Time-Series Load Data Analysis for User Power Profiling

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Abstract : In this paper, we present a power profiling model for smart grid consumers based on real time load data acquired smart meters. It profiles consumers' power consumption behaviour using the dynamic time warping (DTW) clustering algorithm. Due to the invariability of signal warping of this algorithm, time-disordered load data can be profiled and consumption features be extracted. Two load types are defined and the related load patterns are extracted for classifying consumption behaviour by DTW. The classification methodology is discussed in detail. To evaluate the performance of the method, we analyze the time-series load data measured by a smart meter in a real case. The results verify the effectiveness of the proposed profiling method with 90.91% true positive rate for load type clustering in the best case.

Keywords : power profiling, user privacy, dynamic time warping, smart grid
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