



VISPLORE - Visual exploration of energy data



Visplore

Detect the expected – explore the unexpected.

Visplore is a tool designed to explore large and complex data sets to different applications visually.

Visplore was developed by VRVis –Center for Virtual Reality and Visualization Research-Ltd.

VRVis is Austria's leading research company in the field of Visual Computing and a Partner of HAKOM in the field of Visual Computing of data in the energy sector.

Visplore is suitable in conjunction with the HAKOM Time Series Manager (TSM) for the analysis of data with energy relevance. The tool provides a user interface that enables the visual exploration by means of simultaneous views of data on the latest findings in the field of Visual Computing.

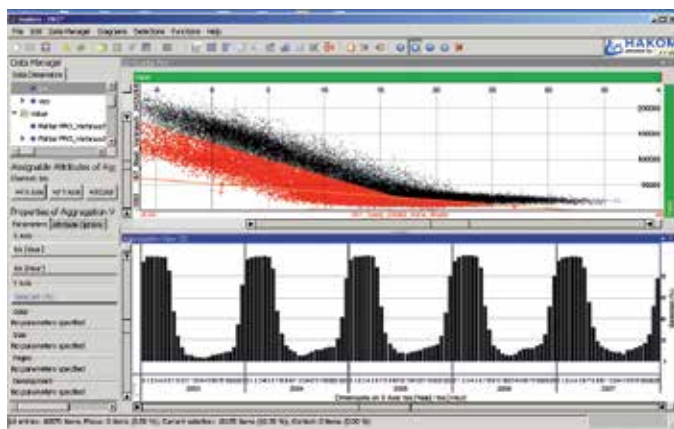


Fig. 1: Relationship between temperature and gas consumption in detail

In the energy sector, Visplore is used for the following applications:

Data Preparation

- Detection of anomalies, errors, etc. without a priori hypotheses
- Selection and export of any subset

Exploratory analysis

- Understanding of large and complex data
- Identification of any patterns (e.g. clusters, outliers, trends...)
- By descriptive statistics quantify patterns
- Relationships, realize and understand

Special focus

- Analysis of variant calculations and black box systems
- Interactive validation of models and analysis of deviations
- Interactive multi target optimisation

Rapid and flexible creation of graphics for presentation purposes

Create graphics that provide meaningful and communicable views to the data

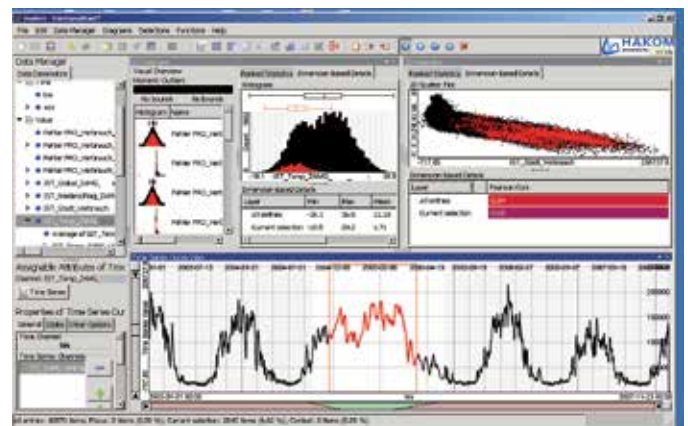


Fig. 2: Analysis of systematic errors of meteorological data in correlation with the target size

The data connection is done using the base connector from the HAKOM Time Series Manager. The base connector allows the addition and the replacing of existing data of already opened Visplore sessions. Optionally, Visplore supports an interface in the comma separated value (CSV) format.

Supports numeric and categorical data, date and time, as well as functional items - be present as time series measurements. Additionally, the system can deal with missing entries.



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Following visualisation techniques are available:

- **Histogram:** displays the distribution of a continuous data attribute.
- **2D scatter chart:** shows the distribution of two continuous data attributes.
- **3D scatter chart:** shows the distribution of three continuous data attributes.
- **Parallel coordinates:** sets typeset multiple continuous attributes in relation to each other.
- **Parallel categories:** displays except-proportional relationship between categorical data attributes.
- **Aggregation-based representation:** is used for making any aggregations using pivot tables, as well as for their visualization through heat maps, bar graphs or scatter charts.
- **Statistical 1D Overview:** provides a graphical overview of data columns by histograms and box plots, and a quantification of any subsets of data to hand of univariate statistical moments.
- **Statistical 2D Overview:** provides an overview of pairwise correlations of data columns in the form of a matrix of 2D scatter plot, as well as a quantification of any subsets of data to hand bivariate statistical moments.
- **Normal table display:** shows details about selected data entries in text form.
- **Table-lens view:** groups larger tables together visually, while a certain range of details are presented in the form of text.
- **The graph of the function:** displays the graph of the function for potentially many functional sizes.
- **Aggregation-based comparative representation of functional sizes:** provides a comparative overview of potentially many explicit 1D or 2D functions.
- **Validation of regression models:** allows the validation of multidimensional regression models on the basis of validation data.

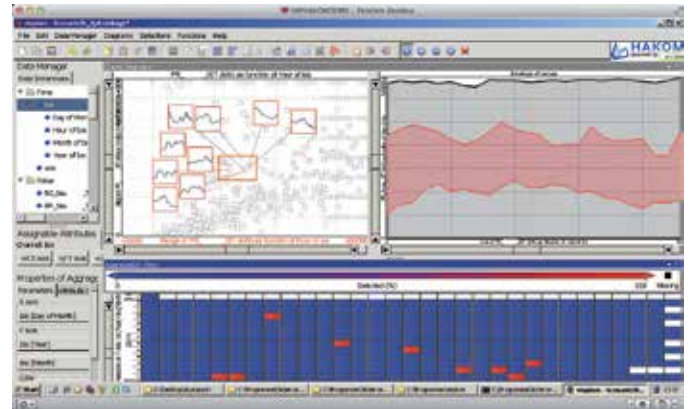


Fig. 3: Clustering and analysis of different daily production profiles of a wind turbine

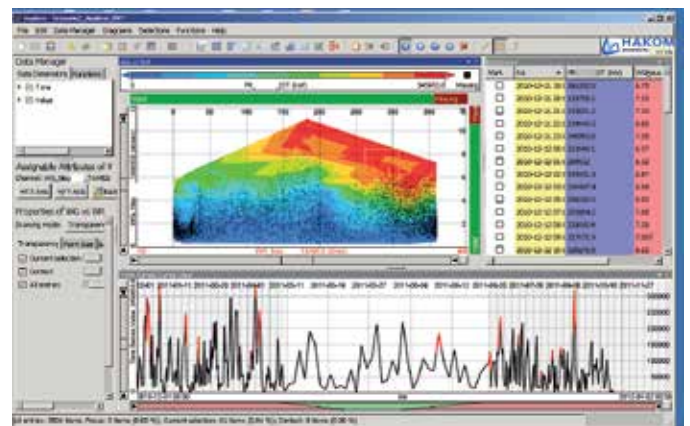


Fig. 4: Analysis of the efficiency of a wind turbine on wind direction and speed

Solution packages

The solution EnerVIS, consisting of HAKOM TSM and Visplore, offers a performant structured database for time series in combination with an uncompromising tool to their visual exploration.