

Energy Consumption in Wireless Sensor Networks

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Abstract

Wireless Sensor Networks (WSNs) have been intensely studied because of their potential applications and technological challenges. However, most analysis of WSN performance has used only computer simulations, with greatly simplified assumptions about the performance of the underlying circuits. WSN network lifetime depends upon communication protocols. The Gossip-Based Sleep Protocol (GSP), implements routing and MAC functions in an energy conserving manner. However, measuring network lifetime with even a protocol as simple as GSP is problematic. Multiple approaches are described for measuring energy consumption in terms of transmit and receive phases, minimum voltage supply required for operation and transmit power. Also multiple methods are described for measuring the lifetime of a sensor node and describing end-of-lifetime behavior. The final result is a model of energy consumption describing the performance of GSP on the Mica2 platform, which is then compared with other models. Academic researchers, professors, students and industrial researchers in the field of WSNs or concerned about energy consumption by general wireless communications devices will be interested in this book.