



AI for Risk Management

WE ARE A LEADING PROVIDER OF SOFTWARE SOLUTIONS AND CONSULTING SERVICES IN THE RISK, WEALTH AND ASSET MANAGEMENT SPACE

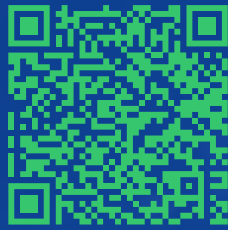
Prometeia is a global firm of quantitative experts and software engineers, dedicated to applying financial modelling, economic research and data science to solve complex business and regulatory challenges. Founded in 1974 as an independent institute for economic research by a group of young university professors, for half a century Prometeia has been developing innovative software solutions, studies, and reports for banking and insurance groups, institutional investors and

public organizations. Our mission is to combine academic excellence with industry experience, integrating macro-economic research, quantitative analysis, business consulting and software development. This distinctive mix of competences has made Prometeia a leading European company in risk, asset and wealth management solutions. Prometeia's technology and specialized advisory are chosen by 300 customers in over 20 countries around the world.

OUR COMBINATION OF RISKTECH PROPOSITION, QUANTITATIVE ADVISORY, AND FINANCIAL AND ECONOMIC RESEARCH MAKES OUR BUSINESS MODEL UNPARALLELED IN TODAY'S MARKET

Prometeia's approach to Enterprise Risk Management is based on the development of quantitative models and advanced analytics. The design of highly specialized software solutions combines cutting-edge technologies and data science techniques with the knowledge of our subject matter experts and our ability to

successfully respond to the growing demands of international regulation. Our deep understanding of financial markets, derived from proprietary economic research, adds a unique element to Prometeia's business model and value proposition.



OUR FLAGSHIP RISK & PERFORMANCE MANAGEMENT SOLUTIONS

Award-winning analytics and leading-edge technologies join forces in the integrated, highly scalable software solutions developed by Prometeia. Prometeia's solutions are based on industry best practice technology such as Microsoft framework, Hadoop, and APS for unparalleled performance. Implemented and

supported by a global team of functional consultants and technology experts, our innovative software solutions anticipate needs and trends across the full spectrum of Risk and Finance industry, while excelling in reporting, data management, security, auditability, and automation.



AI for Risk Management

Prometeia supports banks, insurance companies and other financial service institutions in their digital transformation journey, through the enhancement of internal and external data and the adoption of Data Science methodologies and tools.

Prometeia Center of Excellence for Advanced Analytics includes experts in risk management, experts in modelling and development of algorithms for scientific research, experts in the integration of data-intensive applications at industrial level.

Prometeia provides a 360 degrees assistance to the transformation of banks into data driven organizations, supporting them in the setup of analytical teams, identification of target organizational structure, operational approach, skills required and in the develop-

ment of a portfolio of analytical solutions.

Prometeia develops algorithms for vertical use cases through the adoption of cutting-edge analytical methodologies (text analytics, link analysis, deep learning...) and work for the enhancement of Enterprise Risk Management solutions with Machine Learning and Artificial Intelligence components.

The main Artificial Intelligence analysis, tools and solutions for Risk Management developed by Prometeia cover the following areas: →



**AUGMENTED
CREDIT RISK
MANAGEMENT**

Empowering traditional credit risk modelling using unstructured and qualitative data processed by Machine Learning algorithms.



**TEXT ANALYSIS
FOR CREDIT RISK
MANAGEMENT**

Using text analysis for the automation and enhancement of credit management by analyzing and replicating credit analysts methodologies.



**BEHAVIORAL
MODEL FOR
FINANCIAL RISK**

Enhance behavioural models using internal and external data for a more consistent representation of the empirical reality.



**DATA DRIVEN
OPERATIONAL
RISK**

Exploiting the bank information assets by developing predictive indicators to intercept new phenomena and emerging risks.



**ANTI-MONEY
LAUNDERING &
ANTI-FINANCIAL
CRIME**

Advanced analytics solutions to enhance the efficiency and effectiveness of the AML and AFC process, improving the risk management.



**DATA
ANOMALY
DETECTION**

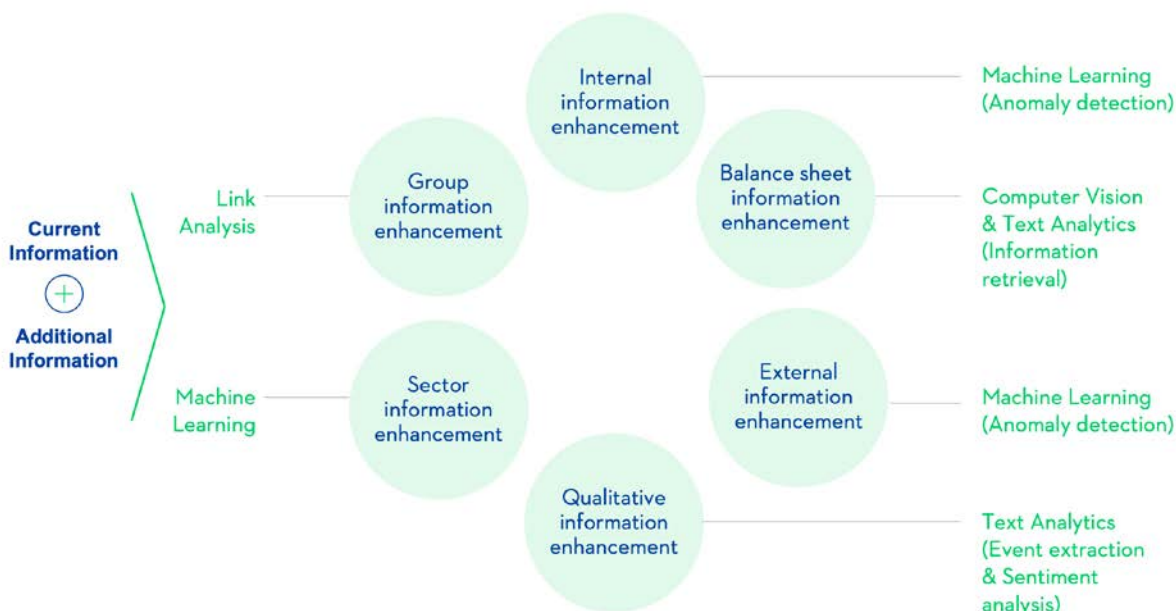
Reduce the risk caused by low data quality through the application of Machine Learning Anomaly Detection.

The Artificial Intelligence can play a key role in ensuring a more effective credit risk assessment, adding value to the traditional credit risk modeling using a blend of structured, unstructured and qualitative data.



The Augmented Credit Risk Management enables the full automation of credit processes, for example by increasing the efficiency of the rating assignment. The application of Artificial Intelligence techniques to current and new data sources allows banks to collect the

“soft information” needed for a correct risk assessment. The analysis of cash flows, POS payments, credit and debit card transactions, network relationships enables risk managers to build a comprehensive picture of the counterparty risk and to strengthen its evaluation.



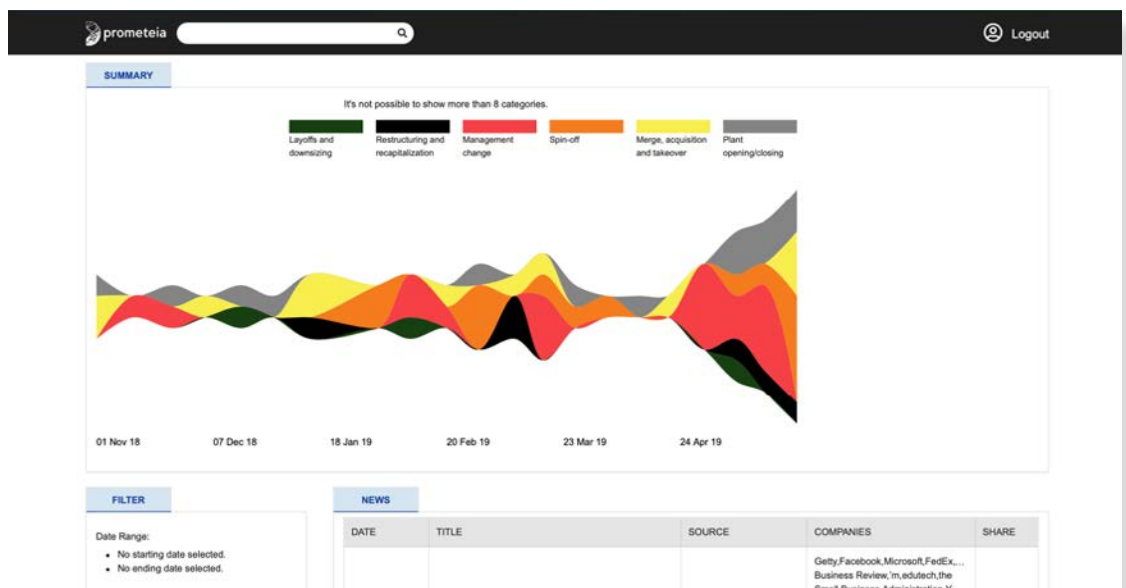
Enhancement of traditional modeling using internal information managed via Machine Learning techniques.	Enhancement of traditional modeling using balance Sheet information through the use of Computer Vision and Text Analysis.
Enhancement of traditional modeling through the extraction of external information flows via Machine Learning and Anomaly Detection techniques.	Enhancement of traditional modeling through qualitative Information, generated via event extraction and sentiment analysis techniques.
Sector Information recovery to produce a forward-looking perspective and identify signals of deterioration of individual sectors / production chains.	Group information integration and better track of the relations among client value chains using Link Analysis.

**TEXT ANALYSIS
FOR CREDIT RISK
MANAGEMENT**

Text analysis is a fundamental tool for the automation of credit management through the analysis and replication of the methodologies normally adopted by credit analysts.

In the credit risk management process, the analysis of both internal and external qualitative information related to the customer is increasingly relevant. It is therefore fundamental to collect news from magazines, newspapers, journals, blogs, topic-specific forums, social media, web portals and web

aggregators. The collection and extraction of significant information from all sources can be automated using Artificial Intelligence. The information extracted can be shaped in signals useful for the detection and active management of potentially problematic credits.



Collection of qualitative information from a variety of online sources.

Identification of credit reliability signals and micro-signals such as organization change, financial changes, legal proceeds, financial crimes.

Generation of the relationship network that emerges by the graph analysis, built using data extracted from qualitative information.

Generation of the geographical relations that emerge from the analysis of qualitative information.

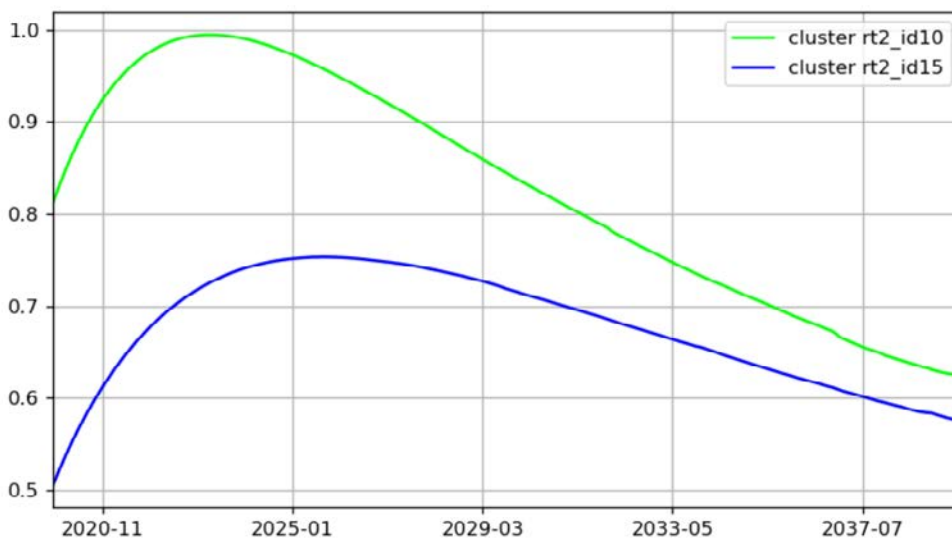
Extraction of the general sentiment signals that emerge from the analysis of qualitative information.

Behavioral models play a key role in the evolution of operational and financial risk management frameworks, through a more consistent representation of the empirical reality.



In the last years the digital revolution dramatically changed the client financial behaviors, putting more attention to the quality of the banking services and ensuring an easier comparison among competitive on-line offers. Artificial Intelligence gives the possibility to enhance the standard quantitative

analysis, by relying on new data typologies, managed through advanced analytical techniques. Prometeia proposes a blend approach in which standard statistical techniques and advanced analytics work together, to provide a deep insight about client financial behaviors.



<p>Extension of quantitative analysis to customer characteristics typically fed from CRM systems (ATM use, credit card use, reliance on digital channels, claims, financial assets under management...).</p>	<p>Extension of quantitative analysis to competitors benchmarking, using historical data about the market conditions applied by other market players to similar products.</p>
<p>Extension of quantitative analysis to macro-economic and demographic information, to better describe the context in which clients make decisions and act.</p>	<p>Tools for the integration of new data typologies, model development and execution of tests to assess the predictive capability and the time stability of the behavioral model.</p>
<p>Development of Prepayment Rates for mortgages and other lending products.</p>	<p>Development of Attrition Models for retail deposits and current accounts.</p>

DATA DRIVEN OPERATIONAL RISK

A data-driven operational risk approach is based on integrated and multi-dimensional analysis of information that enables the development of predictive indicators, to intercept new phenomena and emerging risks.

The investigation of textual data related to complaints, appeals, controls, frauds and losses provides a single view of the phenomena supervised by the risk management offices. The text analysis techniques allows extracting the information content also from unstructured data (free texts) and social-me-

dia open sources. The new information flows are then used for predictive analysis through Machine Learning techniques, which facilitate the understanding of Operational Risk factors, mitigate risk through early warning systems, and automate the monitoring framework.



Detection of phenomena and sources of potential operational losses, through the analysis of texts and free notes.

Identification of root causes and classification of losses in a cross and independent structure of a priori categories.

Analysis of the correlation among events for the prioritization and identification of complaints based on the corresponding risks and potential operational loss.

Improvement of the monitoring system by identification of critical issues, assessment of the complexity of control and automation.

Tool for displaying historical trends, identifying emerging phenomena and insights arising from predictive analyses.

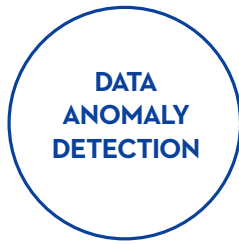
Advanced analytics solutions to enhance the efficiency and effectiveness of AML and AFC processes and improve the risk management.



Artificial Intelligence supports the end-to-end AML process, providing value in each step of the investigation. It allows the modular and progressive integration of relevant databases, based on both internal and external data and the creation of a “Single Customer View”. Thanks to entity resolution and link analysis techniques, it is possible to create a dynamic risk score and to evaluate the risk propagation in the network of customer connections. The AML process is also complemented by investigative tools that provide a complete view of the phenomenon and an optimization of investigation times, supported by text analytics techniques that capture external signals.



<p>Data collection and digital automation to reduce operating costs, eliminate repetitive activities and integrate different types of data.</p>	<p>Identification of direct and risky relationships between customers and their counterparts.</p>
<p>Segmentation, classification and anomaly detection to identify high-risk customers and proactively trigger risk mitigation actions.</p>	<p>Alert prioritization to increase the accuracy of SARs (suspicious activity reports), to increase operational efficiency and reduce revenue loss.</p>
<p>Justification and continuous learning to provide complete transparency and correct interpretation of results.</p>	



Machine Learning Anomaly Detection techniques are useful to empower the standard Data Quality Check and Data Validation processes, typically performed on a daily basis by Risk Management units on structured and unstructured data flows.

In recent years there has been a growing demand for control and certification of the quality of banking data, following the need of corporate reorganizations, new auditing, certification frameworks (such as GDPR) and new regulatory requirements. With the adoption of Artificial Intelligence solutions, it is possible to enhance traditional rule-based approaches in order to reduce the

costs of periodical maintenance, avoid the revision of manually set thresholds and improve the performance reducing the false positives. The proposed solution is based on the use of some of the most innovative techniques in the field of Deep Learning and can be applied to identify anomalies, for example, on client portfolio data, instrument data, market data and risk exposure data.



Investigation of numerical anomalies through Machine Learning approach (HDBSCAN, neural network, autoencoder).

Categorization of numerical anomalies in order to distinguish between independent anomalies and derived anomalies.

Detection of categorical anomalies, investigated through rule-based approaches.

Interactive dashboard for the visualization and exploration of the anomalies.



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