SIMULATION AND DATA ROUTING FOR WIRELESS SENSOR NETWORKS

By

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ABSTRACT

In recent years, wireless sensor networks have been the source of increasing interest for researchers because they gather information from multiple sources at the same time. This technology allows small sensors to be distributed across a geographical region to collect data, which is sent to a main server via a routing algorithm to be compiled and analyzed. In order to obtain the optimum level of performance, researchers must consider three main factors: power usage, adaptability, and physical characteristics.

This thesis examines current trends in wireless sensor networks, introduces a new simulation environment to test out several current routing algorithms, and introduces an extension on a variant of self-selection routing. The simulator is based on the Rensselaer Optimistic Simulation System (ROSS) platform and models the communication patterns between sensors within a network as well as the overall efficiency of the sensor network. Five algorithms: Self Selection V1, Self Selection V2, Cobweb, and SHR-M as well as an extension of self selection incorporating power into the routing algorithm (KAS) are simulated to determine the accuracy of the simulator and analyze trends in various routing algorithms. Results indicated that the simulator was able to verify the results of the algorithms quickly and provide an output format that can be used to analyze the results quickly and efficiently. The algorithm extensionexplicitly takes power into account when routing information to increase network lifetime as compared to the original algorithm.