

EMPURON PREDICTIVE ANALYSIS

Forecasting with Predictive Analysis in the Data Warehouse Based on Artificial Intelligence

Forecasts of power supply and loads based on the EMPURON Data Warehouse

Using the **Modul PA (Predictive Analysis) EMPURON** a prospective analysis method for calculating forecasts based on existing short-term and longer-term system behavior is provided. The system works self-adaptive and implements associative, artificial intelligence, covering different, freely selectable time series, which are fed into the forecasting system. Operators of power plants or grid operators are thus able to predict the consumption or supply of electrical energy for the respective energy system appropriately. For prediction, data of weather stations and weather forecasts, metering data and SCADA data can be used and combined with any configuration of data points. As application examples, the **EMPURON Renewable SCADA** system is used at REC Solar and the **ReMoS** (Control Energy Monitoring System) at the Austrian Power Grid AG.

EMPURON Neural Network for Analysis and Forecasts

For the efficient and sustainable operation of plants and distribution grids most accurate forecasts are of crucial importance. By integrating all the important basic information and the time-triggered execution of the respective models **EMPURON PA** analyzes network and environmental conditions for different individual forecasts. For example for subnets, different periods and events predictions can be determined by the system. Using artificial intelligence based on a Neural Network **EMPURON PA** is predestinated for predictions of great accuracy. For this purpose the neural network is first trained with data from the past and is minimizing in thousands of iterations, the difference between his forecast and the actual value. The weighting of each parameter changes and becomes more accurate. In addition, the actual data are analyzed. So, trends and impending deviations can be detected early.

Features and Standard Functions:

- Integration of any time series up to second's resolution as forecast base
- Training of the system and design of ad hoc forecasts or scheduled forecasts
- Statistics
- Data and events analysis
- Data archiving
- Comprehensive reports and analyzes available on the Internet
- Automated transfer of forecast time series to control center systems



Benefits for users:

- Time savings through self-adaptive system with high accuracy due to the tailor-modeling
- Simple and fast modeling
- Rapid deployment through a variety of existing interfaces
- Optimized Data Warehouse provides high-performance, variable data base for energy data
- Full user enabled parameterization allows separate execution according to use cases

Monitoring and Reporting

EMPURON Predictive Analysis integrates different data sources via freely configurable Importer interfaces and stores them into the powerful **EMPURON Data Warehouse**. For this purpose no additional installations are required. Using **EMPURON CE**, as well as a feature-rich reporting module the determined values are evaluated time-controlled and user-defined. Using a community-enabled portal, all relevant data, reports and deviation information can be displayed and analyzed on the Intranet or Internet. For special data constellations situation-specific reports can be created. The provision of messages to partner systems or by SMS or email is always easily with a few mouse clicks.

The rich reporting capabilities are enabling the display of any desired information. **EMPURON PA** thus ensures the complete representation of all energy generation data, the respective input data and all components of the prognosis.

Openness and Extensive Parameterization of the System

EMPURON PA offers due to the system base of the **EMPURON Application Server** a wide range of integration interfaces. This allows information collection using proven utility standard IEC interfaces to read. Also on the IEC 61850 protocol and a large number of automation protocols, are available interfaces. Profibus, Modbus, DNP3 and in addition, the common interfaces to record meter data are realized. In addition, the EMPURON server has integrated ETL components for transfer of information on file basis for a variety of formats. The importing and exporting functions are working spontaneously or automatically scheduled.

Data sources, processing functions and also the data transfer for the result data are adjustable to the user. In the EMPURON system the authorized user always controls the application. - i. e. full control of provision of training data, the processing of the result values of the forecast, e.g. in deviation in statistics and information transfer.

Figure: Integration of the Predictive Analysis Module in the EMPURON System

