

عنوان مقاله:

Power and Energy Aware Design of an Autonomous Wireless Sensor Node

محل انتشار:

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خلاصه مقاله:

The design of Wireless Sensor Networks is a challenge, requiring to correctly balancing between performance, time, cost and energy. But the main problem with rechargeable WSNs is to predict at design time which will be the total system autonomy. Moreover, it depends on the energy harvested from the environment, and we know that weather may be very unsettled. Thus, it is crucial to design and fine scale the entire power supply chain in order to produce a robust WSN. In this article, we propose an energy estimator able to handle environment like weather parameters to estimate the system autonomy. The key innovation comes from the capability to dynamically rebuild the models all along the project evolution with real measurements on the hardware and to include weather forecasts as dynamic parameters of the DPM policy. Finally, we have experimented various configurations and compared the hardware WSN against the simulator. The results have validated the relevance of the estimator for prospecting various energy problems. By experiment, the estimator has shown that most environmental energy was wasted due to the battery charging constraints. This will foresee the opportunities of energy gains, and the definition of newer extra power modes for the Dynamic Power Management. This work contributes to the domain for WSN design methodology, energy scavenging and energy management to optimize system autonomy.

کلمات کلیدی:

Wireless Sensor Networks, Low Power, Energy Management, Energy Harvesting, Energy Estimator, Dynamic Power Management, Weather Forecasts

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