

AN ENERGY-AWARE ROUTING SCHEME WITH NODE RELAY WILLINGNESS IN WIRELESS SENSOR NETWORKS

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Received September 2006; revised December 2006

ABSTRACT. *Energy efficiency has been known as the most significant problem in all facets of the Wireless Sensor Network (WSN) operations. Many routing schemes, which use the constrained energy available at sensor nodes more efficiently, have been presented. A lot of these routing schemes try to find the optimal paths to optimize the energy utilization at a sensor node. We take the view that the network survivability is an important metric for measuring the network lifetime. For an energy-aware routing scheme in WSNs, it is necessary to use the sub-optimal paths occasionally to increase the network survivability. In this paper, we present a new network lifetime definition and formulate the energy-aware routing problem with defined network lifetime. And then we propose an energy-aware routing scheme with the node relay willingness for WSNs, which considers routing packets not only through the sensor nodes with sufficient energy reserves, but also through the light-loaded nodes. Simulation results show that the network lifetime of the proposed algorithm is longer than that of the routing algorithm considering the energy reserves only.*

Keywords: Wireless sensor networks, Energy-aware routing, Multihop, Node relay willingness

1. Introduction. In the last few years, Wireless Sensor Networks (WSNs), the dense wireless networks of sensor nodes collecting and disseminating environmental data, have become a hot research area [26]. There are many scenarios in which such networks might find applications [10], such as the environmental control in office buildings, the robot control and guidance in automatic manufacturing environments, smart home, and so on.