A New Density Based Probabilistic Counter based Scheme for Solving Broadcast Storm in Mobile Ad Hoc Networks

Abstract:

Broadcasting is a fundamental data dissemination mechanism for route detection, address resolution and many other networks related services in Mobile Ad hoc Networks (MANETs). Although flooding is the simplest mechanism for broadcasting, where each node retransmits every individually received message exactly once, it is usually expensive and results in rigorous redundancy, contention and collisions in the network. These problems are widely referred to as the broadcast storm problem. Hence an effective broadcasting scheme is essential in MANETs to transmit a data packet from the sender to the rest of the network nodes. This work introduces a new counter-based broadcasting scheme to achieve efficient broadcasting by adaptive threshold with a predetermined forwarding probability ‘p’ which can be fixed based on the local density information. The counter identifies nodes with duplicate data packet using threshold values and node removes the redundant message. Probabilistic schemes do not require global topological information of the network to make a rebroadcast decision. As such, every node is allowed to rebroadcast a message. The proposed work also adapts the Random Assessment Delay (RAD) value to network congestion level and uses packet origination rate as an indicator of network congestion by keeping track of the number of packets received per second at each node. The extensive simulation results show that the new scheme outperforms the existing schemes in terms of saved-rebroadcast, reachability and latency.