



RESEARCH ARTICLE

Lifetime Maximization in Sensor Networks for Rare-Event Detection using Optimal Sleep Scheduling

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Abstract— Recent advancements in technology have made low-cost, low power wireless sensors a reality. A network of such nodes can coordinate among themselves for distributed sensing and processing of certain phenomena. In this project a protocol to provide a stateless solution in sensor networks for lifetime maximization is proposed. The protocol proposes a unique way to maximize the life time. Lifetime maximization is one key element in the design of sensor-network-based surveillance applications. A protocol for node sleep scheduling that guarantees a bounded-delay sensing coverage while maximizing network lifetime is proposed. The detection of rare events, where the network is normally silent, except when an event occurs is focused. Sleep scheduling ensures that coverage rotates such that each point in the environment is sensed within some finite interval of time, called the detection delay. The framework is optimized for rare event detection delay and lifetime without sacrificing coverage for each point. The goal of this system to develop a localized distributed protocol for solving the aforementioned constrained optimization problem while ensuring upper bounds on the worst-case detection delay. The resulting sleep schedule achieves the lowest overall target surveillance delay given constraints on energy consumption.

Keywords: - Detection Delay; OSP, Rare Event Detection; WSN

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