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# Congestion Prevention in Vanet using Pollination -A Result Oriented

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***Abstract*- In this paper there is routing requirement which is helpful to prevent from congestion. The best technique which have used in this paper is PBO (pollination based optimization).Pollination is to broadcast the messages to the nodes or vehicles. There are analysis of parameters to solve the congestion problem parameters like packet delivery ratio, overhead etc which has been used in this paper. Pollination helps to change the route if necessary there is no need to follow the same path or route if that path is congested or there is chances of congestion. Every node has their range to broadcast message to their near nodes.**

***Keywords- PBO, Routing, Parameters Etc***

## I INTRODUCTION

Vehicular ad hoc network (VANETS) is the type of MANETS which is used for communication between the vehicles and road side furnishings. In extension to the asert facts of MANETS like absence of settled infrastructure, wireless links and multi-hop broadcast communications, VANET brings the new dare to realize safe communication architecture inward of the environment. Within VANET networks, the nodes are characterized by the high dynamic and mobility, In extension to the developing rate of topology dares and density variability to calculate the neighboring nodes. In extension the 50% of all regularity and the maximum possible communication time duration is only 1 second; now in 90% of the occurrences, the upper barrier for the communication time is 5 s. Another important restraint in the multi-hop inter-vehicular communications is the bounded bandwidth within the environment. assuredly , the wireless channel can occupied by the competing nodes for many reasons (the collisions, or interferences or inadequate the signal strength, time duration of the transmission sequence, etc.). To organize these environment constraints, and in the order to settled safe and better the communication method, now setting the aspect of all functional policies that is now binding, which instill a congestion control access within VANET. We advice in this text that a coordinated or fully spreaded congestion control access, now dedicated to conduct within vehicular networks, unified within the 802.11p ongoing standard, and based on changing scheduling packets according to their suggested options and the available bandwidth is now mutually among the neighbours so that the vehicles sending higher preferences packets are floured.

Lets take the high real-time and the reliability level which is needed by the inter-vehicular safety communications, now we are taking a complete model which is based on the admission access of our congestion control algorithms, lets taking into account accuracy and temporal and operational aspects. Congestion avoidance techniques audits the network traffic loads in an effort to count on and avoid congestion at the known network bottlenecks. Congestion avoidance has now get through the packet dropping. Which is now surrounded by the familiarily used congestion avoidance mechanism has now Random Early Detection (RED), which has suitability for that high-speed transit networks. The Cisco IOS QoS which has been added an application of RED that, when frame, controls and when finally the router drops the packets. when you do not enquired the WRED, the router has used the economical default packet drop structure is called tail.

Fig 1:VANET[5]

Vehicular Ad Hoc Network (VANET) is a self-organized network composed of mobile nodes connected with wireless links (Al-Sultan et al., 2014). In 2003, the Federal Communication Commission (FCC) established the Dedicated Short Range Communications (DSRC) service, a communication service for private and public safety operating at a frequency range from 5.850 3) Low tolerance for error: Some protocols have been designed on the basis of the probability. VANET has used life critical information on which action has performed in very short duration of time and a small bug in probabilistic algorithm might cause harm.5.225 GHz to 5.925 GHz. IEEE has

developed a Wireless Access in the Vehicular Environments (WAVE) standard, or IEEE 802.11p to provide DSRC for VANET communication. A multi-channel spectrum system is developed in DSRC which encompasses seven channels and provides 10 MHz of bandwidth per channel wherein six are Service Channels (SCH) and one is identified as the Control Channel (CCH).SCH are utilized for non-safety and WAVE-mode messages or services, while CCH is used for safety messages ( Mak et al., 2009; Amadeo et al., 2009; Kakkasageri and Manvi, 2014). To ensure the safety of drivers and passengers, a single 10 MHz wide channel is used to exchange safety messages and IEEE802.11-Working-Group (2010)offers a data rate ranging from 3 Mb/sto 27 Mb/s. Lower data rates have better resistance against interference and noises**.**

## II CONGESTION CONTROL IN VANETS

The main target of the congestion control is to feat the given network resources while preventing from the constant overloads of the network nodes and the links. Relevant congestion control mechanisms are very important to give able operation of the network. Assure the congestion control now inward the vehicular ad hoc networks which is going to faces the special challenges and with the specificities of the environment. In this text, we represent in this paper a coefficient and fully scattered congestion control approach, which is based on the changing scheduling and transportation of these priority-based messages, to assure decent and safe communication architectonics within the VANET. Messages preferences have been dynamically evaluated according to the types and the network content, and the neighboring nodes structure. Take the content of high reliability and the real-time response which is required for the inter vehicular communications (include the compulsion crumbling notice like), we propose a entire validation form of our congestion control conclusion, lets take into the account accuracy, mortal, and practical aspects.

To deal with the environment constraints, and in the order to assure the safe and suitable communication architecture setting up kind of service policies grows in important, which influence a congestion control path within VANET. We suggest in this content a coefficient and fully shattered congestion control approach, which is devoted to operate inward vehicular networks ,unified within the 802.11p ongoing standard, and based on changing scheduling packets according to their preference. Furthermore, the acessible bandwidth is shared among neighbors so that vehicles sending higher preference packets are floured. Lets take the high real-time accuracy level neccessity by the inter-vehicular safety communications, we initiate a communication The basic idea of our application-layer congestion control approach is to explain policies, in order to changing and cooefficiently manage the some messages transmission in the network. Messages scheduling has achieved according to the preferences, evaluated as a activity of the service of the concerned messages, the sender function and the neighborhood content. The messages transportation in the vehicular network has achieved in an good and cooperative manner, by favoring vehicles property the highest-priority messages to send. accordingly, our path has divided into three steps that we present after that: dynamic priority assignment, message scheduling and cooefficient message transportation.

## III POLLINATION BASED OPTIMIZATION

In this paper pollination has used for message broadcasting. Place location plays a vital role in pollination. With the help of this concept all the vehicles or nodes know that where is congestion based area for example if node 2 is going to some place and this node finds that there is congestion in this area then it informs previous vehicle that is congested area. Every node has some area or range to broadcast the messages. The messages are move to another path or slow down the speed so that area have freed from congestion.tje pollination technique which has used in this research worl actuaaly taken from flower pollination

### Pseudo code of the proposed Flower Pollination Algorithm (FPA).

1. Objective min or max $f(x), x=\{x_1,x_2,x_3.....x_d\}^t$

2. Initialize a population of n flowers/pollen gametes with random solutions

3. Find the best solution g in the initial population

4. Define a switch probability $p \in [0, 1]$

5. while (t < MaxGeneration)

6. for i = 1 to n ( all n flowers in the population)

7. if r and < p

8. Draw a (d-dimensional) step vector L which obeys a L´evy distribution

9. Global pollination via $x_i^{t+1}=x_i^t L(g_x-x_i^t)$

10. else

11. Draw $\epsilon$ from a uniform distribution in [0,1]

12.Local pollination via $x_i^{t+1}= x_i \in (x_j^t+x_k^t)$

13. end if

14. Evaluate new solutions

15. if new solutions are better, update them in the population

16. end for

17. Find the current best solution g

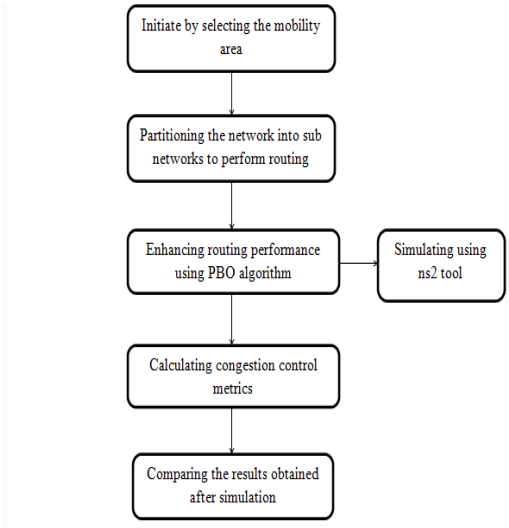
18. end while

## IV PROPOSED MODEL OF CONGESTION DETECTION USING POLLINATION

PROBLEM DEFINATION- A vehicular ad hoc network (VANET) uses cars as mobile nodes in a MANET to create a mobile network. A VANET turns every participating car into a wireless router or node, allowing cars approximately 100 to 300 meters of each other to connect and, in turn, create a network with a wide range. As cars fall out of the signal range and drop out of the network, other cars can join in, connecting vehicles to one another so that a mobile Internet is created. It is estimated that the first systems that will integrate this technology are police and fire vehicles to communicate with each other for safety purposes.

A series of simulations were conducted, with the experimental results verifying the effectiveness and feasibility of the previous work. This work has used with intelligence. The main problem is congestion has occur when multiple nodes has followed same path. Traffic has occur which is called congestion. In previous work congestion has been controlling after it occurs by cross layer mechanism. The main focus of this work is to prevent from congestion before it occurs like detection. PBO (pollination based optimization has considered). Hence following topic has been finalized for research work.

*FLOW CHART OF THIS MODEL*




This flow chart represents the proposed model of congestion prevention using the technique pollination

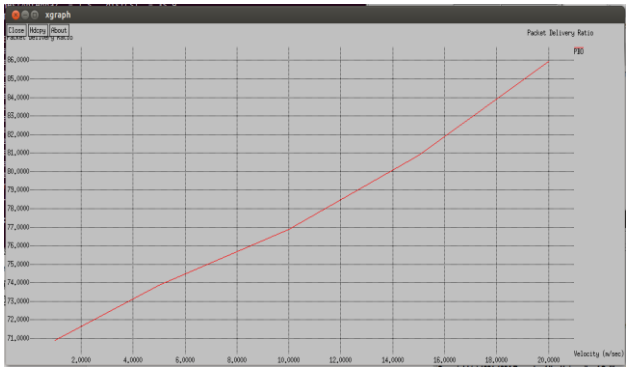
- Firstly initiate by selecting any mobility area in which nodes can move or vehicles can move
- After this divide the network into sub networks to perform routing
- Now the turn is to broadcast messages about any congested area which is possible through pollination
- Node 2 can give the message to previous node 1 in the range of that node 2
- Enhance routing performance by pollination use simulating NS2 tool
- After that calculate the congestion control matrices
- At last compare the result

## V SIMULATION RESULTS

The results have been based on some parameters like packet delivery ratio, End to End delay or overload ratio. The scenario is for 25 nodes and 50 nodes.

GRAPHS OF PACKET DELIVERY RATIO

*A. Packet delivery ratio graph for 25 nodes*

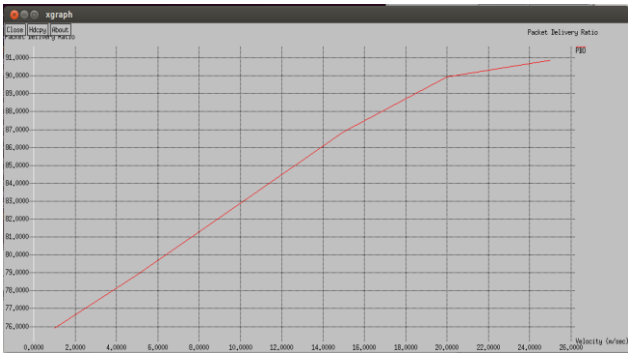



In this graph within enhance technique PBO when the time has increased then more packets have been transferred. Almost 90% packets have been transferred in this graph. The greater value of packet delivery ratio means the better performance of the protocol.

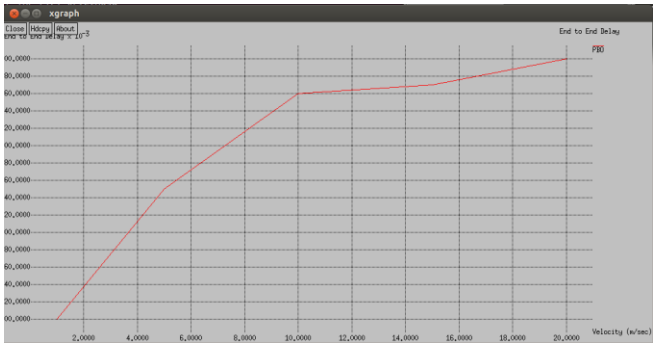
Formulae of packet delivery ratio

∑ Number of packet receive / ∑ Number of packet send

Packet delivery ratio for 50 nodes



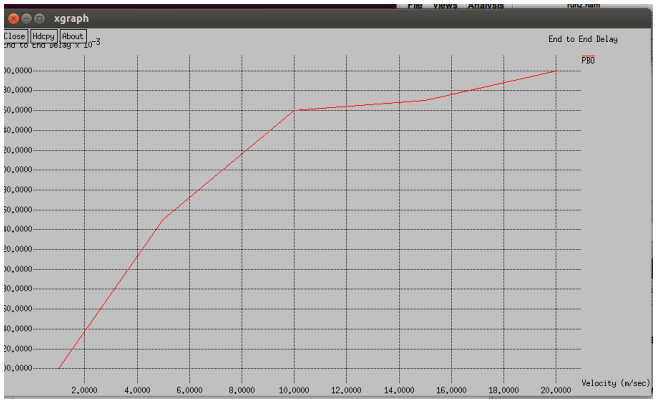

B. End to End delay- This is the second parameter in this paper the graph show that with the increasing of time the less will be delayed. These graphs shows 25 and 50 nodes. The data packets which are successfully reached the destination has counted. The lower value of end to end delay means the better performance of the protocol.
25 nodes




Formulae of End to End delay is

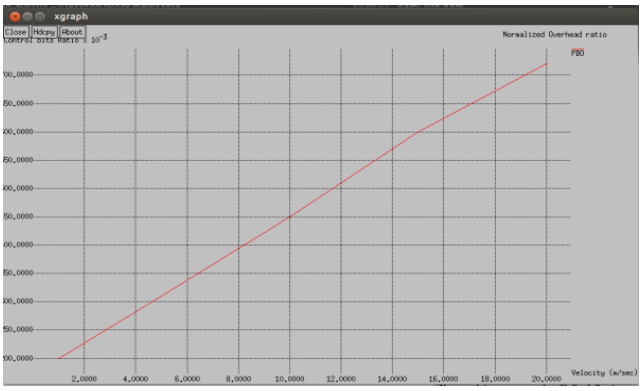
$$\sum ( \text{arrive time} - \text{send time} ) / \sum \text{Number of connections}$$

50 nodes




C. Node overhead ratio- in this graph the fact is the packets should not be overloaded so there is less chances of congestion.

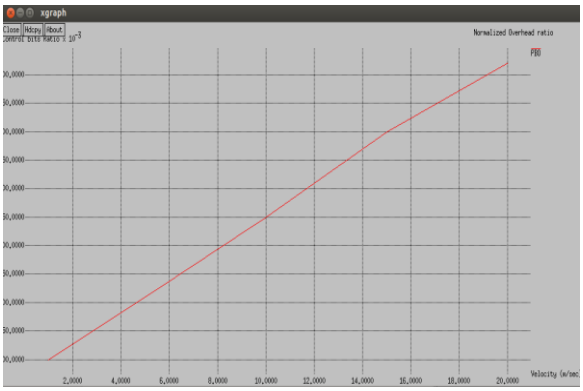
25 nodes




Formulae of noe overhead ratio

Number of packet send – Number of packet received

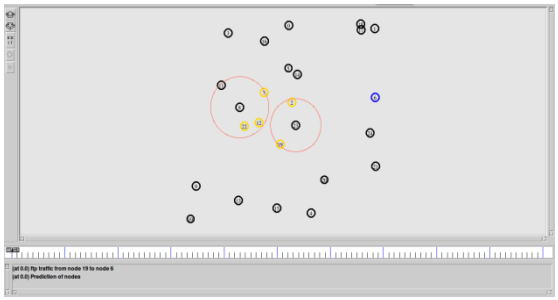
50 nodes

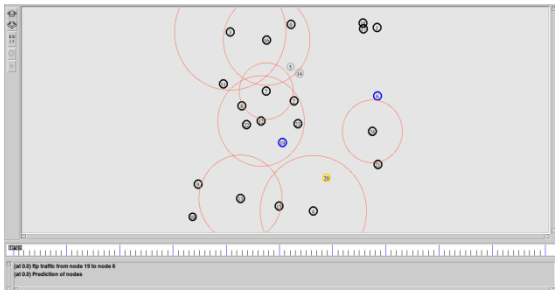



*ANIMATOR SCENARIOS*

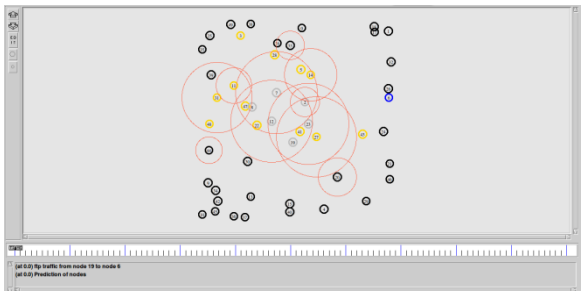
In these scenarios the nodes are randomly distributed wheather they are 25 nodes or 50 nodes. When the nodes the color has changed this shows transmission of messages. The nodes make route as shown in diagram of animator and same color define the route optimization

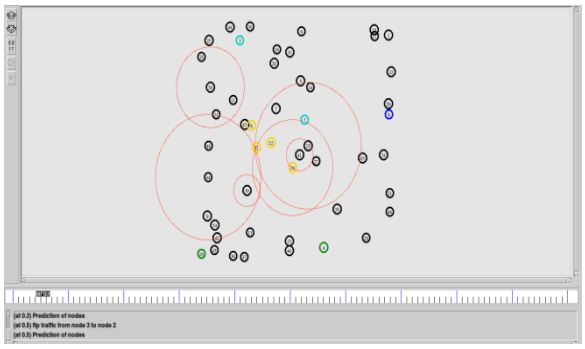
25 nodes





50 nodes





## CONCLUSION

This paper shows congestion, which are now the major challenges in VANETs. In this paper the performance of detecting congestion earlier has increased. Pollination technique has used to enhance the performance like PBO(pollination based optimization). The scenarios are for 25 nodes and 50 nodes. Even the packet rate increase then there is no congestion. With the help of the parameters like Packet delivery ratio, End to End delay and packet overhead ratio the performance has increased as compared to others. All the nodes has specific range to broadcast the messages. The node can broadcast the message in that range only to avoid the congestion. The messages should be change the route or slower down the speed if it is needed. In a specific area there are some nodes which are allowed to move to avoid any problems. It is not compulsory for a node to follow the same route which is going through with the help of pollination the route should be changed to reduce congestion problem. It has avoided by the node which has transfer the message to previous node. There are two types of pollination has been represented in this paper which are local optimization and global optimization. Local optimization means the route is same because there is no congestion in that area and global optimization is the node can change the route like if node 5 wants to go to node 8 then it will follow the specific route but the problem is node 4 has also wants to follow the same path bt it finds there is congestion to transfer any message then this node has change the to transfer the message to node 8.

## REFRENCES

[1] M. Torrent-Moreno et al., "Vehicle-to-vehicle communication: fair transmit power control for safety-critical information," IEEE Trans. Veh. Technol., vol. 58, no. 7, pp. 3684-3703, Sep. 2009.
[2] S. Rezaei et al., "Reducing the communication required by DSRC-based vehicle safety systems," in Proc. IEEE ITSC, pp. 361-366, Oct. 2007.
[3] H. Ilhan, et al., "Cooperative diversity for relay-assisted inter-vehicular communication," in Proc. IEEE VTC-Spring, pp. 605-609, May 2008.
[4] L. Zhou, et al., "Cross layer rate control, medium access control and routing design in cooperative VANET," Computer Commun., vol. 31, no. 12, pp. 2870-2882, July 2008.
[5] T. Kosch et al., "The scalability problem of vehicular ad hoc networks and how to solve it," IEEE Wireless Commun., vol. 13, no. 5, pp. 22-28, Oct. 2006.
[6] H. Ching-Ling et al., "Analysis of aggregated power level and rate-power control designs for status update messages in VANETs," in Proc. IEEE MASS, pp. 615-620, Oct. 2009.
[7] F. Bai et al., "Reliability analysis of DSRC wireless communication for vehicle safety applications," in Proc. IEEE ITSC, Toronto, Canada, pp. 355-362, Sep. 2006.
[8] M. Sepulcre and J. Gozalvez, "Wireless vehicular adaptive radio resource management policies in congested channels," in Proc. IEEE ISWCS, Norway, pp. 380-384, Oct. 2007.
[9] Highway Capacity Manual, Transportation Research Board, Washington, DC, 2000. '
[10] ETSI TC ITS, "Harmonised channel specifications for intelligent transport systems operating in the 5 GHz range," ETSI TS Draft DTS/ITS0040016 v0.0.3, June 2009.
[11] COMeSafety consortium, "D31: European ITS communication architecture: overall framework proof of concept implementation," COMeSafety Public Deliverable, Mar. 2009.
[12] C. Robinson et al., "Ef ficient message composition and coding for cooperative vehicular safety applications," IEEE Trans. Veh. Technol. , vol. 56, no. 6, pp. 3244-3255, Nov. 2007.
[13] R. Sengupta, S. Rezaei, S. E. Shladover, J. A. Misener, S. Dickey, H. Krishnan, "Cooperative Collision Warning Systems: Concept Definition and Experimental Implementation," Journal of Intelligent Transportation Systems, vol.11,No.3, pp. 143-155, 2007.
[14] IEEE 802.11 WG, Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications, IEEE, Aug. 1999.
[15] Wireless Access in Vehicular Environment (WAVE) in Standard 802.11, Specific Requirements: IEEE 802.11p/D1.0, Feb. 2006.
[16] IEEE 1609.3 Wireless Access in Vehicular Environment: Networking Services, 2007.
[17] Vehicle Safety Communications Consortium (VSCC), "Vehicle Safety Communications Project, Task 3 Final Report: Identify Intelligent Vehicle Safety Applications Enabled by DSRC," 2005.
[18] S. Rezaei, R. Sengupta, H. Krishnan, X. Guan, R. Bhatia, "Tracking the Position of Neighboring Vehicles Using Wireless Communications," To appear in Elsevier Journal Transportation Research Part C: Emerging Technologies, Special Issue on Vehicular Communication Networks
[19] C. L. Huang, Y. P. Fallah, R. Sengupta, H. Krishnan, "Information Dissemination Control for Cooperative Active Safety Applications in Vehicular Ad-Hoc Networks," Proc. of IEEE Globecom 2009.
[20] CL. Huang, Y. P. Fallah, R. Sengupta, H. Krishnan, "Adaptive InterVehicle Communication Control for Cooperative Safety Systems", IEEE Network, Vol. 24, Issue 1, pp. 6-13., Jan.-Feb. 2010 [9] B. Sinopoli, et. al., "Kalman Filtering with Intermittent Observations," IEEE Trans. Automat. Contr., vol.49, no.9, Sept. 2004.
[21] Y. Xu, J. Hespanha, "Estimation under uncontrolled and controlled communication in Networked Control Systems," Proc. of Conf.Decision and Control, Dec. 2005.