ML project - Fraud detection

Stakeholder: Xente

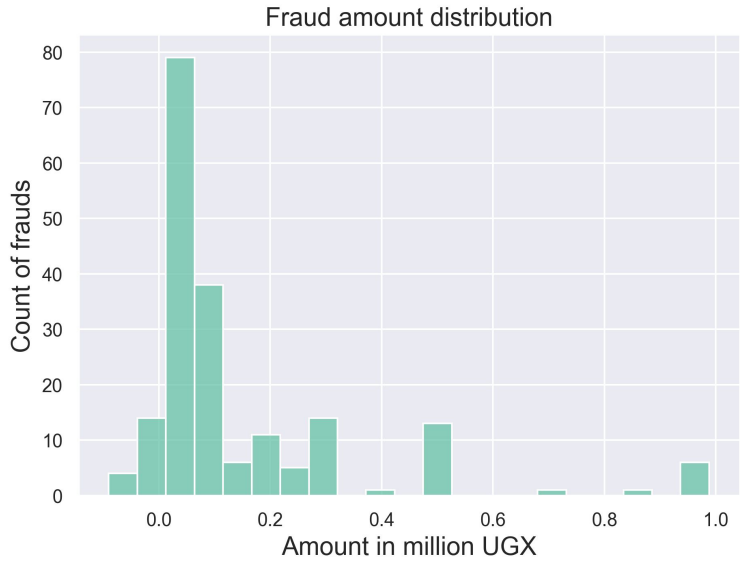
Introduction

Team	Valentin Schoop, Felix Becker, Leonardo Ranasinghe
Stakeholder	Xente
Objective	Accurately classify fraudulent transactions
Value	- Less fraud reimbursement - Higher customer retention - Better company image
Outcome	85.22 million UGX saved

The dataset

Training dataset: 95662 transactions from 15.09.18 to 15.03.19.

Highly imbalanced data: 193 frauds (0.2%).



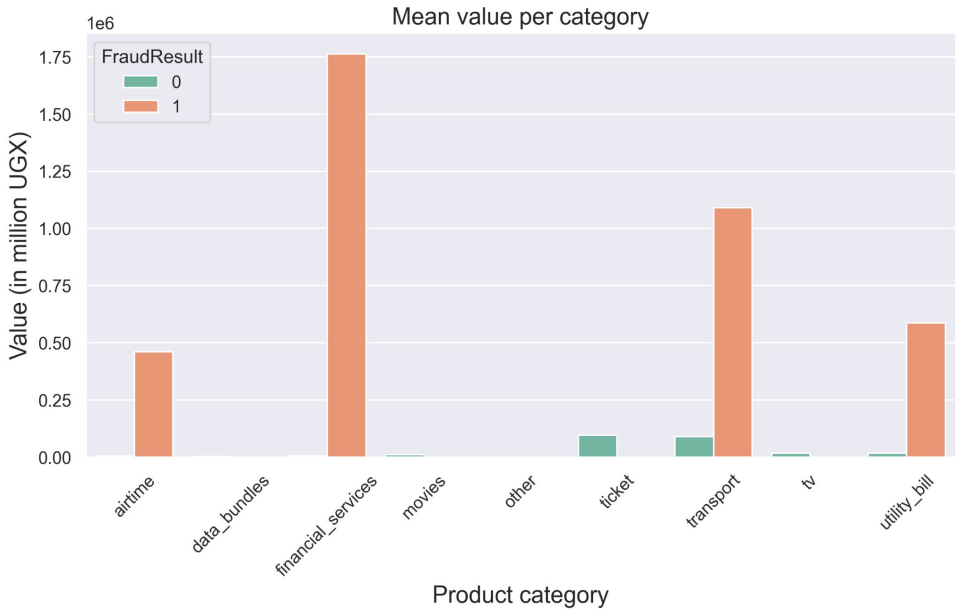
Metric choice

Falsely classified frauds are preferred to falsely classified non-frauds

→ Metrics: Recall, F1, **Matthews correlation coefficient (MCC)**

- High recall
- Check F1
- Model optimised for MCC, good for imbalanced data

Baseline model



Fraudulent if:

transferred amount > 100 x (average amount transferred in all transactions of the same product group)

Recall score = 28%, F1 score = 40%, MCC score = 44%

Machine learning model

Model: **Random Forest classification**

Train/test: 75%/25%

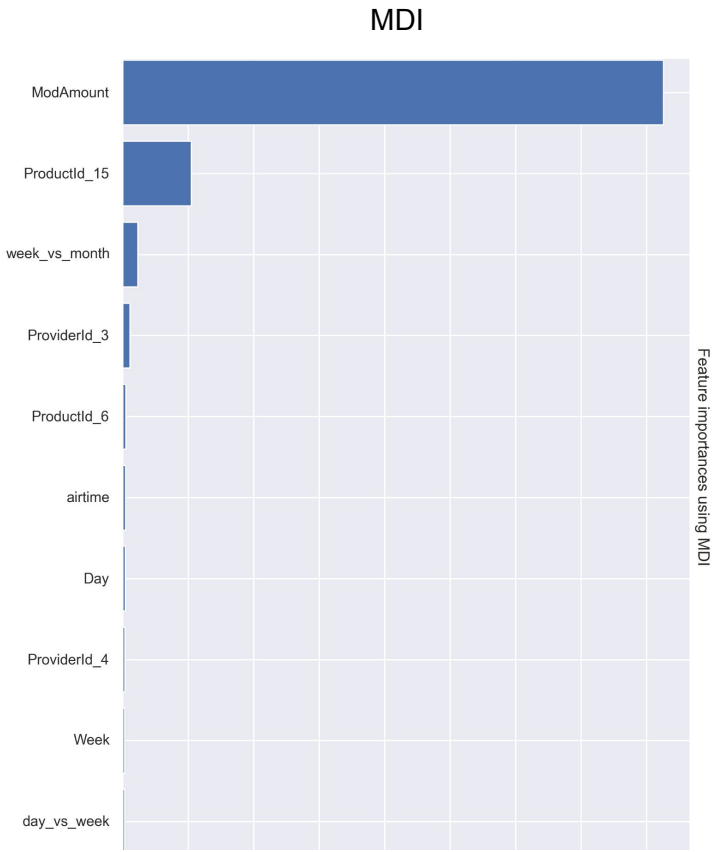
Scaling: Transaction value standardized

Class weights adapted to frequencies

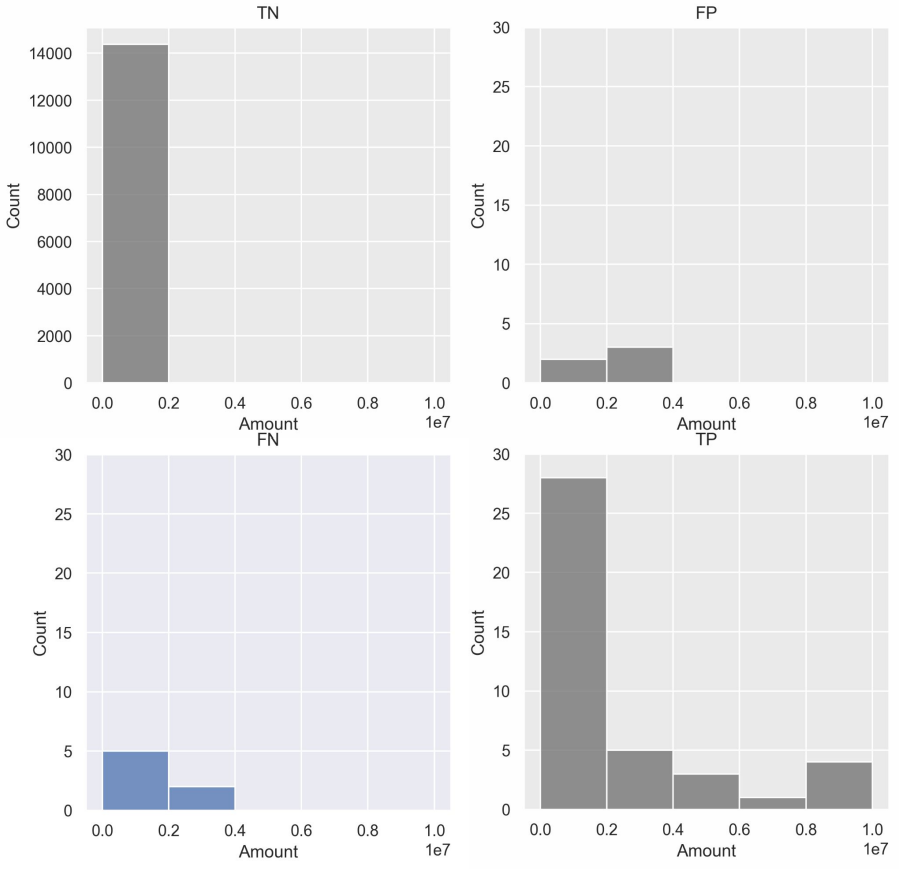
- Detected frauds: 41
- Missed frauds: 7
- Reimbursement: 6.3 millions UGX
- Total saved: 91.52 millions UGX
- **Net saved: 85.22 millions UGX**

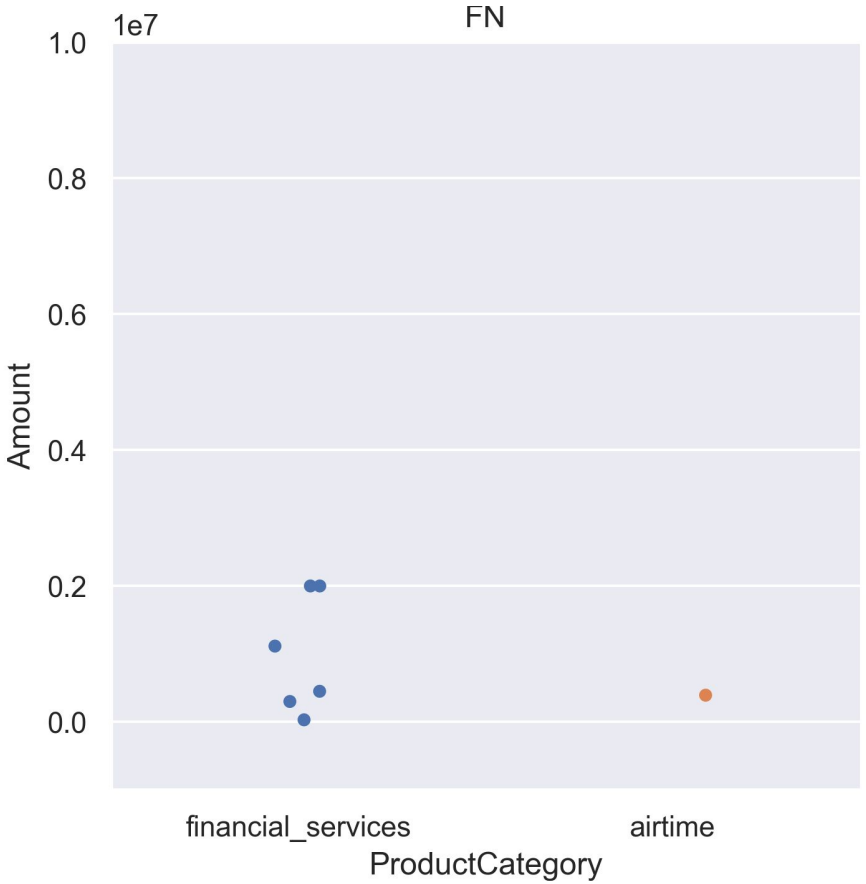
Recall score = 85 %, MCC score = 87 %

Feature importance using MDI



Error analysis





Summary

- Only 5 valid transactions misclassified as fraud
- Still 7 fraudulent transactions misclassified
- Saved the stakeholder 85.22 million UGX