VANET Routing Protocols for Intelligent Transport System Communication Using Security Retransmission Data with WIMAX

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Abstract

Wireless devices are increasing the computing, storage resources and increasing in supporting mobile computing techniques. Particularly, ad hoc networks can potentially connect different wireless devices. The dynamic nature of Vehicular ad hoc networks demands new set of networking strategies to be implemented in order to provide efficient Intelligent Transport System communication. The entire network is mobile and the individual terminals are allowed to move freely. The nodes may be located in or on airplanes, ships, trucks, cars, even on people or very small devices. Routing is a big problem in Vehicular Ad hoc Network; many protocols have been proposed to increase efficiency and security of traditional protocols in VANET.

Centralized and distributed scheduling algorithms, use Secure and Efficient data Transmission algorithm have two protocols called SET-IBS (SET Identity Based digital Signature) and SET-IBOOS (SET Identity Based Online/Offline digital Signature). For source to destination calculate this Shortest Path by using this algorithm and another reason is that to save its battery power using centralized and distributed routing. Routing models carry out based on the travelling node should identify the message authenticated on both online and offline, to provide the efficiency and security in the routing models. It based on throughput improvement with the variation of node density such as link failure ratio, packet arrival rate, retransmission threshold. The efficiency in Vehicular Ad hoc Network, to enhance the security provides for misbehaving node detection that integrates security mechanism to prevent unauthorized access for data transmission.

Keywords: *VANET, ITS (Intelligent Transport System), Distributed Algorithm, DSR Protocol, Security.*

I. INTRODUCTION

The infrastructure less and the dynamic nature of (VANET) demands new set of networking strategies to be implemented in order to provide efficient ITS communication. Source to destination calculate the Shortest Path and another reason is that to save its battery power. Routing models carry out Centralized and distributed scheduling algorithms. As cars fall out of the signal range and drop out of the network and other cars can join the 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.

The RSU can be treated as an access point or router or even a buffer point which can store data and provide data when needed. All data on the RSUs are uploaded or downloaded by vehicles. A classification of applications is also done by as Car to Car Traffic applications, Car to Infrastructure applications, Car to Home applications and Routing based applications.. Based on the type of communication either V2I or V2V, we are arranging the applications of VANETs.

To select suitable members as helpers to download an forward the video and make video streaming more effectively to the requester over the DSRC Ad hoc vehicular network, how to select suitable helpers to forward the downloaded video hop-by hop back to the requester needs to be resolved, the bandwidth aggregation scheme to tackle the aforementioned problem. The performance can get better quality video than cooperative video streaming schemes without the deliberately designed bandwidth aggregation.

Intelligent transportation systems (ITS) are advanced applications to provide innovative services relating to different modes of transport and traffic management and enable various users to be better informed and make safer, more coordinated, and 'smarter' use of transport networks. Intelligent Transport System as systems in which information and communication technologies are applied in the field of road transport, including infrastructure, vehicles and users and in traffic management and mobility management as well as for interfaces with other modes of transport.

Intelligent transport systems vary in technologies applied, from basic management systems such as car navigation, traffic signal control systems, container management systems, variable message signs, automatic number plate recognition or speed cameras to monitor applications, download the video from internet and to more advanced applications that integrate live data and feedback from a number of other sources, such as parking

guidance and information systems, weather information, bridge deicing systems. The predictive techniques are being developed to allow advanced modeling and comparison with historical baseline data.

Short-range communications of can be accomplished using IEEE 802.16m protocols, specifically WAVE or the Dedicated Short Range Communications standard being promoted by the Intelligent Transportation Society of America and the United States Department of Transportation. When a number of persons, a family or a group of friends, drive their vehicles for a trip together, they can form a fleet of vehicles and share their network resources during their trip. Let one member want to watch a video from the Internet. He may not have high resolution or video quality due to his limited 3G/3.5G bandwidth to the Internet. The ITS allow the requested member to ask other members of the same fleet to download video cooperatively. In other words, other members can help to download parts of the video from the Internet and then forward video data to the requested member through the ad-hoc network. The ITS is an application of WiMAX, which consist of Dedicated Short-Range Communications (DSRC) ad-hoc network.

Longer range communications infrastructure networks such as WiMAX (IEEE 802.16m), Global System for Mobile Communications (GSM), or 3G. Long-range communications using these methods are well established but, unlike the short-range protocols, these methods require extensive and very expensive infrastructure deployment. There is lack of consensus as to what business model should support this infrastructure DSRC is part of the intelligent traffic system (ITS) development in the United States. The U.S. Federal Communications Commission (FCC) dedicated 75 MHz in the 5.9 GHz band for communication between vehicles, and between vehicles and roadside stations.

It is safety applications, allowing vehicles to alert each other of traffic conditions and communication of safety messages from the roadside. There are many potential benefits to using this combined system rather than either WiMAX or DSRC on its own. In addition to improving the WiMAX system capacity, the installation of costly WiMAX base stations can be kept to a minimum. The use of the separate set of DSRC frequencies negates the need to divide the scarce WiMAX bandwidth for relaying.

DSRC is a short range system, the frequency reuse can be very high and efficient. The adoption of DSRC, which is desired for its safety and ITS applications, the interest in DSRC may eventually result government mandated equipment on vehicles. The combined network also offers ITS systems an alternative to extensive DSRC roadside equipment for data collection, electing instead to use the combined DSRC/WiMAX network to report ITS information (such as traffic conditions).

II. RELATED WORK

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 each other to connect and turn to 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 systems that will integrate this technology to communicate vehicle with each other for safety purposes.

Data scheduling to schedule the data into audio, video etc. routing models carry out centralized and distributed scheduling algorithm. The secure and efficient data transmission used in distributed scheduling algorithm, it is used for transmitting data. Secure and Efficient data Transmission (SET) protocols, called SET-IBS and SET-IBOOS by using the Identity-Based digital Signature (IBS) scheme and the Identity-Based Online/Offline digital signature (IBOOS) scheme. The vehicle is moving, the node identified the digital signature for data authentication in both online and offline. Scheduling algorithm obtain the requested data and assignment of data items. Each node in VANET plays a router role while transmitting data over the network with multiple nodes. It is dynamic and depends upon the movement of the nodes so it can change unexpectedly and rapidly, network routing model designing because sometimes data has to be transmitted within real time constraints.

Node density module each node acts as a router and forwards the packet to destination, that is it autonomous in behavior. The nodes may leave and join the network randomly with dynamic topology change. Data delivery ratio is the ratio of number of packets received at the destination to the number of packets sent from the source. The performance of node density is better and data delivery Ratio is high. Throughput improvements have variation of node density such as Link failure rate, packet delivery ratio and retransmission threshold. The packet delivery ratio is calculated by using send and received packet after the transmission that is receiving packet divided by sending packet then link failure rate can be calculated.

In ITS (Intelligent Transport System) used to communicate between server and vehicles, it also enables to communicate among vehicle to vehicle, vehicle to roadside and vehicle to Infrastructure. VANET is an upcoming technology to establish

communication between the vehicles while travelling, which provides internet connectivity resulting in increased road safety, giving important alerts and accessing comforts while travelling. The ITS communication having three critical roles are requester, forwarder and helper. Requester is the member having the demand for video streaming service.

Forwarders are members that are responsible for forwarding piece of video data through DSRC-based ad-hoc network. Helpers are member that not only forward the video data through DSRC based ad hoc network and also utilize their WiMAX to download video data from the internet.

Retransmission can done due to link failure, physical failure, Temporary Parallel Route Recovery for Frequent Link Failure in VANET. In network there is a very frequent link failure due to high mobility of nodes from available network region. So this frequent link failure causes packets to not reach respective destination. This mechanism to establishes a kind of parallel route discovery for real time application for packets to be delivered at destination by minimizing losses and to establish parallel routes during link failures to deliver the data safely to destination. In travelling node to identified the digital signature based on the Secure and Efficient data Transmission algorithm, it provide security only in the SET-IBOOS for efficient communication. The route recovery establishes temporary path between the nodes when there is link failure. The node before the failure link buffers the packets, after establishing new path it then forwards the buffered packets to the destination through newly established path. In Group member selection, select particular nodes and create a connection for that node. To mitigate the communication and computation overhead that occurs while using the group member selection scheme. The group member selection based on requester, forwarder and helper; only a small number of vehicles participate in verification process.

III. PROPOSED SCHEME

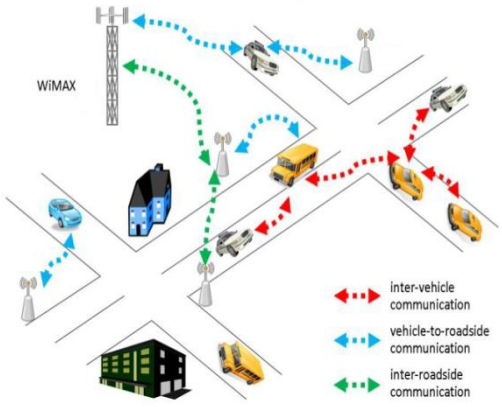
WiMAX is suitable for wireless technology for the networked vehicular application because of mobility support at vehicular speed and wide area coverage which minimize the rate of handover. Vehicular Ad hoc network also provide Value Added Service like email, audio, video etc. The safety measure of Intelligent Transport System, used to communicate server and vehicle in efficient way. Intelligent Transport System coverage is remote sensing and communication technology to improve the road safety. In Vehicular Ad hoc Network, the group member is selected between the Requester, Helper and Forwarder; only a small number of vehicles participated, the selected node act as a Helper and forwarder of data.

To Schedule the data by using Secure and Efficient data Transmission for requester and assign data to the particular node with help of helper and forwarder. The data transmitted to the requested member with help of helpers and forwarders then data send to vehicles correctly. Direct Short Range Communication is one way or two way short to medium range communication for automotive vehicles that use set of protocols and standard. The security mechanism also provides to secure the data and efficiently transmitting the data; the data travelling node also identified the signature based on the request to schedule the data in SET-IBOOS.

A. Advantages in Proposed System

1. In WiMAX, area of coverage depends upon the network establishment; more number of access points available, and long distance coverage, bandwidth also increased using Dedicated Short Range Communication.
2. Integrate security mechanism for misbehavior node detection to enhance security and efficient.
3. Save battery power and storage is unlimited.
4. Centralized and Distributed algorithm is efficient for communication.
5. Intelligent Transport System is an efficient methodology.
6. Seamless connectivity.

B. Architecture for Proposed System



The architecture diagram describes, communication between the ITS (Intelligence Transport System) among vehicles and how to utilize DSRC and WiMAX ad hoc network in efficient ways and provide security.

IV. CONCLUSION

Group member can easily transmitted data based on the identification of Secure and Efficient data Transmission algorithm. In security enhancement, packets are divided into fragments and encoding as well as decoding techniques by using digital signature Algorithm also performed to ensure packet authentication and packet integrity, no

communication authority without digital signature. Secure and Efficient data Transmission Algorithm is a minimum energy consumption model and path reliability calculation was proposed to achieve stable routing with minimum energy resources. The threshold value intrusions can be identified quickly. The proposed scheme achieves better performance than existing schemes in terms of performance metrics. It uses following factors called Link failure rate, packet delivery rate and retransmission threshold during both transmission and reception to forward packet by maintaining high residual energy consumption for each node. The Link failure rate calculated by using receiving data divided by sending data called packet delivery ratio. Retransmission threshold is calculated when the range is below threshold value.

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