Digital Finance 3: Technology in Finance

Lesson 31: Fraud Detection and AML

FHGR

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Fraud detection is a continuous arms race between attackers and defenders.

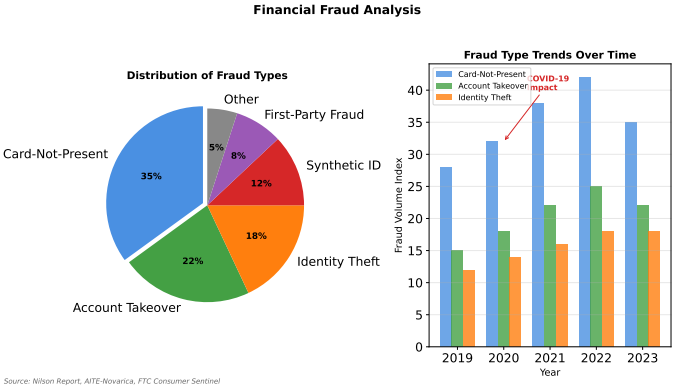
Learning Objectives

By the end of this lesson, you will be able to:

- Classify different types of financial fraud
- Design ML-based fraud detection systems
- Understand real-time scoring architectures
- Apply anomaly detection techniques
- Balance precision and recall in fraud detection
- Explain AML compliance requirements

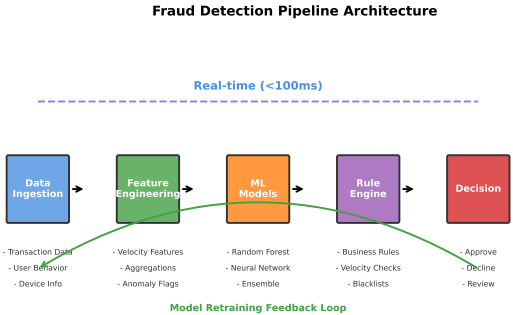
Anomaly detection identifies novel fraud patterns without labeled examples.

Fraud Types Distribution



Credit card fraud, identity theft, and account takeover are the most common fraud types in finance.

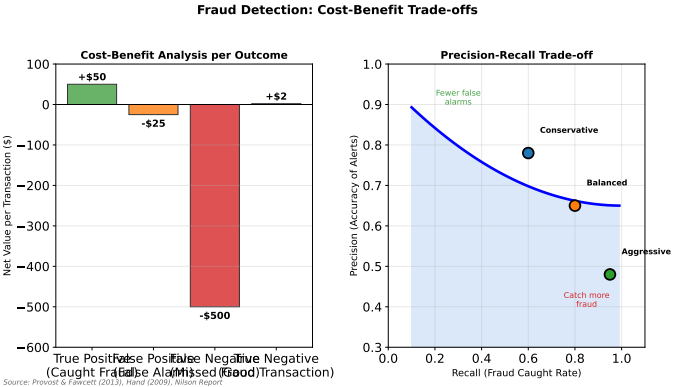
Fraud Detection Pipeline



Source: stripe.com (Radar), fico.com (Falcon Fraud)

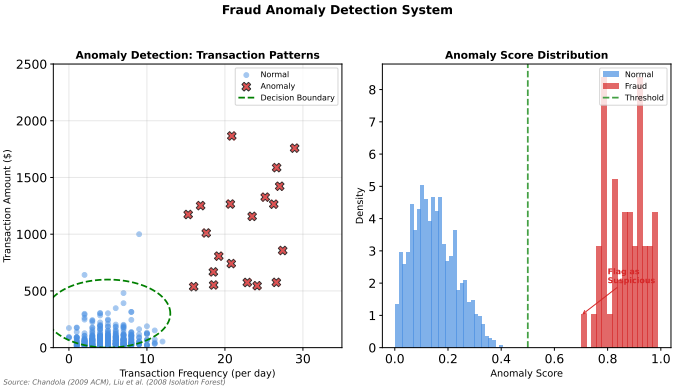
Modern fraud detection systems combine rules-based filtering with ML models for real-time scoring.

Fraud Cost-Benefit Analysis



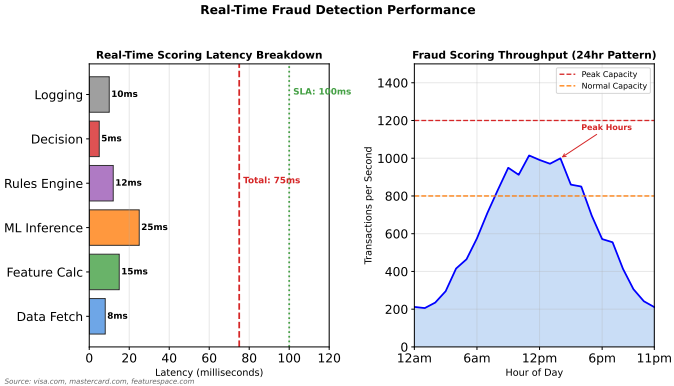
Optimal fraud thresholds balance fraud losses against customer friction from false positives.

Anomaly Detection Techniques



Unsupervised methods detect anomalies by identifying patterns that deviate from normal behavior.

Real-Time Scoring Architecture



Real-time fraud systems must score transactions in milliseconds to avoid payment delays.

Fraud Detection And Aml: Key Takeaways

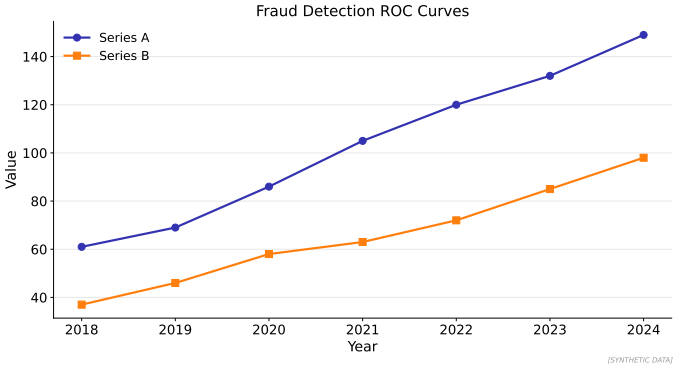
Key Takeaways:

- ML significantly improves fraud detection accuracy
- Real-time scoring essential (sub-100ms latency)
- Class imbalance major challenge (0.1-1% fraud rate)
- Anomaly detection for new fraud patterns
- Cost-benefit analysis determines thresholds
- AML compliance requires explainable models

Next Lesson: NLP in Finance

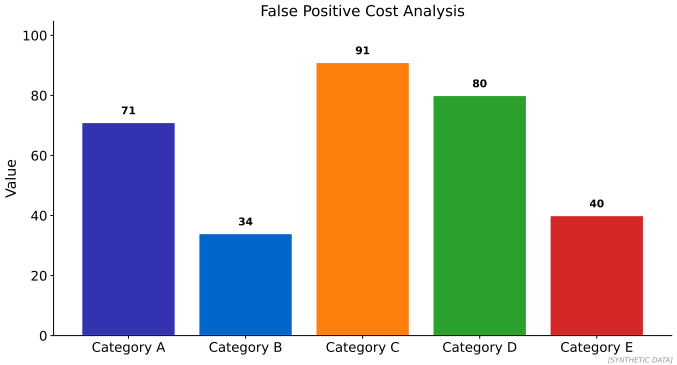
Fraud evolves constantly - models require continuous monitoring and retraining.

Fraud Detection Model Comparison



Ensemble methods typically outperform single models.

False Positive Cost Impact



Balancing detection rate against customer experience costs.