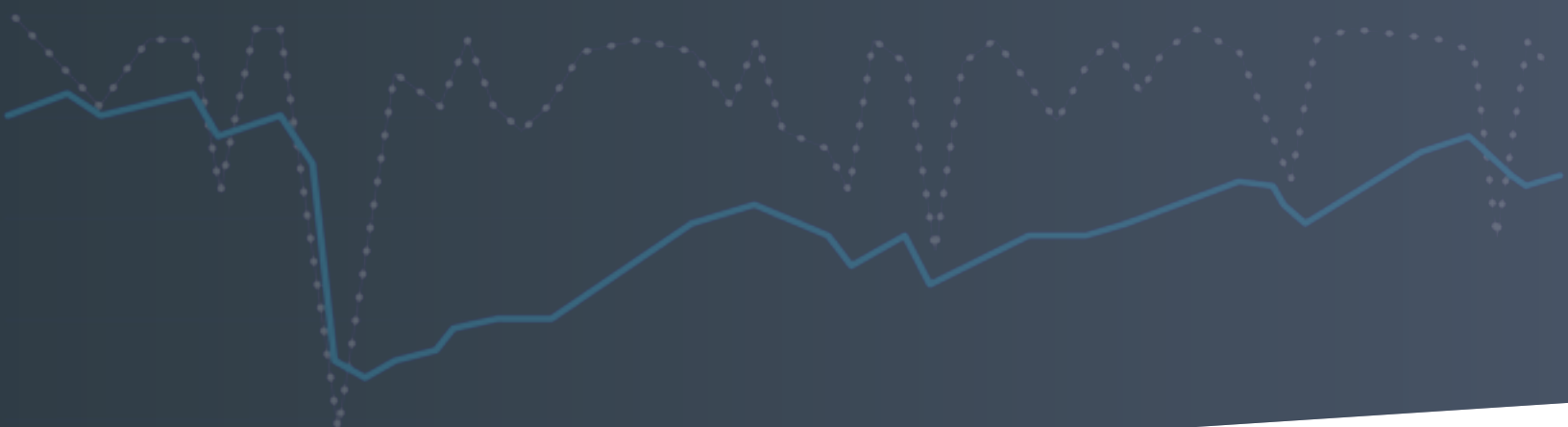# CREDIT RISK INTELLIGENCE

ASSESS CREDIT RISK, MINIMIZE DEFAULTS AND FAST-CYCLE LOAN APPLICATIONS WITH MACHINE LEARNING

BigML has developed an innovative Machine Learning based Credit Risk Intelligence (CRI) solution that offers highly accurate predictions to benefit banks and financial institutions that are looking to:

- Assess loan risks in advance and minimize defaults and delinquencies.
- Augment rule-based systems and subject-matter experts with
- objective model-driven predictions.
- Reduce operational costs with process automation.
- Fast-Cycle loan applications without taking on undue risk.

Financial institutions that empower their front line employees and decision makers with the power of actionable and timely credit risk predictions can better quantify risks, avoid write-offs and boost labor productivity — all thanks to Machine Learning.

BUSINESS PROBLEM

Consumer and commercial debt has been steadily growing around the globe, which has lead to many more late or missed payments, and delinquent or non-performing loans which call attention to the for better, more dynamic risk management practices.

Traditional credit risk systems either rely on static business rules or are only able to predict delinquencies a short time ahead of actual non-payment events. As a result, financial institutions offering personal loans, instant loans and related investment products learn too late about imminent defaults.

By contrast, Machine Learning is capable of dealing with many variables to explore thousands of complex combinations (not just linear) to discover statistically significant patterns that otherwise would have gone unnoticed. In addition, Machine Learning driven approaches are better suited to changing circumstances as they can automatically learn and adapt over time.
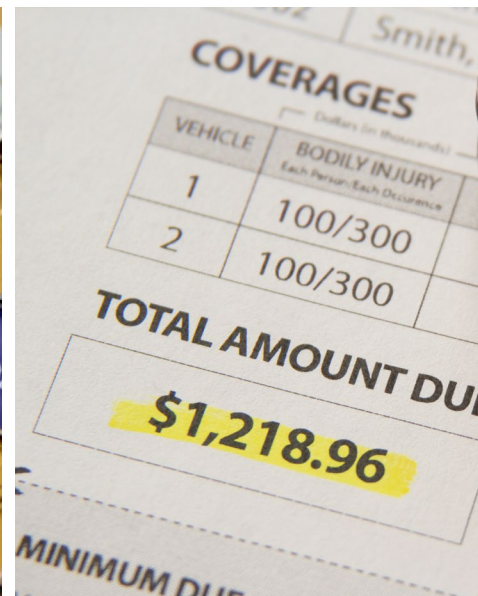
Fortunately, most banks have a wealth of historical customer data at their disposal that can be used to anticipate future consumer behavior to help them gain distinct competitive advantages while improving and automating decision making.

SOLUTION & BENEFITS

CRI helps credit risk analysts, loan officers and underwriters make informed decisions based on data. It consists of a custom web application built on top of BigML's comprehensive Machine Learning software platform. CRI stores a rich history of predicted and actual loan performance that continuously get updated to iteratively improve model performance with the active collaboration of front line staff instead of bypassing them.

CRI predictive models can anticipate a future delinquency in advance, e.g., 2 to 3 months. Early detection of delinquencies have a highly-measurable business impact since more reaction time allows a bank to take measures to remediate potential negative outcomes and losses. Some BigML customers are detecting 30% more defaults in their loan portfolios after applying the intelligent risk scores in their processes.

Aside from assuring timely payments, CRI helps financial institutions shorten the time it takes to process loan or credit line applications to control costs while delivering better service levels. Cost savings include labor and third party data costs skipped for those loan applications that carry a higher risk profile

RISK LEVEL →	A	B	C	D	E	F
REVIEW OPERATION	ACCEPT		ACCEPT WITH CAUTION		REJECT	
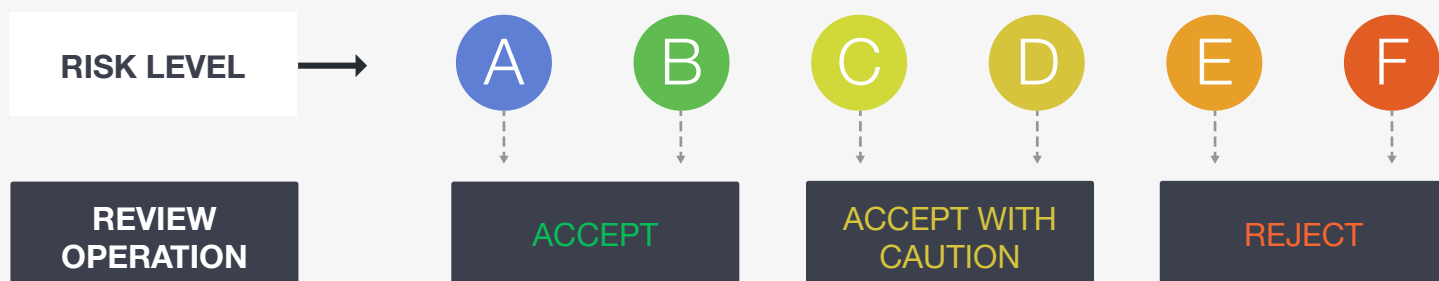
CRI supports a fluid data model that can be sourced from many different systems of record or external providers depending on the need. The input variables cover attributes of applicants (e.g.,new/existing borrower, employment status, reported income), loan requests (e.g., amount, purpose, duration), third-party data (e.g., credit score) or economic forecasts while the output variable is a discretized indicator of the credit application quality. Candidate CRI models take into account novel parameters such as shocks or anomalous events to normal consumer behavior in customizable time windows. CRI automatically selects the best models based on criteria that balances the natural tradeoff between accuracy and robustness.

The final recommendation can be a combination of the CRI recommendations overlaid on existing business rule filters. Together, they make up the intelligent risk score. Default probabilities captured in the predictions are discretized into multiple categories, e.g., A through F. However, the model

classification cut-off points (operating thresholds) can be easily modulated according to current risk appetite or other business constraints.

The system recommendations are accompanied with explanations of the most important variables influencing potential delinquencies or defaults. All CRI predictive models are interactive, interpretable and traceable which lend them well to strict regulatory compliance requirements.
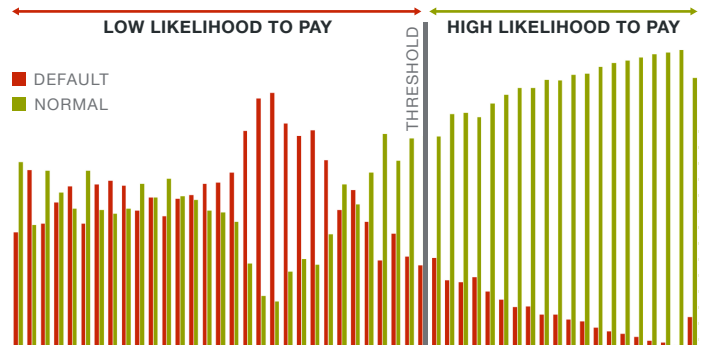
BigML's Credit Risk Intelligence application acts as the central data repository for all the loan applications, past and present, at your financial institution to facilitate better decision making.
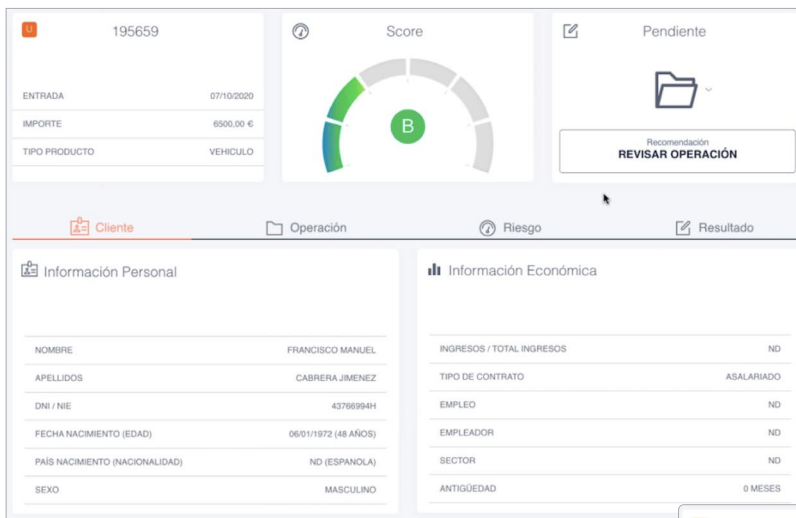
The top line predictive score for each loan application can be seen in this detailed view along with all the relevant details for that application such as the loan applicant's demographic and financial profiles.

The predictive loan scores are explained in detail by displaying the most relevant patterns found in the applicant's data in a human-readable format. This supports regulatory compliance and lets loan officers have an in-depth understanding of the risks involved while exercising highly nuanced control of the approval process.
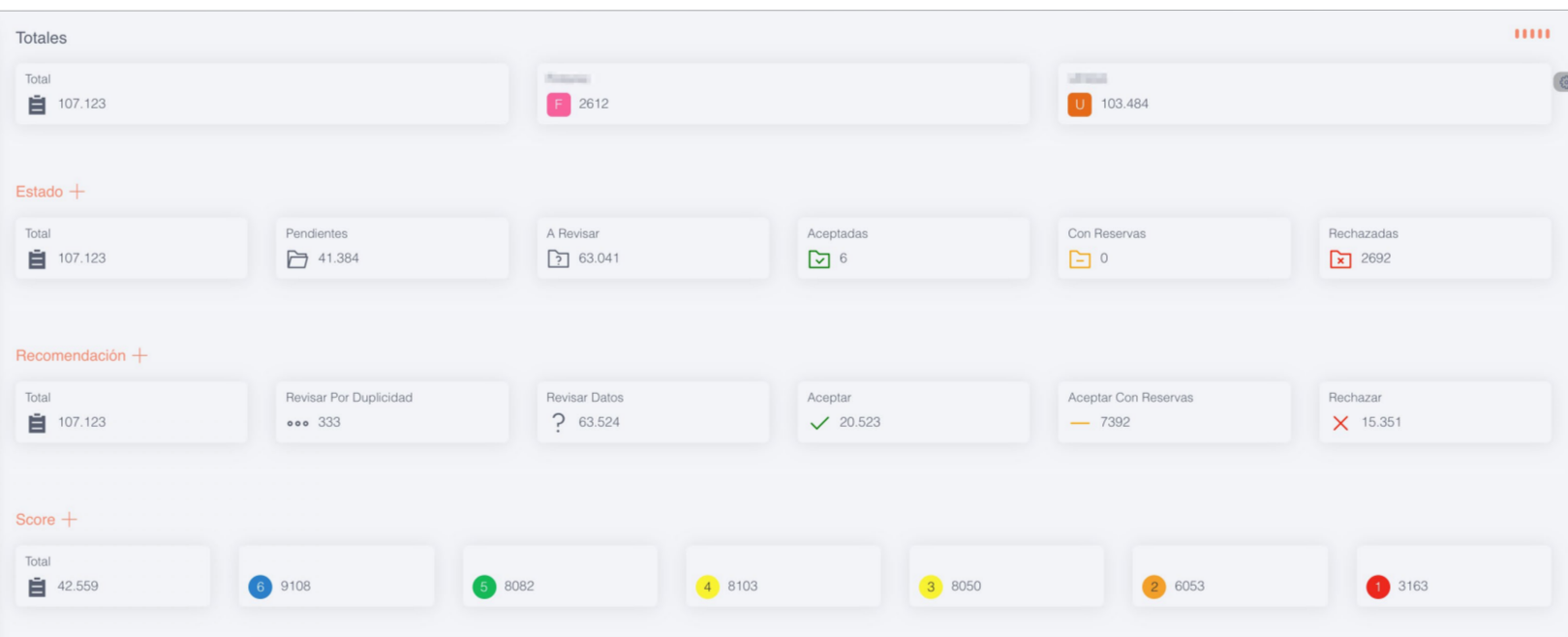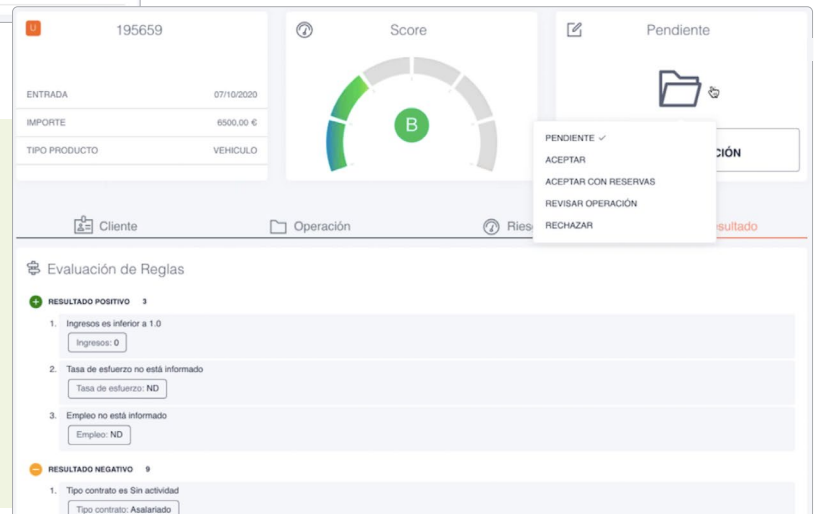
BigML's Credit Risk Intelligence application allows users to view the key performance metrics of their active loan portfolios in a single place while organizing them by multiple criteria such as predictive grades.

The CRI solution utilizes a mixture of sophisticated supervised and unsupervised learning techniques including but not limited to classification, anomaly detection, and clustering. CRI is capable of predicting in batch or in real-time and the end-to-end workflow managed by BigML's core Machine Learning platform makes it easy to fully automate the process programmatically. ICR can be directly integrated with customers' enterprise systems through export files, REST API calls, or through libraries in multiple programming languages.

- **Deployment:** CRI can be deployed on-premises or in any cloud service (AWS, Azure or Google Cloud, A1 Digital). CRI installations are auto-deployable via containers and multiple instances can be activated in parallel to serve different concessions, departments, business units or subsidiaries. CRI runs on Linux servers with industry standard CPUs. GPUs are optional but recommended for image analysis if applicable.

- **Auto-Scaling:** The CRI backend provides autoscaling capabilities out-of-the-box to optimize the utilization of available system resources autonomously among multiple users, tasks and servers.

- **Administration:** Admins can manage access tokens, user accounts, user groups in a granular fashion. periodic tasks and traceability reports. System resource utilization reports let admins monitor performance based on CPU/GPU and memory usage, cache size, uptime and mean response time. Execution logs are available for traceability and more detailed diagnostics purposes.

About BigML

In the near future, all applications will be predictive. To stay relevant in a faster, complex, connected, and uncertain world, predictive applications will have to take advantage of Machine Learning and other Artificial Intelligence techniques in one way or another. BigML's platform, private deployments, and rich toolset helps enterprises create, rapidly experiment, fully automate and manage Machine Learning workflows that power best-in-class intelligent applications.

For more information, visit BigML.com or email us at info@bigml.com