DUTY CYCLING IN TARGET MONITORING WIRELESS SENSOR NETWORK SYSTEMS

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Submitted: Jan. 15, 2013 ***Accepted: May 21, 2013*** ***Published: June 2013***

Abstract- Duty cycling is an important method for energy constrained sensor network systems to prolong lifetime. Current research on duty cycling is mainly based on such assumption that all the sensory coverage should be maintained while some nodes are sleeping. However, for the applications of target monitoring, it is not necessary anymore to keep the whole sensory coverage of the sensor network. It only needs to make sure that such kinds of nodes are active which can perceive the activities of the monitored targets. This paper proposes a novel duty cycling design for target monitoring sensor networks, which includes two algorithms - sleep scheduling algorithm and gradient query algorithm based on sleep periods. In the proposed design, most of sensor nodes are sleeping, while still keep the functions of target monitoring and information query in the sensor networks. The performance of our design has been evaluated through both theoretical analysis and simulations, which prove the functionality of the proposed design on the reduction of energy consumption.

Index terms*: Duty cycling, sleep scheduling, gradient query, target monitoring, wireless sensor network systems.*