CHAPTER 8

CONCLUSION AND FUTURE ENHANCEMENT

8.1 CONCLUSION

This chapter concludes the three different techniques that are proposed to improve the performance of the DSR routing protocol by providing the reliable and optimal route. They are Reliable and Effective Cache Management Technique, Reliable and Effective Load Balanced Routing protocol and Optimized Reliable and Load Balanced Routing Protocol.

A Reliable and Effective Cache Management Technique is developed for the DSR on-demand routing protocol. In this approach the stale cache problem is considered in order to improve the performance of the routing protocol by improving the route cache performance. DSR route caches have the disadvantage like stale route cache entries, incomplete error notification and insufficient cache size etc. In this technique, initially, estimate the combined weight function for each route stored in the route cache of the node. The Combined Weight Function is estimated with the help of the signal strength i.e., when the signal strength is high then the node is nearer to the source or destination is away from the source. CWF takes another parameter as length. Length is considered in terms of number of hops to travel to reach the destination. If the length is minimum, then the distance between the source
and destination is minimum, the packets send may reach the destination quickly with less overhead, energy and delay.

Traffic load is considered as another parameter to estimate the CWF. In the high traffic load, the route may get congested and which leads to breakage of the link. So traffic load also considered for calculating the CWF. When the load is minimum, the packets can easily flow in the route to reach the destination. Energy level is also considered as one of the parameter for calculating the CWF. The energy plays a vital role in life of the network. If the route has minimum energy level then there is a high chance of failure of nodes and as well as the routes which pass through that node gets failed. So, these are the four parameters considered for the estimation of robustness of the link using the CWF.

The routes in route cache are arranged based on the combined weight value, the routes with maximum signal strength and the energy level, minimum length with traffic load. The route in the route cache of the node is updated by removing the route with minimum least weight functions. During the route predication mechanism, the link breakage can be detected using the received signal strength of that link. When the link is likely to be broken, then the node will select the most reliable path from the route cache as the alternated route, before the link gets break. Since this technique proactively selects a best alternate route from the route cache. Simulation result shows that, RECM minimizes the delay, overhead, energy and the throughput is increased when compared with the DSR routing protocol of the MANET. This metrics are improved by avoiding the reinitiating route discovery by reducing the stale routes in the route cache.

A Reliable and Effective Load Balanced Routing Protocol is developed for DSR routing protocol in Mobile Ad Hoc Networks. In this
technique, load balancing technique is taken into consideration, the workload is distributed evenly across the two or more nodes, multiple links, in order to use the resources in a better way. Multiple components is used for balancing the load which may increases the reliability through redundancy. If load is not balanced then it increases the traffic which increases the congestion in the network. Due to congestion, the link may get broken. So, multiple components are used instead of the single component which increases the reliability through redundancy. But, it is difficult to evenly distribute the load among the multiple paths.

In this approach, initially, a combined weight function is estimated using the signal strength, traffic load, energy and length of the route. The freshness of each route is estimated. The best n paths are selected based on the value of the combined weight value among the paths stored in the route cache. Then the traffic has to be distributed over these paths based on the network diversity coding. Network diversity coding is used to split the block into number of equal blocks. All the blocks which is allocated over the path be reached the destination successfully when there is a maximum combined function. If suppose, the path has a minimum weight function, then all the blocks sent over these paths gets lost. The receiver node receives the original message and can be reconstructed using Lagrange interpolation and secret sharing scheme, if at least L blocks out of M blocks reach the destination. Due to this the packet delivery ratio is maximized by sending a message through multiple paths and also the continuous usage of that route leads to reduction in energy, overhead and delay time to reach the destination. Simulation result shows that the performance of the routing protocol is enhanced by minimizing the energy consumption, delay and overhead. It also increases the packet delivery ratio when compared with the DSR routing protocol.
Optimized Reliable and Load Balanced Routing Protocol for Mobile Ad Hoc Networks is developed to reduce the overhead involves during routing. This technique is used to optimize the previous work RELBR. In the DSR routing protocol, the header of the packets consist of IP addresses of all the nodes through which they have to transmit the packet. So the transport overhead increases highly in the network. Then number of packets involved in routing is reduced to reduce the control overhead of the DSR routing protocol.

In this mechanism, two phases are involved to reduce the overhead which in turn increases the scalability of the routing protocol. In the first phase, the path for the data packet transmission is determined by the DSR route discovery process. During the transmission of the data packets, at every node the bloom filter is used to estimate the compressed source route. So, in this phase, it reduces the per-packet control overhead of DSR by compressing the source route with a Bloom filter.

The second phase of this technique, reduces the total control overhead. In this phase, each intermediate node between the source and destination node deletes its own node address carried by the data packets, after visiting that node before forwarding to the next node of the route in the source route list. By deleting this redundant control information in the data packet header, it reduces the total control overhead. Simulation result shows that the overhead is ORLBR. It increases the packet delivery ratio and reduces the energy consumption, overhead and end-to-end delay in a considerable manner.
8.2 FUTURE ENHANCEMENT

Mobile ad-hoc networking is a hot concept in computer communications. Due to dynamic topology, the routing is the major issue in the MANET.

In this research, the routing of the DSR is enhanced by improving the route cache, distributing the load and increasing the scalability. These techniques can be implemented to any other on-demand routing protocol to attain the reliable and optimal routes between the nodes.

The above works can only provide robust paths between source and destination regardless of the Quality of Service (QoS) requirements such as a bandwidth, latency, jitter and delay guarantees. These demands are very frequent especially for real time applications.

Even though this research improves the reliability of the routing, it doesn’t concentrate on the malicious node which may affect the reliability of the routing. This node may block the traffic that passes through it. It can also perform traffic sniffing which affects the network performance. Sometimes it may lead to the Denial of Service.

Due to mobility, security is also a major issue to be considered in future.