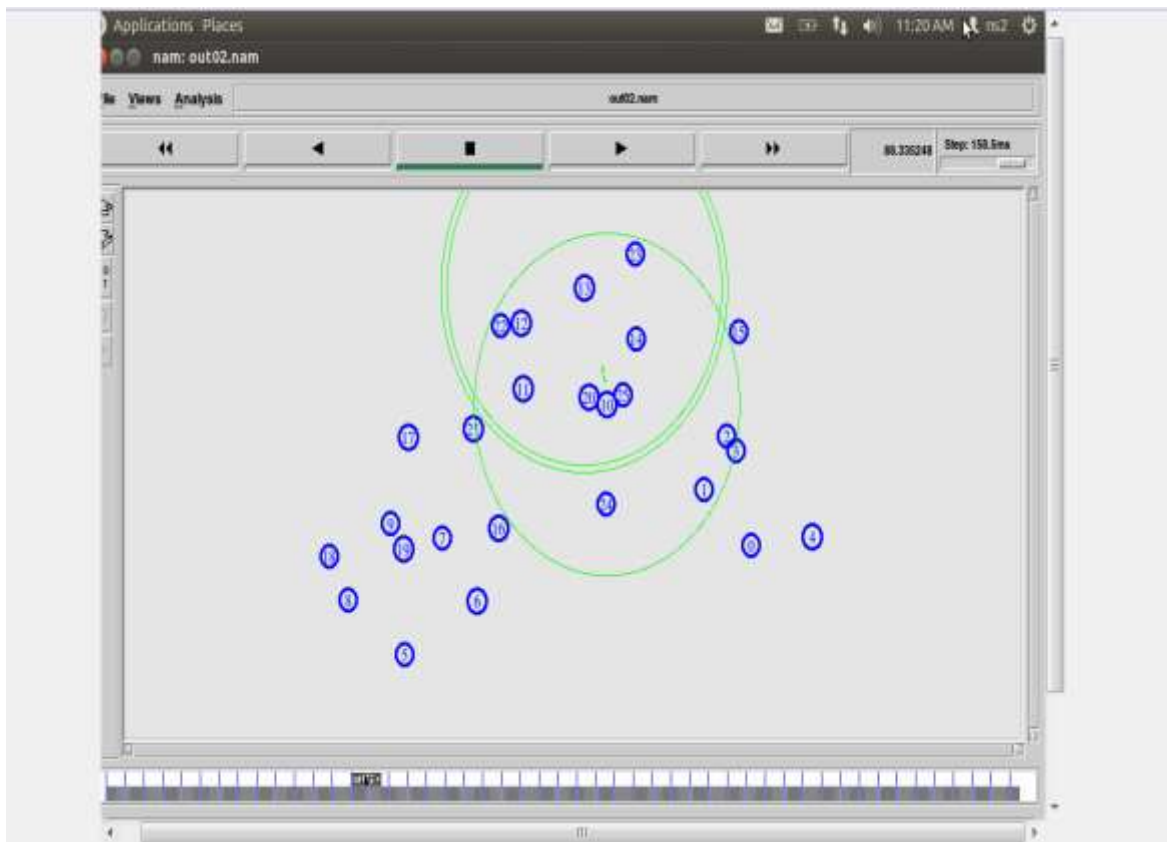


Fig. 2 Direct communication between nodes without interference

4. Conclusion

When a moving vehicle in roadways receives a safety message about the type of vehicle that is around a certain distance then it is an alert for the vehicle and accidents can be avoided. Safe moving of vehicles all over the roadways is provided with the help of On-board unit fixed in all vehicles.

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