TU Clausthal

Bachelor-, Master- und Doktorandenseminar
des Instituts für Informatik

# Automated modeling of appliance signatures for realistic consumption trace synthesis


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Domestic appliance power consumption analysis became an important research area in recent years. Its applications allow to get insight into the overall energy use in residential sector, its optimization and controlling. Most prior analysis techniques model device power consumption using the simplified on/off states with stable power levels derived from averaged statistical data which does not reflect the actual diversity of consumption signatures in real data. Only recently the first steps were undertaken towards the device-accurate load modeling.

In this work a new approach to the automated device power consumption modeling is introduced. The Automated Model Builder for Appliance Loads (AMBAL) allows to derive models with different accuracy levels based on the requirements from the real device power consumption data collected by means of smart meters. These models are represented by sequences of parametrized signatures; the model's complexity is kept minimized for the required accuracy level. The evaluation of AMBAL models was performed using device traces with consumption patterns of different complexity from the previously collected datasets. As an example of the usage of the resulting models a synthetic appliance trace generator was developed which allows simulation of user activities in homes with different number of occupants and corresponding device actuations producing traces of any required complexity (regarding number of devices in use). The generated data can be valuable for the development of analysis algorithms such as Non-Intrusive Load Monitoring (algorithms for decomposing aggregated traces into device-level data). This generator was integrated with an open source framework for development of power disaggregation algorithms (NILMTK) thereby contributing to the automation of testing and evaluation of these algorithms.


## Montag, den 31.10.2016, 17 Uhr s.t. im Besprechungsraum 106, IfI, Julius-Albert-Straße 4


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