A Survey on Efficient Routing in VANET

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Abstract**—** *Reliable, protected, confidential, and fast communication in vehicular networks is extremely challenging due to the highly mobile essence of these networks. Contact time between vehicles is very limited and topology is constantly changing. Dependable communication in vehicular networks is of crucial importance because without trust, all intension for minimizing the latency or maximizing the accuracy could be avoided. Roadside units (RSUs), which enable vehicles-to-infrastructure communications, are expand along roadsides to handle the viable communication demands caused by explosive increase of vehicular traffics. To overcome above mentioned problems in Vehicular Networks we using some frameworks. In this paper, we present a survey on the types of efficient routing techniques, trust management frameworks and the existing solutions to achieve better results in vehicular networks routing. Finally, we will present open research issues in this field that demand further significant research efforts.*

Keywords— Vehicular Ad hoc Networks, Road Side Unit, Communications, Scheduling, Routings

I. Introduction

A vehicular ad hoc network (VANET), cars act as a mobile node in a MANET to implement a mobile network. A VANET turns each and every co-operating car into a wireless routers or node, allowing cars approximately 100 to 300 meters of each other to associate and, in turn, to develop a network with a vast range. As vehicle off of the radius region and get off of the domain range, other cars can join in this network, for connecting vehicles to one another within it. So, that a mobile Internet is created. It is evaluate that the first systems that will accommodate this technology used to communicate police and fire vehicles. General Motors, Nissan, Toyota, DaimlerChrysler, BMW and Ford promote these are automotive companies. Intelligent vehicular ad-hoc network (In VANET) is another one term for promoting vehicular networks. In VANET consolidate various networking technologies such as Wi-Fi IEEE 802.11p, WAVE, IRA and ZigBee technologies. Vehicular ad hoc networks are anticipated to develop wireless technologies such as enthusiastic short-range communications which is a type of Wi-Fi. Cellular, satellite, and Wi-MAX are other candidate wireless technologies. VANET can be seeing as property of the knowledge transportation systems (ITS). As build up in ITS, vehicles communicate between each other through inter-vehicle communication (IVC) as well as with communication via roadside base station to vehicle communication (RVC).The next origination of wireless communication technologies, there will be a need for the fast deployment of separate mobile users in the system. Significant examples comprise founding endurance, adequate and dynamic communication for necessity/rescue operations, disaster remedy efforts, and military communication networks. Vehicular Ad-hoc Networks (VANETs) can be considered as a subset of Mobile Ad hoc Networks (MANETs) with unique characteristics.

A typical VANET reside of vehicles and access points on the road. Vehicles move on the roads can able to sharing information between themselves with the Internet through the access points. When Vehicles move at high speed but their mobility is rather regular and Predictable.

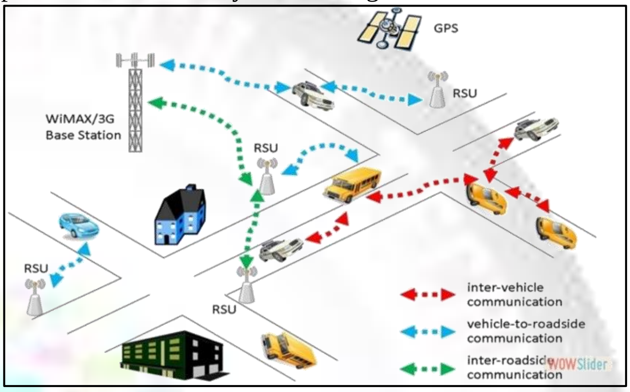

Fig. 1: VANET function

This figure represents the functioning of the vehicular network and the study included cost projections for a vehicular infrastructure roll-out that would initially focus on safety and vehicle monitoring applications. In this report, it was estimated that 40% of all initial rural freeway roadside infrastructure would have to be solar powered. A breakdown of the deployment costs also found that over 63% of these RSU costs would be absorb by solar energy provisioning, e.g., batteries, solar panels, and their associated electronics. The projected costs of these nodes come to almost one billion dollars in the proposed initial deployment. It is well known that the provisioning cost of a solar-powered communication node is a strong function of its average power consumption. This cost can be significantly lowered by improving the energy efficiency of the node, which is the motivation behind our paper. In this paper survey on recent schemes which focus on vehicular efficient routing and traffic avoidance system is established. Discussion is also built on distinct factors involved in collision avoidance system and the way they are borrowed. Simulation result considered in VANET is also part of activity. In addition to this, a summary of different pattern is also mentioned. The paper is divided into following sections as follows: The first section contain the basic introduction about the project. The next section involves related work done on vehicular system. The third section describes factors involved in efficient and traffic avoidance system. After that section gives general simulation parameters. Finally last section concludes the paper.

II. Factors in Vehicular Network Services

A. *Inventive Transport Applications*

Intelligent transport system (ITS) that exhibit a range of applications like on global positioning system, traffic information, analysing a traffic jam, traffic management system, and divert the routes which support the traffic scenario.

B. Collision Avoidance

Vehicles to vehicles and vehicles to roadside communications unit will save our lives and anticipated injuries. Through this application, if a vehicle reduces its speed appreciably once finding an accident then vehicle transmits its location to its neighbour vehicles within a network. And various receivers can try to transfer the message to the vehicles further position them and therefore the vehicle in question will emit some alarms to it's different vehicle during this process, a lot of vehicles way behind can easily get the alarm signal before any accident occurs.

C. Traffic Improvement

According to this application the vehicles may function as expertise collectors and forward the traffic related information for VANETs. During this system, vehicles may determine based on if it's have a huge amount of vehicles and or the speed of vehicles is very slow, then transfer this data to vehicles approaching that location. The knowledge is transferred by vehicles traveling in different direction so it should be propagated quicker to the vehicles toward the congestion location..

D. Energy Harvesting in VANET

Energy harvesting is a newly emerging technique presenting itself as a promising solution to energy-constrained wireless networks, such as wireless sensor networks where sensors have a limited lifetime, and vehicular networks where low-cost battery-powered RSUs are deployed in rural areas and beside long highways. The primary objective of this subsection is to provide the reader with a concise description of the architecture of an energy harvesting network (EHN) as well as energy harvesting techniques and generic applications.

E. Trust Management

Only a few trust models have recently been proposed for accomplished honest vehicular networks for information sharing. In this part, we outline them and specify the issues. Note that great efforts, for example the work in, have been spent by researchers in security and privacy on trust establishment in VANETs that await on a security framework and most often makes use of certificates. A more extensive summary of this kind of trust systems can be found in. We focus on trust replica that do not completely await on the static infrastructure and thus can be more easily deployed.

III. VEHICULAR EFFICIENT PROCESS DESIGN

Researchers have tried to come up with solutions to overcome the problem with efficient and security threats in VANET. Methods for both detection and transmission techniques to assist overcoming this dilemma and the characteristic these models use for such purpose are discussed next.

A. Solar-Powered Wireless Mesh Networks

In this section, we address the problem of resource provisioning in solar-powered wireless mesh networks. This entails assigning battery and solar panel sizes for each network node so that outage-free operation is obtained, based on the use of historical solar insolation data and an assumed BUP. Here we using energy-aware resource provisioning (EARP). Energy-aware routing creates a complex dependence between the routing and the energy state of the nodes, making the resource provisioning problem very difficult. A genetic algorithm (GA) is described for determining these resource assignments, and our presented results show that significant cost savings are possible using this approach.

B. Resource allocation for Solar-Powered WLAN Mesh Networks

Here, we assume that the design uses a proposed power saving mechanism based on simple extensions to IEEE 802.11. This approach is statistical since future load conditions and solar insolation may not exactly match that for which the node was designed. For this reason, control algorithms are introduced which attempt to maintain outage-free operation of the node by sometimes introducing a capacity deficit. Results are presented showing that significant resource reductions are possible using the proposed design.

C. Cost in Hybrid Solar/Wind Powered WLAN Mesh Nodes

This chapter we present geographic provisioning results for solar and wind powered WLAN mesh nodes. A cost model is imported which is helps to enhance the hybrid provisioning of the nodes. The results suggest that in certain geographic area a hybrid wind/solar powered WLAN mesh node is the excellent cost composition. Cases will be included using previous IEEE 802.11 standard assumptions and will also acknowledge the case where changes are made to the definitive so that mesh AP power saving is possible.

D. Traffic Scheduling

An energy adequate road-side access point organize is considered. A scheduler is designed that is capable of satisfying the communication specifications of the vehicles in the vicinity of the AP while minimizing the energy needed using AP power control. The problem is first addressed as a Mixed Integer Linear Programming optimization. An upper bound on the energy provided by the scheduler is then borrowed which can be used as a comparison with practical scheduling algorithms. Taking influence of the comprehensive use of GPS positioning devices that facilitate vehicle location and velocity inputs, a factual algorithm is recommended. A various results are then presented which show that the proposed algorithm performs well when compared to the performance bound.

E. Scheduling in Green Vehicular Infrastructure

Here, we focused on scheduling problem if there are more RSU in the circle. When this is the case it may be desirable to balance the energy load over the roadside units so that energy provisioning costs are minimized as much as possible. The first is a low complexity First Come-First-Assigned (FCFA) scheduler that makes greedy RSU selections followed by a minimal energy time slot assignment. The next algorithm, the Greedy Flow Graph Algorithm (GFGA), makes the same RSU choice but when new vehicle arrives for same RSU, time slot will be reassigned.

F. Routing in Vehicular Ad Hoc Networks

We mainly focused on a key networking issues: routing protocol for VANETs. The main provision of routing protocols is to bring minimal communication time with minimum expenditure of network resources. However, simulation results showed that they endure from worst performances because of the distinctive of fast vehicles movement, So finding and maintaining routes is a very difficult task in VANETs. In additionally, a realistic mobility model is very important for both design and implementation of routing protocols in VANETs. In this paper, we will summarize the most recent research progress of routing protocols and mobility models in VANETs.

G. Design of efficient Vehicular Applications

The identification of telematics application requirements, and the study of what communication technology can fulfil them, are key factors which have to be considered at the design stage. This is the only technique of predict the good performance in vehicular application from early stages. Following this idea, the work that has been implemented in this paper monitor the main networking requirements of vehicular applications, and gives some ideas about how to apply them with current wireless communication technologies and the solutions of network.

H. Scalable Robust Authentication Protocol

Usually, the security issues of VANETs are solved by using signature schemes that depend on a public key infrastructure (PKI). Below the PKI solution, each vehicle has pair of cryptographic keys as public key and a private key. The private key is a secret key of vehicles, whereas the public key is constrained for vehicle identity that means certificate, which is handover by a trusted authority (TA) in network. The exploit schemes must be adequate because, according to, vehicles should be able to transmit safety messages within 100–300ms. Therefore, it is very critical for authentication to be quick to verify than to generate.

I. Effective and Low-Overhead Transmission Power Control

Analyse the minimum ‘required knowledge’ of positional information on neighbouring nodes that is necessary to guarantee a preconfigured maximum beaconing load in the network. We analyse how well the beaconing load controlled when the provider control is challenged by realistic (Nakagami-m) channel models as well as by non-consistent vehicular traffic densities. We propose an effective beacon power control approach that only desires a trivial amount of additional communication overhead.

J. Vehicular Internet Access using in Situ Wi-Fi Networks

Focus on data uploads and downloads from cars to cars. There are two logic for this. First, A lot of emerging applications treats cars as data sources in mobile sensor networks, where a variety of sensors (GPS, cameras, on-board diagnostics, etc.) acquire and deliver data about cars and the neighbouring environment. Second, it is likely that the download performance will be at least as good as uploads, because most transmission links have more frequency in the download direction. In any case, most of our result specify the properties of the bi direction in radio signals, and these findings should apply equally to both data transfer directions.

K. Extending Drive-Thru Data Access

A relay-based solution to extend the service range of roadside APs. As a vehicle moves towards an AP, its signal quality with the AP may be poor. In order to broaden its connection period and improve the quality, the vehicle selects a vehicle geographically ahead of it to serve as a broadcast. It selects a vehicle behind it to serve as a relay when it leaves the AP coverage area. The broadcast mechanism can improve the throughput and extend the AP coverage. When nodes close to the AP also need to access the AP, they may compete bandwidth with nodes asking for relay. Further, IEEE 802.11 is known to suffer from so-called performance anomaly.

L. An approximation algorithm for the generalized assignment problem

An approximation algorithm for the generalized assignment problem was ½. We consider the max-profit generalized assignment problem (Max-GAP). That examined the analogues minimization version Min-GAP: instead of profits p(i, j)there are costs w(i, j), and the objective is to find a achievable process of all items (assuming such an assignment exists) while minimizing the total cost.

M. Load Balancing and Machine Scheduling

Here, show an O(log n)-competitive algorithm for the unrelated machines case, and 8 complex algorithms for the related machines case. Although competitive analysis notions apply to algorithms, which will be run without any restrictions on run times, all on-line algorithms presented in this method run in regulate polynomial time, whereas the identical lower bounds are based on information-theoretic arguments and apply even if we allow the on-line algorithm to use randomization.

<table>
<tr><th>S. No.</th><th colspan="2">Routing in VANET</th></tr>
<tr><td>1</td><td>Ad-hoc Based Routing</td><td>Proactive, reactive, hybrid</td></tr>
<tr><td>2</td><td>Cluster Based Routing</td><td rowspan="4"></td></tr>
<tr><td>3</td><td>Location Based Routing</td></tr>
<tr><td>4</td><td>Broadcast Routing</td></tr>
<tr><td>5</td><td>Geocast</td></tr>
</table>

Table 1: Routing in VANET

IV. CONCLUSION

In Vehicular ad hoc networks, with every relationship links a user has it presents the trust established between the vehicle and the infrastructure of each link. In this article, we present a survey on the types of efficient routing techniques, trust management frameworks and the existing solutions discussed in vehicular networks routing. Finally, we will present open research problem in this field that need further significant research efforts and other researchers proposed existing solutions to prevent in VANET. Seeing that trust and efficient mechanism can be an effective mean to prevent, we have further explored transmission and information credibility evaluations as promising approaches to getting efficient and better results in vehicular network communications.

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