Sensors and Materials, Vol. 26, No. 5 (2014) 325–332
MYU Tokyo

S & M 0998

A Concentric Clustering Architecture with Particle Swarm Optimization Algorithm in a Wireless Sensor Network

Young-Long Chen*, Neng-Chung Wang[1], Mu-Yen Chen[2], Yung-Fa Huang[3] and Yi-Nung Shih

Department of Computer Science and Information Engineering,
National Taichung University of Science and Technology,
No.129, Sec. 3, Sanmin Rd., Taichung 404, Taiwan
[1]Department of Computer Science and Information Engineering,
National United University, Lienda, Miaoli 360, Taiwan
[2]Department of Information Management,
National Taichung University of Science and Technology, Taichung 404, Taiwan
[3]Department of Information and Communication Engineering,
Chaoyang University of Technology, Taichung 413, Taiwan

(Received December 24, 2013; accepted March 6, 2014)

Key words: WSNs, energy efficiency, clustering algorithm, PSO algorithm

The lifetime of wireless sensor networks (WSNs) is limited because the sensor nodes must rely on battery power, which is a limited resource. In this paper, we improve a Clustering Algorithm based on Social Insect Colonies (CASIC) to extend the lifetime of a WSN. We propose the CASIC with Particle Swarm Optimization (CASIC-PSO) scheme, which uses a Particle Swarm Optimization (PSO) algorithm to select a cluster head that can prevent the selection of inappropriate nodes and balance the node energy consumption. Simulation results show that our scheme effectively reduces energy consumption and extends the lifetime of WSNs.

*Corresponding author: e-mail: ylchen66@nutc.edu.tw