

SAS® for Risk Modeling and Decision Making

A trusted solution for managing risk models and decision strategies



Overview

Risk-based decision making in the financial services industry has shifted dramatically due to digitalization and the widespread adoption of automation and advanced analytics. While some still struggle to harness vast amounts and types of data and use it for sophisticated analytics initiatives, banks are using risk models for a widening scope of decision making. For example, risk models are used to assess credit risk, calculate minimum levels of capital and proactively detect stress signals.

Being able to quickly deploy new, innovative models to meet changing business needs is essential in an unpredictable financial environment. But many models get stuck in long development cycles - due to problems with the data, analytics and processes. And models that are stuck in development can't deliver business value, no matter how innovative they are. As firms increasingly rely on risk models to feed automated decisioning processes, any gaps in their capabilities will likely amplify shortfalls in business results.

SAS provides a blend of cross-industry best practices and an integrated framework to address these challenges. We deliver data management, model development, deployment and monitoring capabilities through SAS Risk Modeling and intuitive decision-process design and rule-set management capabilities through SAS Intelligent Decisioning. The combination gives organizations a repeatable, auditable and transparent way to develop and manage risk models and decision strategies.

Capabilities

A risk modeling and decisioning solution from SAS supports the full analytics life cycle from data preparation to model development, validation, deployment, decisioning and monitoring. With SAS, modelers can create open, explainable models in a well-managed and controlled environment. And they can do it using the latest analytical techniques, such as artificial intelligence (AI) and machine learning.

Our solution automates key tasks, so organizations can build better models faster. These models can be deployed into integrated decision management workstreams that deliver tangible business benefits and ROI. Because developers can use the programming language of their choice, they can rapidly develop and deploy reliable risk models and decision logic - with the right controls in place.

Broad, Trusted Data Access, Integration and Management

With SAS, it's easy to access and integrate new data from multiple sources, then prepare it for developing state-of-the-art risk models. Quickly access third-party data, macroeconomic information and other data from multiple sources. Use a comprehensive (optional) data model, based on industry best practices, to build a consistent and robust data mart that's powered by integrated data extraction, deduplication, mapping and loading capabilities. If an external data source already exists, use that data source directly for faster implementation.

Comprehensive, Streamlined Data Preparation

To overcome time-consuming analytical data preparation activities, a drag-and-drop interface lets data engineers and less-technical users explore, build and run transformations, cleanse, augment and join data within the integrated visual pipeline of activities. Quickly prepare all types of model development data using interactive techniques for missing value imputation, outlier and correlation analysis.

Explore the data model, create development data sets with multiple, predefined target variable definitions, or create variables on demand. All work is shared, which strengthens cooperation and helps retain corporate knowledge as well as model governance. Advanced techniques (such as AI suggestions) help discover and fix data issues. You can identify potential predictors, reduce the dimensions of large data sets and create new features from your original data - with fast, in-memory performance.

Fast, Flexible and Reliable Model Development

SAS supports multiple modeling techniques - from scorecards and statistical models to machine learning - using SAS and a variety of open source languages. Modelers can develop risk models and quickly build multiple challenger models, back-test or benchmark them, then deploy the best for optimal results. This approach enables fast, flexible and scalable deployment of risk models for in-database, batch or real-time processing within SAS decision engines.

Benefits

- **Enhance productivity and collaboration.** Modelers build in a single environment from start to finish, across the full model life cycle. This unites teams and processes and promotes information sharing - speeding development cycles and helping to retain intellectual property.
- **Save time on data preparation.** An interactive, self-service tool makes it easy to prepare data for analytics. Quickly examine all types and sizes of data sets for patterns, anomalies and missing values through built-in, AI-enabled techniques - and benefit from open access to a wide variety of new data sources.
- **Speed model development and reduce costs while empowering users.** Using APIs, Python, R and other programming languages, developers can experience the high-performance power of SAS without exclusively coding in SAS.
- **Reduce model risk.** Ongoing monitoring across the process keeps models aligned with business and regulatory compliance requirements. From individual models to an entire portfolio, this repeatable, transparent approach reduces model governance efforts and implementation risks.
- **Find the best model faster to streamline decision making.** With superior performance from distributed processing and feature-rich building blocks for machine learning, multiple users can quickly explore and compare multiple modeling approaches.
- **Shorten the cycles of decision making.** Agile configuration and fast deployment of new rules and strategies enable informed decision making across silos of activity - wherever decisions are made.
- **Ensure transparency.** With SAS, decisions are explainable, governed and auditable. Transparency across the process - from data to models to deployment and decisioning - gives full visibility and control, making it easy to explain decisions to internal and external stakeholders. Audit tracking and versioning help deliver trusted outcomes.

Challenges

- **Time-consuming, manual approaches.** Opportunities are lost if too much time is spent collecting data or improving data quality, coding or orchestrating manual processes.
- **Inconsistency and rework.** Duplicated efforts increase costs while a variety of skill levels and expertise make it hard to reach consensus. Ad hoc approaches may cause production processes to be overlooked or handled inconsistently.
- **Uncontrolled model degradation.** Unless models are continuously monitored, their performance degrades - resulting in poor decisions and lost business opportunities.

- **Disjointed approach to model development, deployment and decisioning.** Many firms are challenged to tightly integrate the full process from model development to deployment - negatively affecting decision engine outcomes.
- **Complex cross-functional risk and compliance processes.** Regulatory demands and digitalization are challenging firms to increase model sophistication and granularity of calculations.

A Collaborative, Visual Environment

SAS provides a full-function content management application that gives modelers and analysts a straightforward way to create, manage and share content, and administer content permissions. A collaborative workspace lets everyone see the work that's happening for a project, including shared parameters such as derived variables, modeling projects and notes. Users can create interactive reports and dashboards by querying data from multiple sources. Dynamic visuals help them understand what's happening, plus share key performance metrics through the web or mobile devices. Recipients can slice and dice views to find answers or raise more questions.

Robust Statistical, Data Mining and Machine-Learning Techniques

SAS provides a broad set of advanced statistical, machine-learning and deep-learning techniques from an integrated environment.

Capabilities include clustering, advanced regression, decision forests, neural networks, gradient boosting models and more. Developers can embed open source code within an analysis and call open source algorithms seamlessly - using the language of their choice. Complex machine-learning algorithms can be automatically tuned for optimal performance, saving time and resources.

Model Testing and Performance Reporting

With SAS, you can test different modeling approaches in a single run and compare results of multiple machine-learning algorithms with standardized tests to automatically identify champion models. You can compare champion versus challenger models via parallel runs or back-testing, and detect and preempt model instability - then present performance information to executive management and regulators. SAS provides a wide selection of web-based model stability, performance, calibration and model-input validation reports, including those recommended by regulators.



Figure 1. Explore and visualize your risk portfolios.

Streamlined Model Deployment for Decisioning Processes

Business users can create decision workflows using an interactive, visual environment - no tedious coding required. The interactive interface includes drag-and-drop nodes that can be reused, making decision-rule building and deployment fast and collaborative. From a single interface, analytical models and business rules are natively integrated, managed and published, with similar logic for batch and real-time web service execution. The result is faster deployment and model integrity within analytically driven operational decisions.

The SAS® Difference

- **Complex analytical problems solved faster.** In-memory data persistence eliminates the need to load data multiple times during iterative analyses. Analytical model processing time is measured in seconds or minutes - not hours - so you can find solutions to complex problems faster than ever.
- **Efficient model development and deeper insights.** SAS provides a fast, flexible and economical option to create and deploy risk models. In turn, you can quickly get better insights

from granular data that's supported by powerful machine-learning techniques.

- **Reduced risk and improved outcomes through automated operational decisions.** Based on operational data and informed by accurate models, business leaders and technical personnel can jointly implement the right decisions with sophisticated business logic, predictive analytics and machine learning.
- **Flexible, customizable decision logic.** Business rules and analytical models can be integrated with custom code for decision logic that goes beyond analytical models and rules. Custom code allows you to integrate your business applications in an open computing environment using REST APIs, Python and other integration options.
- **Governance across the board.** Our solution helps you manage high-volume contextual customer interactions and other enterprise decisions effectively and consistently, within a governed environment. Complex model and decision logic can be deployed easily, regardless of transaction volume or the complexity of data attributes.

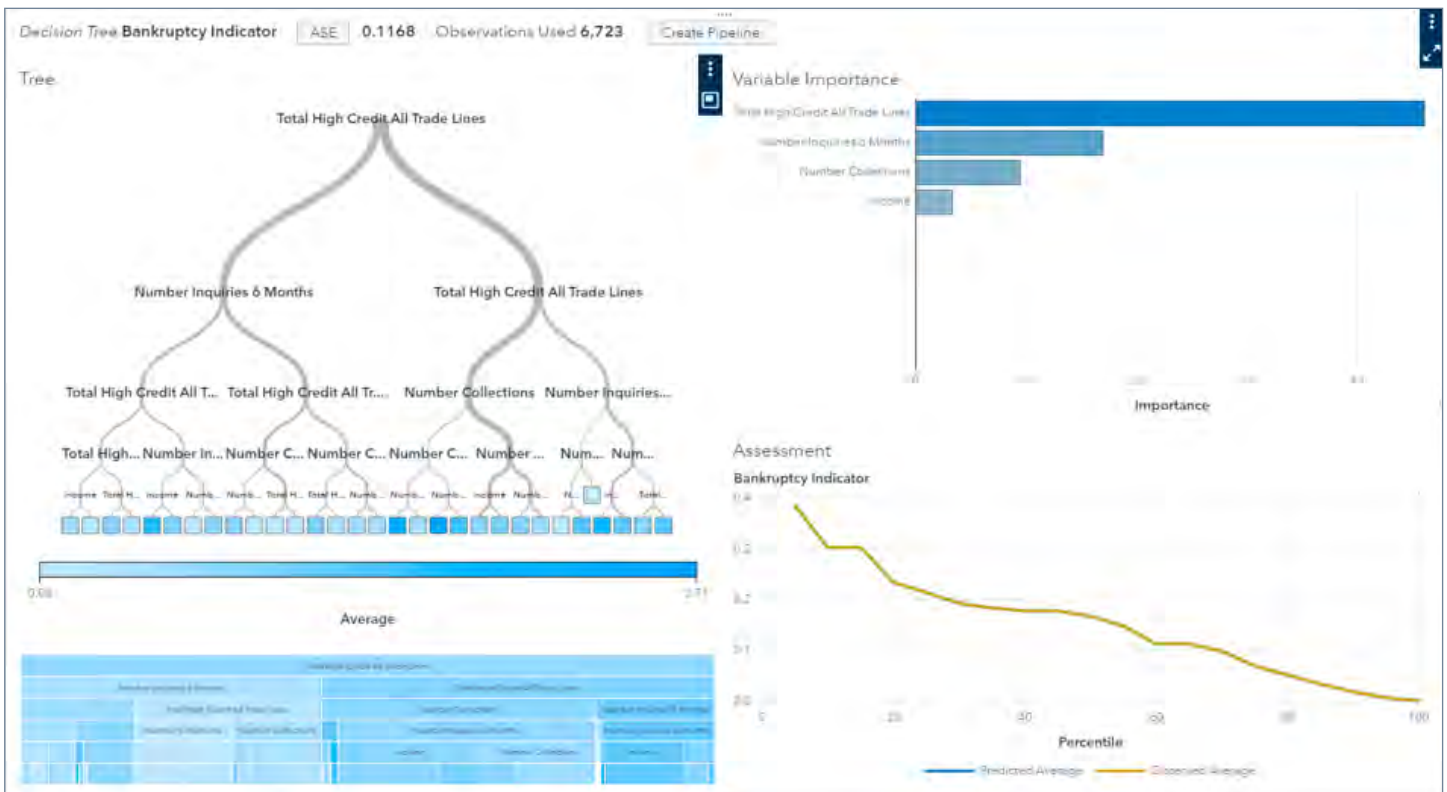


Figure 2. Examine key risk indicators and correlated variables.

To learn more, please visit sas.com/riskmodeling

