A JOINT DUTY CYCLE SCHEDULING AND ENERGY AWARE ROUTING APPROACH BASED ON EVOLUTIONARY GAME FOR WIRELESS SENSOR NETWORKS

Iranian Journal of Fuzzy Systems

مقالات آماده انتشار، پذیرفته شده ، انتشار آنلاین از تاریخ 10 دی 1395 XML

نوع مقاله: Research Paper

نویسندگان

M. R. Meybodi[3] ؛ A. Movaghar[* 2] ؛ M. S. Kordafshari[1]

[1]Department of Computer Engineering, Science and Research Branch, Islamic Azad University, Tehran, Iran

[2]Department of Computer Engineering, Sharif University of Technology, Tehran, Iran

[3]Computer Engineering and Information Technology Department, Amirkabir University of Technology, Tehran, Iran

چکیده

Network throughput and energy conservation are two conflicting important performance metrics for wireless sensor networks. Since these two objectives are in conflict with each other, it is difficult to achieve them simultaneously. In this paper, a joint duty cycle scheduling and energy aware routing approach is proposed based on evolutionary game theory which is called DREG. Making a trade-off between energy conservation and network throughput, the proposed approach prolongs the network lifetime. The paper is divided into the following sections: Initially, the discussion is presented on how the sensor nodes can be scheduled to sleep or wake up in order to reduce energy consumption in idle listening. The sensor wakeup/sleep scheduling problem with multiple objectives is formulated as an evolutionary game theory. Then, the evolutionary game theory is applied to find an optimal wakeup/sleep scheduling policy, based on a trade-off between network throughput and energy efficiency for each sensor. The evolutionary equilibrium is proposed as a solution for this game. In addition, a routing approach is adopted to propose an energy aware fuzzy logic in order to prolong the network lifetime. The results show that the proposed routing approach balances energy consumption among the sensor nodes in the network, avoiding rapid energy depletion of sensors that have less energy. The proposed simulation study shows the more efficient performance of the proposed system than other methods in term of network lifetime and throughput.

کلیدواژه ها

Wireless Sensor Network؛ duty cycle scheduling؛ Energy aware routing؛ Evolutionary Game Theory؛ Distributed Reinforcement Learning