

Rethinking weather station selection for electric load forecasting using genetic algorithms

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Abstract-

Demand forecasting is and has been for years a topic of great interest in the electricity sector, being the temperature one of its major drivers. Indeed, one of the challenges when modelling the load is to choose the right weather station, or set of stations, for a given load time series. However, only a few research papers have been devoted to this topic. This paper reviews the most relevant methods that were applied during the Global Energy Forecasting Competition of 2014 (GEFCom2014) and presents a new approach to weather station selection, based on Genetic Algorithms (GA), which allows finding the best set of stations for any demand forecasting model, and outperforms the results of existing methods. Furthermore its performance has also been tested using GEFCom2012 data, providing significant error improvements. Finally, the possibility of combining the weather stations selected by the proposed GA using the BFGS algorithm is briefly tested, providing promising results.

Index Terms- Electric load forecasting; Energy demand; Weather station selection; Genetic algorithms; Cross-validation; Weather station combination; BFGS algorithm

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