# TRAFFIC CONGESTION DETECTION AND BROADCASTING BY USING AODV IN VANET


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## Abstract

*Congestion detection is major problem in urban roads. To make smart decisions to avoid congestion Vehicular Ad-Hoc network (VANET) is one of the solution. We present a strategy to detect the traffic congestion of both vehicle-to-vehicle (V2V) and vehicle to infrastructure (V2I) communication and this gives vehicle drivers several options about the location of congestion and its magnitude as well as options to avoid getting stuck in congestion. The messages transmitted guide the driver so as to take the decision needed. These can detect areas of high traffic density and low speeds. Multiple approaches have been proposed to detect the congestion. In this project, we first analyze data obtained by vehicular communication to avoid the traffic and then include road side units i.e. towers. The system is capable of detecting traffic congestion areas in real-time with data collected and disseminated to vehicles using V2V communications. We visua and simulate the result by using AODV, Geobroadcast Communication pattern and Netbeans IDE7.0.1 Platform and shows that this is one effective way to control congestion.*


## 1.Introduction

Growing traffic on roads leads to unwarranted and unscheduled delays that have implications leading to loss of revenue and sometimes even loss of life. This consideration has led engineers putting in work in the recent past to detect traffic congestion and offer solutions that aim to reduce unwanted effects. Vehicular Ad-hoc network (VANET) has emerged as a possible solution to design networks that can solve traffic congestion detection problems . The first attempts aimed at vehicle to vehicle communication which essentially has a short range (1 km). Vehicle can be equipped with these V2V devices and that can serve the purpose of dedicated short range communication or DSRC. This mode is simpler and attractive in some ways but has limitations that warrant use of other schemes. For one, if density of vehicles is low or if the vehicle in question breaks down, V2V will cease to be effective. More importantly, it cannot solve the problems of early warning over a large range so as to allow vehicles to take alternate routes to destination. The other possibility which offers larger range and other benefits that occur from longer range is vehicle to infrastructure or V2I network. This has long range and data processing and transmission of message to a full region covering all vehicles. However, to implement this, large resource is needed as communication towers are expensive propositions. The range of these V2I depends on its power and a suitable compromise or tradeoff between spacing of towers and transmission power can be arrived at depending upon the terrains and statistics of vehicle density and the topology of interconnection of roads. While observing the desirable features of both V2V and V2I. We control the good features of both and offer a better solution on traffic congestion detection and control. We present a typical model of a road with a bend and show using simulations that traffic congestion can be effectively done using V2V & V2I combined. This combined use of V2V & V2I is robust and efficient as we show through our simulation results.

## 2.Methodology :

In our work here, the traffic congestion detection is achieved by broadcasting the messages, with communications form vehicle to vehicle (V2V) as well as vehicle to infrastructure (V2I). The vehicle is assumed to be equipped with a communicating device. The communication is initialized by the affected vehicle. The vehicles which are involved in the communication are called as nodes. These nodes are mobile in nature hence while selecting the communication pattern this mobile nature is considered.

## EXISTING SYSTEM

Decision Making Algorithm was used.If one vehicle has met with an accident because of which a particular lane of the road is blocked, it can create congestion which we want broadcasting to reflect. In our method the affected vehicle generates the message of warning i.e. message for informing the accidental event. After receiving this warning message the vehicle in short range takes decision and forwards it and thus onset the congestion is reported.

## PROPOSED SYSTEM:

## A.AODV:

The Ad hoc On-Demand Distance Vector (AODV) algorithm enable dynamic, self-starting, multihop routing between participating mobile nodes wishing to establish and maintain an ad hoc network. AODV allows mobile nodes to obtain routes quickly for new destinations,and does not require nodes to maintain routes to destinations that are not in active communication.

**Information Gathering:**

The most basic information is the gathering of data from the environment. Each vehicle must be equipped with one or more devices that are capable of gathering data such as current location and speed.

**Information Sharing:**

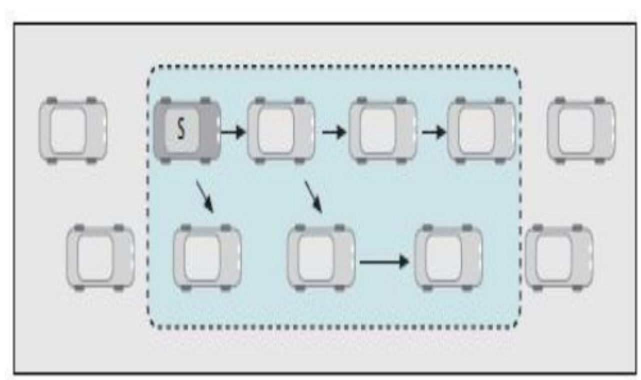
The information must be shared between vehicles. Vehicles must be equipped with a device that allows them to transmit and receive information to and from other vehicles by creating a vehicular ad-hoc network (VANET).

**Knowledge Propagation:**

This Decision is propagated so that vehicles away from the event zone, unable to make this determination with the information received from vehicles around them, can benefit from it.

**B.Communication Pattern**

For broadcasting the message Geobroadcast Pattern is used in which it has very low latency of messages to inform addressed vehicles as fast as possible. Geobroadcast messages are unidirectional Geobroadcast messages are typically sent upon a certain external event, Geobroadcast messages are not sent continuously, although messages with the same content may be repeated from time to time.




## 3.Traffic Congestion Detection:

Congestion Detection achieved according to decision the traffic flow is directed, by using V2V & V2I communication

### A.V2V Communication:

**Message Broadcast by Affected Vehicle:** When accident happens the affected vehicle speed goes to zero. The device placed on the vehicle gathers this information such as current lane of the vehicle, current speed of the vehicle, lane identifier. The packet is send without any map knowledge to the one hop neighbor which is closest to destination. The affected vehicle is continuously broadcasting the message packets. Similarly we have road side units i.e. towers and this warning message is also received by the towers, based on which they take appropriate action. Affected vehicle generates the warning message and keeps on checking for vehicle in range. As soon as any object comes in its range, it transmits the message and it will keep on transmitting continuously.

**Message Broadcast by Vehicle in Short Range:**

Vehicle in short range is the immediate vehicle coming in the range of affected vehicle. This vehicle receives the message transmitted by affected vehicle i.e. warning message. From the message vehicle gets the information about lane status. With this information the vehicle takes decision of diversion, at the same time this vehicle updates the message fields and retransmits the message. When vehicle in short range receives the warning message it gets the information of blocked lane. The receiving vehicle first compares that whether the current lane of vehicle is equal to the blocked lane i.e. it checks whether it is in the blocked lane or not. If it is not in blocked lane then it simply discards the message and it will also not rebroadcast the message. If message receiving vehicle is in blocked lane then it will take decision of diversion. The message will be broadcasted by short range vehicle to all the vehicles which are coming in its range. This message will be transmitted by vehicle only before taking the diversion and changing the lane and as soon as it enters in another lane it stops broadcasting. Thus only one message will be transmitted by all the vehicles, and only affected vehicle is broadcasting continuously and thus congestion is detected.

### B.V2I Communication:

The affected vehicle broadcast messages and it is received by all the objects in the range. This message is also received by the road side unit i.e. tower. The tower is utilized for long range communication. When the lane gets blocked due to accident, the affected vehicle starts broadcasting messages which informs the vehicle about the incident and also informs the status of the lane; accordingly next coming vehicle takes decision

## 4. Analysis:

**Congestion Detection**

By plotting the number of vehicles v/s speed we can find out how many vehicles are there in congestion at particular time. For this we have to consider different time series. The graph of traffic congestion detection for different three series is shown in fig. 8. From the graph we observe that for series one (blue) and series two (red) vehicle are in congestion as their speed reducing to zero, and for third series(green) no vehicle in congestion. Thus we have detected the congestion on road.

From graph we observe that without algorithm no vehicles are in congestion as the speed is not reduce to zero when Decision Making Algorithm is applied the speed of vehicle reduces to zero hence we detect the congestion. Vehicle broadcasting is limited only one message thus highly reducing the message overhead which improves bandwidth utilization also. Hence we call it as intelligent communication system to detect congestion

## 5.Conclusions:

In the present research we have implemented and carried out comprehensive analysis and comparison of unipath on-demand routing protocols (DSR, AODV) and multipath on-demand routing protocol. To achieve lower routing overhead, lower end-to-end delay, to be more resilient to route failures and alleviate traffic congestion for robust scenario where mobility is high, nodes are dense and traffic is more, simulation results reveals AOMDV is the best choice. The overall conclusion is that a multipath routing protocol, AOMDV is best choice to move towards a network with better Quality of Service. In future work will cover control after congestion detection which will improve the intelligent transportation system (ITS) which is today’s need, and expand this research for control Inner-city traffic where more complex topologies exist.

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