

# Preventing Accidents and Detecting Traffic Loads on Highways with V2v Communication in VANET



Ali Najm Abdullah Al Tameemi

**Abstract**— Road safety became as fundamental problems to the governmental manufacturing of vehicles over the past quarter century. The aggregation of word's vehicles have undergone with amazing improvement, enhancing the activity of density and causing a lot of glitches. In this article, we highlighted the problems of detecting the load of traffic on motorways and suggested a system for detecting and preventing incidents on motorways utilizing ad-hoc networks for vehicles. To do this, we implement a vehicle 2 vehicle connecting scenario using a Weighted Cluster Algorithm (WCA) and calculate the power based on various network parameters. The daily population increase in India is increasing, leading to a massive increase in road traffic. Improving new vehicle development has led organizations, specialists and foundations to concentrate their best to develop the safety of road, which is considered as a crucial thing today. (Panse, 2016).

**Keywords:** VANET, Ad Hoc Network, D2ITS, ITS, DBCV algorithm

## I. INTRODUCTION

In recent decades, the development of radio allowed the specialist to define framework conditions for the correspondence in which vehicles participate in the communication systems. In this sense, for instance, vehicle ad hoc communications which used for connection among vehicles and midst of the vehicles and infrastructure. Vehicle ad hoc connection is recent kind of communication in that knots (i.e., vehicles) connect to others and probably along with wayside infrastructure. The aim / goal of VANET is to prevent car accidents, safer road and blockage, etc. Improving an influential sys in a vehicle connection has many essential benefits, both from way recruiters and from the driver's standpoint. Efficient motion alarms and outdated data on traffic accidents could be decreased the influx of cars, enhance on-road wellbeing and improve protected while driving on expressways. Vehicle ad hoc connections are being considered for the various important safety of ways and motion dominate applications. Our suggestion task involves the aspect of congestion discovery and equips driver poop and communication with other vehicles. We use a control server to make a decision. For the purpose of increasing the decision-making tool of the remote server, it is additionally switched to an RSU tool (Road Side Unit) as an intermediary

communication tool. These tools are full of practical things and can be used as a transmitter, receiver and route device .(Mahak Goel, 2018)

## II. II. RELATED STUDY

The paper VANET concentrates on the simulation of vehicle traffic [2, 3, 4, 5, 6, 7] and many routs [8, 9, 10, 11]. Some research has considered the issue of using VANETs for searching and considering dispersed traffic information [12, 13, 14]. The vehicles that rely on GPS network that can set up an ad hoc wireless connection which can be found and distribute poop of traffic. Collision Avoiding Sys [15, 16] are prepared to discover the mishaps of traffic in a proper time and to quickly forward that poop to prohibit vehicle's collision. These sys are mostly diverse from congestion sys. In the past, information on short separations should be transmitted quickly and should be highly robust, as they have a direct impact on living conditions, while in the latter data, electricity will be maintained for long periods of duration, must be spread with so long dissipations, and will improve the population Stowage used.

Due to the CAR 2 CAR connection organization, a non-profit consortium started by European vehicle manufacturers aiming at developing of safety of road and efficacy has issued a statement published in 2007 containing principles of V2V and V2I. Some of organizations started by industrial, governmental trends and educational institutions or academics have made same efforts in present years.

Due to the European Commission. Collaborative vehicle infrastructure sys took an important first move toward a sys based on V2I and V2V replacement systems through saving the frequency of radio in the EU's applications of vehicles that support the co-agent sys among car manufacturers. The expectation of EU that this measure will lead to definitive introduction of the first product sympoles in the first part of the coming ten years, with many tries and efforts to focus on road safety. Junping, Z. et al. submitted a report on a multifunctional, poop-driven, intelligent transport sys that collects lots of poop from various exists such as VDITS, MDITS and LDITS. Maslekar, N. et al. It is suggested that the changeable sign of activity and controlled sys focusing on V2V connection which can be initiated . This system reduces the dwell time of vehicles in crossover degree in addition to decreasing the length of line. In order to grasp this framing, the view of the cluster is used for the vehicles approach convergence. The signals of traffic are dominant by group of vehicles .

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It utilizes the DBCV algorithm. This algorithm is a mixture of clustering and propagation techniques and used to collect a prescribed poop. Clusters are designed round the direction of travel of vehicles with a particular geographical area which is near from convergence.

Gradinescu, V. et al. suggested a framing focusing dominate decisions on data from alternative vehicles. Each vehicle is equipped with a special device and the trans-receivers are placed at the intersection with traffic signals. This dominator guest at the roundabout is a versatile dominate of framework signal.

Fogue et al.suggested an e-NOTIFY automated accident revealing framework that transfers the information to the crisis centre and road accident assisting who use the capacity. e-NOTIFY focuses on improving care after a crash by providing rapid and influential monitoring of accessible crisis resources, that offers the chance of recovery and survival of those who are injured in accidents of traffic.

Francisco J. Martinez, et al. Suggested Vehicular Ad-hoc Connections (VANETs) supply comprehensive explanations for connection among cars on speedways. V2V communication improves way prediction, reduces density and ensures with high safety. IEEE 802.11p is a new norm taken by WAVE (Wireless Access in Vehicular Environments) which architecture supports ITS. In this work, the present researchers with a warning sys for the driver in that destroyed vehicles send a cautionary letter and other vehicles propagate this message. The researchers focused on disseminating alerts sent by destroyed knots to tell the rest of the vehicles in the script in 802.11p-rely on VANETs. The goal is to transfer high-quality, low-delay vehicle safety messages.

In the year of 2012, S.P. Bhumkar, et al. A modern form of algorithm and method for fatigue detection has been proposed that using of eye blinks, alcohol sensors, etc. to detect fatigue without delay and capture events from drivers.

### III. PROBLEM WITH EXITING SYSTEM

The burden of road traffic is influenced by numerous factors. Some are not surprising, such as road development, rush hours or consist of necks, and others are eccentric such as dissatisfaction, environment and human being behavior. Drivers who do not know the traffic load inevitably join in and increase their seriousness. The most extreme the traffic density, the most of time it takes to remove it as soon as a cause for it is developed or eliminated. A driver's ability in order to understand the road rules could allow him to take a look at alternative modes for saving both time and fuel. In the point where many drivers have this ability, the traffic density, in particular the traffic incident detected with limited incidents, for example, becomes less disturbances or temporary interruptions, and only the vehicle is in the immediate area of event in the particular season. could be influenced. That could result in so much productive and using of our street foundation. Increasing the traffic density by the manner of the driver and the lack of data from a long distance. The recent sys like the reports of traffic of helicopter are effectual since of gaining a well results or pictures of a reservoir from the air, wherever it begins, wherever it fines and how slowly or quickly it moves. Therefore, all reports demand a number of resources which

are limitable to large metropolitan places. That retrofit the drivers with profitable poop about the traffic rules, the sys should be:

- Realize a traffic density, and its location, seriousness and limits.
- Depend on information to drivers within of the density which leading for it.

These couple of demands should be met with every traffic revealing sys. In order to determine the traffic density, a watcher, such as a one who is traveling by helicopter, must see vehicles that are far apart from each other and are out of the line of sight of the other. A visible image of the overload which can be gained by the vantage point which done well above the road surface. With vehicles that are overloaded to get their own picture of discovery, they must work together via communication with V2V (vehicle to vehicle) or V2I (vehicle to infrastructure). It is visible image which increased load has been established, this poop must be based on vehicle get away of the traffic jam as the vehicles leading to them which get obscure action to avoid more escalation. (VANET, 2016)

### IV. PROPOSED METHODOLOGY

• Simulation Scenario: In order to simulate the contribution of the suggested speedway transporting way, real-time traffic simulation tools rely on a busy highway.

• Vehicle-to-Vehicle Connection (V2V): V2V is an innovation that allows vehicles to connect with one another.

• Vehicle-to-Infrastructure Connection (V2I): Vehicle-to-Infrastructure communication is the wireless interchange of information among vehicles and speedway infrastructure. In this stage, the connection between the vehicle and the infrastructure is simulated, with the vehicle and the decision server communicating with others in order to provide the traffic at random via motorways.

• Vehicle-to-Roadside Unit (V2R): In V2R connection, Roadside Units (RSUs) hold the information from moveable knots; this is a connection infrastructure utilized to support the route poop through road traffic.

Wherefore utilizing the hybrid of V2V, V2I & V2R makes an influential incidental prevention sys. The integral part of the suggested sys uses the following devices:

• Decision server: That is additional functional server which gets data from RSU nodes about traffic (if the nodes are under load condition then power consumption in node is high).

• RSU: Road side unit (RSU) devices are working as Wi-Fi or access point for vehicle nodes and for similar nodes (other RSU) these devices are working as connected link nodes. These RSUs are connected using a backbone bus and in direct communication with the server.

• Vehicle: These are MANET fully functional devices which are able to send and receive data from other devices and also behave as router node.

• Improvements: This is our main goal to achieve the following prospective over the proposed research work.

The major part of the suggested sys uses the Decision Server that gets data from RSU about the traffic and vehicles. The main aspect is to do a very high presenting, evaluate the presenting of various on routing protocols. Design and implement rule based on sys server machine to know and warn the discovery. Figure shows the pictorial representation of concept.

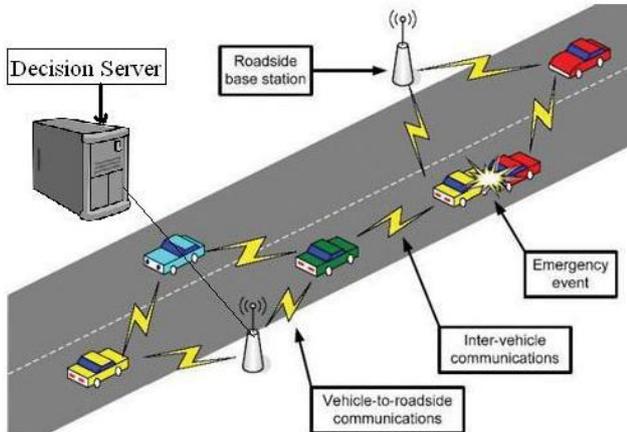


Figure 1. Proposed architecture

In the above diagram RSU is represented and connected using a high speed bus via underground cable, with a server. And the other nodes are represented using objects (e.g. cars) which are running over highway.

V. IMPLEMENTATION

The overall system implementation of the proposed approach has to be done in three different scenarios. First, we find the appropriate communication approach for vehicle-2 vehicle connection with Weighted Cluster Algorithm (WCA). The main goal behind this algorithm in communication is to improve network performance in complicated scenarios. In WCA, we need to determine the quality of the connecting nodes (V), that also makes the stabilization of the network parameters constant. Therefore, in this WPA, we will consider four different factors related to speed direction and vehicles.

The most important meters are connectivity, transportability (distance) and speed. Connectivity parameters indicate that vehicles are in the same speed or not. Transportability shows the distance among the vehicles. Speed shows how fast vehicles drive on the highway.

The performance of a vehicle network is calculated based on parameters like throughput, parcel transmission ratio, directing overhead and end-to-end delay for different numbers of vehicles (nodes).

VI. SIMULATION

VANET can be considered with different connection meters which tabulated in Table1.

Table1. Simulation Parameters

Parameter Name	Value
Number of Nodes	10, 20, 30, 40, 50
Traffic Type	UDP
Communication Type	CBR

Directing Protocol	AODV
Queue Type	DropTail

Simulation Scenario: Network is simulated with a various types of vehicles (nodes) i.e. 10, 20, 30, 40, 50. VANET Scenario with 20 nodes is shown in figure 2.

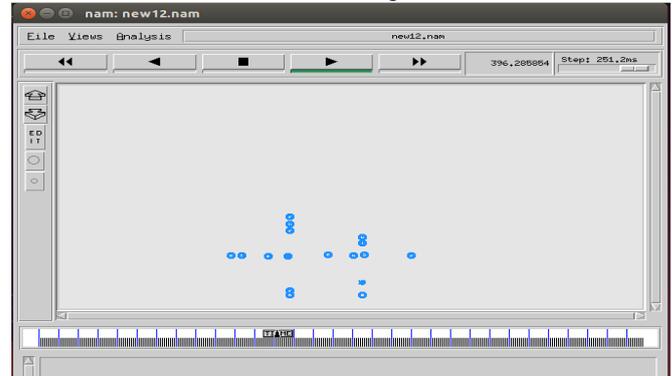


Figure 2. Simulation Scenario of 20 nodes in NAM

VII. ANALYSIS OF RESULT

The presenting of vehicular ad-hoc connection is valued regard various meters, for instance throughput, directing overhead, end to end lateness, and packet transmission ratio that can be computed on main basis of simulation. Throughput can be known as a various number of parts, bytes or packets for single unit of time.

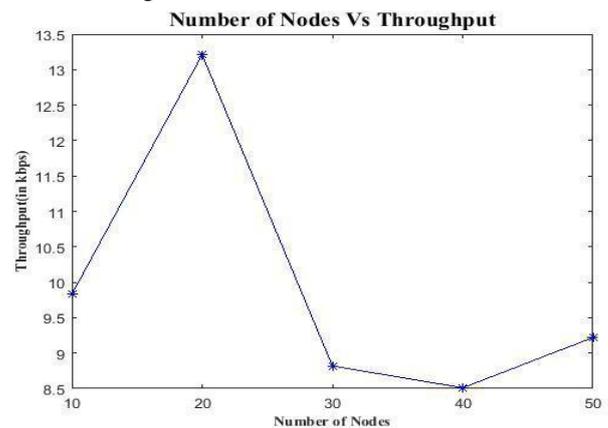


Figure 3. Throughput Vs Number of Knots

Data Transmission Rate is the ratio of accepted packet and aggregate of downed with receiving of packets in a communication.

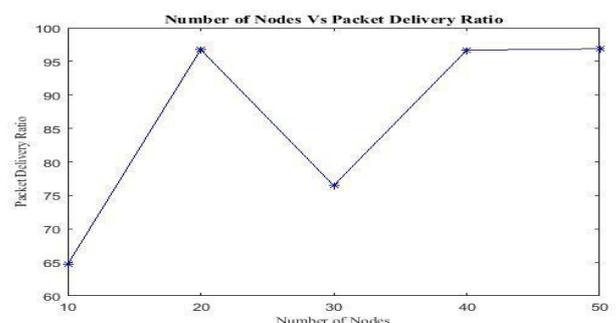
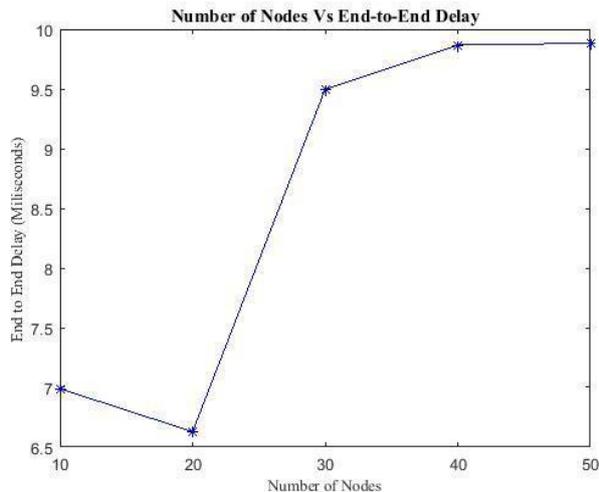


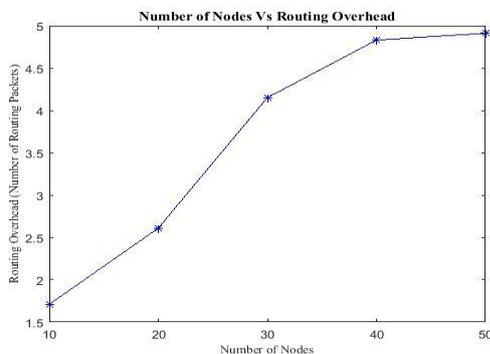
Figure 4. PDR Vs Number of Nodes

End to End Delay is demanded by packet to arrive its direction.



**Figure 5. End to End Delay Vs Number of Nodes**

Directing Overhead is the aggregate number of directing packets traversed in communication over simulation period.



**Figure 5. Directing Overhead Vs Number of Nodes**

## VIII. CONCLUSION

VANET can be defined as a communication of vehicles where knots connect with other. This work valued the presenting of VANET with parameters i.e. directing above, packet transmission ratio, end to end late and throughput. The basic problem with the communication is disseminating messages to vehicles with a high speed. Integrating I2V, V2R and V2V approach can bring solution to this.

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