CHAPTER 5

CONCLUSION AND FUTURE WORK

5.1 INTRODUCTION

The research presented in this thesis addresses several problems in VANET communication system for a mobile adhoc network. The significant contributions and their impact in this area are consolidated and described in this chapter.

VANET system offer many benefits, while it is applied to wireless communication system, including routing protocols assumed as a critical dilemma that needs to be tackled in VANET, particularly in a sparse environment, by designing an efficient routing mechanism that has impact on enhancing the network performance, in terms of disseminating messages to a desired destination, balancing the generated packet (overhead) on the network, and increasing the ratio of packet delivery within the limited time delay. MAC protocols are used for improving the performance of routing.

Many schemes are used as a parameter for improving the performance of the protocols, taking the clustering of moving vehicles into account, presenting two Cooperative schemes and analyzing its performance. To reduce the delay and enhance the network performance, the Enhanced Multicast Algorithm is employed which reduces the delay shown by the vehicles passes through the intersection. Throughput and energy efficiency of the system are also improved and the MAC layer is used for sending
information analyzing the performance of MAC in terms of PDR and delay of emergency packets.

5.2 CONTRIBUTION OF THE THESIS

Novel routing approaches have been developed for secure communication between vehicle to vehicle, mainly focusing on the issues, such as Message Transferring, Delay, Network Performance, Throughput and Security.

The simulation results show that the performance of the proposed algorithm is better than the existing algorithm, as it provides a satisfactory trade-off between the computational complexity and the detection performance.

5.2.1 Analysis of Data in VANET based on Clustering

Based on Long Range (LR) and Short Range (SR) unicasting and multicasting schemes, an efficient routing protocol has been successfully developed and Clustering based routing schemes are considered in an attempt to produce significant QoS results, and the dynamic clustering algorithm is proposed based on the parameters such as LR and SR transmission range. After forming the cluster, the schemes are introduced in the proposed protocol for efficient transmission, mainly using them for reducing the delay constraints in VANET. Both the schemes are combined reducing the delay and using the Long Term Evolution (LTE), the long range communication has been evaluated in clustering and IEEE 802.11p is employed for short range communication evaluation in clustering. The first scheme performs non-cooperative unicasting and multicasting, at the same time the second scheme completely outperforms non-cooperative unicasting beyond a particular range of cooperating vehicles. The performance of the system model is analyzed
considering the schemes SR collaboration with LR unicasting and SR collaboration with LR multicasting, and it is observed that the proposed scheme has validated the novel techniques, and its viability is assessed through the newly developed simulation model.

5.2.2 Enhanced Multicast Algorithm for Mobile Ad Hoc Using Cooperative Ad Hoc MAC in VANET

An Enhanced Multicast Algorithm is found to have reduced the delay shown by the vehicles, as they pass through the intersection Road Side Unit (RSU). A Cooperation scheme for VANET is examined in this research primarily concentrating on the MAC layer known as Cooperative ADHOC MAC (CAH-MAC). The proposed approach consists of helper detection and transmission algorithm with DSRC Protocol which accomplishes reduction in the computational time for the retransmission of a packet that happens to fail because of the poor channel condition.

In this system, each node holds back their time slots and in close proximity nodes produce a cluster reserving their time slots for allocating time frame using discrete time slot allocation algorithm. A helper node makes use of its unoccupied time slot to relay a failed packet to arrive at the destination through cooperation link layer for direct transmission without disturbing the normal transmission. Hence Network lifetime is accomplished by finding multicast path that minimizes the variation of the remaining energy of all the nodes and thus increases a throughput using header table.

5.2.3 A New Secure Message Transferring in Taxi Service for Vehicular Ad Hoc Network

A Taxi service is an important point to point transportation in many cities. The new security features reduce the risk of taxi crimes and preserve
the privacy of taxi passengers. The authentication mechanisms consist of digital signatures confirmed to be the most appropriate scheme even with high overhead. The existing network solutions cannot be easily applied to VANETs, provided that it is fundamentally of different nature of this new category of networks. This work recommends several new security features to reduce the risk of taxi crimes and to preserve the privacy of taxi passengers. This proposed work mostly focused on entity based authorization. The structure of the VANET provides a secure and privacy based taxi service. Using the analysis and results obtained, it is concluded that the existing network solutions cannot be readily applied to VANETs, given the radically different nature of this new type of networks. And this proposed work has investigated the feasibility of V2R communications in taxi service scheme, and the experimental results show that the proposed work provides enhanced efficiency in V2R Communication.

These proposed techniques have provided solutions to major problems of the VANET systems, including the minimization of the propagation delay, waiting time, increase of throughput, packet delivery ratio and resource allocation examined using the proposed techniques. Thus, the proposed framework of VANET structure provides a secure taxi service for the travelers.

5.3 FUTURE RESEARCH DIRECTION

There are several interesting open problems in VANET communication system requiring further processing of the future research. Some of them are discussed here briefly. The future research may investigate the feasibility of V2R communications in VANET jointly working with V2V communication analyzing the different attacks of the wireless network, reducing the security risk from the network during the data transmission.
Yet another future scope is to implement the power-aware multicast protocols to create control traffics. The basics of mechanism in this thesis are extremely extensible and support QoS for the MANET but have not taken relative mobility in the midst of the nodes. The consequences of dynamic network topology transformations because of relative mobility and a more sensible link model, on the complete presentation of CAH-MAC require further investigation.

Dynamic cluster based model used in this thesis may be extended to address the complex data structures and further delay of the emergency packets. Also, quite a lot of new security features possibly will initiate to lessen the risk of taxi crimes and to preserve the privacy of taxi passengers in future.

5.4 SUMMARY

The solution methodologies have been proposed in this research for the performance improvement techniques for VANET communication systems using Development of HCA with long term evolution Resource Block Scheme, Enhanced Multicast Algorithm with CAH-MAC and Cluster based New Secure Message Transferring in Taxi Service for VANET approaches. Then the performance of the proposed schemes have been assessed and compared under numerous conditions with the existing algorithms by considering the parameters like Network Lifetime, delay, Throughput, Packet delivery ration, security and so on and, it is concluded that the above four proposed techniques provide better performance improvement in VANET communication systems.