Introduction

Energy saving is an important issue in times of shortages of resources and increasing energy prices. Different areas of research are investigating the relevant factors. In economic psychology, studies carried out in the last decades revealed that immediate feedback plays an important role for consumption behaviour. This aspect is neglected in most systems currently implemented in households and offices.

Domestic energy use is commonly invisible to the user. People have only a vague idea of how much energy they are using for different purposes and what sort of difference they could make by changing day-to-day behaviour or investing in efficiency measures. Key issues are for instance the lack of real time information around consumption and the influence of energy use information on energy-saving behaviour. Hence the importance of energy feedbacks consists in making energy more visible and more amenable to understand and control.

System Design

Distributed Resource Management

Mesh Architecture of WoT:
- Local platform
- Global gateway
- Managing sensors and actuators using HTTP requests

RESTful Access to Resources:
- Register
- Update
- Manipulate
- Delete

Goal

A multi-layered architecture consisting of four functional modules
- Context-based monitoring and control

SmartTecO Environment

SmartTecO is our smart laboratory environment, which employs 33 µPart sensor nodes to detect movement around the tables or of the devices, and to monitor temperature and lighting status in the rooms. Each socket is equipped with a Plugwise² Circle and each heater is controlled with FHT³ sensor and actuator.

Heterogeneous Sensor Networks

- µParts: 1cm² low power wireless sensor nodes with temperature, light and movement sensors
- Plugwise network: measures the energy consumption of appliances and switch them on/off
- FHZ network: a FHT thermostat measures the room temperature and communicates wirelessly with FHZ base station

Conclusions:

- An architecture for context-based monitoring and control in the home/office setting of energy consumption
- Ambient and energy sensing based on currently deployed heterogeneous WSNs

Future Work:

The next step will be to implement the correlation module integrated in the uBox, which has the role of managing, filtering and correlating information from the local context interpretation.

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