Institut für Verteilte Systeme
Institute of Distributed Systems

universität ulm

Power Consumption Analysis of Storage Architectures in Wireless Sensor Networks

Wireless Sensor Networks consist of sensor nodes that utilize low-power wide area networks to periodically transmit sensor readings (e.g., temperature, humidity, pollution levels) to backend services. These sensor nodes are typically battery-powered and their processing capabilities hence limited. This directly results in a trade-off between temporal resolution of transmitted sensor data and battery lifespan.

As part of a research project at the Institute of Distributed System, we research novel storage mechanisms at the sensor node to reduce the temporal resolution by default, but still allowing for high-resolution on-demand access of past readings. The goal of this topic is to investigate the power consumption characteristics of LoRa sensor devices in regard to storing sensor readings in non-volatile memory on the sensor node and transmitting data to the network. This problem can be investigated through the means of network simulations (e.g., using the FLoRa framework for OMNeT++ or similar tools) and analytical calculations. Additionally, practical experiments on real LoRa hardware can be performed to validate the analytical results (not absolutely required for the topic).

Master's Thesis	30 CP
Project	8/16 CP

Suitable for students with an interest in wireless sensor networks, microcontroller development (Arduino, ESP8266, ESP32, ...), and network simulation.

Please contact me for additional details, If this topic sparked your interest.

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If you are interested or you need additional details,
feel free to contact me or drop by for a non-binding chat.