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Subgraph Complex Metrix Computed Dissemination Protocol For Vanet

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ABSTRACT

Vehicular Ad-hoc Networks (VANETs) consist of moving vehicles with the capacity to process, store and communicate through a wireless medium. VANETs guarantee a wide scope of services, such as safety and security, traffic efficiency, and others. In any case, disseminating data in VANET. In this paper, we introduce a dissemination protocol based on complex networks' metrics for metropolitan VANET scenarios, called SCMC'S. Every vehicle should construct a subgraph to distinguish the relay node to proceed with the distribution process. In the view of the local graph, it is feasible to choose the relay nodes to depend on complex network metrics. Simulation results represent that SCMC'S offers high efficiency in terms of coverage, the number of transmitted packets, delay, and packet collisions constructed with well-known data dissemination protocols.

Keywords: *VANET(vehicular adhoc networks), dissemination protocol, subgraph operation ,TMS(Traffic management system),SCMC.*

I. INTRODUCTION

The VANET networks are basically an application of mobile Ad hoc networks (MANET). Vehicular networks are a projection of Intelligent transportation Systems (Intelligent transportation Systems - ITS).

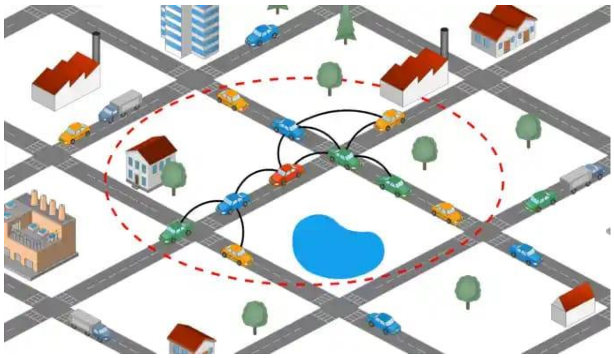
The main objective is to develop road safety through the use of communications technology and the rise of wireless devices at low cost. For the establishment of such a network, vehicles should be equipped with some embedded sensors such as radars, cameras, a global positioning tracking system, and performing a processing stage.

Vehicles could interact with one other owe to the V2V communication as well as with road infrastructure via V2I communication. This prompts the presence of a few VANET applications that intend to secure and comfortable driving in the future by providing timely data opportunities to drivers and concerned authorities.

In reality, non-safety applications disseminate data that includes a vast area of multimedia and infotainment communications, such as hotel advertisements on the road and parking details. Safety and security applications mostly disseminate routine beacon messages (e.g., traffic data) and emergency warning messages (e.g., accident caution).

In this paper, we present a new infrastructure-less safety data dissemination protocol.

The last target at reaching a high delivery proportion as well as a high Geo cast precision by sending messages only to concerning vehicles with an overhead base expense.



II. RELATED WORK

This section introduces state of the art on protocol to provide data dissemination over urban valet scenarios and also identifies the gap in the literature to design complex network metrics.

"IP address passing for VANETs," in Proceedings IEEE International Conference PerCom, pp. Arnold, Cao. G, Lloyd W, and Zhao et al. proposed a vehicle route-based data prefetching plan, which amplifies data dissemination success probability in an average sense when the size of local data storage is limited, and wireless connectivity is stochastically unknown.

"Performance comparison of scalable location services for geographic ad hoc routing," in Proceedings IEEE INFOCOM, Miami, FL, pp. Das . S, Pucha. H and Huves et al. present novel mobile applications and services in vehicles and transportation infrastructure.

"Conditional transmission performance study of new communication, "Ducourthial. B, Khaled. Y et al .proposes a VANET application that can detect, control, and reduce traffic congestion based on data that describes traffic patterns.

"Analysis of Multihop emergency message propagation in Vehicular Ad hoc Network,"
proceedings international symposium on manet Giovanni Resta, et al. analyze the propagation behavior of Interest and Data packets in the vehicular ad hoc network (VANET) environment through extensive simulation.

"Urban multi-hop broadcast protocol for vehicle communication systems," Ozuberg inter-vehicle communication et al. analyze the vehicle-to-vehicle (V2V) data dissemination with network coding in two-way road networks, where the vehicles move in opposite directions.

"Issues in mobile ad hoc networks for vehicular communication," IETE Technical Review, kakkasageri M.S et al. proposes an NDN architecture for the future Internet, which focuses on the delivering mechanism based on the message contents instead of relying on the host addresses of the data. In this paper, a new protocol named roadside unit (RSU) assisted of the named data network (RA-NDN) is presented.

"Predicting Parking Lot Occupancy in Vehicular Ad Hoc Networks," 65 th IEEE Vehicular Technology Conference, Andreas Barthels, and Martin Mauve, Bjrn Scheuerman
et al. presents trusted data dissemination claims our high attention.

"A Method for Sharing Traffic Jam Information using Inter-vehicle communication," Nakoi et al. investigates how to deploy the drop boxes optimally by considering the trade-off between the delivery delay and the cost of dropbox deployment.

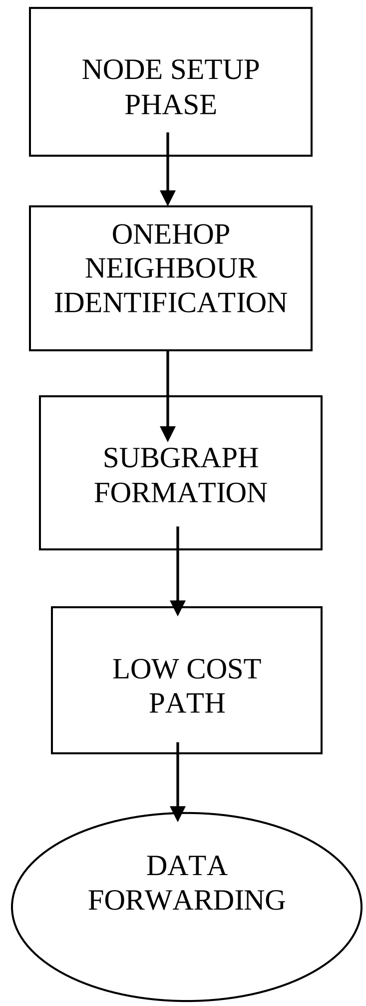
"Delay-bounded routing in vehicular ad-hoc networks," in Proc. Skordylis A and Trigoni N, et al. proposes a prediction-based assessment of the relevance of events without requiring prior route knowledge. Relevance is modes.

"Vehicular ad hoc networks: Applications and related technical issues," Commun. Surveys Tuts.,Muhlethaler P, Laouiti
et al. proposes an approach that uses fuzzy logic, with the help of fuzzy logic toolbox in MATLAB software, to choose the forwarding nodes and uses network coding to reduce the number of retransmissions.

III. PROPOSED SYSTEM

Neighborhood knowledge discovery SCMC takes advantage of beacons that are already exchanged by vehicles to obtain the contextual knowledge of its neighbors, avoiding extra overhead. Significantly, each vehicle *vi* transmits periodic beacons by default containing its id and other information, where SCMC includes the information about its current position *Li(x, y)* and its 1-hop neighbors *N(vi)*. Upon receiving beacon signals, the vehicle updates such information on its list of neighbors *listN(vi)*, constructing an edge-induced subgraph*G_E_u_* with contextual knowledge about 2-hop neighbors for each nearby vehicle *u* ∈*listN(vi)*. This represents the connection links between the vehicle *vi* with its 1-hop and 2-hop neighbors. Building a subgraph with global knowledge enhances the overhead and error because of topology changes caused by moving vehicles.

A. FLOW CHART



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B. IMPLEMENTATION

From the above workflow, a vehicle is selected as a node, and nodes are created from a certain area of interest. After selecting a node within the range of a particular area, the one-hop neighbor is identified and selects the best relay path. Then by selecting a one-hop neighbor subgraph is formed to connect all the nearest nodes. Based on the subgraph operation, a low-cost path is obtained, and data packets are transmitted. Tools used in the proposed are:

NS TOOL: Network Simulator is a technique where a program model, behavior of a network can be predicted. This provides various applications and services it supports that can be observed in a test lab.

TCL: Tool Command Language is an interpreted script language developed by Dr.John Ousterhout at the University of California. TCL is comparable to Netscape JavaScript Microsoft virtual basic.

OTCL: Objected Oriented extension of Tcl and created by David Wetherall. It is used in a network simulator(NS 2) and usually runs under a UNIX environment.

OPERATING SYSTEM: Red hat Linux 9 is an operating system. Ns-all in one package is needed.

C. RELAY SELECTION

In the relay node selection step, SCMC considers two complex networks' metrics: *i)* degree centrality and *ii)* betweenness centrality. The degree Centrality reflects the

$$G(i) = \sum_{j=1}^{n} a_{ij}$$

prominent of a given vertex in the graph in terms of the number of neighbors computed based on Eqn. Where i means the vehicle that wants to find its degree centrality, j represents all other vehicles, n is the total number of vehicles, and a denotes the adjacency matrix, in which the cell aij is set to 1 if there is a connection to the node j and 0 otherwise.

D. SCMC'S OPERATION

Introduces the processing of an information message required for SCMC operation, where SCMC selects only the vehicles that are inside the AoI to relay the message *msg*. Besides, a vehicle just performs there transmission as soon as it is the first time it is receiving*MSG* and has been shown as a relay node in the field *relays* contained in *MSG*, which decreases the number of redundant messages and packet collisions considerably. Hence, the list of neighbors is used to create the subgraph*G_E_u* _ to select the best neighbors used to continue the retransmission process., The selected relay node identifiers *ids* are included in the field *MSG.relays*, and then a relay scheduling time *st* that follows a uniform distribution ($st \in [0.0, 0.05]$) is established.

IV. SIMULATION RESULTS

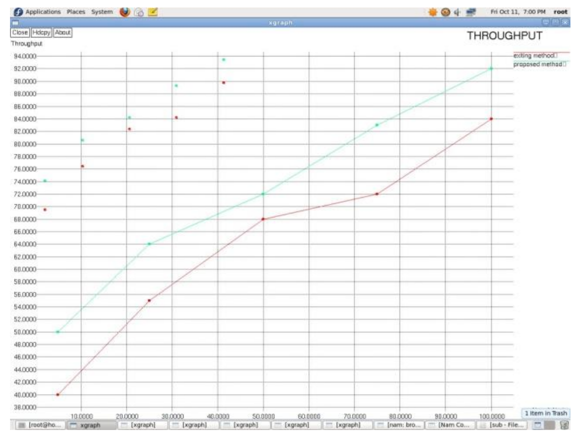

Fig. a Throughput analysis

From the above fig. a, we infer that comparing to an existing system, throughput increases in the proposed system.

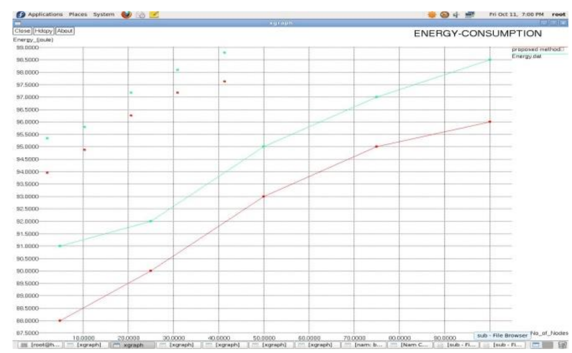

Fig. b Energy analysis

From the above fig. b, the graph X-axis represents the number of nodes, and Y-axis represents the energy in joules.

V. RESULT AND DISCUSSION

The above figures were obtained using a network simulator for corresponding data transfer from another sender vehicle to the destination vehicle. The communication is started between one vehicle to another vehicle, and one hop neighbor is identified for other different vehicles.

When compared to an existing system, the energy and packet delivery ratio is improved in the proposed system. In proposed throughput increases, energy and delay overhead decreases.

VI. CONCLUSION

Data dissemination over VANET is a challenging task due to the specific characteristics of VANETs, such as highly dynamic mobility, short time of contact between vehicles, and short-range communication. In this way, this article showed the efficiency of the SCMC for data dissemination with low overhead, collisions, and delay, while keeping high coverage. In SCMC, each vehicle must maintain local knowledge of its 1 and 2-hops neighbors, which will be used to construct a subgraph. Based on such subgraph, SCMC selects the best vehicles to retransmit the message based on network complex metrics, i.e., between ness centrality and degree centrality.

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