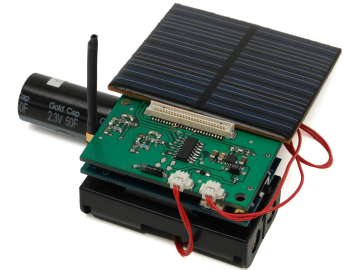


RIKA Project

« Energy-Budgeting Wireless Gardener »

Background

Wireless sensor nodes are tiny devices for environmental data-gathering and event-detection. To achieve easy installation, they are equipped with wireless communication modules. As a node's lifetime is generally limited due to energy constraints, next-generation nodes are equipped with energy harvesting modules and advanced energy storage facilities—e.g., a combination of solar panels and supercapacitors. Yet, to prevent depleted energy buffers during periods of low harvesting potential, nodes must be aware of incoming and outgoing currents. Gaining knowledge of these factors enables nodes to choose appropriate duty cycles, task schedules, and energy modes.

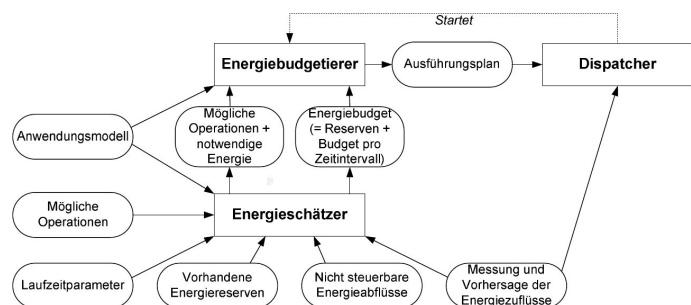


Project Description

Setting The application for the project is a plant monitoring system: Wireless sensor nodes are attached to plants and measure soil humidity, temperature, and light. They periodically report the readings plus the node's health status to a central station. Furthermore, nodes generate high-priority events in case one of the measured values exceeds a certain limit. The central station writes all received samples into a database. In addition to this, a visual frontend displays the readings on a screen. Besides informing the user about critical values, the application shows plant statistics and details as well as health information of the attached sensor nodes.

Project Cornerstones

- Installation and accessing of the sensors plus conversion of the samples
- Energy-aware scheduling of tasks
- Development and implementation of prediction models for harvested and consumed energy
- Wireless communication design and implementation for data exchange (sensor samples, node configuration)
- Database layout and accessing
- Design and implementation of the visual frontend for user interaction



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