PowerIT

IT for Implicit Interaction based Energy Management

Motivation

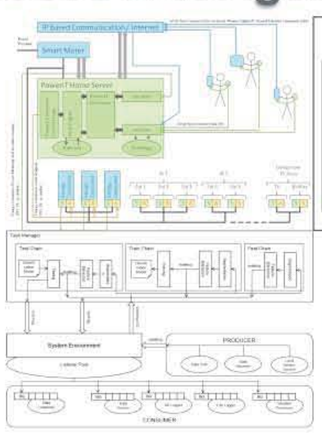
Advances in ICT open up new avenues for innovation of how energy is supplied and consumed. ICT components and sensors have become miniaturised and give rise to pervasive embedding of sensing, computing and digital networking in the world; to the Internet of Things and real-time economies; and to ambient intelligence and digital services that blend with the everyday. Energy research programmes reflect the vital importance of advances in ICT toward smart grids, and smart meter initiatives are an initial step toward interactivity and two-way communication between supplier and consumer. The potential of ICT for addressing the energy problem however is much larger, and as yet underexplored and underdeveloped.

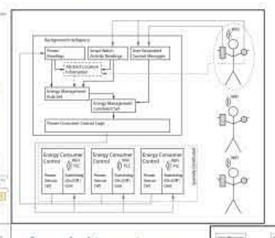
The objective of this project is to develop methodologies and information and communication technologies towards future generation, user/consumption centric (user in the loop), implicit interaction based energy management systems, PowerIT.

Mission

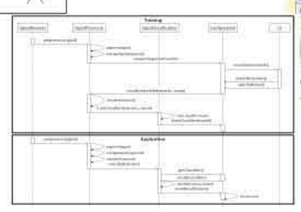
For implicit and interactive system control and background processing of real-time occurrences, unobtrusive, highly available and secure system components are available that are concerned with the following aspects and depicted in the diagrams below: I) Core system model and background intelligence, II) Activity Context Recognition, III) Location Context Recognition and IV) Energy Consumption and Control Observation.

Core Intelligence

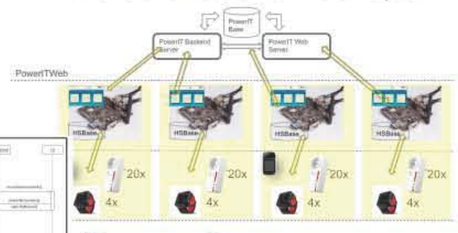




Architecture Model Evolutions



Incremental Data Persistence and Backups

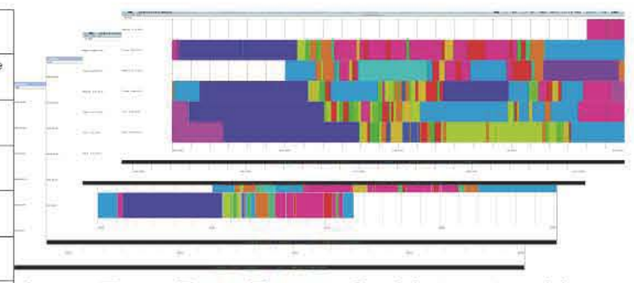


Process Sequences and Interprocess Communication

Activity Recognition

read		eat		meet		smoke	
break_smoke		education		dontcare		socialize	
car_driving		entertainment		phonecall		sports	
coffee		family_care		pray		travel	
computer		household		relax_think		tv	
cook		hygiene		shop		work	
drink		locomotion		sleep		write	

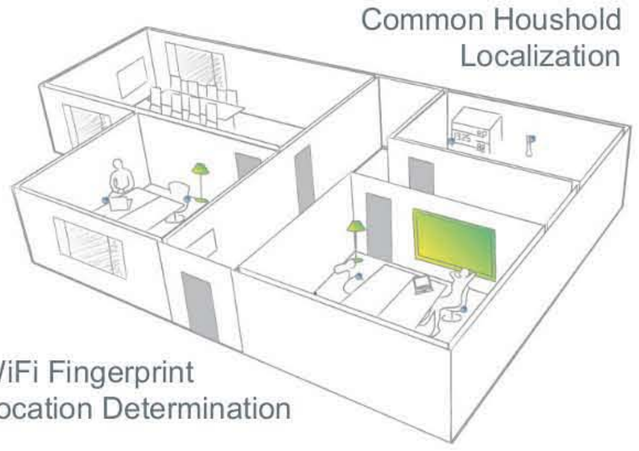
Activity Iconography



Long Term Data Traces for history tracking

Online Activity Labeling and Evaluation

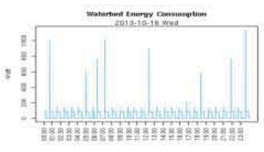
Location Recognition

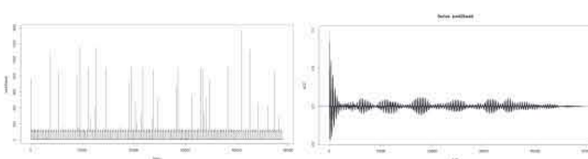


Common Houshold Localization

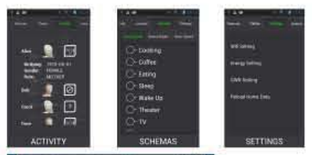
WiFi Fingerprint Location Determination

Energy Consumption & Control





Vast Device Outputs and thorough Consumption Evaluation

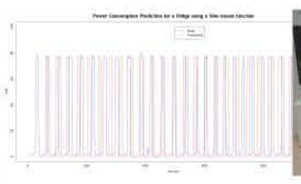


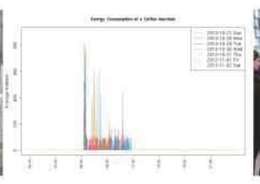
Device Control and Online Observation over Schema and App Access

Appliance Observation and Control over Wrist Worn Sensor

Exploitation & Case study

The developed methodologies and implemented and realized software components were practically evaluated within real-world household environments as well as presented at various occasions at exhibitions or scientific showcases.





Acknowledgements

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Contact
Alois Ferscha, Gerold Hoelzl
Welma Pereira, Peter Halbmayer
<lastname>@pervasive.jku.at

FFG

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Wir denken an morgen
Im Unternehmensverbund der ENAMO GmbH

Institute for Pervasive Computing
Technology for People