**Chapter 7 Conclusion and Future Work**

In connected vehicles environment, two-hop direct V2X communication has been considered as a promising technology to support ITS applications, which be applied to transmit safety-related messages, increase traffic efficiency, reduce power consumption and decrease traffic accidents.

It can also support the strict QoS requirements such as lower latency, reliability and scalability.

**7.1 Thesis Conclusion**

In this work, we have proposed a two-hop direct V2X communication over side link to increase the packet transmission range of traffic-related data packets. As some V2X communication applications require a large communication range which a single-hop direct V2X communication cannot achieve, an increased packet transmission range by the proposed two-hop transmission technology can contribute to a higher packet reception ratio than the single-hop transmission scheme.

To exploit the two-hop direct V2X communication in an efficient manner, we have provided detailed analysis of the resource allocation scheme. In addition, context information such as real traffic location and environment condition has been collected and taken into account to select proper relays. In order to evaluate the proposed technology, we have also implemented a system-level simulator to inspect on the performance of different V2X communication schemes in a highway scenario.

The simulation results have shown the performance improvement by applying the two-hop direct V2X communication over side link with the same amount of spectral resource as for single-hop direct V2X communication. In addition, the results have also shown that the performance of the two-hop direct V2X communication can be optimized by adapting the resource allocation for different hops.

Compared with [paper thesis], our relay selection scheme is similar with [paper thesis] by using the maximal distance. But in our two-hop direct V2X communication over side link system, network has been taken into account assisting the communication system allocating the radio resources for different hops V2X communication.