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ENHANCEMENT of VANET ROUTING by OPTIMIZE CENTRALITY WITH ANT COLONY APPROACH

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Abstract- Vehicular Ad Hoc Network (VANET) is an appearing new technology integrating ad hoc network and improve road traffic safety. The main challenges in VANET is searching, maintaining an effective route for transporting data information. Today some kind of routing protocols used in VANET Hence, an analysis on routing protocols based on number of parameters of VANET i.e. a required issue in communication. AODV routing protocol is also used in VANET. AODV protocol suffers worst performance when it is directly applied in VANET. In this paper, a metaheuristic (Shapely Value) approach is used to reduce the delay information, packet dropped and increasing the throughput.
Keywords- VANET, routing protocols, ACO, ONE Simulator

I. Introduction

Recently, many works are done in VANET environment, including feasible mobility and propagation models. (VANETs) has grown over the last few years, particularly in the context of appearing intelligent transportation systems (ITS). However, efficient routing in VANETs remains demanding for many reasons, e.g., the varying vehicle density over time, the size of VANETs (hundreds or thousands of vehicles), and wireless channel fail due to high motion and natural obstructions in cities.

Safety and video monitoring car applications are key Information and Communication Technologies (ICT) services for smart city and have been attracting an important observation from governments, car producer, education, and society.

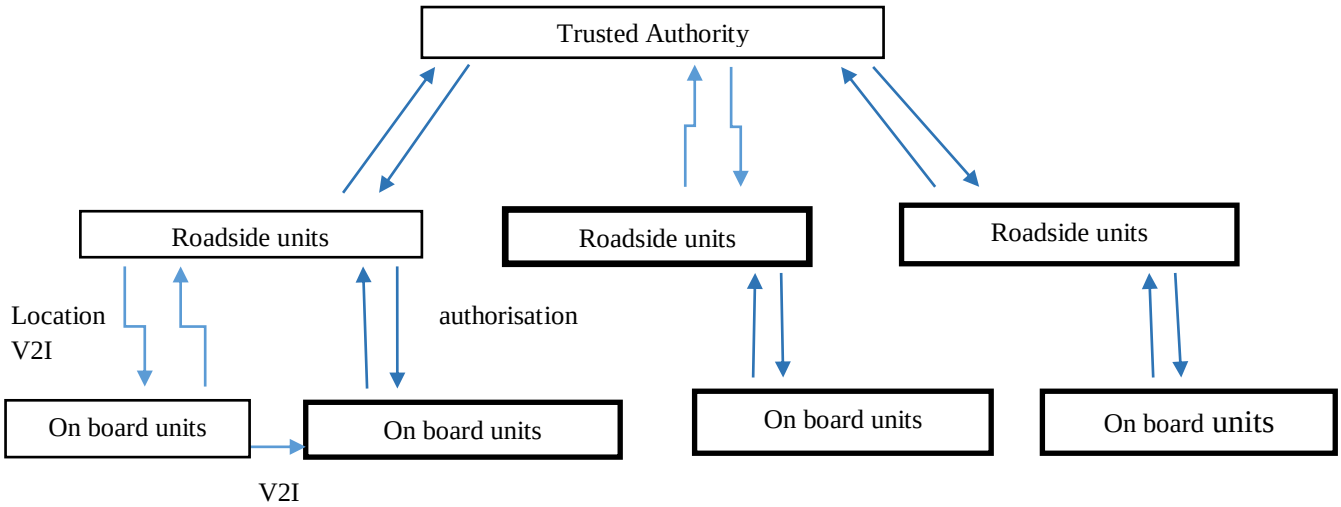
Nowadays, the distribution of real-time multimedia content over [5]. Vehicular Ad-Hoc Networks (VANETs) is appearing a reality and admitting drivers/passengers to have new experiences with on-road videos in a smart city. Multimedia VANETs are well-suited for seizure and sharing environmental monitoring, observing, traffic accidents, and accident-based video smart city applications [2].

VANET (Vehicular Ad-hoc Network) is a new technology which has taken huge attention in the recent years. Due to rapid topology changing and frequent disconnection makes it difficult to design an efficient routing protocol for routing data among vehicles, called V2V or vehicle to vehicle communication and vehicle to road side infrastructure, called V2I [1][4]. It is self-ruling & self-organizing wireless communication network, where nodes in VANET involve themselves as servers and/or clients for trading & sharing information.

Vehicles can cooperate with each other to circulate short videos of dangerous situations to partially inform drivers and safety teams about them both in the city and on a highway.

The growing demand of wireless devices and wireless communication tends to research on self-curing and self-organizing networks without the support of any centralized management or pre-demonstrated authority/infrastructure. This kind of networks is known as Ad hoc networks.

Vanet: It minimizes both vehicle crashes and traffic crowding which are critical problems across the whole world. VANET having high dynamic topology. From high dynamic topology frequently disconnection occur between two vehicles



VANET (Vehicular Ad Hoc Network)

II. Related Work

In this paper, they propose a new hybrid location-based routing protocol that is particularly designed to address this issue. Our new protocol gather features of reactive routing with location-based geographic routing in a manner that efficiently uses all the location information available. The protocol is designed to gracefully exit to reactive routing as the location information decreases. They show through analysis and simulation that their protocol is scalable and has an optimal overhead, even in the presence of high location errors. Their protocol provides an enhanced yet practical location-enabled solution that can be install in all VANET-type environments [4].

Authors made redundant transmission trees, however the topology is highly dynamic. This proposal is tough to implement in opportunistic and dynamic VANET environments: stability and availability of communication links over time are fault-finding issues when dealing with real-time multimedia applications and they become much more demanding when coupled with vehicular mobility and frequent lane changes [2].

Author presents the advantages and disadvantages of VANET routing protocols for inter vehicle communication. The existing routing protocols for VANET are not reliable to meet each traffic scenario. Thus design of an efficient routing protocol has taken crucial attention. Due to rapid topology changing and frequent disconnection makes it difficult to design an efficient routing protocol for routing data among vehicles, called V2V [4][8].The authors propose an

opportunistic backbone-based geographic routing scheme for V2V video transmissions by using a Bayesian model for predicting where vehicles are going to be, so they can build the backbone by also considering such predictions [7].

To increase the performance of Ad-hoc on Demand Distance Vector (AODV) routing protocol by using some parameters i.e. Active route to choose the best path for routing and differentiate the proposed AODV protocol performance with Normal AODV in terms of different performance metrics i.e. average throughput, average delay and average network load. Results show that proposed AODV routing protocol has best performance as compared to normal AODV [1].

Several VANET approaches and differentiate them, like delay-based and network coding techniques, mixed with expectation, difficult to minimize the number of forwarding nodes and the final packet loss; even now the data rate increases, performance gets worst. Since the authors are talk over the performance evaluation of VANET protocols for video conveyance they should have also included QoE results into the paper [6]. Authors introduces an application infrastructure to handle multi-hop, multi-path, and dynamic environments and a routing protocol, the DBD (Distributed Beaconless Dissemination), that increase the circulation of live video flows on multimedia highway VANETs. DBD uses a backbone-based approach to create and maintain continuous and high quality routes during the video delivery in opportunistic Vehicle to Vehicle (V2V) expected. It also increase the performance of the IEEE 802.11p MAC layer, while increasing the packet delivery ratio and decrease the forwarding delay. Performance rating results show the advantages of DBD compared to previous works in forwarding videos over VANETs, where main purpose and individual QoE results are measured [2]. The authors provide several rating scenarios (traffic safety, video transmission, and audio streaming), so the study is interesting, but also in this case, the protocol requires signal and general costs messages to work. The main drawback of the current backbone-based routing protocols is that they do not consider the SF problem in their decision schemes, as well as they do not evaluate the quality level of the delivered videos based on QoE metrics [2][3].

III. Routing Protocols

The feature of highly dynamic topology makes the design of efficient routing protocols for VANET is demanding. The routing protocol of VANET can be divided into two categories such as Topology based routing protocols & Position based routing protocols.

1. Topology based routing protocols: Topology based routing protocols use link's information within the network to send the data packets from source to destination. Topology based routing approach can be further categorized into proactive (table-driven) and reactive (on-demand) routing.

2. Position based routing protocols: Geographic or Position based routing is a routing that each node knows its own & neighbour node geographic position by position determining services like GPS. It doesn't maintain any routing table or exchange any link state information with neighbour nodes. Information from GPS device is used for routing decision.

IV. Proposed Work

1. In previous work ignore the connectivity of relay node only see the shortest path of relay node.

2. In previous work ignore the problem of hidden terminal, therefore increase the packet drop in the network and reduce throughput.

3. In previous work make a cluster of node according to its distance, so increasing the energy slowly by some nodes.

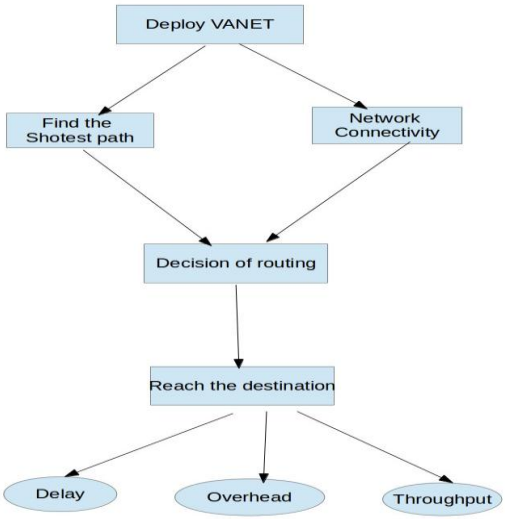


Fig: Proposed work

1. To increase the through put of routing by route the data according to network connectivity of node.

2. To reduce the delay of routing by proposed approach.

3. To analysis the parameters delay, overhead on different number of nodes.

V. Ant Colony Optimization (ACO)

Ant Colony Optimization (ACO) algorithm is a randomness approach for solving the operational problem. ACO is used to find the good path through graph. ACO is used to designing Meta heuristic algorithm. Meta- heuristic is a higher level of heuristic designed to find, select and generate a good path. Meta- heuristic is used to solve the optimization problem.

The first algorithm was design for searching a best path in a graph, which is based on the behaviour of ants seeking. Real ant are capable to find the shortest path from colony to food source. While walking ants lay pheromone on the ground and follow pheromone previously trail can detect it with high probability to follow it.

Ant colony optimization is an iterative distributed algorithm. At each iteration, a set of artificial ants are considered. Each of them are walking vertex to vertex on the graph and not visiting any vertex that is already visited by them. Vertex are traverse randomly. At the each step ACO constructed a best path for a graph.

ACO system consist of two rules:

1. Local pheromones update rule: - this rule is applied when solution is constructed.

2. Global pheromones updating rule: - this rule applied after all ants construct a solution.

VI. ONE Simulator

In this paper, present the Opportunistic Networking Environment (ONE) simulator. ONE is a java based tool. ONE is individual event simulation engine. ONE simulator is capable for handling node movements, inter- node contact, routing and message communication. Result collection are done through visualization, reports and post processing tools. Node movement is implemented by movement model. Connectivity based on the node location, communication range and bit rate. Message generate themselves through event generator. Simulation result is present by visualization tool or report modules.

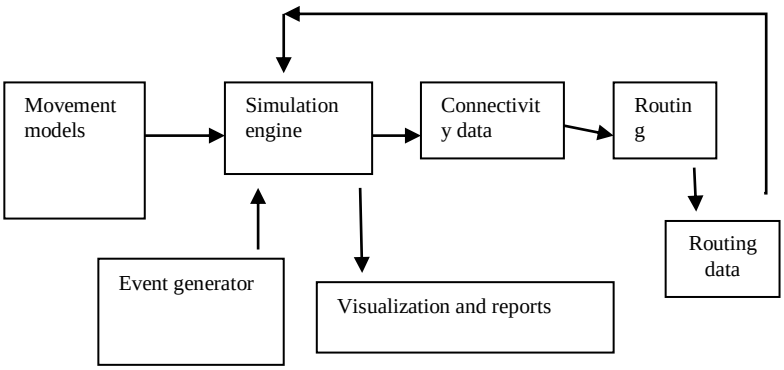


Fig. ONE simulator environment

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