

Algorithm reveals the electricity consumption of individual appliances

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Opportunities to save energy become apparent once you can determine energy consumption of single appliances without extra measurement effort. A newly developed algorithm provides assistance on the path to greater energy awareness.

"Using the measured performance data from the [power supply](#) of a household, the algorithm serves to illustrate the use of individual [appliances](#)", according to Wilfried Elmenreich, who is developing the technology at the Institute for Networked and Embedded Systems in collaboration with Dominik Egarter. This saves costs: Firstly, because it is not necessary to use any additional measuring equipment to determine the frequency of appliance use, and secondly, because knowledge of the consumption increases the user's [energy](#) awareness. This technology represents an integral part of the concept of the so-called "smart grid", an intelligent electricity network.

Mathematical methods provide the background to this development: The algorithm presented is derived from a model based on Markov chains and a sequential Monte-Carlo method (particle filtering) for the state estimation of the appliances. The researchers were able to illustrate that the algorithm works at an accuracy level of 90 per cent in typical households.

The paper was published in the internationally recognised journal "IEEE Transactions on Instrumentation and Measurement".

More information: Egarter, D., Bhuvana, V. P. & Elmenreich W. (2014). PALDi: Online load disaggregation via particle filtering. *IEEE Transactions on Instrumentation and Measurement*, pages 467 - 477, 64(2). mobile.aau.at/publications/Egarter_PALDi_Particle_Filtering.pdf

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