

## Business Problem & Objective

### Business Problem:

- Credit card fraud, though accounting for less than 0.2% of total transactions, results in estimated annual losses ranging from ₹3–4 crore.
- The current fraud detection system is rule-based, leading to:
  - A high rate of false positives, necessitating superfluous manual reviews.
  - Unidentified fraudulent transactions, resulting in both financial detriment and damage to reputation.

### Objective:

- To develop a machine learning model capable of identifying fraudulent transactions with a high recall rate (thereby detecting the majority of fraud cases) while concurrently minimizing the incidence of false positives.

## Model Results

Model Used: Logistic Regression (with class weights to handle imbalance)

Performance Metrics:

Metric	Default Threshold 0.5	Tuned Threshold 0.35
Recall (Fraud)	92%	85%
Precision (Fraud)	6%	20%

ROC-AUC      0.98                      0.98

**Impact:** At tuned threshold, prevents ~₹3 crore annual fraud losses.

## Recommendations & Next Steps

### Recommendations:

- Deploy model at **tuned threshold ( $\approx 0.35$ )** for balanced precision and recall.
- Auto-block **top 1% highest-risk transactions**, send next **4% to manual review**.
- Retrain the model **quarterly** to adapt to evolving fraud tactics.
- Integrate **feedback loop** with fraud investigation team to refine predictions.