

# TRACKING AND MONITORING OF THE MOVEMENT OF VEHICLE IN CITY SCENARIO USING VANET

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## Abstract

In this research paper we consider the VANET infrastructure for communication and data transfer. VANET is the infrastructure less network of vehicular node that are move from one place to another place and communicate with road side unit or other node or both road side unit and vehicular node. In real world scenario we see that vehicles are not follow the traffic rule and regulation, they can easily break limitation and rules. In our propose system we try to control the mobility and speed of vehicle by tracking and monitoring these vehicle with help of road side unit. The road side unit also communicates with POLICE, HOSPITAL and RTO office in any emergency situation

**Keywords:** - VANET, RSU, NS2

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## 1. INTRODUCTION

Vehicular ad-hoc network (VANET) have many newly area for researchers. VANET is the collection of nodes where nodes are vehicle and they can freely move and also communicate with road side unit or other vehicle. VANET have various element like vehicle node, road side unit(RSU), sensors, personal device and Wi-Fi. These elements are required for VANET architecture.

In VANET vehicle node move towards destination and also communicate with RSU element and access the services and they also perform inter vehicle communication and forward message to other node. Various routing protocols use in VANET such as AODV, DSDV DSR and OLSR etc. We

select routing protocol based on our requirement and specification of application.

VANET is differ from MANET, vehicle nodes (VANET) are highly mobile in nature therefore topology also have dynamic in nature. In VANET we can't guarantee end to end connectivity but movement of node will be predicted due to scenario restriction like knowledge of roads direction and turns.

In this research paper we propose a system for tracking and monitoring the movement of vehicle in city and take suitable action based on situation. We place RSU and provide communication with POLICE, HOSPITAL for handling any emergency situation.

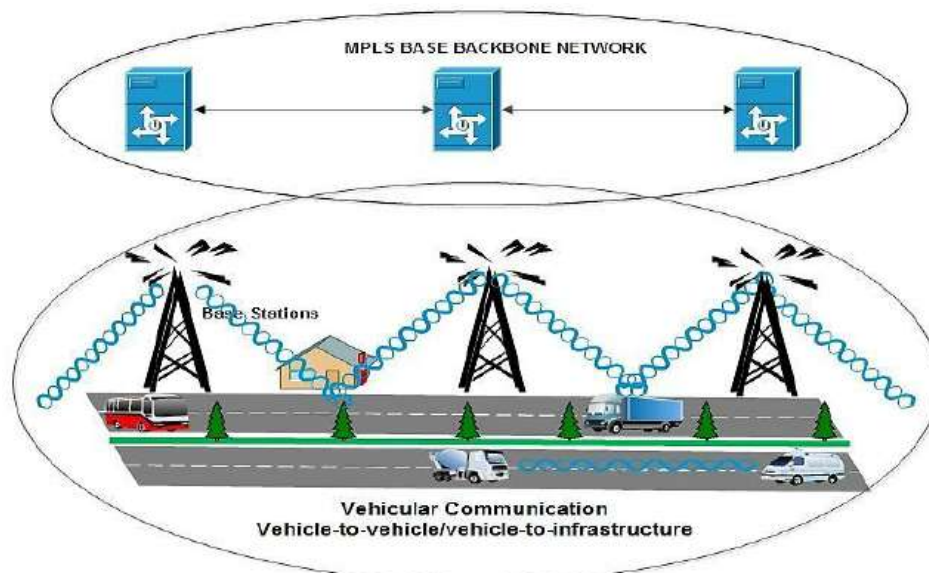


Fig.1 Architecture of VANET

In this paper basic introduction of VANET provide. In section II we describe the existing system. In section III we describe the propose system. In section IV we perform simulation and analysis the result and at last section V we conclude the whole concept of our propose system.

## 2. RELATED WORK

VANET is widely used research area. There are various application of VANET such as automatic traffic control, Adaptive signal system and intelligent automotive system.

All these applications are used to monitoring the traffic and handle the traffic signal according to that.

Modern days are very high-tech, everything connected to internet or intranet and communicate with their control site. In present time, vehicles communicate with RSU or communicate with other vehicle and forward message due to this other vehicle knew the upcoming event. But In current system we only monitor the speed of vehicle. We can't stop these high speed vehicles because of manual prevention technique.

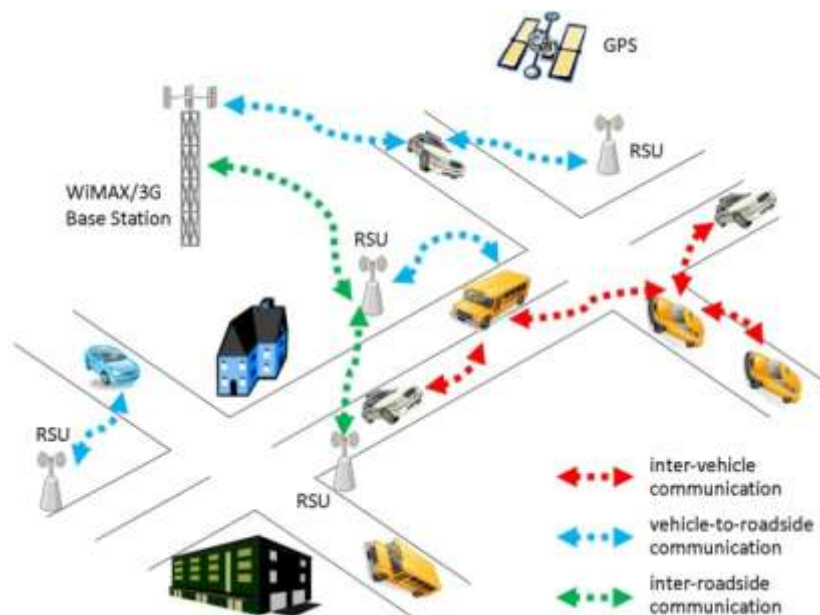


Fig.2 An Architecture of Related Work

In emergency situation POLICE and AMBULANCE vehicles nodes are need to reach action site on time. But most of time these vehicles nodes are unable to reach on action site because of high node density and traffic on road.

There are no such system for provide run-through for these vehicles (POLICE & AMBULANCE) and communication structure for these vehicles.

In the given figure we can see that there are three types of communication perform. First one inter-vehicle communication, second one vehicle - roadside and last one is inter- roadside communication.

In inter-vehicle communication, An vehicle communicate with other vehicle node or communicate with more than one vehicle nodes at same time. In vehicle- roadside communication vehicle communicate with roadside unit (RSU). In inter-roadside communication road side units communicate with each other and forward message.

## 2. PROPOSE SYSTEM

In our propose system we try to eliminate drawback of exiting system. In our system we monitor the speed of vehicle and if speed of vehicle cross the define speed limit then we stop the vehicle at next checkpoint. Here RSU

check the speed of vehicles by using speedometer device and after detecting break speed limit RSU\_1 communicate with RSU\_2 which place at some distance. Then RSU\_2 down the barrier and stop the vehicle.

In our system we also detect the heavy load vehicle with help of weight measuring technique. These weight machine may fix into road and when vehicles cross this weight machine road RSU\_1 monitor the weight of each vehicle. When any heavy weight vehicle detect, RSU\_1 check the system time if system time is greater than 8AM and less than 10PM then RSU\_1 communicate with these heavy vehicle and divert their route or stop their movement.

In our system we provide run through path for HOSPITAL and POLICE vehicles. When any ambulance node read to move then HOSPITAL communicate with RSU Control Center and provide route of that ambulance vehicle node. Then RSU Control Center communicate with respective RSU's and these RSU provide run through path for that ambulance node.

In POLICE case when police vehicle node chase some vehicle like thief, terrorist or other illegal vehicle than police vehicle node communicate with RSU Control Center and RSU Control Center communicate with specify path RSU and pull down the barrier, so target vehicle stop at barrier.

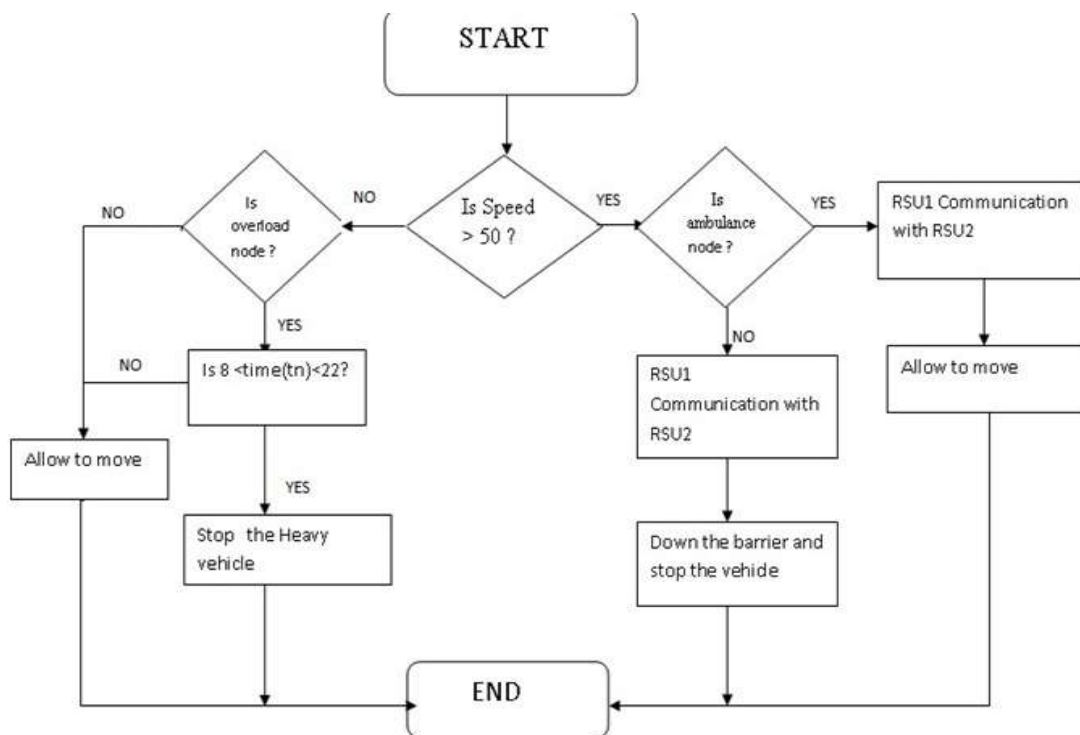


Fig.3 Flow Chart of Propose System

In the given figure we describe the working of our model using flow chart.

- Step1. We measure the speed of vehicle .
- Step2. If speed is less than 50km/hr(assume) then we check weight of vehicle.
- Step3. If vehicle is not heavy weight then allow to move that vehicle.
- Step4. In case of heavy weight vehicle we check the system time and if system is more than 8AM and less than 10 PM then we stop that vehicle otherwise we allow that vehicle
- Step 5. If speed is greater than 50km/hr then we check that vehicle is ambulance node or not. In case of ambulance node allow to move.
- Step6. In case of normal vehicle and speed greater than 50km/hr, RSU\_1 communicate with RSU\_2 and pull down the barrier and stop vehicle

### 3. SIMULATION AND RESULT ANALYSIS

We simulate our propose system in NS2 (Network Simulator 2). In simulation we consider 4000\*4000 simulation area and packet size 50bits/sec

Here we apply AODV and DSDV routing protocol in our propose system and compare result in terms of throughput, end to end delay and packet delivery ratio. In NS2 simulation we perform simulation for 10 nodes, 20 nodes, 30 nodes, 40 nodes and 50 nodes and compute performance metrics for all these number of node. We perform computation process by using trace file and AWK programs.

**PDR (Packet Delivery Ratio):-** As figure we can say that for our propose system PDR of AODV is much greater than DSDV



Fig.4 Propose System Architecture

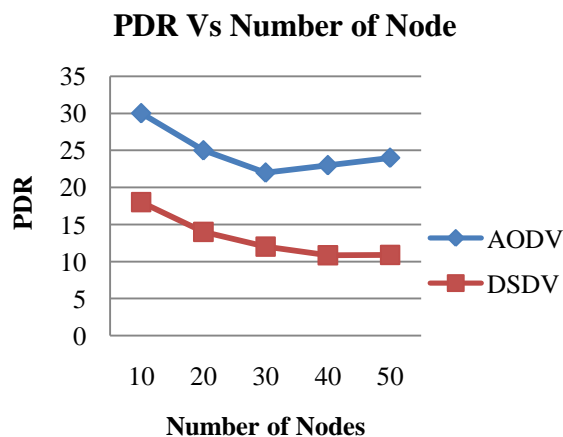


Fig.5 PDR Vs Number of Nodes

### 3.1 End to End Delay

In figure we can see that delay of DSDV protocol is much less than AODV routing protocol.

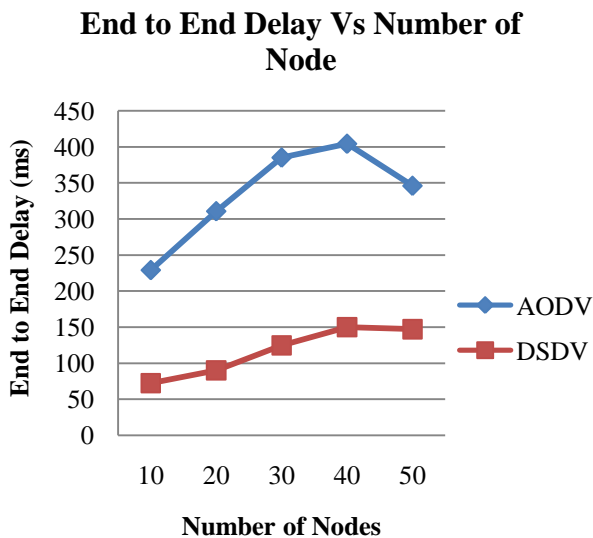


Fig.6 End to End Delay Vs Number of nodes

### 3.2 Throughput

In figure throughput of AODV is much greater than DSDV. Here we consider 50 nodes.

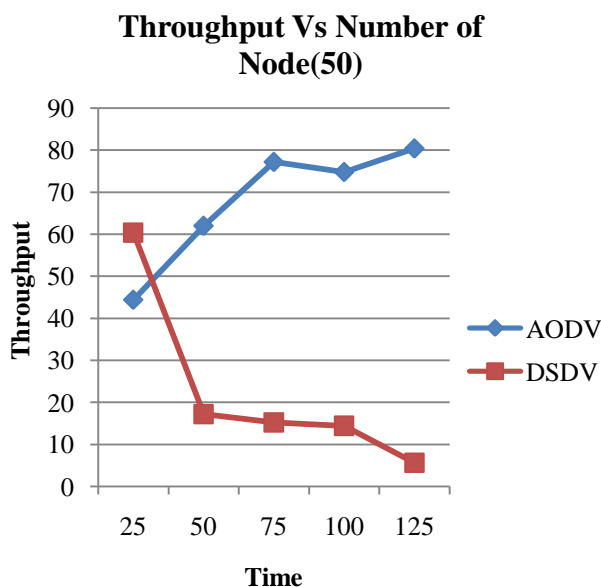


Fig.7 Throughput Vs Time(ms) for 50 nodes

### CONCLUSION

In our research paper we propose a system based on VANET architecture. In our propose system we monitor vehicle and if any vehicle break the traffic rules like cross the speed limit or heavy weight vehicle enter into city between 8AM to 10 PM then system identify these vehicle and stop these vehicles.

In addition we setup communication structure for POLICE, HOSPITAL and RTO office so they easily communicate with RSU Control Center and handle any kind of emergency situation.

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