

Energy-Efficient Sensor Data Gathering in Wireless Sensor Networks

Ruqiang Yan*, Zhaoyan Fan¹, Robert X. Gao¹ and Hanghang Sun

Southeast University, No. 2 Sipailou, Nanjing, 210096, China

¹University of Connecticut, 191 Auditorium Road, Storrs, CT 06269, USA

(Received August 6, 2012; accepted October 11, 2012)

Key words: data gathering, energy efficiency, wireless sensor network, RSSI

In this paper, we present the design and realization of energy-efficient sensor data-gathering schemes used in wireless sensor networks (WSNs) for monitoring engineering systems. A key issue in the design of WSNs is to establish a reliable assessment scheme by combining data acquired from each individual sensor into a single wireless sensor network. However, as the size of the network rapidly grows, aggregating information made by all the sensors becomes computationally intractable, causing increased energy consumption. Hence, it becomes critical that the WSN be sectioned to allow for computational efficiency while reducing the overall data communication requirements for the purpose of energy saving. Different data-gathering schemes have been investigated in this study for energy-efficient sensing. In order to automatically perform effective data gathering in such a network, the hardware and software of the sensor node are designed to meet the requirement of optimizing energy efficiency. It was found that the overall energy cost of the system is considerably less for a sectioned WSN than the conventional centralized network structure.

*Corresponding author: e-mail: ruqiang@seu.edu.cn