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Residential load scheduling method with load balancing for demand response in home energy management system

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Introduction: Smart Grids will be the promising solution to the future energy crisis. One of the most important features of the smart grid is its active Demand Response (DR) model through which the consumer can shape their daily energy consumption patterns so that they can reduce their energy usage and peak to average ratio (PAR).

Aim: In our work, bidirectional communication architecture has been proposed between the end users and the service provider. Real time pricing models (RTP) has been adapted to reflect the fluctuations in the electricity market. Load scheduling method encourages the users to adopt smart usage of electricity. The method aims at scheduling the appliances based on their need, hence to optimize the energy usage and to minimize the usage cost. The optimization problem for load scheduling has been solved using genetic algorithm. The load balancing approach spreads the electrical load over a time horizon in order to appropriately schedule the requests that have been rejected by the admission control, while minimizing a cost function related to the energy price. Every appliance, represented by a task has to be processed in a certain time window according to power load, preemption state and priority characteristics.

Results: Based on the assumptions of consumption patterns of the consumer from an Indian middle class scenario, an approximation of the daily power consumption pattern in the household is made and demand load profile for a day has been computed. The load scheduling algorithm is applied to the residential demand load with the target of scheduling the operation of burst loads found in the household.

Conclusion: From the results we conclude that we get a better dispersive load with our proposed scheduling method which in turn will definitely optimize the usage cost in a real time environment.

Biography

Geetha S has completed her Post-graduation in Information Technology and pursuing her Doctoral studies. Presently, she is working as an Assistant Professor in an Engineering Institution. Her research interest includes smart grid, natural language processing and soft computing. Her research focuses on developing an optimization problem for demand response in smart grid and trying out its implementation in a real test bed.

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