# A Robust Approach for Alert Case System for Vanet

Binal Bhargav[1], Prof.Vinit Gupta[2]

[1] Student, Hasmukh Gosvami College of Engineering, Vahelal, Gujarat Technological University Ahmedabad, Gujarat, India

[2] Assistant Proffesor, Hasmukh Gosvami College of Engineering, Vahelal, Gujarat Technological University
Ahmedabad, Gujarat, India

## Abstract

*The well-known traffic congestion problem in every environment has negative impact on many areas including economy, environment, health and lifestyle. Recently, a number of solutions based on vehicle-to-vehicle communications were proposed for traffic congestion detection and management. Vehicular ad hoc networks (VANETs) are used to collect and aggregate real-time speed and position information on individual vehicles to optimize signal control at traffic intersections. Vehicular ad hoc network (VANET) is a promising technology to enable the communications among vehicles. We present a strategy to control traffic congestion with the help of vehicle-to-vehicle (V2V) and vehicle to infrastructure (V2I) communication. This is achieved by transmission of messages which alerts the drivers about possible traffic breakdown. The message transmitted will guide the driver so as to take the decision needed to control the traffic congestion.*

**Keywords**: *Vanet, Broadcast Alert message, High delivery ratio, Less Congestion*

## I. INTRODUCTION:

### 1.1 Architecture of VANET

Vehicular Ad Hoc Networks (VANETs) [1] are self-configuring networks where the nodes are vehicles (equipped with onboard computers), elements of roadside infrastructure, sensors, and pedestrian personal devices. Wi-Fi (IEEE 802.11-based) technologies are used for deploying such kind of networks. At present, the IEEE group is completing the IEEE 802.11p and IEEE 1609 final drafts, which are known as “Standard Wireless Access in Vehicular Environments” (WAVE), specifically designed for VANETs. This technology presents the opportunity to develop powerful car systems capable of gathering, processing, and distributing information.

Mobile Ad Hoc Networks or MANETs are the collection of dynamic self-configuring networks of mobile nodes. Each node will act as a host and a router that will offer connectivity to the sub-sequent node in the network. Because of the mobility feature of these networks, the communication should be able to adapt any changes in the location of the nodes or any changes that are due to the surrounding environment. It is important to find the multi-hop route between the source and the destination. Once the route is found, then each node will forward the traffic (or packets) till the target node is reached. The VANET example is shown in figure 1[1]

Vehicular Ad hoc Networks (VANET) are the technical basis of IT’S, for which first draft standards are coming up [1]. They enable vehicles to actively communicate among each other and to better perceive the traffic situation in their vicinity, like accidents and traffic jams [1]. VANETs allow vehicles to avoid problems, either by taking any desired action or by alerting the driver. Besides the road safety enhancements that VANETs will bring, they also open doors for many applications to enhance the driving and traveling comfort like Internet access from a car.

In this paper, Section II describes Literature review (include technique to reduce congestions) .Section III in which Proposed Plan .Section IV in which Conclusion.

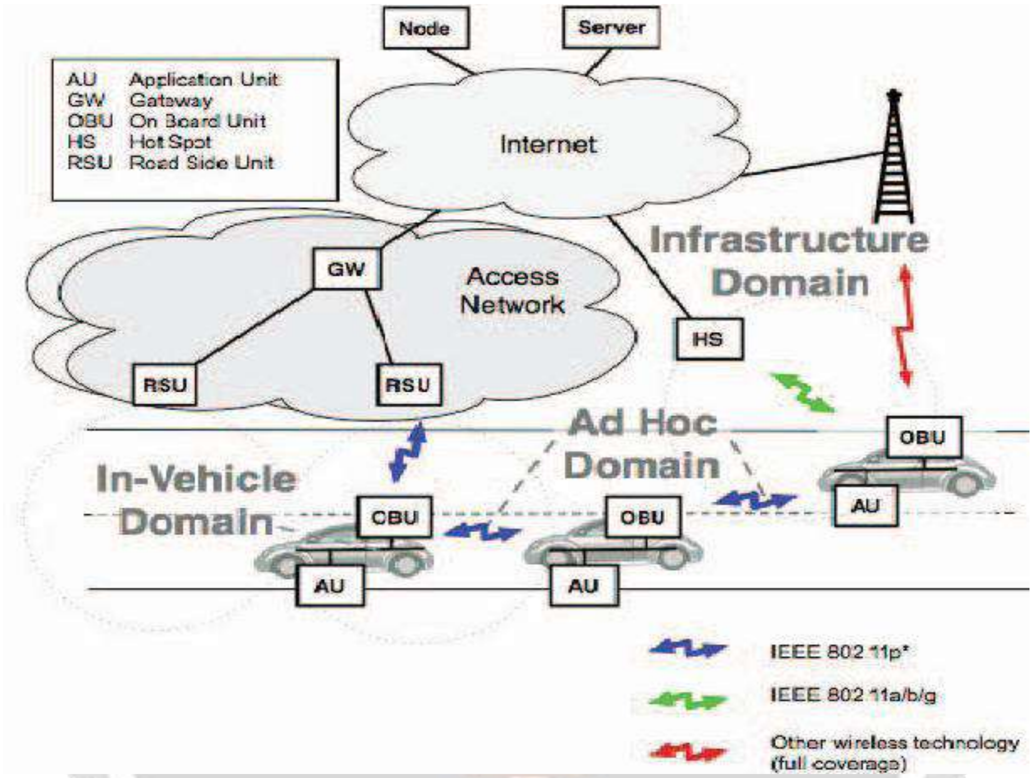


**Fig. Architecture of VANET**

### 1.2 Component of VANET

There are mainly three components of VANET:

- On-Board Unit.
- Road Side Unit.
- Application Unit.

#### 1.2.1 On-Board Unit (OBU)[4]

As shown in fig.2.2, On-Board Unit is Physical device located in a vehicle and responsible for C2C and C2I communication.OBU has IPv6 Geo Networking and an AU that contain regular IPv6 stack.

- AU and OBU communicate internally through **Ethernet.**
- Communication between OBU and other OBU/RSU is done by **WLAN**.

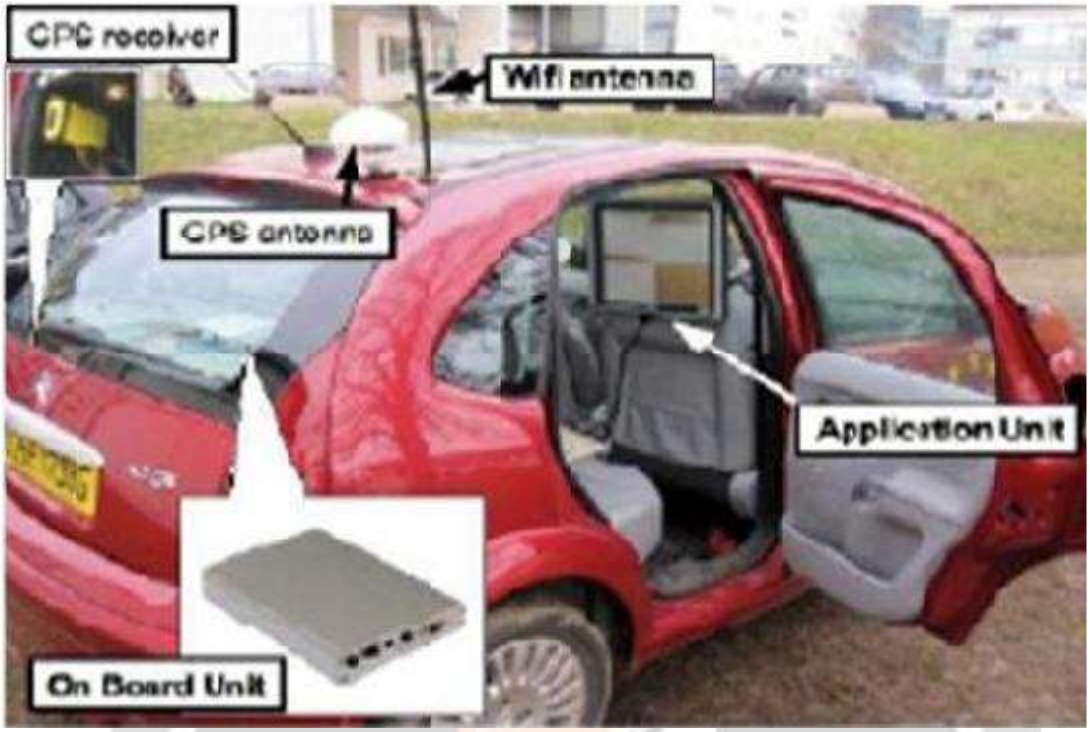


**Fig. Component of VANET**

### 1.2.2 Application Unit (AU) [9]

Application Unit is an in-vehicle or road-side entity and runs applications that can utilize the OBU's or RSU's communication capabilities, respectively.
Examples of AUs are:

- A dedicated device for safety applications like hazard-warning
- A navigation system with communication capabilities
- A hand-held device such as a PDA that runs Internet applications

### 1.2.3 Road Side Unit [9]

RSU is Physical device located at fixed positions along roads, highways or dedicated locations. RSU support both IPv4 Geo Networking and regular IPv4 routing. If RSU does not cover the necessary range for delivering GeoBroadcast .packets, the packets are forwarded by nearby vehicles thanks to the multi-hop communication mechanism in IPv4 over C2Cnet.

### 1.3 Attacks on VANET [8]

There are several types of attacks performed by intruder of the VANET system. Attacks involve Denial of Service (DOS), active, passive, control of movement etc. In this work author broadly classified types of attacks on VANETs.

#### 1.3.1 Classification Based on Nature

Depending on the nature, the attacks can be classified according to figure 2.3,

- **Passive Vs. Active:**

A passive one is that can only push the message in the network. An active generates packets and place them on the network.

- **False Information:**

Attacker injects information which is wrong that influences the behavior of other nodes.

- **False Position:**

The technique is used by attackers to alter the fields related to their speed, position, and direction of travel.

- **Vehicle tracking:**

A global observer controls the routes of the vehicular nodes designated to use and the observe data that is for various purpose.

- **Internal vs. External:**

In internal attack, the attacker node is considered as a member of the network. Attacks by external node are considered as intruders. In large cases attacks by internal nodes can't be discovered as they treated as authenticated node by this network.

- **False GPS signal:**

The vehicles using GPS are easily vulnerable to various types of attacks such as the GPS signal.

- **Denial of service:**

A node may want to block the services offered by VANET or even may want to cause an accident. Flooding the network with lots of fake messages can be an example of this attack.

## II. LITERATURE REVIEW

Various researchers are working on VANET to find the solution for current traffic congestion problem. Many methods are used to reduce the traffic congestions detection and management using VANET.

### 1. Improved Performance Modeling of Intelligent Alert Message diffusion in VANET.

In this paper author proposed a D-FPAV(Dynamic Fair Transmit Power Adjustment) [2]Algorithm that support both traffic & non traffic situation, in this algorithm to calculate transmit power control value at each vehicle with the help of beacon message information .Then interchange the transmit power value calculated among the neighboring vehicle and last to select power value . IEEE.802.11p WAVE mode improves the performance of broadcasting safety messages in VANET by enabling two vehicles to communicate immediately without imposing any connection setup overhead till they operate in the same channel Thus event driven safety messages are exchanged quickly and with guaranteed delivery using BSSID[2].

### 2. Greedy Forwarding Mechanism and Decomposition areas in urban environment for VANET.

In this paper, to solve the broadcast storm problem using greedy forwarding and decomposition zones. In which firstly used GyTAR (Improved Greedy Traffic Aware Routing protocol) [4] is an intersection-based geographical routing protocol capable to find robust routes within city environments. It consists of two modules: (i) Selection of the junctions through which a packet must pass to reach its destination, and (ii) an improved greedy forwarding mechanism between two junctions. Hence, using GyTAR, a packet moved successively closer towards the destination along streets where there are enough vehicles to provide connectivity. GyTAR out performed previous routing protocols in terms of packet delivery ratio, routing overhead and end-to-end delay. LAR is an on-demand source routing protocol. LAR sends location information in all packets to (hopefully) decrease the overhead of a future route discovery [4]. Author also present a new geographic routing protocol VANET called "Intelligent Routing protocol in Urban environment for VANET "(IRUV). The approach adopted by IRUV protocol is given in three parts:

a. Collecting information on traffic segment "between source and candidate junctions".
b. Calculating the score for the candidate junction which represents the cost of the section of road.
c. Apply Dijkstra's algorithm to choose the best path to the destination

So our protocol IRUV selects the fastest and shortest route in the road network as the best way.

**3. Distributed Road Traffic Congestion Quantification Using Cooperative VANETs**

In this paper Author present an algorithm designed to enable each vehicle in the network to detect and quantify the level of traffic congestion in completely distributed way, independent of any supporting infrastructure and additional information such as traffic data from local authorities. Therefore divided this algorithm in two mechanisms: - (i) congestion detection and quantification, and (ii) information dissemination [5].

In first mechanism measures are speed, travel time and delay, volume, level of service, demand and capacity, cost, etc. The authors concluded that congestion is a function of reduction in speed, and that the setting of a threshold that is directly related to travel speed is most appropriate to use as a metric of traffic congestion. Every vehicle measures its own speed and time during which the speed is lower or higher than the threshold. In second mechanism to use adaptive broadcasting scheme that adjusts the broadcast interval according to the difference of congestion level for the current street that vehicle calculated on its own and the level from the database that includes values received from other vehicles as well. According to our scheme each vehicle will broadcast the message containing the value of congestion level of the street where it is currently located and for the previous street it was located for the current street.

**4. An Effective Multi-Hop Broadcast Control Mechanism for Emergency Alert Message in VANET**

This paper author present, position base broadcast module, named Broadcast Control Unit (BC Unit), in order to reduce the re-broadcast nodes and minimize emergent message conflict. If quantity of vehicles increased, the message delivery rate will decrease significantly due to the message contentions and collisions. In order to deal with the message contentions and collisions, the Urban Multi-Hop Broadcast protocol (UMB)[6] alternates the original RTS/CTS (request to send/clear to send) handshake mechanism with IEEE 802.11 defined RTB/CTB (request to broadcast/clear to broadcast) which include GPS information, and also apply Black-Bust mechanism (letting receivers sending black-burst signals with a duration which is proportional to their distance from the source) to select the furthest node being next forwarder. In [6], a Binary Partition Assisted Broadcast (BPAB) protocol was proposed, it improves UMB by using Binary-partition method to divide the area within its transmission range into many subareas, and chose the next forwarder in the farthest segment randomly. [6] Proposed a cross-layer solution and elected the next forwarder by using its BRTS/BCTS (broadcast require/clear to send) handshake mechanism. Protocols proposed in were all applied the GPS information and vehicles' movement to elect the next forwarder. Prioritized Broadcast Contention Control (PBCC) module optimizes the back-off distribution to improve the probability of successful broadcast and prioritizes forwarders based on GPS information. In the PBCC's forwarding algorithm, communication range is partitioned into many equal zones. Vehicles in the communication range are prioritized based on the zone index and back-off value. In a receiver periodically rebroadcast the emergent message until a message implicit ACK is received. Protocols in wants to interleave message sending time with different function, which determine the back-off value or contention windows size.

## III PROPOSED PLAN

The main problem in existing system is formulated as follows.The traffic signal control is not dynamic currently; hence there is a situation for vehicles to experince high waiting time.The traffic signal timing is also static because the vehicle density is not considered. Hence the proposed system has to overcome this by moving onto the dynamic manner.For the solution of this problem the algorithm used which call the oldest arrival first (OAF) ,that makes use of the per vehicle real time position and speed data to do vehicular traffic scheduling at an isolated traffic intersectionwith the objective of minimizing delays at the intersections.This simple algorithm leads to a near optimal schedule that analyzed by reducing the traffic scheduling problems, with conflict graph & the objective of the algorithm is tominimize the latency values of the job.If the condition that all jobs require equal processing time is enforced,than the OAF algorithm becomes the oldest job first (OJF) algorithm in the job scheduling domain with conflicts between jobs and the objective of minimizing job latency values. An important requirement for the OJF algorithm is that all jobs require equal processing time.OJF uses the VANET to divide up the approaching vehicular traffic into platoons that can be treated as jobs in the scheduling with conflicts.The traffic signal controller can then use the conflict-free schedule from the OJF algorithm to schedule platoons of vehicles in a safe conflict-free manner.

## IV CONCLUSION

The Traffic congestion reduction is main task in VANET. In this Paper various Algorithms are present to reduce the traffic congestion Traffic Congestion in which main issues is low delivery ratio and fewer throughputs. To overcome this problem to need a proper routing and proper method to increase delivery ratio so in Future this can be achieved by OJF Algorithm and Event Driven Safety Message.

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