Chapter 8

Conclusion and Future Scope

The dissertation considers the solutions for the crucial issues of the IoT networks. The IoT is the progressing field and is expected to grow at exponential rate. The sensor devices are already common now and we can find those at homes and offices easily. But there is lacking support for the communication of these sensor smart devices without human intervention. The benefits of the IoT will only be tasted, if we are able to resolve the issues related with IoT as soon as possible. The study presents the several issues emerging from this field. Most important are found to be related with routing and heterogeneity in IoT networks. The important metrics should be given due importance such as end-to-end delay, packet delivery ratio, throughput, signal noise ratio etc. Also, the heterogeneity is found to be at maximum in case of IoT networks. The research presents various types of heterogeneity and analyzed that most important are communication technology heterogeneity and data heterogeneity. Several issues have been found, while dealing with these both. The dissertation proposes the algorithms for the reliable routing and for resolving heterogeneity issues of IoT architecture. ACO approach has been used for finding the reliable routing solutions. According to literature survey ACO approach has been found that the proposed algorithms are performing better than the standard algorithms in terms of throughput, average delay, packet delivery ratio etc. The algorithms are tested and implemented on the simulator which is designed in C# (.Net platform). As the standard simulators are studied and analyzed these are not found suitable at present for providing solutions for routing and heterogeneity issues of IoT networks. That is why, own simulator IoTRSim has been developed with the vital node metrics required for the simulation purpose. The results show that there has been more than 200 % increase in the speed using the proposed algorithms and more than 50% decrease in case of end-to end delay. It can be concluded that using such approach and the proposed simulator and algorithms, the solutions can be found for the IoT network issues.

Future Scope

The researchers are continuously working in this domain. The research is going at very fast pace and the solutions have been found for most issues. The future work can be done on the different technologies. The proposed simulator’s functionality can also be improved in the future to include
the live video streaming. The efforts can be made to propose a single format so that the conversion to the different technology (of the sensor device) can be avoided. All the smart sensor devices should follow only one format whether it be ZigBee, Wi-Fi or Bluetooth. We can avoid the conversions, delays and the gateway approach. More simple solutions can be found avoiding routing overheads. Also, the IoT architecture may be changed and instead of having only three prominent layers, we can have one more layer, which does all the necessary modifications. Along with the routing and heterogeneity issues, there are several other such as privacy, maintaining security of data etc. Some algorithms may be proposed by the researchers, which take into account all these together (heterogeneity, privacy, security, etc.).

The transmission of multimedia content is possible today, but fast transmission of the data is required. The researchers may work for the processes for fast delivery of data which takes less time and effort and the energy of the nodes is also saved. Algorithms are also required for the management of node failure and saving the energy of the smart devices. When all these issues are taken care of, it will not take much time to change this world of devices. Soon we will be having a greater number of smart devices communicating with other efficiently and effectively without the need of human intervention.