

Resum de Tesi Doctoral



UNIVERSITAT POLITÈCNICA DE CATALUNYA
BARCELONATECH

Escola de Doctorat

DNI/NIE/Passaport

Nom i cognoms

Títol de la tesi

Unitat estructural

Programa

Codis UNESCO

(Mínim 1 i màxim 4, podeu veure els codis a <http://doctorat.upc.edu/gestio-academica/impresos/tesi-matricula-i-diposit/codis-unesco>)

Resum de la tesi de 4000 caràcters màxim (si supera els 4000 es tallarà automàticament)

This research work proposes three main contributions on the load forecasting field: the enhancement of the forecasting accuracy, the enhancement of the model adaptiveness, and the automatization on the execution of the load forecasting strategies implemented. On behalf the accuracy contribution, learning algorithms have been implemented on the basis of machine learning, computational intelligence, evolvable networks, expert systems, and regression approaches. The options for increase the forecasting quality, through the minimization of the forecasting error and the exploitation of hidden insights and miscellaneous properties of the training data, are equally explored in the form of feature based specialized base learners inside of a modelling ensemble structure. Preprocessing and the knowledge discovery algorithms are also implemented in order to boost the accuracy trough cleaning of variables, and to enhance the autonomy of the modelling algorithm via non-supervised intelligent algorithms respectively.

The Adaptability feature has been enhanced by the implementation of three components inside of an ensemble learning strategy. The first one corresponds to resampling techniques, it ensures the replication of the global probability distribution on multiple independent training sub-sets and consequently the training of base learners on representatives spaces of occurrences.

The second one corresponds to multi-resolution and cyclical analysis techniques; through the decomposition of endogenous variables on their time-frequency components, major insights are acquired and applied on the definition of the ensemble structure layout. The third one corresponds to Self-organized modelling algorithms, which provides of fully customized base learner's.

The Autonomy feature is reached by the combination of automatic procedures in order to minimize the interaction of an expert user on the forecasting procedure. Experimental results obtained, from the application of the load forecasting strategies proposed, have demonstrated the suitability of the techniques and methodologies implemented, especially on the case of the novel ensemble learning strategy.

Lloc

Data

Signatura