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The use of steady-state level combinations and signal event edge correlations in the disaggregation of total power measurements

Penn, Joseph J

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ABSTRACT

The work presented extends and contributes to research in Non-Intrusive Load Monitoring (NILM), focussing on steady-state and transient power measurement disaggregation techniques for circuits containing household appliances. Although previous work in this area has produced and evaluated a wide range of NILM approaches, much of it has involved the use of datasets captured from real-world household implementations. In such cases, the lack of accurate ground truth data makes it difficult to assess disaggregation techniques. In the research presented, three NILM techniques are comparatively evaluated using measurements from typical household appliances assembled within a laboratory environment, where accurate ground truth data could be compiled to complement the measurements. This allows for the accuracy of the various disaggregation approaches to be precisely evaluated. It is demonstrated that the correlation of transient event edges in aggregated power measurements to individual appliance transient exemplars performs better than the matching of steady-state power levels against individual appliance state combinations. Furthermore, the transient approach is shown to be the most appropriate technique for further development.