CARL VON OSSIETZKY universität OLDENBURG

Fakultät II *Informatik, Wirtschafts- und Rechtswissenschaften*
Department für Informatik

Internes Kolloquium

Am **Montag, den 16. März 2015,** um **16:00 Uhr** hält

Mohamed Abdelaal
Universität Oldenburg

im Rahmen seiner beabsichtigten Dissertation einen Vortrag mit dem Titel

Decentralized Energy Conservation Techniques for Wireless Sensor Networks

Der Vortrag findet im A5 0-054, Campus Haarentor statt.

Abstract:

The crux behind this work is to extend the lifetime expectancy of wireless sensor networks (WSNs). In particular, we target exploiting the trade-off between reducing certain quality-of-service (QoS) measures to a degree still tolerable by the application (such as, for example, precision and latency) and extending the application's lifetime. These approaches are classified into three main roots: Energy-cheap"' data aggregation, Virtual Sensing and Lifetime Planning. Currently, we have already achieved a reasonable progress as can be seen below.

In the first category, we propose a new data compression technique based on the so-called fuzzy transform, referred to as FuzzyCAT. It has been refined to minimize the recovery error even with high compression ratios via hybridizing the approximating function. Currently, we work on a cooperative prediction model through which a continuous data stream is guaranteed at the sink node. Next, we introduce a general module for pre-conditioning the sensor data prior to compression. The crux is to quick-sort the sensor data prior to being lossy-comprised. This idea bases on the fact that lossy compressors prominently resemble the behavior of low pass filters. The recovery mechanism comprises encoding the data indices using a lossless approach.
In the second category, virtual sensing is proposed a novel technique for decreasing the sensing unit energy consumption and simultaneously slashing the event-miss probability. Earlier, a technique, referred to as EAVS, has been proposed and a case study of gas leaks detection was given. Reliability of such systems composed of virtual and real sensors should be improved. An ontology on sensor-environment relationships is utilized to automatically generate rules before deployment to switch between real and virtual sensors.

Finally, we propose a novel method to (1) meet the expected network lifetime, and (2) achieve the best efforts QoS requirements. Our methodology here is to divide and conquer, where the entire node lifetime is viewed as a successive phases of fixed length. The core idea is to allow for a graceful degradation of the energy consumption throughout the entire lifetime. At each phase, the energy consumption as well as the QoS parameters of the previous phase are evaluated. Accordingly, the system reconfigures its parameters to wisely consume the allocated energy during the current phase. A predictive self-adaptive mechanism is required to perform such adaptations.

Betreuer: **Prof. Dr.-Ing. Oliver Theel**

Weitere Kolloquiumstermine sind im WWW abrufbar.