Classification and forecasting of load curves

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Abstract

The load curve, which gives the time evolution of the power requested by a customer, enables EDF to have a better knowledge of electricity customer uses. This load curve is only available for customers with automated meter reading. For the others, EDF must estimate this curve.

Usually a clustering of the load curves is performed, followed by a discrimination of each class by the explanatory variables. Then the load curve is forecast by the centroid of the predicted class. The results are not very satisfactory in particular due to the weak discrimination power of the explanatory variables. The method proposed here combines classification and discrimination more tightly, and use in a different way the classes for forecasting.

A pre-treatment is done on data in order to identify global and local behaviours, then an unsupervised clustering is performed (first step), followed by a classification (second step) supervised by the result of the first step. The process is reiterated by initializing the unsupervised step by the previous discrimination step, and so on up to stabilisation of the clusters. Finally, the load profiles are predicted by covariance analysis and variable selection : we consider the clusters as new explanatory variables, either globally or locally in each cluster by introducing interaction terms in the regression formula.

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