International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 05 Issue: 07 | July 2018 www.irjet.net p-ISSN: 2395-0072

Optimal solution on vehicular Ad-hoc Network for congestion control by short message transmission

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Abstract: India is a nation which has the one of the greatest Non-Lane construct road arrange in light of the planet. Many developed nations today use sharp Transportation structure (ITS) to deal with action related issues and give smooth and safe ride on avenues. The road development stops up are rehashing issue in India. One of the genuine reasons that incite action congestion is the poor establishment and perspective of road customers in India.
Congestion in the city is a key issue to oversee, which is sufficient to waste valuable time and fuel both, Due to high convey ability rate and relative speed interface dissatisfaction happen routinely. VANET is used to deal with the issue of congestion, and settle on decisions well early to keep up a vital separation from development stop up. In this paper we proposed a response for perceive and control the action stop up by using of both (V2V) and (V2I), thusly the drivers wind up doubtlessly aware of the region of blockage and likewise way to deal with decline slowing down out in blockage. The stop up is recognized by exploring the data got by vehicular correspondence and road side units to avoid the development. Our recommendation system is equipped for recognizing and controlling development obstruct consistently. V2V and V2I correspondence organize is used to get and send the messages. We reproduce the occur by using Short message transmission between V2V & V2I and show this is one capable way to deal with control congestion. The Proposed approach ensures reliable and advantageous transport of messages to consider obstructs and avoid it.

Keywords : VANET, Congestion Control, V2I,V2V, VD, ISD, CHD.

Introduction:

Traffic on road is a major problem today. Millions of hours and gallons of fuel are wasted everyday by vehicles jammed in traffic. This is fact that wasted billion gallons of fuel today due to increase of traffic intensity [1].

Vehicular Ad-hoc network (VANET) is similar to Mobile Ad-hoc network (MANET) but in VANET vehicle act as node instead of mobile act as a node in MANET.. VANETs are key part of keen transportation framework. This approach is more viable as every vehicle in the correspondence run attempt to tackle their concern separately. VANET give two sorts of correspondence. One is vehicle to vehicle correspondence and other is vehicle to foundation correspondence. The message sending and spread ought to be done in little measure of time. Subsequently, dependability and low deferral are critical components for VANET applications to spread and scatter the message to the district of intrigue..

All the shortrange radio technology like Wi-Fi, Bluetooth, Zigbee,visible light communication for communication purpose.

As VANET use short range radio technology for communication purpose, the federal communication commission has allocated 75 MHz of dedicated short range communication (DSRC) at frequency range of 5.9 GHz to be used for vehicle to vehicle and vehicle to infrastructure communication. This spectrum is divided into seven channels. One control channel and six service channel. Control channels are used to transmit the safety related message like beacons and event driven message. Beacon messages are periodically send by the every vehicle which includes their speed, location direction of travel to their neighboring vehicle. So using this beacon message vehicle can count number of surrounding vehicles. Event driven message are generated when the vehicle detect any abnormal situation. Six or more service channel are used to transmit non safety message like sharing file, gaming, web surfing, file download, finding nearest restaurants, theatre, petrol pump, nearest parking availability. [3][8]

1.2 Characteristics of VANET

Highly Dynamic topology : The speed of the vehicles in the diverse activity condition, for example, amid surge hours, movement light, road turned parking lot, mishap, late night and school region are distinctive which result in unique topology of the vehicular network[2].The topology of the system can be change by driver conduct because of his/her response to the messages[4]

Frequent Network Disconnection: there is fastmanipulationtakes place becauseof the non-static nature of vehicular topology in the link connectivity of VANETs and this lead us uptoresult of frequently network disconnection. For example: In rural areaduring the late nightvehicle move with high speed so communication link between vehicle remain active for very short duration of time[2].
Hard delay constraints: The very importantfeature of the VANET is to provide security and safety so all the message related to safety is propagate on some time interval to avoid further congestion and collision[2]

1.3 Application of VANET

Safety: These applications basically focus on the reduction of the road accident, saving human life avoids collision. safety application include lane changing warning, sudden halts warning, obstacle discovery, warning on departing the highway, warning on entering intersection related messages[2]

Travel Related Information: when unfamiliar driver enters in the new city than he/she don't know about the available services like gas location, car services location, petrol pump, business related location etc. using this approach driver can find this information by communicating with other vehicles and road side unit.General Information Services: As VANETs are integrated to internet, general application of internet like sharing the files, file download, gaming, web surfing, email are also available.

Literature Survey: VANET is an autonomous & completely self-organizing wireless communication network. In this network the cars are called dynamic nodes and Infrastructure is called Static node which involve themselves as servers and/or clients for exchanging & sharing information. [6]

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.

In [7],.In this component two capacities are utilized called candidate estimation work and expected balance computation function.in challenger estimation work every vehicle can check number of encompassing vehicle in view of listening hi message in the listening interim. While in expected counterbalance computation work vehicle ascertain the length of the balance space in view of encompassing vehicle. The principle preferred standpoint of PCC instrument is that every vehicle in the system shift the dispute window estimate as per the quantity of neighboring vehicle. Here the CW esteem increment when number of vehicle increments.

Distributed-FPAV (D-FPAV) was planned to solve some disadvantages of FPAV. D-FPAV controls broadcast range for the control messages animatedly. On the other word, D-FPAV decreases the range of beacon messages in overcrowding situations that is caused smaller probability of getting beacons in far distances [9].

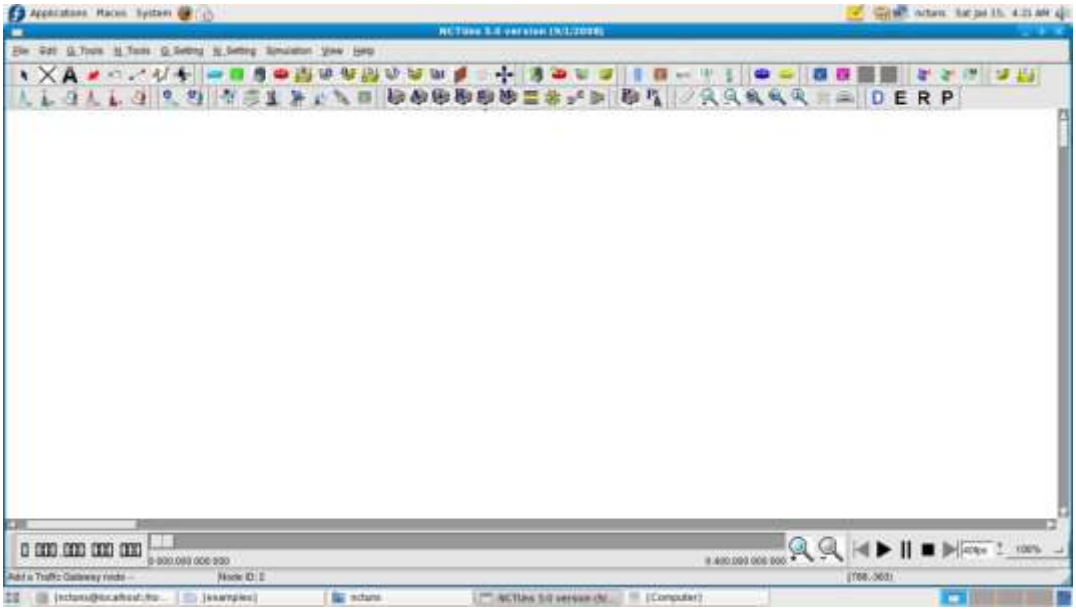
An agreeable and completely circulated clog control method, in view of dynamic planning and transmission of need based messages, to ensure dependable and safe correspondence design inside VANETs was proposed by Mohamed Salah et al. [4]

In ref [5] proposed and implement algorithms here carrier sense (CS) threshold value can be assigned vigorously for fine tuning, the distributed fair transmit power adjustment D-FTPA of VANET congestion control approach. The D-FTPA algorithm can be used any situation i.e. traffic and non-traffic condition.

3. SIMULATION WORK

The Visualization Window be responsible for a visual illustration of the field and nodes which are designed by us and also shows the simulation run scenario and linking the data with the nodes designed. The simulation GUI based window provides some basic functionality such as designing the nodes , vehicles and many other devices through the help of mouse in which we can zoom the nodes and also can scroll them anywhere inside the window. The figure below shows the simulation window customized to visualized vehicular traffic for the visualization.

This Visualization window has many inbuilt properties inside it which we can see in the figure below:



Visualization Screen of NCTUns

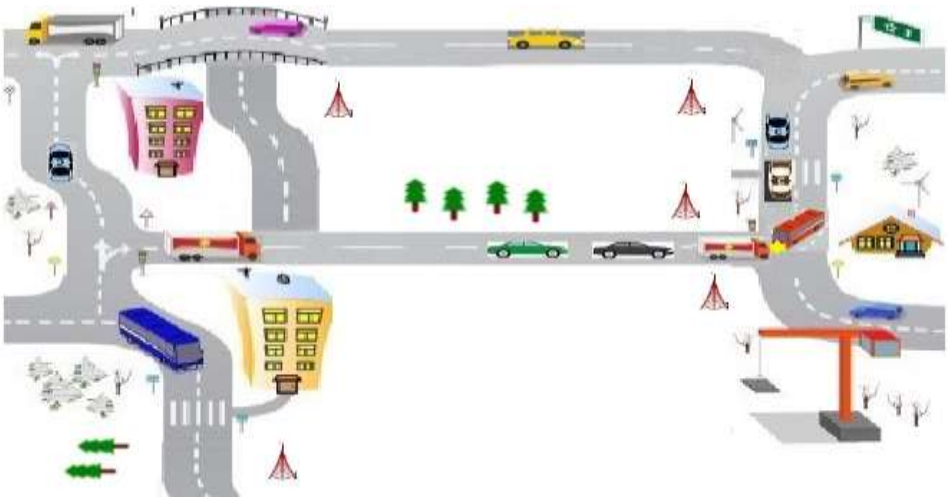
Scenarios of the Simulation

Here we are defining three scenario of the simulation run the first one is shown below in which when the traffic signal light is turned red then all the vehicles will stop there and this way till the traffic light does not turn to green all the vehicles will come and stop there so the traffic will get increase till the traffic signal is red.

Congestion Starts over a signal

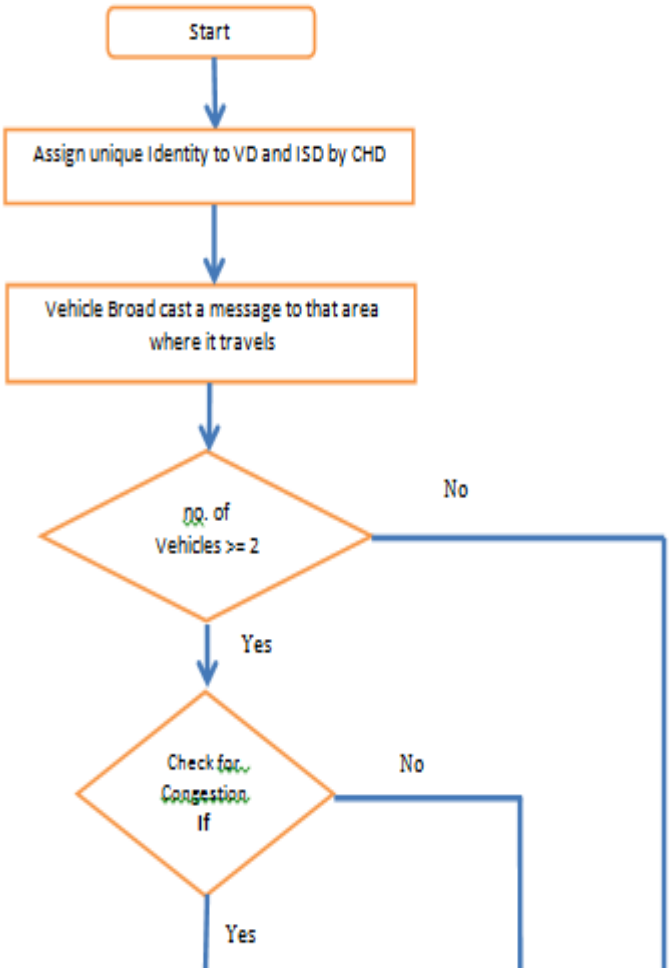
We can see that at this point of time that vehicles are in congestion due to the traffic signal but some vehicles away from the congestion are still not aware of it; they will receive the congestion information when those vehicles will come in the transmission range of a vehicle that are actually in congestion. As we know that this type of congestion will get flushed off after a short period of time. In this scenario of congestion we know the time at which our congestion will get cleared off.

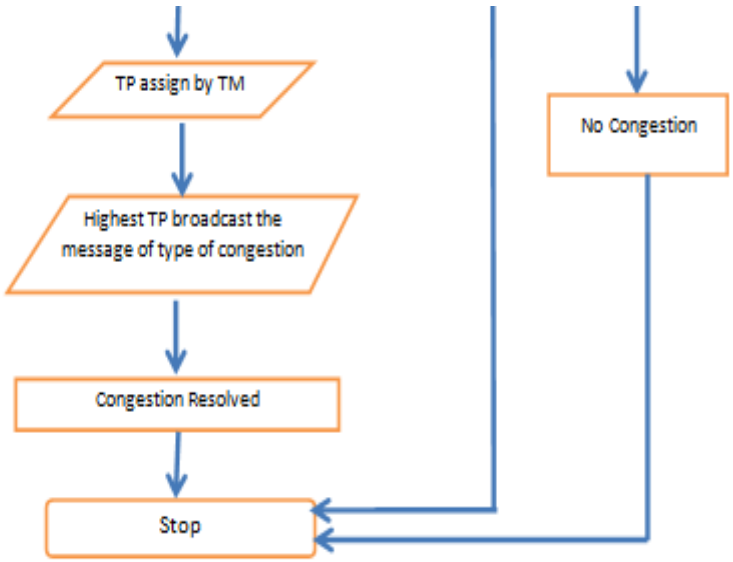
Figure below shows another scenario in which an accident has occurred and due to which congestion is formed. In this scenario no one has the idea that after how much time a congestion will get cleared off.



Congestion As Seen By the Selected Vehicle

4. PROPOSED WORK Controlling Simulation Run





Algorithm

- ✓ **step 1:** Start
- ✓ **Step 2:** declare variable VD1, VD2, VD3,...,VDn, ISD1, ISD2, ISD3,...,ISDm, CH1,CH2,CH3,...,CHk, TM TP.
- ✓ **step 3:** Every chauraha have unique idnetity called CH1, CH2 etc.
- ✓ **step 4:** Every vehicle have their own TP that is manage by TM.
- ✓ **Step 5:**Chauraha dynamically assign an ID(VD1,VD2 etc) to the vehicles entering in his range.
- ✓ **step 6:**Every VD broadcast a message to that area where it passes.
- ✓ **step7:**If there is no another vehicle then message receive by VD "No congestion".else Message received "congestion Occur"
- ✓ **step 8:** whenever congestion occur Highest TP vehicle broadcast the message of type of Congestion.
- ✓ **step 9:** TP assign by TM resolve the congestion.
- ✓ **step 10:** stop.

Whenever any vehicle come into the range of any Infrastructure Device; then the device which are installed at Chauraha called Chauraha Device (CHD) provide a unique Identity to that particular vehicle. Similarly CHD Provide unique Identity to all the vehicles which are passes through between two chaurahas or two infrastructure Devices. With this there are some infra-structure which also assign a unique ID by CHD.

This vehicle also Broadcast a message by VD to check the congestion between that particular area. This is the same method followed by ISD; this ISD work between two or more areas. If any congestion present there then vehicle any device reply that message by "congestion available" and vehicle will change the path and choose the path which have no congestion or zero congestion.

There are two types of conditions occurring between broadcasting and receiving the message i.e. either there is congestion or no congestion. If there is no reply received by vehicle from vehicle side then vehicle directly cross the path without any other problem.

Behalf of that if vehicles no is more than 2 then again two condition will occur either there is traffic or may be area is traffic free for this the VD who broadcast the message will receive a message either of congestion available or less congestion available.

If there is less congestion between two path then vehicle cross the road and continue their moving. Instead of that there is heavy of some kind of traffic then a new methodology work their i.e. "Trust Manager"

Every vehicle will have their own trust point & these points will assign through Trust Manager. Trust manager will assign points according to their responses, work, and other details.

Every government vehicle like ambulance, police vehicles, fire brigade etc. has high trust point. When many no. of vehicles available in a particular area then these trust points having vehicle plays an important role to resolve the traffic between two node points. And the working will stop after the stopping of vehicles and again start with the start of vehicle.

REFERENCES:

[1] Scharank, David and Lomax, Tim. The 2007 Urban Mobility Report. Technical Report.s.l. : Texas Transportation Institute, September 2007.

[2] ParulChaodhary, Umang, "Literature review on vehicular ad-hoc network for intelligent transport", 2nd International Conference on Computing for Sustainable Global Development, IEEE 2015.

[3] MohamadYusofDarus and Kamalrulnizam Abu Bakar,"Congestion control algorithm in VANETs", world applied sciences journal 21(7), No.1057-1061, IDOSI- 2013

[4] MohamedSalahBouassida and M. Shawky, "A Cooperative Congestion Control Approach within VANETs: Formal Verification and Performance Evaluation", In Proceeding of EURASIP Journal on Wireless communications and Networking Volume 2010.

[5] Mohammad RezzaJabharpourSattari, RafidahMd Noor and Saied Ghahremani." Dynamic Congestion Control Algorithum for VANET", InertnationalJouranl of software Engineering And its Applications, Vol. 7 ,No. 3 May 2013.

[6] M.Sheela Devi and K.Malar, "Improved Performance Modeling of Intelligent Alert Message Diffusion in VANET", Fifth International Conference on Advanced Computing,463-467, IEEE 2013

[7] "Mark chi- weihsu, tien-yuanhsieh" Aprobability based MAC channel congestion control mechanism for VANET",IEEE 2013

[8] Shruti R. Kolte, Mangala S. Madankar, "Adaptive Congestion Control For Transmission Of Safety Messages in VANET", International Conference For Convergence Of Technology, IEEE 2014.

[9] R. Braune and M. Bogl, " Meta- heuristics Based on solution construction." In *Metaheuristic Search Concepts: ATutorial with applications to production and logistics, G.Zapfel et al springer, verlag Berlin Heielberg, 2010.*