ABSTRACT

Mobile Ad-hoc Networks (MANET) are self-configuring, infrastructure less network that comprises of a collection of wireless mobile nodes to construct a temporary network without the assistance of any centralized administration. Each node in the MANET acts both as a router and forwarding data packets to other nodes within the radio ranges and uses multi-hop communication for long distances. In such a network the nodes are moved arbitrarily, thus network topology changes frequently and unpredictably. If receiving node is not in the boundary of transmission range, the message is delivered to the destination node with the help of some intermediate nodes.

Routing operation is the most fundamental role in MANETs. The degree of mobility nature in MANET, because of this topology changes very often. Nodes ordinarily interact in multi-hop design and the router functions as intermediate nodes by sending information. In the routing protocol's execution, routing metrics have been designated to various paths. It ascertains the cost of every path, thus to choose or to estimate the best path. This estimated route is then preserved in the routing table. This routing table information is utilized for future use. The routing metrics are incorporated into the routing protocols to enhance correspondence efficiency in term of transfer speed (bandwidth), the rate of error, reliability, latency, and expense. Therefore, as specified recent routing measurements are required to analyze and enhance the execution of MANET in managing more imperatives. The nodes in MANET have restricted process speed and power, battery, storage, and communication capabilities. One in all the foremost problem in MANET is their routing algorithms that determine the path which leads to effective performance metrics.
Many research works have been carried out in the area of routing algorithms in MANET. Routing protocols in MANET are classified as proactive and on-demand routing protocols. In mobile ad-hoc networks, the efficient energy utilization in a node is considered as essential for developing a routing algorithm. Failure of a node due to energy drain leads to network partition and communication failure in the network. Hence designing energy aware routing protocol has become an issue. The objective of these protocols is to reduce the energy consumption of mobile nodes in the network in order to increase the network lifetime. Another concern of the most critical network is bandwidth utilization, even though the efficiency in energy is a prime concern.

A Mobile Agent Based Reliable and Energy Efficient Routing Protocol (MAREERP) is proposed for providing reliable and energy efficient routing. It also describes the methodology to obtain the link cost metrics such as network load, bandwidth, energy consumption and link availability. Then the mobile agents are deployed randomly over the source node and it migrates hop by hop until reaches the destination. Mobile agents collect the metrics mentioned above from each node that they traverse and combined them to estimate the cost metric. Multiple paths are established based on the collected information and then the sender selects the optimal path using the path cost metric which is the summation of link cost metric along the path.

Particle Swarm Optimization (PSO) based approach utilizing Expected Transmission Count metric (ETX) is proposed in order to reduce the transmission including the number of retransmission which is utilized to deliver the packets efficiently to the destination in short duration of time. In the existing approach, the source select the optimal path after the repetition of computations that related to the load in the network. It will affect the performance of the system due to the enormous amount of transmission. In
order to improve the selection of optimal path, the PSO algorithm is used to find the shortest path that efficiently sends the packets to the selected destinations in a less amount of time. The important constraint behind the optimal path selection is, the optimal path should contain the minimum hop count. Based on the estimated fitness, pbest and gbest values priority is selected. The selection of the optimal path is carried out, depending upon the prioritized value and the Expected Transmission count is applied onto the optimal path. By this approach, the packets can be transmitted efficiently with the minimized number of transmissions and retransmissions. Thus by minimizing the transmissions the efficiency of the network can be increased.

Simulation results ascertained that the proposed work upturns the packet delivery ratio while reducing the delay, packet drop and energy consumption in the incidence of high traffic loads, varying network size and mobile speed. It is also shown that these techniques can increase the efficiency and reliability of the network by minimizing the packet drop and communication overhead.