CHAPTER 6

CONCLUSION

With emerging mobile applications, MANETs attracted lot of research. A MANET is a self-configuring, mobile nodes wireless network. Node mobility is random and independent. MANETs are not responsible for controlling or regulating traffic. Wireless nodes in MANETs form a temporary network without infrastructure and move freely. So, two arbitrary nodes, which want to communicate, need not be in radio range. Here, direct communication is impossible. So, a routing path involving other nodes in network is a must before establishing actual transmission. Routing algorithms are the key to MANET success and is an active area of research for MANETs.

The solution proposed in this thesis involves:

1. The multipath routing algorithms create several paths between pairs of sources and destinations due to which error tolerance improves, load balancing and bandwidth aggregation is achieved, and reduces delay. The performance of multipath routing AOMDV is investigated for varying node pause time.

2. Currently on-demand ad hoc routing protocols begin path discovery once route breaks, incurring great costs for detecting disconnections as well as for establishing fresh routes. This work modifies AOMDV so that path handoff occurs smoothly based on link availability prediction. When
paths are about to be broken, sources are warned about proposed disconnection and sources then initiate route discovery thereby obviating total disconnection.

3. Routing in MANET is an NP-hard problem. Heuristic methods are applied to find optimal routes from source to destination. In this thesis, BAT optimization is used to find best path for AOMDV on the basis of link quality, neighbor queuing delay, nodes velocity and bit error rates.

4. The Bat algorithm suffers from local minima problem; to overcome this Hybrid BAT is proposed. To increase population diversity for BAT to avoid being trapped in local optima, it is hybridized with Harmony Search (HS). An improvement is made in BAT by adding pitch adjustment to HS which serves as a mutation operator to speed up convergence.

In the initial stage of the investigations, LQ-AOMDV is proposed where the route handoff occur using link availability estimation. Simulations demonstrate that the suggested LQ-AOMDV attains better performance than AOMDV. BAT optimization locates optimal AOMDV route on the basis of link quality, neighbor’s queuing delays and velocity as well as bit error rates. Simulations are conducted to evaluate the Hybrid Bat AOMDV (HBAT-AOMDV) and compared with LQ-AOMDV and BAT-AOMDV. Experiments were conducted with 100 nodes and each node’s transmission power at 0.005 watts. The simulation results of this work for PDR, average end to end delay and jitter achieved.

It is seen that the PDR of Hybrid BAT-AOMDV is enhanced when contrasted with LQ-AOMDV and BAT-AOMDV. Average values of HBAT-
AOMDV is increased by 3.68% than LQ-AOMDV and increased by 1.8% than BAT-AOMDV.

It is noted that the average end to end delay of Hybrid BAT-AOMDV is improved by reducing delay as opposed to LQ-AOMDV and BAT-AOMDV. Average values of HBAT-AOMDV is reduced by 12.54% than LQ-AOMDV and reduced by 5.4% than BAT-AOMDV.

It is observed that the average jitter of Hybrid BAT-AOMDV reduces jitter as opposed to LQ-AOMDV and BAT-AOMDV. Average jitter for HBAT-AOMDV is reduced by 0.77% than LQ-AOMDV and reduced by 5.75% than BAT-AOMDV.

6.1 SCOPE FOR FUTURE WORK

As an extension of this thesis work, additional work research can be carried out in continuation of the proposed research work. Based on the results presented in this dissertation future work could be to integrate the proposed solutions in a single framework and develop new fuzzy mathematical programming based techniques for variation aware multi-metric optimization.

1. The cooperative nature of nodes and the wireless links in MANET makes it vulnerable to attacks. Securing the network against attacks is essential. The future work can be extended to include security features in the proposed technique.

2. The MANET may contain nodes varying from tens to tens of thousands depending on the application. Further evaluation is required to study the scalability issues.