CHAPTER VII

CONCLUSION OF RESEARCH AND FUTURE WORK

7.1 RESEARCH WORK

In this research work, various techniques include link-utility-based improved backoff cooperative MAC protocol for MANET, link-utility-based improved backoff cooperative MAC protocol with minimum delay scheduling for MANET, link-utility-based improved backoff cooperative MAC protocol with fair scheduling for MANET and link-utility-based improved back off cooperative MAC protocol with slot reuse in MANET. These techniques are used for eliminating the hidden node problem, mitigating the problem of collision, achieving the optimal throughput while keeping good fairness and minimizing the delay and overhead.

In chapter 1, the brief introduction about mobile adhoc networks and its features, applications and issues, MAC protocols in mobile adhoc network with its types, requirements and challenges, aim and issues of cooperative transmission, collision avoidance and backoff algorithms are discussed. Link quality, characteristics and issues of fair scheduling, and resource allocation techniques in mobile adhoc network are also explained that help in the proposed techniques. Finally, an overview on proposed work and thesis organization are proposed which indicate the chapters corresponding to the proposed techniques.
In chapter 2, the existing works on the cooperative transmission, link quality and collision avoidance, fair scheduling and resource allocation are discussed. By the study of existing system, the limitations of existing protocols are known and it creates a motivation to propose a new technique. The conclusion provides the overall problem identified in the existing system.

Chapter 3 discusses the link-utility-based Improved Backoff Cooperative MAC protocol that uses the cooperative communication and provides three kinds of transmission. When a source wants to send the data, it first forwards RTS packet. By receiving RTS packet, the destination forwards back CTS packet. The nodes that receive the CTS and RTS packet become partners and relay nodes of the source. When the utility value of nodes along the direct path is more, then the data are transmitted in $D_{\text{trans}}$ path, otherwise, in either CT1 or CT2. Further, nodes along the path estimates backoff time using an improved backoff timer algorithm, which prevents the problem of collision. The performance of the LIBCMAC is evaluated using metrics such as average packet delivery ratio, average energy consumption, packet drop and end-to-end-delay. This technique also successfully eliminates the hidden node problem.

Chapter 4 analyses about the second work, a minimum delay scheduling algorithm in Link-Utility-Based Improved Backoff Cooperative MAC Protocol. A minimum delay scheduling algorithm is
used for deriving the TDMA schedules, utilizing the slot reuse concept to achieve minimum TDMA frame length. This technique is used to derive a relationship between the delay incurred by a data packet and the TDMA frame length to reduce the frame length through slot reuse, and the delay is minimized. The performance is mainly evaluated based on the metrics like average packet delivery ratio, average energy consumption, packet drop, end-to-end-delay and received bandwidth. Simulation results show that this technique reduces the delay considerably.

Chapter 5 discusses the second work, a fair scheduling algorithm in Link-Utility-Based Improved Backoff Cooperative MAC Protocol. The new improved link-utility function is implemented that uses the rate vector and power vector. Based on the link utility cost, the best link will be found. The flow is selected and popped up from the priority queue that is allocated the small number of slots in order to provide the fairness during scheduling. After getting the input priority queue, joint per flow-scheduling routing algorithm will be applied. The performance is compared with JPFS. The performance is mainly evaluated based on the metrics like average packet delivery ratio, average energy consumption, packet drop, end-to-end-delay and received bandwidth. This technique achieves the optimal throughput while keeping good fairness.
Chapter 6 deals with the link-utility-based cooperative MAC protocol with distributed dynamic slot allocation in MANET. A fully dynamic slot scheduling and allocation scheme is used here. This scheme mainly depends on slot request and release. Distributed schemes combine two approaches namely, proactive approach and reactive approach. Simulation result shows that the extended model produces good performance results in all operating conditions.

7.2 FUTURE WORK

Mobile data traffic trends evaluates multimedia applications like online gaming, web television and video calling as the largest majority of global data traffic by utilizing real time video and voice content usually encoded using variable bit rate (VBR) techniques to optimize space-to quality ratios. QoS requirements for real time VBR data are satisfied by making the packets to be received before the expiry of application’s playback deadline and by minimizing the packet loss by keeping it below the application’s required threshold.

Real Time (RT) services requires a high QoS level. Various traffics in wireless networks can be classified into different categories. The non-real time traffic services are bandwidth adaptive and do not require Quality of Service (QoS) guarantees. QoS requirements for real time VBR data are satisfied by making the packets to be received before the expiry of application’s playback deadline and by minimizing the packet loss by keeping it below the application’s required
threshold. In Non-Real Time (NRT), the bandwidth and processing demands become high when the operations like collection, processing and dissemination of data is concerned. The images, video, audio and scalar data present in the real-time traffic have different metrics. It is necessary to promote high data rate accommodation.

Hence the future work concentrates on applying the proposed techniques like minimum delay scheduling, fair scheduling and slot allocation to multiple traffic classes such as Video, Voice and Text. Various priority queues are assigned for each class of traffic thus guaranteeing the bandwidth utilization and fairness. Each user traffic should be scheduled based on their traffic priority such that the resources are fairly allocated.