ABSTRACT

The mobile ad hoc network (MANET) is a self-configuring infrastructure-free network of mobile devices connected by wireless links; it is essentially a temporary wireless network which users who are willing to communicate form and who subsequently use multi-hop peer-to-peer routing to provide the network connectivity. MANETs have applications in rapidly deployed and dynamically changing environment such as military systems. The nodes in MANET being mobile may result in dynamic topology with a high rate of link breakages and network partitions leading to an interruption in the ongoing communication. Further, the nodes in MANET are dependent upon the exhaustible power supply; and because of shared nature of medium, the transmitted packets may cause an energy loss in the surroundings nodes due to overhearing. There is increased possibility of packet loss and congestion in MANET compared to wired networks, resulting in considerable energy consumption. While the problem of network partitioning due to the movement of nodes cannot be handled by routing protocol, the partitioning due to the outage of battery can be solved by routing decisions. The routing techniques help in the path establishment for communication. The traditional routing protocols may not be suitable for MANET due to its dynamic nature. The MANET group of internet engineering task force (IETF) has specified the routing techniques for MANET. These routing techniques consist of different types of overheads such as the routing overhead; and the overhead caused in managing the link failure is a significant contributor of energy consumption. This is because the start node of the broken link has to wait/retry for a time-out interval before deciding that the link has failed and cannot be used further and has to inform through a route error (RERR) packet to all other nodes using the failed link in their path. Also, the packets following this path experience large delays and the source node has to find a new route to destination. In this thesis is proposed a technique to measure the stability of the link. The
measured value reflects the present stability of the link, that is, it gets updated with the time. The technique was implemented on dynamic source routing (DSR), the chosen candidate routing protocol is selected due to the absence of local recovery mechanism in its ns2 implementation. The energy aware QoS routing protocol (EAEDSR) with link stability prediction for MANETs is proposed. The link stability helps to predict the likely link break time. In order to select a stable and reliable path, in route discovery, the nodes consider the received power strength and traffic levels of the nodes on the path. The destination selects the node disjoint multiple paths. The nodes over the path keep on monitoring the node’s stability and the link lifetime. The link lifetime is measured by the received signal power strengths at different time intervals. The node’s stability is measured by considering the available energy of the nodes. These two measures help to compute the link stability metric which is used as a preemptive criterion. The technique reduces the communication overhead exponentially. The simulation results show that the proposed technique outperforms DSR.

Keywords: MANET, link breaks, overhead, link stability, preemptive, routing protocol.