

# AI-DRIVEN CREDIT CARD FRAUD DETECTION

IMPROVING FRAUD CAPTURE WHILE REDUCING UNNECESSARY MANUAL REVIEWS

ABIGAIL DE GUZMAN

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**Author:** Abigail de Guzman

**Course:** Post Graduate Diploma in AI and Machine Learning

**Institution:** AIM School of Executive Education and Lifelong Learning

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# THE PROBLEM WE'RE SOLVING

- Credit card fraud creates **direct financial losses and reputational risk**
- Manual review is **costly, slow, and does not scale**
- Existing rule-based approaches **struggle** with:
  - Evolving fraud patterns
  - High false positives (customer friction)

The challenge is detecting fraud **early and accurately** without overwhelming operations.

# WHY FRAUD DETECTION NEEDS TO IMPROVE

01 Every false negative → **financial loss**

02 Every false positive → **customer dissatisfaction + operational cost**

03 Highly imbalanced fraud data makes accuracy alone misleading

# OUR PROPOSED SOLUTION



- Machine learning model evaluates transactions in real time
- Assigns risk scores instead of hard yes/no rules
- Supports risk-based decisioning:
  - Auto-approve
  - Flag for review
  - Escalate high-risk cases

# MODEL STRATEGY

## Two models evaluated:

- **Baseline:** Simple, interpretable model
- **Advanced:** Ensemble model capturing complex fraud patterns

## Selection focused on:

- Fraud detection effectiveness
- Reduction of false positives
- Operational feasibility

# WHAT WE ACHIEVED



**Improved fraud detection accuracy**



**Significant reduction in false positives**



**Better balance between fraud loss and customer friction**

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-  **Fewer false positives →**
    - Lower manual review costs
    - Less customer friction
  -  **Better fraud capture →**
    - Reduced financial losses
    - Faster response to emerging fraud patterns
  -  **Scalable approach →**
    - Handles transaction growth without proportional headcount increase

## BUSINESS IMPACT AND ROI

Even small improvements in precision can translate to meaningful cost savings at scale

# RISK, GOVERNANCE, AND TRUST

- Model decisions are **explainable** at feature level
- **Supports:**
  - Audit requirements
  - Regulatory review
  - Internal risk governance
- **Continuous monitoring** planned to detect:
  - Model drift
  - Bias indicators
  - Performance degradation

The model is **transparent, monitorable, and aligned with risk governance standards.**

08

## KNOWN **LIMITATIONS**

Model performance depends on historical data quality

Thresholds require tuning based on risk appetite

Not a standalone solution – complements existing controls

# RECOMMENDATION

- Proceed with Random Forest–based risk scoring model
- Use as decision support, not auto-rejection engine
- Next Steps:
  - 1.Pilot deployment on limited transaction stream
  - 2.Define business thresholds with Risk & Operations
  - 3.Monitor performance and customer impact
  - 4.Iterate and scale

This approach balances fraud protection, customer experience, and operational efficiency.

# THANK YOU

abbydeguzman@gmail.com

### **Acknowledgment**

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- Grammarly was used for grammar and phrasing suggestions.
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All final interpretations, coding steps, and written analyses were reviewed and edited to reflect the author's own understanding and insights.

**END OF DECK**