CHAPTER 7

CONCLUSION AND FUTURE WORK

7.1 CONCLUSION

Wireless sensor network is widely considered as one of the most important technologies for the twenty-first century. In the past decades, it has received tremendous attention from both academia and industry all over the world. Data gathering is a common function of sensor networks, where information sampled at sensor nodes needs to be transported to central base stations for further processing and analysis. In view of the severe energy constraints of sensor nodes and the limited transport capacity of multi-hop wireless networks, an important topic addressed by wireless sensor networks community has been in-network data aggregation.

The main goal of the research is to ensure secure data gathering among the sensor nodes. For that, the data gathering scheme is proposed which consists of six phases like delay aware energy balanced dynamic routing protocol, energy and security based data gathering, energy efficient multipath routing scheme, scheduling based data set scheme and optimized secure data gathering scheme.

- In first phase, Delay Aware Energy Balanced Dynamic Routing Protocol (DA-EBDRP) is proposed to balance the energy efficiency and energy balancing. In second phase, Energy based Data Gathering Approach (EDGA) is proposed to make the correct balance between the three factors like residual energy, distance and data gathering ratio. In the third phase, a Security based Data
Gathering Approach (SDGA) is developed based on multi linear approach which attains low length of mobile sink route and minimum energy consumption in WSNs.

- In fourth phase of the work, a Secure Energy Efficient Multipath Routing Scheme for Data Gathering (SEEMRS) is proposed based on secret sharing which attains authenticity and data confidentiality in WSNs.

- In fifth phase, it is proposed to develop the Scheduling based Data Set Scheme (SDSS) to make the balance between the data availability and scheduling status. By proposing this scheme, the network connectivity is well improved while reducing the minimum network latency.

- In sixth phase, Optimized Secure Data Gathering Scheme (OSDGS) is proposed based on optimized signature verification and co-commitment scheme which attains low length of mobile sink route and high integrity of packets in wireless sensor networks, for ensuring the integrity of the packet and efficient process of data transfer in routing.

- The overall performance of the system OSDGS achieves good throughput, high network lifetime, high residual energy, more packet ratio while attaining low delay, overhead than the existing schemes SEEMRS, SDGA and EDGA.

### 7.2 FUTURE WORK

- Modification to Harmony Search Algorithm which is a clustering technique can be incorporated in future to reduce the consumption and improve the network lifetime. It is one of the techniques utilized to extend lifetime of the network by applying
data aggregation and balancing energy consumption in the middle of the networks.

- In future, the work can be extended towards Multi-Layer Energy Efficient And Delay-Reducing Chain-Based Data Gathering Protocol. The main advantage of this protocol is that it uses the idea of total energy algorithm to construct the chain.

- Need to enhance elliptical curve cryptography to maximize high authentication status.

- Energy Management Systems can be provided to ensure the minimum energy level and balance the data collection status and throughput.