Performance Improvement of Cluster-Based Routing Protocol in VANET

[1]Priyanka A, [2]Marrynal S Eastaff
[1]PG Student Msc Information Technology, [2]assistant Professor Information Technology,
[1, 2] Department Of Information Technology
[1, 2] Hindusthan College Of Arts And Science, Coimbatore

Abstract: The future vehicular ad hoc network (VANET) application will be an event driven and require events of different types to be delivered to moving vehicles within some specified time. Hence we propose a publish-subscribe based event notification framework that uses roadside units (RSUs) to deliver events to vehicles that subscribe to them within the validity periods of both the subscriptions and the events. The RSU will disseminate only a finite number of events at a time and has a cost associated with it. The referred two scheduling problems to schedule the dissemination of events from RSUs are formulated. The main problem is to maximize only the number of subscriptions that are matched to some events. The next problem is in addition to maximizing the number of subscriptions matched, also aims to minimize the total cost of disseminating the events. The designed offline and online algorithms for the problems that a service provider can execute to schedule event disseminations from the RSUs. Detailed simulation results are presented to show that the algorithms are able to match a high percentage of subscriptions with low average event dissemination cost for some realistic city traffic scenarios.

Index Terms - VPN Security, ISDN, IPSec, Intrusion Deduction

I. INTRODUCTION

Wireless Sensor network (WSN) is an emerging technology and has great potential to be employed in critical situations. The development of wireless sensor networks was originally motivated by military applications like battlefield surveillance. However, Wireless Sensor Networks are also used in many areas such as Industrial, Civilian, Health, Habitat Monitoring, Environmental, Military, Home and Office application areas. Detection and tracking of targets (eg. animal, vehicle) as it moves through a sensor network has become an increasingly important application for sensor networks. The key advantage of WSN is that the network can be deployed on the fly and can operate unattended, without the need for any pre-existing infrastructure and with little maintenance. The system will estimate and track the target based on the spatial differences of the target signal strength detected by the sensors at different locations. Magnetic and acoustic sensors and the signals captured by these sensors are of present interest in the study. The system is made up of three components for detecting and tracking the moving objects. The first component consists of inexpensive off-the shelf wireless sensor devices, such as MicaZ motes, capable of measuring acoustic and magnetic signals generated by vehicles. The second component is responsible for the data aggregation. The third component of the system is responsible for data fusion algorithms. The Adhoc networks are wireless decentralized networks created on the fly by hosts located in proximity of one another is no longer just a research concept. This is to require minimal effort to setup, ad hoc networks are suitable for a wide range of applications, including battlefields communications and disaster recovery operations. The latest new vehicles come already equipped with GPS receivers and navigation systems. Car manufacturers such as Ford, GM, and BMW have already announced efforts to include significant computing power inside their cars [5, 6] and Chrysler became the first car manufacturer to include Internet access in a few of its 2009 line of vehicles .This trend is expected to continue and in the near future, the number of vehicles equipped with computing technologies and wireless network interfaces will increase dramatically.

II. LITERATURE SURVEY

2.1 TITLE: Vehicle sorting for platoon formation: Impacts on highway entry and throughput
AUTHOR: R. Hall and C. Chin, Oct. 2005

Automated highway systems (AHS) are intended to increase the throughput and safety of roadways through computer control, communication and sensing. In the “platoon” concept for AHS, vehicles travel on highways in closely spaced groups. To maximize benefits, it is desirable to form platoons that are reasonably large (five or more vehicles), and it is also desirable to ensure that platoons remain intact for considerable distances. This paper develops and evaluates strategies for organizing vehicles into platoons at highway entrances, with the objective of maximizing the distance that platoons stay intact, so that they do not need to be regrouped into new platoons on the highway itself. Fundamentally, this entails grouping vehicles according to their destination.

2.2 TITLE: The Impact of Cooperative Adaptive Cruise Control on Traffic-Flow Characteristics
AUTHOR: B. van Arem, C. J. G. van Driel, and R. Visser

Impact of having cooperative adaptive cruise control (CACC) embedded vehicles on traffic flow characteristics of a multilane highway system. The study identifies how CACC vehicles affect the dynamics of traffic flow on a complex network and reduce traffic congestion resulting from the acceleration/deceleration of the operating vehicles. An agent-based microscopic traffic simulation model (Flexible Agent-based Simulator of Traffic) is designed specifically to examine the impact of these intelligent vehicles on traffic flow.

2.3 TITLE: An experimental comparative study of autonomous and co-operative vehicle-follower control systems,
AUTHOR: R. Rajamani and S. Shladover

We introduce a cooperative collision-avoidance (CCA) scheme for intelligent transport systems. Unlike contemporary strategies, the envisioned scheme avoids flooding the considered vehicular network with high volumes of emergency messages upon accidental events. We present a cluster-based organization of the target vehicles. The cluster is based upon several criteria, which define the movement of the vehicles, namely, the directional bearing and relative velocity of each vehicle, as well as the inter-vehicular distance. We also design a risk-aware medium-access control (MAC) protocol to increase the responsiveness of the proposed CCA scheme. According to the order of each vehicle in its corresponding cluster, an emergency level is associated with the vehicle that signifies the risk of encountering a potential emergency scenario. To swiftly circulate the emergency notifications to collocated vehicles to mitigate the risk of chain collisions, the medium-access delay of each vehicle is set as a function of its emergency level. Due to its twofold contributions, i.e., the cluster-based and risk-conscious approaches, our adopted strategy is referred to as the cluster-based risk-aware CCA (C-RACCA) scheme.

2.4 TITLE: A directional data dissemination protocol for vehicular environments
AUTHOR: R.S.Schwartz, R. R. R.Barbosa, N. Meratnia, G. Heijenk, and H. Scholten

It prevents the so-called broadcast storm problem in dense networks by employing an optimized broadcast suppression technique; and it efficiently deals with disconnected networks by relying on the store-carry-forward communication model. The novelty of the protocol lies in its simplicity and robustness. Simplicity is achieved by only considering two states (i.e., cluster tail and non-tail) for vehicles. Furthermore, vehicles in both directions help disseminating messages in a seamlessly manner, without resorting to different operation modes for each direction. Robustness is achieved by assigning message delivery responsibility to multiple vehicles in sparse networks.

2.5 TITLE: Scheduling algorithm for beacon safety message dissemination in vehicular ad-hoc networks
AUTHOR: V. Sadatpour, M. Fathy, S. Yousefi, A. Rahmani, E. Cho, and M. Choi

Beacon safety message dissemination in Vehicular Ad-hoc Networks (VANETs) suffers from poor reliability especially in congested road traffics. The main origin of this problem is CSMA nature of Dedicated Short Range Communications (DSRC) in MAC layer. In this paper, a scheduling algorithm in the application layer is proposed to alleviate the problem. We first divide the road into a number of geographical sections. In each section, we form a cluster between moving vehicles. Then we perform a scheduling algorithm including two levels. In the first level, nonadjacent clusters can transmit at the same time.

III. EXISTING SYSTEM

The ad hoc network (VANET) application will be an event driven and require events of different types to be delivered to moving vehicles within some specified time. Hence we propose a publish-subscribe based event notification framework that uses roadside units (RSUs) to deliver events to vehicles that subscribe to them within the validity periods of both the subscriptions and the events. The RSU will disseminate only a finite number of events at a time and has a cost associated with it. The referred two scheduling problems to schedule the dissemination of events from RSUs are formulated. The main problem is to maximize only the number of subscriptions that are matched to some events. The next problem is in addition to maximizing the number of subscriptions matched, also aims to minimize the total cost of disseminating the events. The designed offline and online algorithms for the problems that a service provider can execute to schedule event disseminations from the RSUs. Detailed simulation results are presented to show that the algorithms are able to match a high percentage of subscriptions with low average event dissemination cost for some realistic city traffic scenarios.. Detailed simulation results are presented to show that the algorithms are able to match a high percentage of subscriptions with low average event dissemination cost for some realistic city traffic scenarios.

IV. PROPOSED SYSTEM

We propose a novel DA-Platoon architecture in which we consider both traffic dynamics under disturbances and the constraints due to VANET communications. We investigate the characteristic of DA-Platoon dynamics under disturbance. Based on the analytical model, we derive the desired DA-Platoon parameters that can satisfy both traffic dynamics requirements and VANET connectivity requirements. To mitigate the negative effects of traffic disturbances, we propose a novel driving strategy for the

leading vehicle of a platoon, with which we can obtain the desired interplatoon spacing that can help achieve the desired traffic dynamics and that does not violate the VANET constraints in disturbance scenarios.

V. DESCRIPTION OF MODELS

5.1 Vehicular Infrastructure Deployment

Vehicular Adhoc networks (VANET) are networks composed of a large number of wireless devices having sensing, processing, communication, and movement capabilities. The two basic communication modes in the module, which respectively allow OBUs to communicate with each other and with the infrastructure RSUs. All the vehicles communicate through wireless channels, a variety of attacks such as injecting false information, modifying and replaying the disseminated messages can be easily launched.

5.2 Communication and Data collection

This Module developed to vehicular networks data collection and aggregation process. More than Mobile sensor nodes randomly moving data transmission processing and then sensor node update neighbor information.

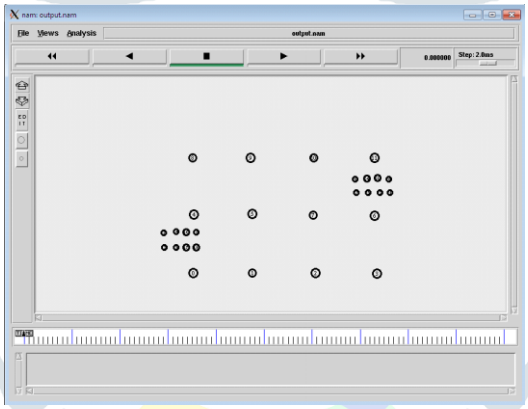

Fig 1.Output Screen - Identification of sensor nodes

5.3 Disturbance-Adaptive platoon

Proposed a novel disturbance-adaptive platoon (DA-Platoon) architecture, in which a platoon controller shall adapt to the disturbance scenario and shall on sider both VANET and platoon dynamics requirements. The requirement of the DA-Platoon architecture, we then analyze the traffic dynamics inside a platoon and derive desired parameters, including intraplatoon spacing and platoon size, so as to satisfy VANET constraints under traffic disturbance.

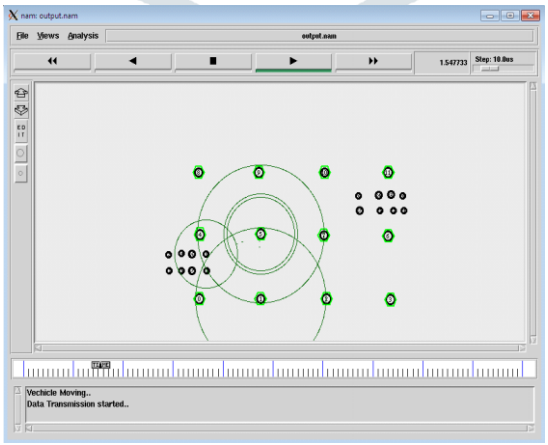

Fig 2 Output Screen – Clusters in VANET

5.4 Performance based graph result

This module is developed to performance based result analysis. Average End-to-End Delay, packet Delivery Ratio

VI. CONCLUSION

A new VANET cluster formation algorithm that groups the nodes based on the position and direction information to form stable clusters was proposed. The stable clustering algorithm elects cluster head based on a multi-metric algorithm. The proposed system is evaluated using simulation software NS2 (Network Simulator 2). Simulation results reveal that there is increase in throughput, and decrease in propagation delay and average cluster change per vehicle. Thus the performance of VANETs gets improved by providing a stable network topology.

VPN is an emerging technology that has come a long way. From an insecure break off of Public Telephone networks to a powerful business aid that uses the Internet as its gateway. VPN's technology is still developing, and this is a great advantage to businesses, which need to have technology that is able to scale and grow along with them. With VPN businesses now have alternative benefits to offer to their employees, employees can work from home, take care of children while still doing productive, and have access work related information at anytime. VPN will also help to make the possibility of a business expanding its services over long distances and globally, more of a reality.

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