Wireless Sensor Networks

Lab WS'2011/2012

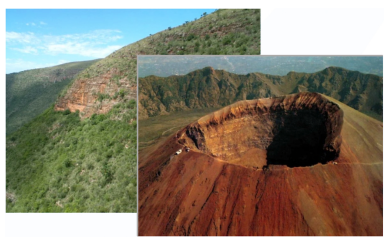
TECHNISCHE UNIVERSITÄT DARMSTADT

Overview

Embedded everywhere, hundreds of tiny sensor nodes detect activities in the real world, generating data that is fed into different systems, informing users about the current system state and supporting the decision of how to actuate next. Sensor network technology is being applied in many environments and with multiple purposes:

In **logistics and transportation**, sensor nodes are used to track containers and pallets their are attached to, generating information for the real-time enterprise.

Unobtrusively **monitoring habitats** or other physical environments of difficult access is enabled by sensor networks, collecting data at resolutions and scales difficult to achieve with traditional instrumentation.



On the way towards **energy efficient construction**, sensor networks help evaluate the behavior of new and existing buildings to potentially improve the construction / restoration process, construction materials, providing information about heat leaks, etc.

Nodes attached to parcels facilitate observing and controlling crops in **precision agriculture**. Soil moisture and crop temperature are only some variables used to adjust fertilizing or pesticide applications.

Sensor networks for **structural engineering** estimate the state of the structural health, detecting changes (e.g. vibrations due to wind or load) that might affect the service offered by the structure.

The common denominator in these scenarios are the *sensor networks*, composed of low-cost, low-power miniaturized sensor nodes that communicate untethered across short distances to carry out their collective task. For these sensor networks to work, sophisticated architectures and efficient communication protocols must be developed to allow large amounts of nodes to collect, process and disseminate data.

General Information

- Objectives of the Lab:
  - Using a hands on approach, explore a variety of tools needed to implement, test and document end-to-end applications with Wireless Sensor Networks technologies using Contiki
  - Participate in one such project like TUD's Solar House
  - Strengthen your abilities to successfully work in a team
- Language:
  - Slides in English
  - Solutions to exercises in English or German
- Course Type:
  - Lab (Praktikum)
  - 4 SWS, 6 Credit Points

Organization and Contact

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Course URL: **http://www.dvs.tu-darmstadt.de/teaching/wsnlab/2012**