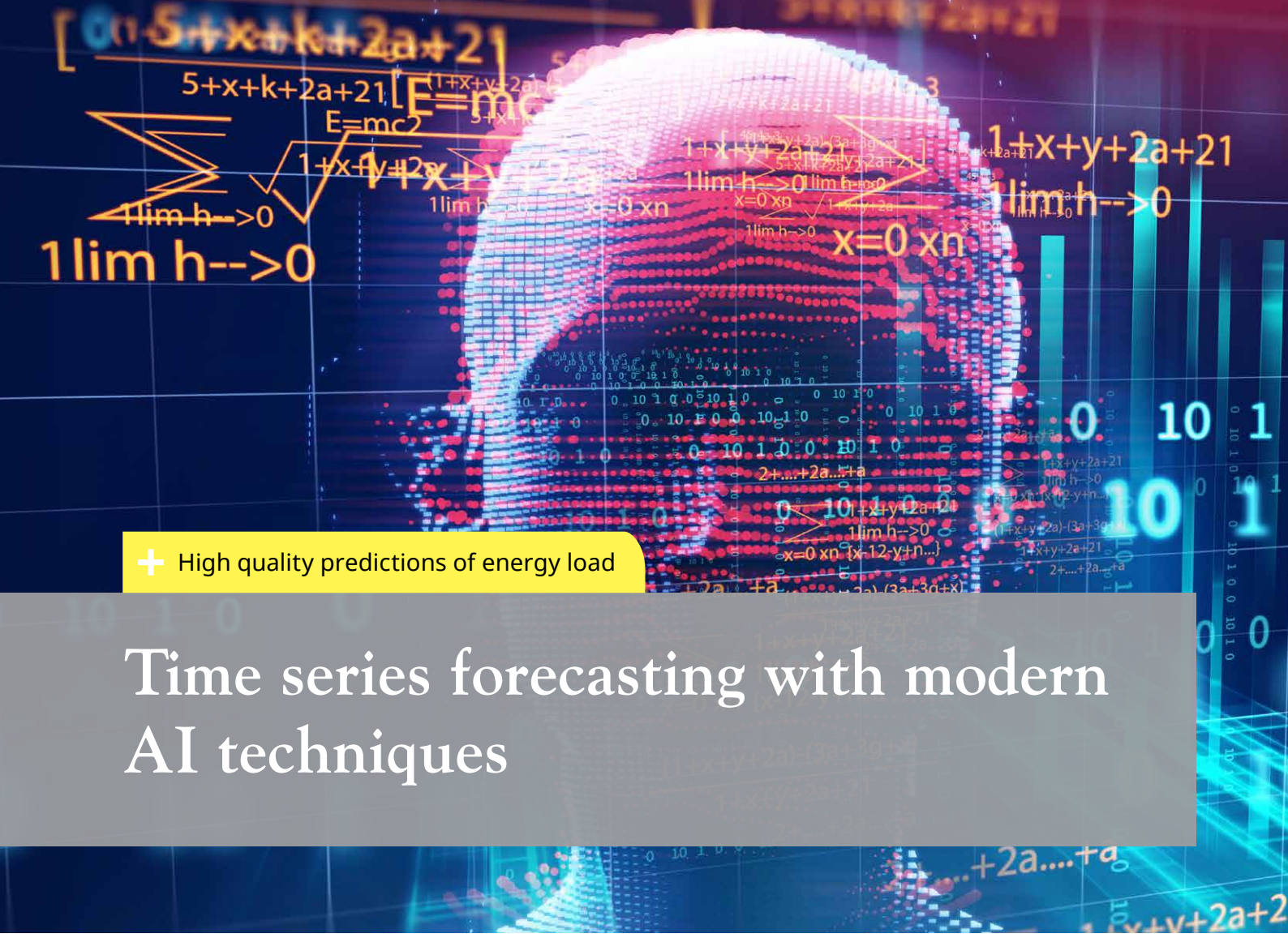


+ High quality predictions of energy load

Time series forecasting with modern AI techniques

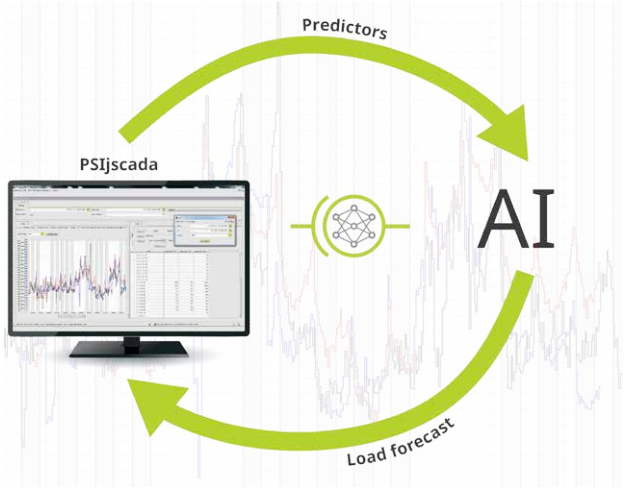
+ Time series forecasting
+ Short- and medium-term energy load prediction
+ Machine Learning approaches (Support Vector Machines, Random Forest, Deep Neural Network)
+ Deep Learning based on the Recurrent Neural Network (LSTM)
+ Interfacing between PSI application and modern Data Science tools

PSI

+ High quality predictions of energy load

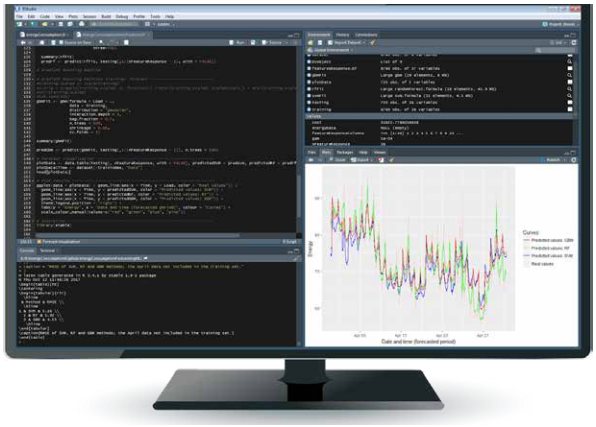
Time series forecasting plays an important role in numerous real life domains such as finance, trade, climate, healthcare and many others. In particular, the short- and medium-term energy load forecast is a challenging computational activity. There are many influencing factors such as weather conditions, the social behavioural aspects and an overall trend component that make the load time series data significantly non-linear. Therefore appropriate algorithmic approach must be chosen in order to provide the solution that recovers properly the observed seasonality and other features of considered time series.

The precise time series prediction has particularly high importance in the context of the energy trade. Energy and power are the subjects of trading activity in certain time resolution. For instance, the European Power Exchange is a market place to trade the energy in the form of contracts with hourly liability. The reliable knowledge about the energy consumption in near future can significantly support the trader with making reasonable bids, which subsequently provides measurable financial benefit. The forecasted consumption profile should recover all features of the measured time series such that the precise decomposition into the power standard products can be achieved.



Recently we observe a renaissance of broadly defined Artificial Intelligence techniques in literally all domains of human activity. The prolific Data Science community develops various techniques that can be almost directly applied to solve the problems in industry-related applications.

Here we propose the application of modern Machine Learning approaches to the time series prediction embedded in the PSIjscada program. The Support Vector Machines, Random Forest and Deep Neural Network methodologies provide predictions based on the pre-trained models that are available in local repository.



In general we also propose the other algorithmic approaches that support an overall time series forecasting business process. The energy data collection, data preprocessing including missing values imputation and anomalies detections are crucial steps that precede the Machine Learning model training. Together with model creation and finally—prediction, all mentioned elements of the time series forecasting procedure are now available in the PSIjscada product. Entire computational process is based on efficient algorithmic approaches that ensure expected high quality of resulting predictions. The process automation reduces significantly preparation time on one hand, the accuracy of obtained forecasts provides significant business benefit on the other.

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