Catching & Ranking Risks

CATCH 2.0: Finding and prioritizing hidden operational risks

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CONTEXT

Itaú Bank is **Latin America's largest financial institution**, managing an R$1.4 trillion credit portfolio and over 3.4 million active vehicle loans.

Itaú Bank wants to build **Catch 2.0**, an **autonomous risk framework** that automatically **detects unknown operational failures** and prioritizes them by business urgency, allowing analysts to resolve high-impact issues immediately.

PROBLEM

Too many false alarms

Analysts spend most of their day checking alerts that turn out to be nothing. Rigid rules fire on every small variance.

No clear priority

When many alerts arrive at once, there is no Rank #1. Serious issues can wait while small ones get attention.

HOW CATCH 2.0 WORKS

Four steps turn raw loan events into a short, ranked to-do list for analysts.

1. **Collect Events** — Track each loan step by step
2. **Learn What Is Normal** — Spot unusual next steps
3. **Detect Anomalies** — Find unusual weeks automatically
4. **Rank Anomalies** — Show the most urgent first

DATA + DETECTION

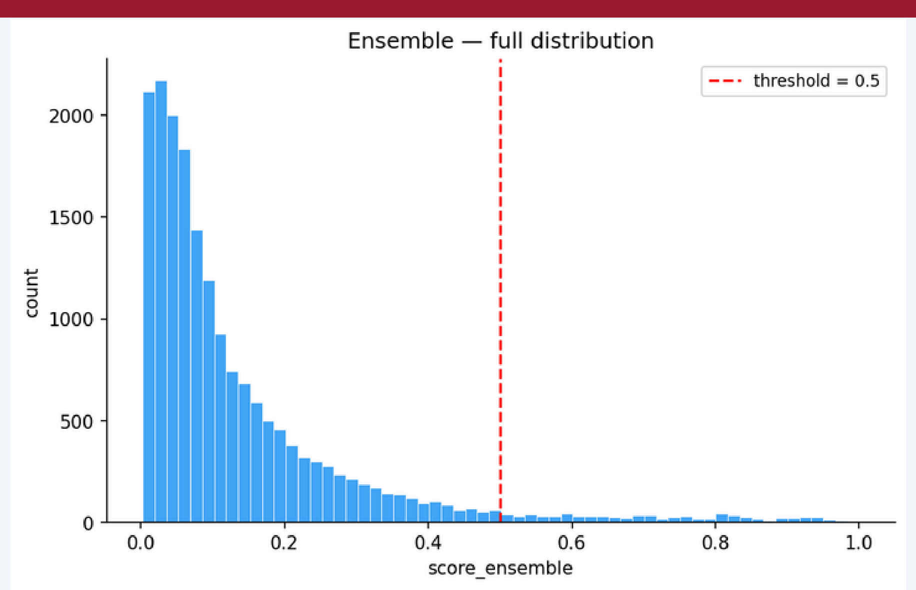
Data we use each week

Number of events, Number of distinct loans involved, and Cross-entropy score from the Transformer.

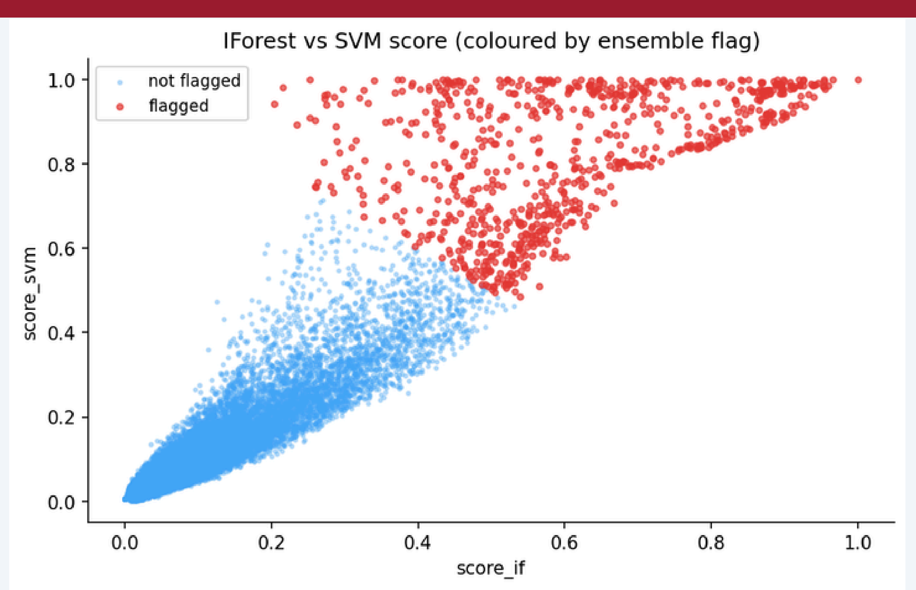
Scaling right-skewed data

Datasets are heavily right-skewed, so we apply a log transform and a prior-only z-score transformation:

$$z = \frac{log(1+x) - \mu}{\sigma}$$



Ensemble score distribution (threshold = 0.5)



IForest + SVM (red = flagged)

Anomaly Decision Rule

(Isolation Forest + One-Class SVM) score > 0.5

The score sits in [0, 1]. Values near 0 look normal. Values above 0.5 are flagged as anomalies.

Why this beats fixed cutoffs

The ensemble captures multi-dimensional interactions across event counts, loan scope, and sequence surprise.

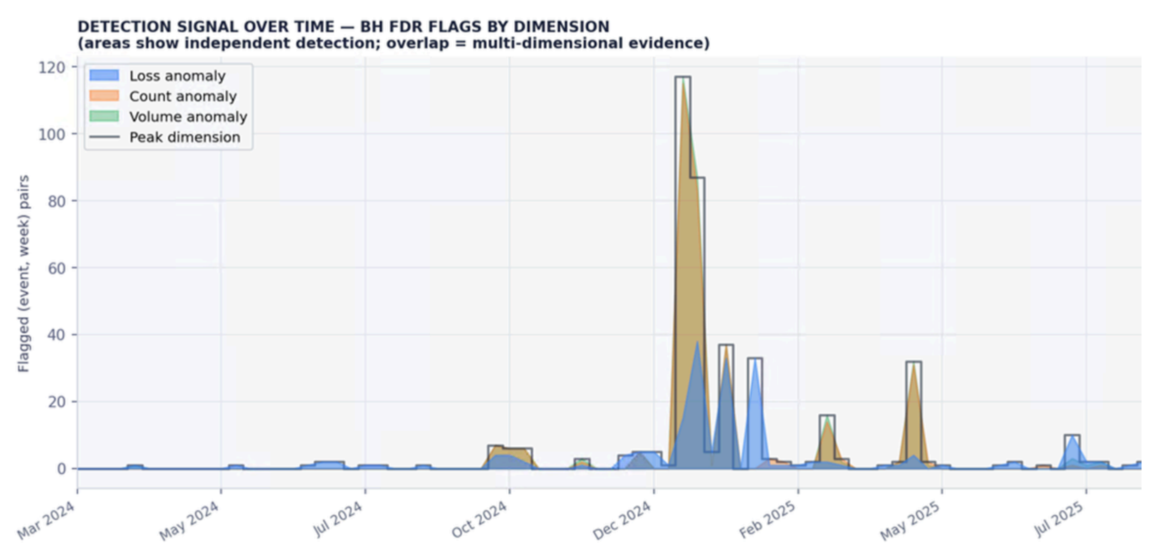
Controlled Alert Precision

Mathematically bounds false alarm rates, expanding monitoring coverage without overwhelming analysts with noise.

RANKING + RESULTS

Urgency = Model evidence × Process scope × Financial exposure × Business severity

We also add persistence, recency, and process-graph boosts when upstream steps look abnormal.



CATCH RISK | Priority Action Queue

Active Portfolio: 3.4M Contracts | Queue: 30 Ranked Incidents

Rank	Process Domain	Business Severity Cluster	Exposed Contracts	Severity Score	Root Cause Flag	Action
#1	CONTRACT_ORIGINATION	CRITICAL	1,379,082 contracts	100	Proposal validation gap	Investigate Now
#2	VEHICLE_VALUATION	CRITICAL	380,230 contracts	92.6	Table lookup mismatch	Review Root Cause
#3	LIEN_OPERATIONS	HIGH	759,480 contracts	78.3	Infinite retry loop onset	View Contracts

*Simulated values are shown to protect Itaú Unibanco's proprietary data

VALIDATION

A real failure we tested

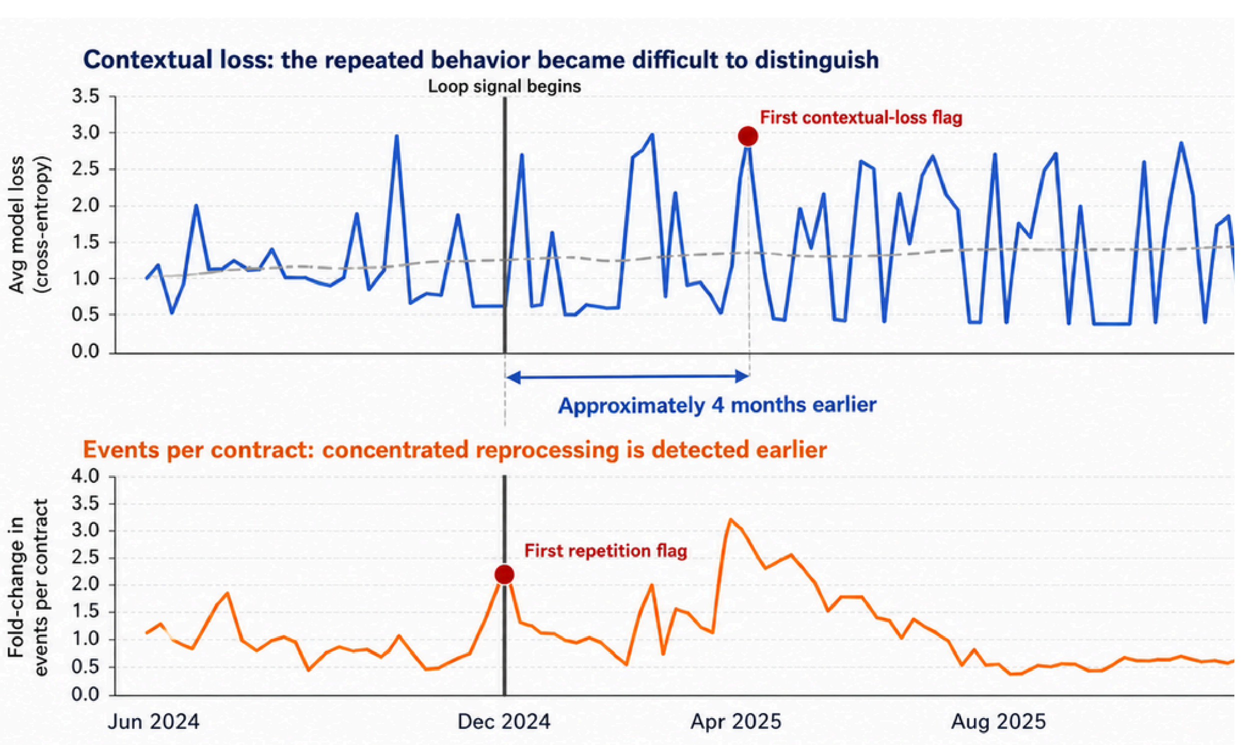
Over 500,000 car loans got stuck repeating the same registration step. Errors grew silently.

Why previous detection missed it

The error blended into the baseline, so the score stayed near zero and no alarm fired.

What CATCH 2.0 did

It looks for structural pattern shifts, not just spikes. The loop is flagged months before manual reports.



Detection 4 Months Earlier!

BUSINESS IMPACT

80%+	Analysts less time spent hunting false alerts
8.2M	Active contracts protected (Monitored in field validation)
525x	Reduction in Review Objects for Analysts
$270B	Portfolio scale ready for wider domain application