CHAPTER 7
SUMMARY, CONCLUSION AND FUTUREWORK

This chapter presents the summary of the research work and contributions (which has four different proposed methods) and the future enhancements of the proposed methods.

In the introduction part, the properties and challenges of MANETs are discussed clearly. The importance of QoS Provision is explained. The trust properties are discussed in MANETs perspective. The motivation of QoS Trust is discussed. In the literature survey, the recent and relevant works that have been done in the MANETs area are discussed. Different QoS and Trust computation methods are discussed. The existing QoS and Trust routing protocols are discussed.

The research work proposed four different methods. In the first method (WBTQ), the conventional Optimal Link State Routing (OLSR) is enhanced by two parameters like QoS and Trust. Bandwidth and packet forward ratio are considered as QoS and Trust parameters. The proposed routing protocol selects the multipoint relay (MPR) nodes (i.e. those are enabled with quality and trust) as intermediate nodes in path establishment. Since the nodes packet forwarding attitude is considered in selection of intermediate nodes, the WBTQ could reduce the packet drops comparatively with existing methods. Hence it improved the considerable improved performance. In simulation results, the WBTQ outperformed the OLSR.

In FQTM, a node QoS Trust is computed based on node quality and attitude parameters like energy, bandwidth, mobility and reliability. The parameters are aggregated using the fuzzy logic in computation of QoS Trust value. The fuzzy logic followed the rule base, where the rules are derived to reflect the network conditions. The routing process is proposed for both unicast and multicast routing protocols. The proposed method time and space requirements are analysed with asymptotic notations, and results are taken in simulation tool.

In QTFPN, the properties of Dynamic Fuzzy Petri Net (DFPN) are adopted and the MANET is modelled as DFPN. The DFPN is a fuzzy related data structure to manage the knowledge information. Each packet transfer initiates the computation of
certainty factor \( (\mu) \), where the \( \mu \) is evaluated based on quality parameters of the node. The concurrent reasoning algorithm (CRA) is devised for the routing process to find the trustworthy path. In case of path breaks, CRA has an efficient route recovery mechanism. The CRA is worked out for both unicast and multicast protocols. The performance of QTFPN is studied theoretically and with simulation results.

In QTAR, the trust is managed through four phases, i.e., computation, aggregation, propagation and routing. In trust aggregation, node recommendations are considered using Dempster Shafer Theory (DST), which can minimise the effect of biased recommendations. The trust transitive matrix operations are introduced in routing phase. The performance of QTAR is measured in simulation tool.

Nowadays, trust computational methods gained researcher’s concentration, due to its importance in social networks. The trust properties of MANET are closely related to trust properties of social networks. Hence all the proposed trust computation methods in the thesis can also be applicable to social networks with less number of assumptions. In both MANETs and social networks, nodes have to participate in applications along with the unknown members. Hence the computation of member nodes trust values is certainly helpful in identification of malicious node activities and elimination of harmful members. In social networks, formation of social communities based on members trust values is an interesting concept. Wherein the community members have similar social properties.