



Automatic Knowledge Extraction

GENERATE

PREDICT

OPTIMIZE



Extract the essentials. To explain, predict and optimize.

xtractis® is a cutting-edge solution for predictive analysis, providing automatic extraction of non linear models and identification of optimal solutions.

xtractis® originates from the latest advances in Fuzzy Logic coupled with Machine Learning to offer an innovative and powerful tool for decision making assistance: it defines an interface between linguistic and numeric concepts, merging qualitative and quantitative data. Moreover, it includes an intensive assessment of the robustness of the extracted models.



For what kind of issues?

xtractis® identifies and makes explicit any relationship existing between data sets of different types:

- hedonic evaluations / liking / preference ▶ subjective data
- instrumental / formulation / socioeconomic ▶ objective data
- qualified assessors evaluations / sensory ▶ subjective objectivized data

A modular and comprehensive software solution

GENERATE

Thanks to its outstanding extraction engine, **GENERATE** automatically identifies efficient models from your databases (even if incomplete or with a high dimensionality).

You discover relationships between explanatory and studied variables expressed as interpretable models

PREDICT

Thanks to its powerful inference engine, **PREDICT** allows you to predict the behaviour of your complex processes in real time.

You accelerate your test or simulation cycles as you get instant responses from your models

OPTIMIZE

Thanks to its unique non linear model inversion algorithms, **OPTIMIZE** proposes in one click exact optimal solutions satisfying your multi-objective request.

You benefit from shorter design and prototyping cycles by directly reaching targeted objectives

Robust and operational models

DESCRIPTIVE MODELS

- ▶ translate the modelled process into linguistic decision rules.

PREDICTIVE MODELS

- ▶ predict the outcome of the studied variable given a new simulated situation.

ROBUST MODELS

- ▶ maximize the relevance of the prediction in unknown situations.

INVERTIBLE MODELS

- ▶ allow the discovery of exact optimal solutions (expressed on original variables).

Contact us for a free analysis of your needs:

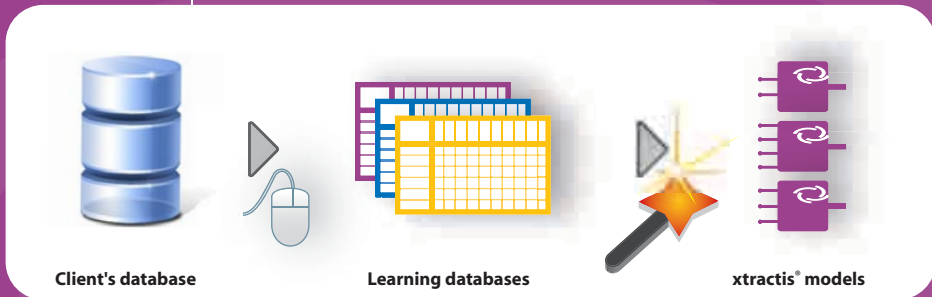
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intellitech
INTELLIGENT TECHNOLOGIES



Using your available databases, xtractis® GENERATE automatically builds relevant models that are both accurate (descriptive quality) and robust (predictive quality).

USE

- Model your complex processes in order to explain them, predict their behaviour, and discover optimal solutions areas.
- Easily generate predictive and interpretable models that have both a maximum accuracy and robustness.
- Identify synergies between variables. Organize and interpret main influences from variables and influences from interactions.
- Materialize the decision making strategy of your experts, and perpetuate the tacit knowledge of your company.

FUNCTIONALITIES

- Creation of a learning database by filtering and/or aggregation of the available data.
- Segmentation of the studied population to extract specific decision models for each segment.
- Intelligent reduction of dimensionality. Automatic selection of explanatory variables among original variables.
- Automatic generation of fuzzy models thanks to different learning strategies applied by the "Magic Wand" tool.
- Complete Cross-Validation analysis of the robustness of the generated models. Computation of their accuracy. Evaluation of the contribution of the variables.
- Display of the model structure (explanatory variables, linguistic rules). Dynamic exploration of the decision surface (2D/3D).
- All functionalities of xtractis® PREDICT.
- All functionalities of xtractis® OPTIMIZE.

Create your project, import and validate your databases.



Define learning databases by selecting an appropriate filtering. Visualize deleted values and variability of the resulting data.



Launch the extraction by selecting a learning strategy, or by using the Magic Wand tool.



Compare the performance of the generated models in terms of accuracy and robustness. Discover sets of influent input variables.



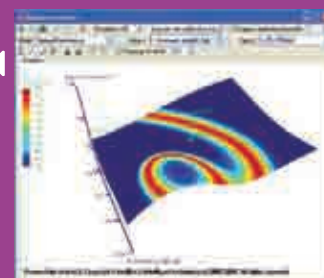
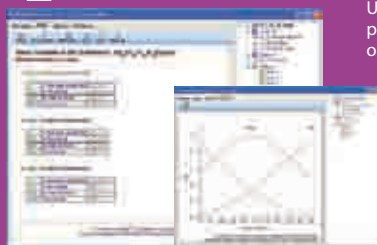
Visualize performance plots of the models. Define the selection request to identify the top-models among all generated models.

Model	Accuracy	Robustness	Variables	Rules
Model 1	0.95	0.85	5	10
Model 2	0.92	0.82	4	8
Model 3	0.90	0.80	3	6
Model 4	0.88	0.78	2	4
Model 5	0.85	0.75	1	2

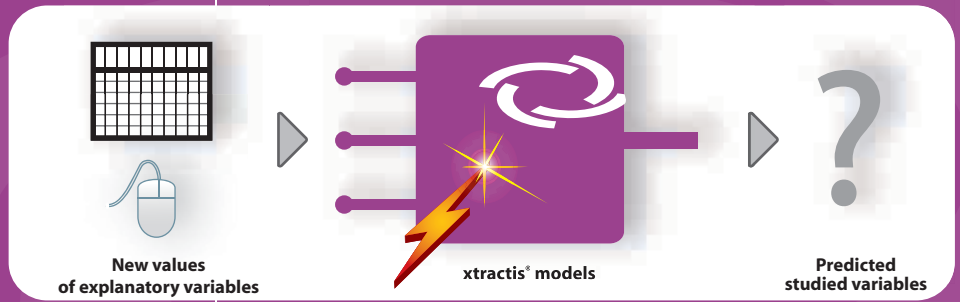
Display the variables and the rules defining your models.



Graphically explore your models. Use them for prediction and optimization.



- **OS:** Windows XP
- **Processor:** Core 2 Duo (min. Pentium 4)
- **RAM:** 2 Go (min. 512 Mo)
- **Software:** Internet Explorer 6 or higher



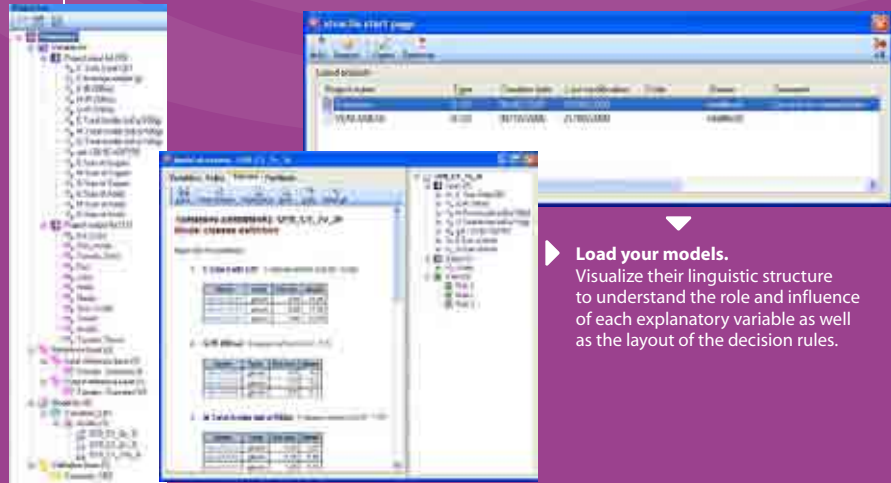
Using the xtractis® models provided by GENERATE, xtractis® PREDICT instantly computes the value of each studied variable for new inputs of explanatory variables.

EXAMPLES OF USE

- Test your new products and fine tune them quickly.
- Simulate new formulations.
- Anticipate the behaviour of your consumers.
- Perform sales forecasts.
- Diagnose hazardous situations.
- Evaluate the risk of an investment decision making.
- Predict a quality indicator.

FUNCTIONALITIES

- Real time prediction engine, even with missing inputs or outside the learning data range.
- Simultaneous predictions of several studied variables.
- Filtering of input data to improve the quality of the prediction.
- Possibility to manually define linear models
- Saving and loading of the prediction data file (input variables value sets and corresponding predictions).
- Display and printing of the prediction report.
- Display of the model structure (variables, classes, rules) and of the contribution of the explanatory variables.
- Display of the model performance (accuracy, robustness): correlation plots, error measures, mapping degree...
- Dynamic exploration of the decision surface (2D/3D graphs).
- Customization of object labels (variables, models, assessors, products...) and of the numerical format.

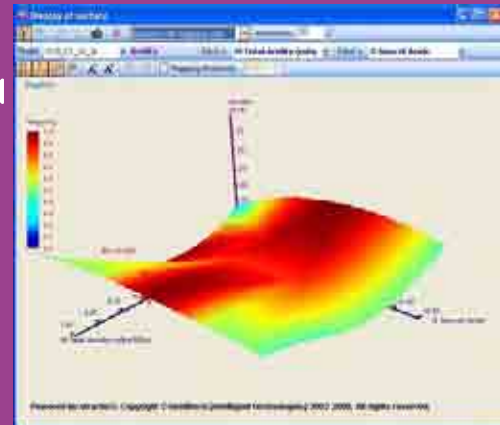


Load your models.
Visualize their linguistic structure to understand the role and influence of each explanatory variable as well as the layout of the decision rules.

Freely explore your models.

Display cross-sections of the transfer function linking the studied variable to the explanatory variables, as a 2D/3D surface.

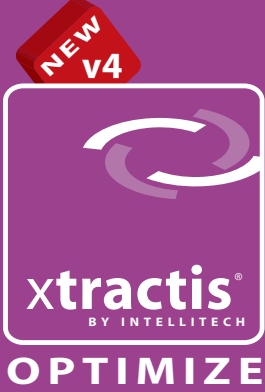
Thanks to graphical tools, explore the topography of your models and interactively visualize the influence of each explanatory variable.



Detail the decision strategy and the weight of each rule fired for the computation of the prediction, thanks to the traceability report.

Model	Accuracy	Robustness
A. Total Acidity	0.95	0.95
B. Total Acidity (ml of 100g)	0.95	0.95
C. Total Acidity	0.95	0.95
D. Total Acidity	0.95	0.95

- **OS:** Windows XP
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- **RAM:** 1 Go (min. 512 Mo)
- **Software:** Internet Explorer 6 or higher



EXAMPLES OF USE

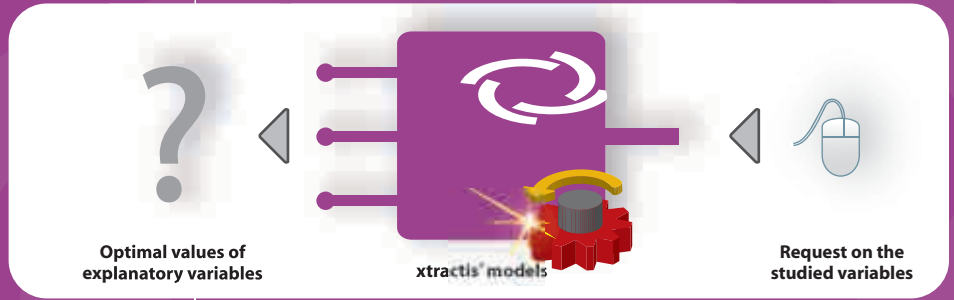
- Define the optimal specifications of your products, while reducing the number of prototypes.
- Search for drug formulations maximizing efficiency albeit minimizing toxicity.
- Maximize the liking of your segment of consumers by matching a target sensory profile.
- Discover the optimal dimensioning of a structure.
- Find the optimal balance in the components of a marketing-mix.
- Optimize the tuning of your industrial process.
- Optimize geographical allocation of resources.
- Discover investment scenarios minimizing risk.
- Discover customer's profile minimizing damage risk.

FUNCTIONALITIES

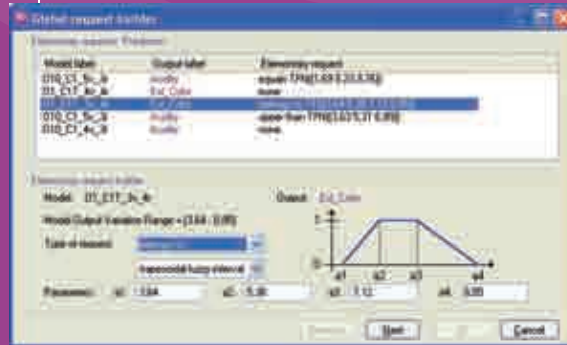
- Definition of multi-objective requests on the studied variables, and constraints on the explanatory variables .
- Simultaneous inversion of several fuzzy or linear models and discovery of exact optimal solutions (exclusive use of original variables).
- 2D/3D graphical tools for visualization of areas of optimal solutions.
- Display and print of the optimal solutions research report.
- Saving and loading of requests and optimal solution files.
- All functionalities of xtractis® PREDICT.

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The essentials, for optimization.



xtractis® OPTIMIZE inverts the models provided by GENERATE, to identify the values of the explanatory variables fulfilling at best your multi-objective request.

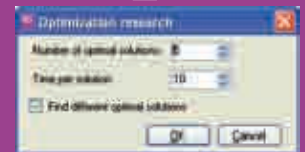


▶ Define flexible requests on several studied variables.

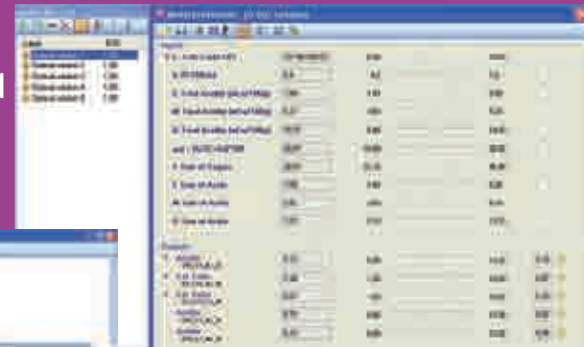
Specify the allowed domain by setting constraints on explanatory variables.



▶ Launch the optimization process by fixing allowed time and the number of solutions wanted.



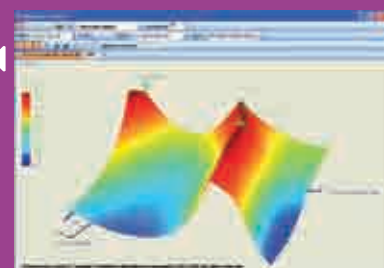
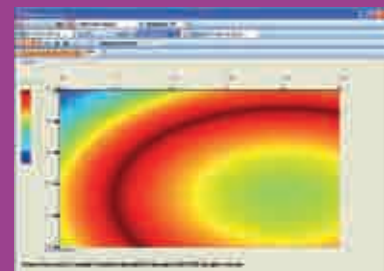
Visualize the most satisfying solutions: values of all explanatory variables.



Consult the optimization report.



Explore areas of satisfying solutions. Visualize cross sections of the decision surface around optimal solutions.



ABOUT INTELLITECH

INTELLITECH [intelligent technologies] is a private Research & Development company, founded in 1998 by Dr. ZALILA Zyed and based in Compiègne (France). It is specializing in data mining software and design of intelligent systems, capable of making decisions in total autonomy in an unknown and dynamically changing environment. Its products incorporate the latest advances in Artificial Intelligence, especially fuzzy logic and machine learning for the fusion of imprecise, uncertain and subjective data.

INTELLITECH is currently applying its expertise and know-how in two areas:

- Intelligent Driver Assistance Systems, with more than 19 years of experience and 8 patented inventions, several of which are already on the market. The latest, xpark!® assists the driver for self-parallel and self-perpendicular parking, even in the most difficult situations;
- Predictive Analysis Software, with the xtractis® suite dedicated to automatic knowledge extraction and predictive modelling.

INTELLITECH has been supported by OSEO, the French Innovation Agency. It has won several national and international awards and benchmarks for its products xpark!® and xtractis®.

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