Abstract

The high-level contribution of this paper is an energy-aware version of the well-known position-based Greedy Perimeter Stateless Routing (GPSR) protocol for mobile ad hoc networks (MANETs). In the proposed energy-aware GPSR protocol, referred to as E-GPSR, we optimize the greedy forwarding mode as follows: a forwarding node first determines a candidate set of neighbor nodes – the nodes that lie closer to the destination than itself. The weight of each such candidate neighbor node is then computed to be the sum of the fraction of the initial energy currently available at the neighbor node and the progress (i.e., the fraction of the distance covered between the forwarding node and the destination) obtained with the selection of the neighbor node. The candidate neighbor node that has the largest weight value is the chosen next hop node to receive the data packet. This procedure is repeated at every hop where greedy forwarding is possible. In case, greedy forwarding is not possible, similar to
GPSR, E-GPSR switches to perimeter forwarding. With E-GPSR, the fairness of node usage considerably improves compared to GPSR. Simulation results illustrate that the time of first node failure, due to the exhaustion of battery charge, increases significantly (as large as by 55%) with the use of E-GPSR, whereas the hop count increases only as large as by 7%.

Reference


Index Terms

Computer Science Wireless
Key words

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