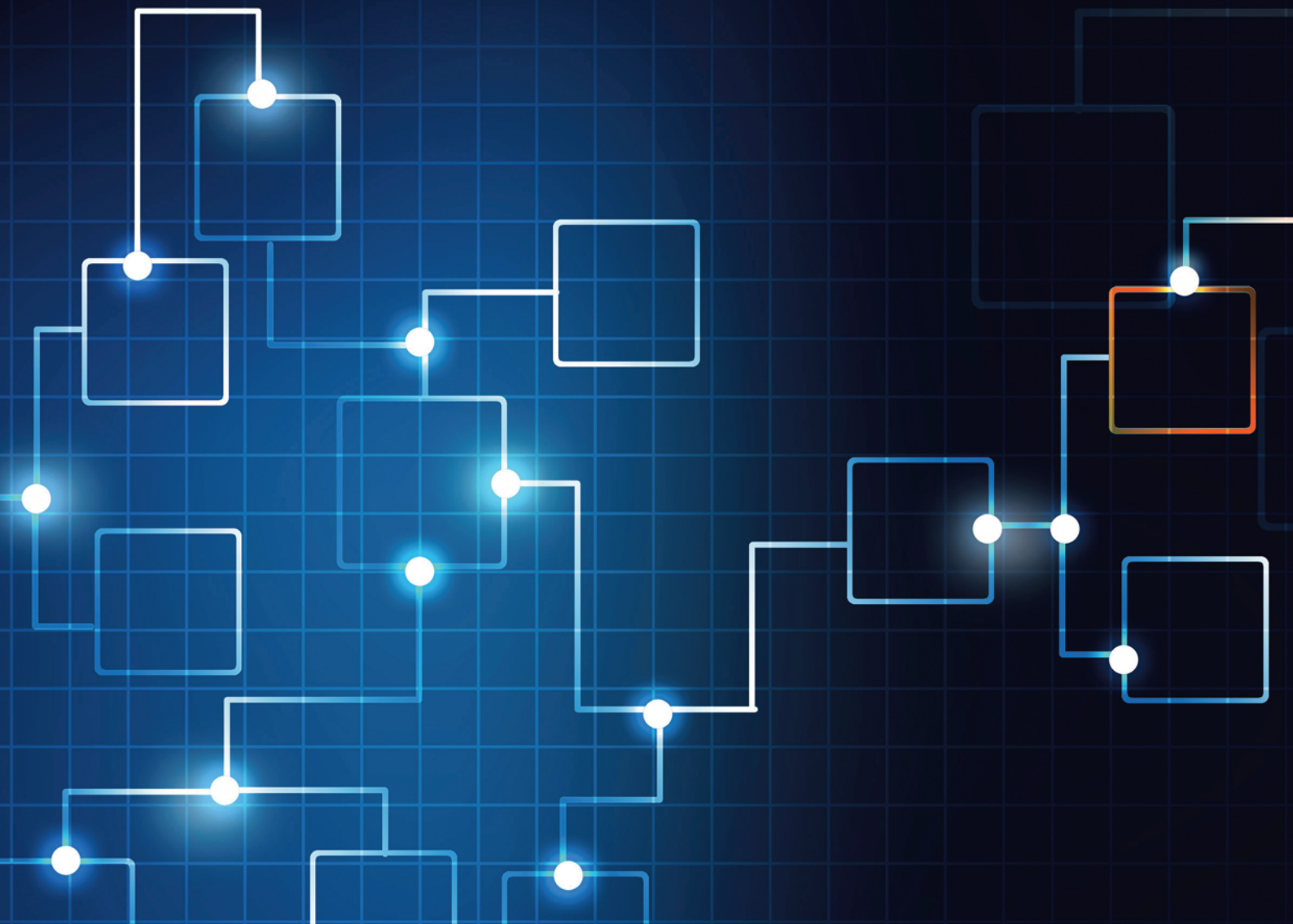


Component Modelling

MODEL CRAFT

Management Solutions



WHY MODEL CRAFT™?

MODEL CRAFT™ IS AN AUTOMATED MACHINE LEARNING AND COMPONENT-BASED MODELLING TOOL THAT ALLOWS SIMPLIFYING AND INDUSTRIALIZING THE DEVELOPMENT AND VALIDATION OF ADVANCED ANALYTICS MODELS

ModelCraft™ has intuitive components for data processing, advanced analytics model development and interpretability. This platform empowers users to seamlessly connect to any data source and create modeling workflows visually, eliminating the need for coding expertise.

ModelCraft™ effectively meets industry demands by:

- ▶ Simplifying the integration of sophisticated machine learning algorithms—such as gradient boosting, elastic nets, ensemble models, random forests, support vector machines, and neural networks—into the modeling process.
- ▶ Streamlining and expediting the modeling process through code reuse and minimizing the time dedicated to routine tasks.
- ▶ Making advanced modeling techniques accessible to teams without specialized knowledge.
- ▶ Enhancing the performance, traceability, and comparability of models.
- ▶ Facilitating model interpretability and automating the generation of model documentation.
- ▶ Ultimately, refining model development and validation processes and fostering the creation of advanced challenger models.

ModelCraft™ is developed in the cloud and natively uses auto-scalability and parallel computing capabilities.

Thanks to this, ModelCraft™ tool accelerates the transition to component-based modelling, which is more efficient, interpretable, accessible and reduces model risk.



STRUCTURE OF MODEL CRAFT™

MODEL CRAFT™ HAS TWO PRIMARY WORK AREAS: THE DATA MANAGEMENT PANEL AND THE MODELLING PANEL

The data management panel enables users to connect to any database and perform tasks such as extracting, merging, and loading tables using SQL. Through the component-based modelling panel, users are able to perform exploratory data analysis, prepare data for modelling, and train and interpret advanced machine learning algorithms.

01 Data Management

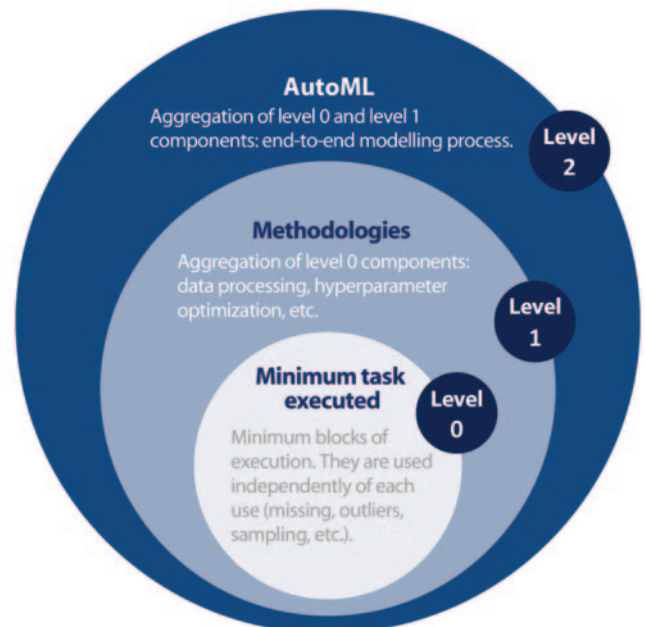
- Database management
- Simultaneous connection to different data repositories with MySQL technology.
- SQL programming

02 Modelling

- ▶ Data processing and EDA
- ▶ Modelling components and advanced machine learning algorithms
- ▶ Interpretability and automatic reporting components



The modeling components are organized into three levels of depth: from level 0, which covers minimal executable tasks such as outlier detection or model training, to level 2, which involves aggregating components to construct an end-to-end modeling process.



FUNCTIONALITIES OF MODEL CRAFT™

MODEL CRAFT™ FEATURES A LIBRARY OF PREDEFINED COMPONENTS
THAT SUPPORT THE ENTIRE MODELING LIFECYCLE



Input, Output and Download

Input data reader with different formats and delimiters
Database connection components (Cloud, RDS)
Download of models, processed datasets and automated reports



Database Management

Simultaneous connection to different data repositories with MySQL technology.
SQL data processing (generation of tables, data manipulation and retrieval, table traversal, etc.)
Import and export files



Sampling

Sampling algorithms
Training, test and validation samples
Algorithms for processing highly unbalanced data (oversampling and undersampling techniques)



Feature Engineering

Correlation analysis
Missing analysis and imputation
Outlier analysis and treatment
Encoding techniques
Binning algorithms



Visualizations

Comparing and selecting the optimal model
Analysis of database structure
Exploratory Data Analysis
Calculation of descriptive statistics



Model Training

Hyperparameter search techniques
Training of supervised and unsupervised models
Ensemble methodologies



Performance and Prediction

Mapping of criteria to training samples, validation and testing
Calculation of metrics and KPIs
Out-of-time analysis and backtesting
Predictions
Model validation



Interpretability

Analyzing variable importance using advanced interpretability techniques (SHAP, LIME, Surrogate models)
Conducting univariate and bivariate analyses
Maintaining trace of the entire development process
Automatic generation of a model report



Automated Machine Learning

Generation of user-created components
Determination and optimization of the critical path between components
Ability to create custom components using Python

Encapsulation of components in three levels of depth
Access to Python code generated by each component

FEATURES OF MODEL CRAFT™

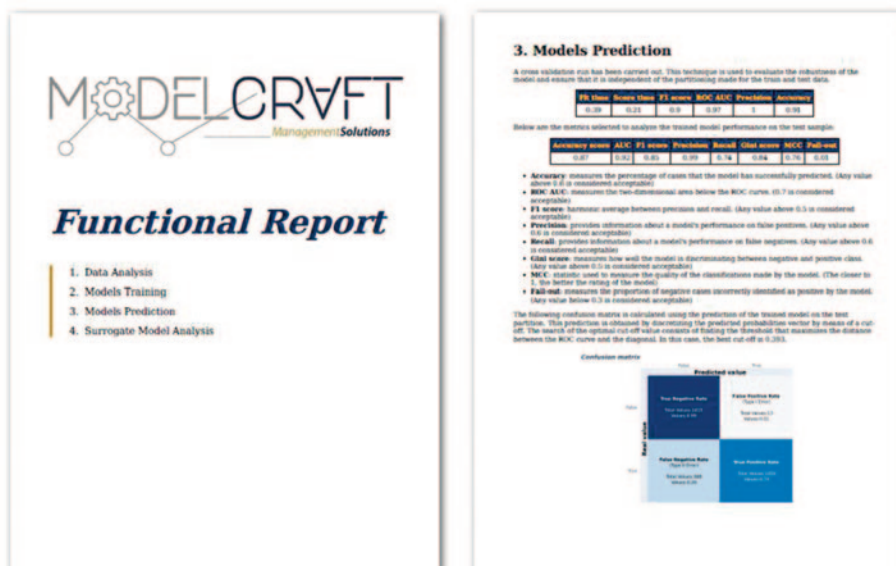
MODEL CRAFT™ FACILITATES THE APPLICATION OF MACHINE LEARNING TECHNIQUES THROUGH AN INTUITIVE AND ROBUST PLATFORM, DEPLOYED AS A TECHNOLOGY THAT IS SIMPLE, FLEXIBLE, AND SCALABLE

User

- **Ease of use:** the ModelCraft™ interface supports the visual construction of modeling workflows, providing structured access to all parameter settings.
- **Customization:** users can design their own components and modelling flows, with access to the generated Python codes.
- **Explainability:** with a single click, ModelCraft™ produce a detailed summary of the model, including its variables and the entire development process, explaining user decisions (e.g., model hyperparameters) and algorithmic choices (e.g., reasons for variable exclusion).
- **Traceability:** the platform ensures complete traceability of developments, offering full access to code, along with comprehensive logging and traceability features.
- **Optimized code:** each component within ModelCraft™ is fine-tuned to optimize computational efficiency, utilizing libraries from cutting-edge programming environments.
- **Evolution:** ModelCraft™ is continuously updated to meet industry demands; for example, upcoming additions to the tool include the use of large language models (LLMs) and the development of advanced neural networks.
- **Adaptability:** ModelCraft™ has additional modules to solve specific problems with ad-hoc solutions such as: ModelCraft™ University, ModelCraft™ Virology, or ModelCraft™ Validation Workspace (MVW).

IT

- **Deployment flexibility:** ModelCraft™ can be deployed either as an on-customer-cloud tool or as software-as-a-service (SaaS) in the Cloud, according to customer needs.
- **Scalability and parallel computing:** ModelCraft™ is scalable and takes full advantage of parallel computing capabilities, allowing the processing of large volumes of data and executions with a high computational load.
- **Easy deployment:** the designed architecture allows ModelCraft™ to be deployed in a very short time, including an analysis of customer needs, configuration preferences and necessary customizations.
- **Reduced support:** ModelCraft™ requires reduced IT support, and maintenance services includes the deployment of new releases.

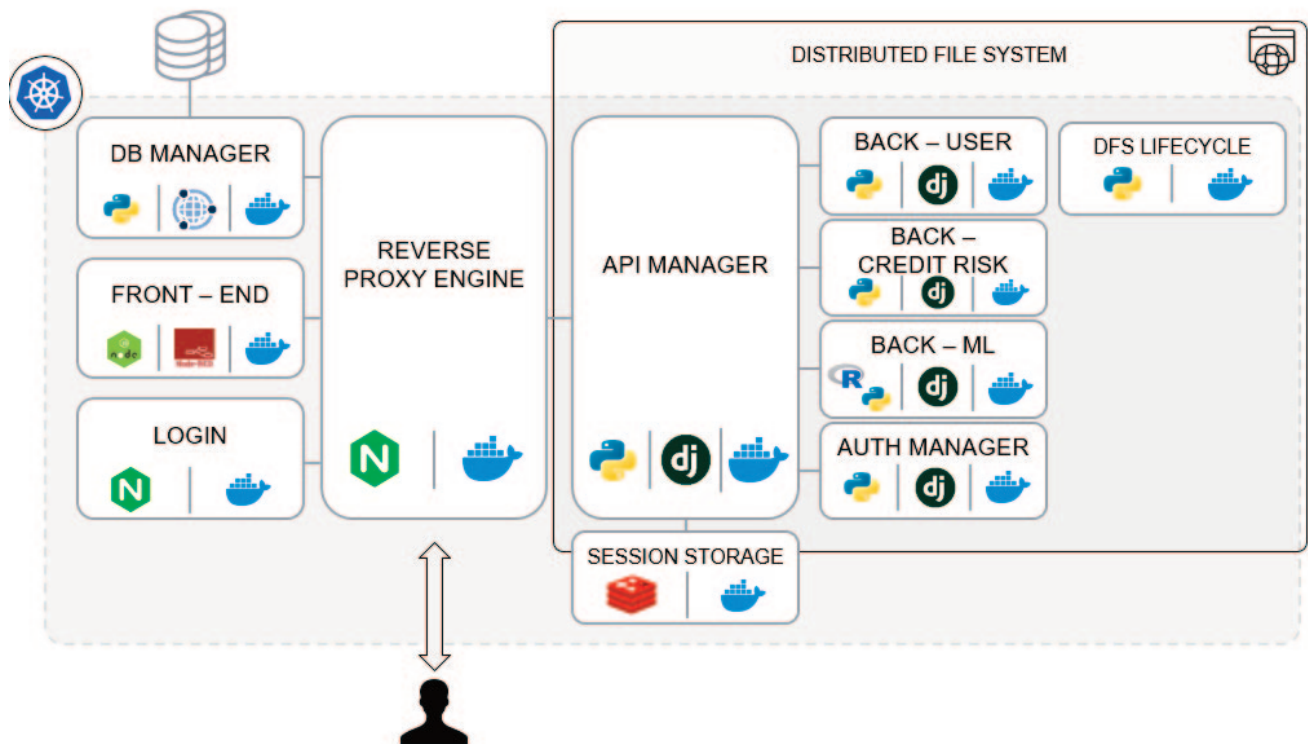


Example of a model report automatically generated by ModelCraft™.

IT ARCHITECTURE

MODEL CRAFT™ HAS BEEN DEVELOPED CLOUD-NATIVELY, USING A KUBERNETES-BASED ARCHITECTURE THAT ENABLES RAPID DEPLOYMENT OF THE COMPONENT LIBRARY AND A VISUAL PROGRAMMING FRONTEND

The ModelCraft™ architecture is focused on different stacked component libraries, allowing the use of the components as microservices, and includes a user, storage and execution manager.



CREDENTIALS

Management Solutions has extensive capabilities and references in the field of advanced modelling, combined with in-depth knowledge of technology and business processes.

Management Solutions provides differential value in the field of advanced modeling:

- ▶ It has extensive experience in the development, validation and implementation of models and algorithms applied to multiple business areas in different industries and sectors.
- ▶ It has quantitative capabilities and resources with a high degree of knowledge and specialization (two thirds of its staff are STEM).
- ▶ Specifically, it has teams of data scientists who carry out projects in artificial intelligence and machine learning, as well as an R&D team dedicated to the practical application of AI applied to management.
- ▶ It has developed a Chair in Big Data and Analytics together with the Universidad Politécnica de Madrid, where it develops lines of research on modelling techniques and artificial intelligence. This has allowed it to develop ModelCraft™ and to keep it up to date with the latest advances in modelling and computing.

Thanks to these differential values, Management Solutions implements ModelCraft™ in all its industries and in all the countries where it operates.

MANAGEMENT SOLUTIONS

LEADING BUSINESS CONSULTING SERVICES FIRM

Management Solutions is an international consulting Firm whose core mission is to deliver business, risk, financial, organization, technologies and process-related advisory services.

Management Solutions currently has a multidisciplinary team (functional, mathematical, technical and systems integration) of 4,000 professionals, and operates through 48 offices (21 in Europe, 22 in the Americas, 3 in Asia, 1 in Africa and 1 in Oceania) from where we also serve clients operating in other countries (most notably Belgium, Finland, Greece, Luxembourg, Andorra in Europe; Panama, Dominican Republic, Venezuela, Bolivia, Honduras, Nicaragua, El Salvador, Guatemala, Uruguay, Paraguay in the Americas; Saudi Arabia, Qatar, Singapore, India in Asia; and Senegal, Equatorial Guinea, Angola in Africa).

Management Solutions' differentiating factor lies in its in-depth knowledge of the businesses in which its clients operate and in its high degree of sector-specific and functional specialization.

To ensure full coverage of its clients' needs, Management Solutions structures its value proposition by industry and line of activity, bringing together a wide range of skills.

Industries

*Financial Institutions
(Banking and Insurance)*

Energy

Telecommunications

Consumer and Industry

Government

Construction

Services

Strategy

Sales and Marketing Management

Transformation: Organization and Processes

Risk Management and Control

Management and Financial Information

New Technologies



We create value propositions for our clients and commit to their effective implementation to exceed client expectations, becoming their trusted partners

For further information you may contact:

Manuel Ángel Guzmán

Partner at Management Solutions

manuel.guzman@managementsolutions.com

Javier Calvo

Partner at Management Solutions

javier.calvo.martin@msgermany.com.de

Javier Mendoza de Puelles

Manager at Management Solutions

javier.mendoza.puelles@msspain.com

Segismundo Jiménez

Manager at Management Solutions

segismundo.jimenez@msspain.com

Management Solutions, Professional Consulting Services

Management Solutions is an international consulting Firm whose core mission is to deliver business, risk, financial, organization, technologies and process-related advisory services.

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