

Fraud Detection in Financial Transactions





The Problem

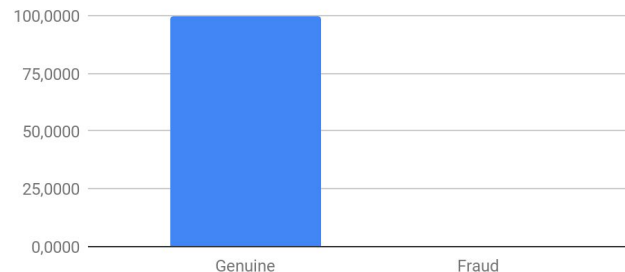


Reports and statistics

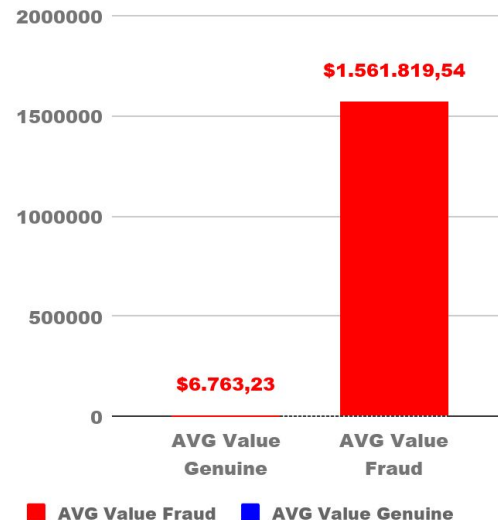
“[...] financial institutions are objectively liable for damages generated by internal acts related to frauds and crimes committed by third parties in the context of banking operations.” [1]

[1] <https://jus.com.br/artigos/68721/fraudes-bancarias-responsabilidade-dos-bancos>

Amount of Transactions



Average of Transaction Value






Financial Transactions

A method to detect if a transaction is genuine or fraud by a quick, secure, and automatic way, minimizing losses to the institution and their clients.

Financial institutions require to approve their client's payment activities.





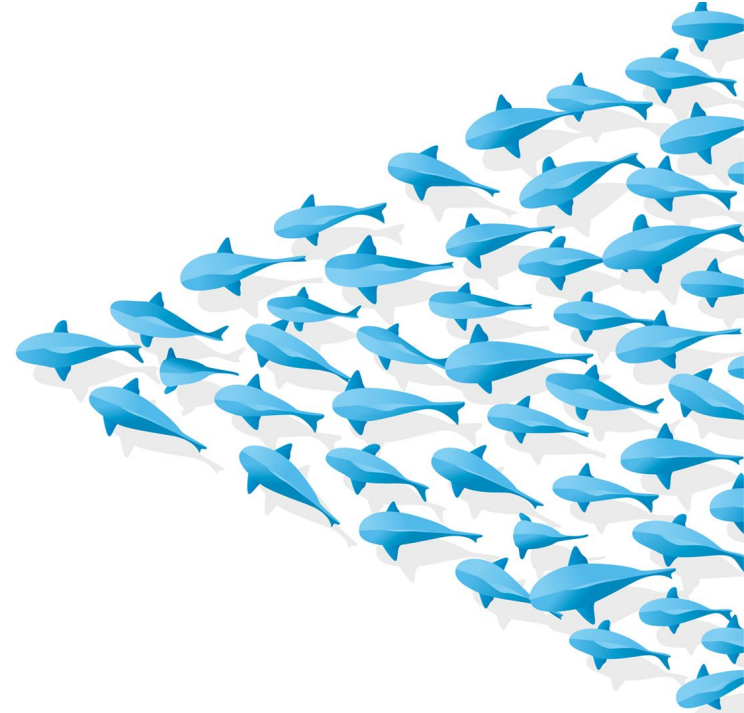
To understand the comportment and **anticipate** probable fraudster act

- Anomaly
- A fraud pattern

IF IT IS NOT A 100% FRAUD



IS IT REALLY GENUINE?





Classification and Response

Result		Classification	
		Genuine	Fraud
Transaction Response	Genuine	Transaction Genuine Classification Genuine	Transaction Genuine Classification Fraud
	Fraud	Transaction Fraud Classification Genuine	Transaction Fraud Classification Fraud



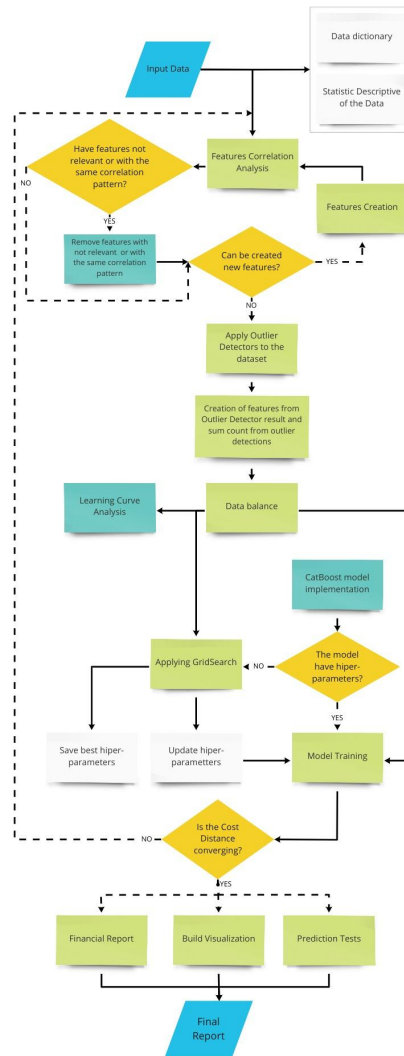
Methodology

Work Steps

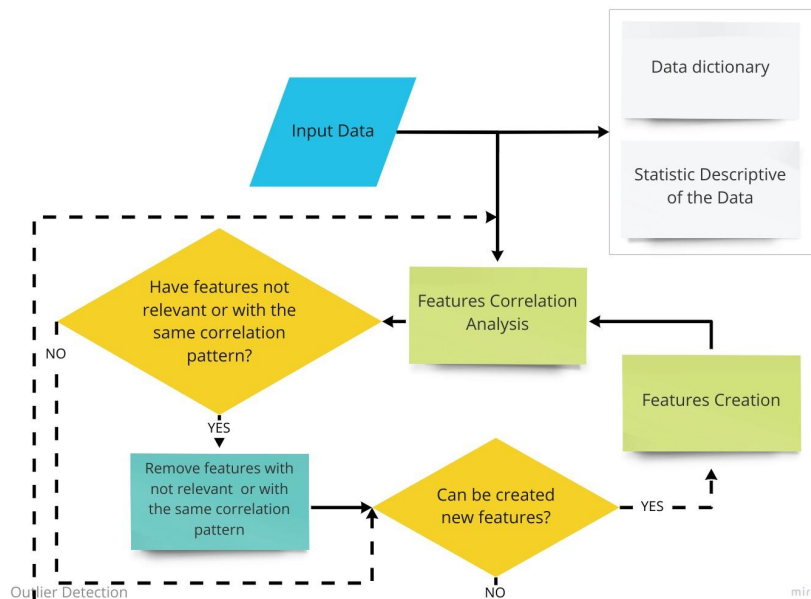


Work steps

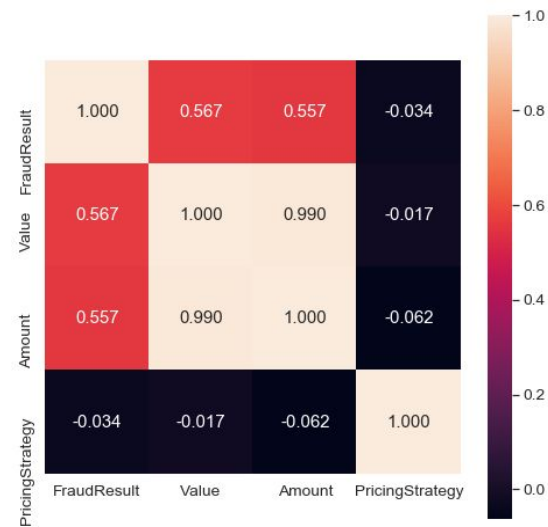
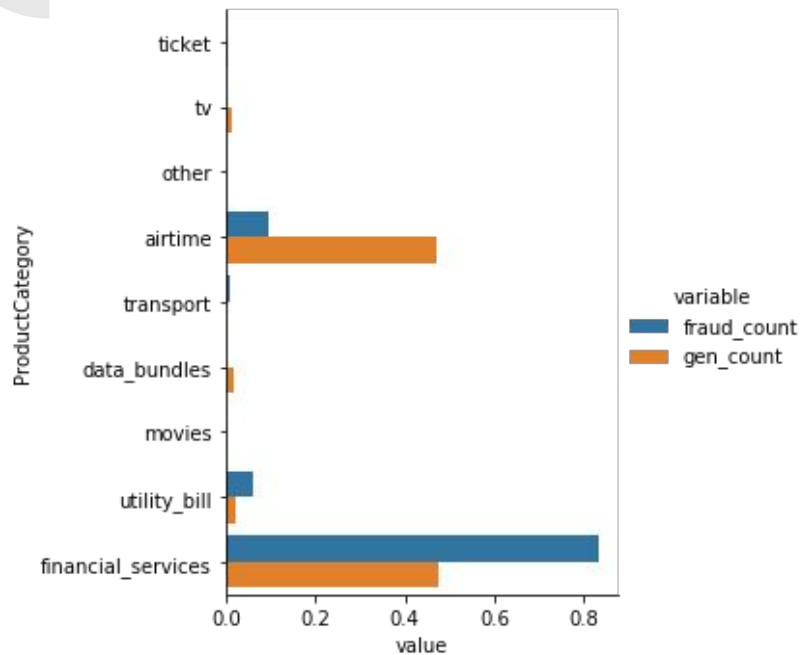
1. Features Analysis
2. Outlier Detection
3. Data Balance
4. Model Training
5. Reporting



Features Analysis



- Data Transaction Comprehension;
- Data Correlation Analysis;
- Data Manipulation;
 - Create Features
 - Remove Features





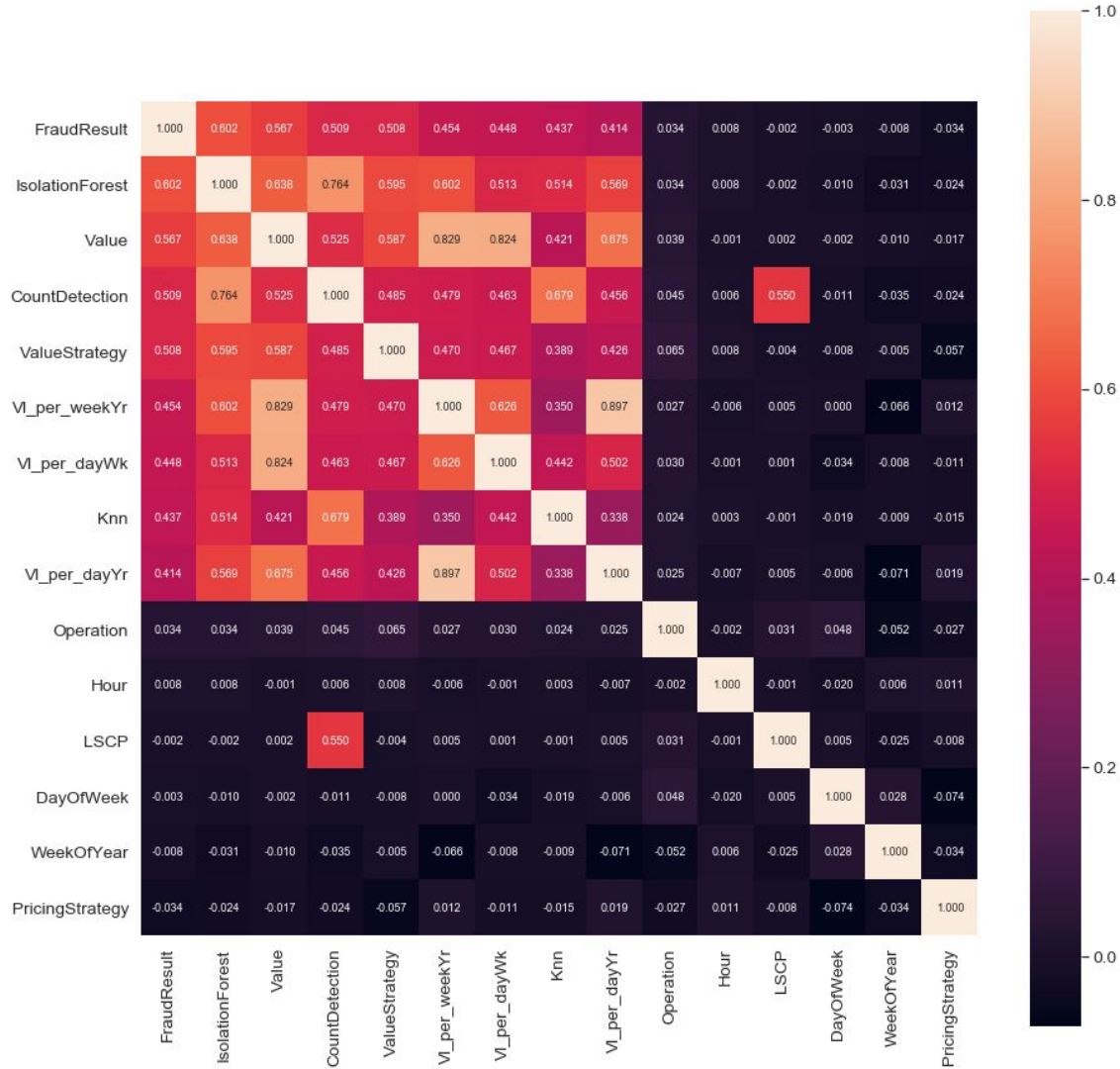
Outlier Detection

Apply Outlier
Detectors to the
dataset



Creation of features from
Outlier Detector result and
sum count from outlier
detections

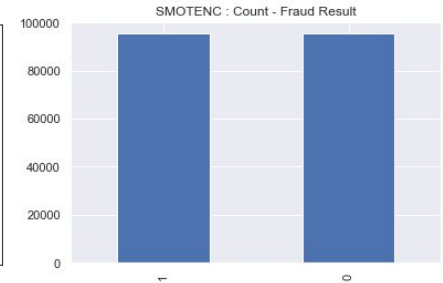
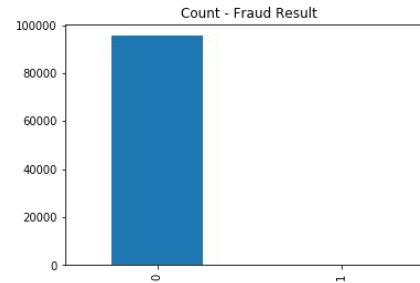
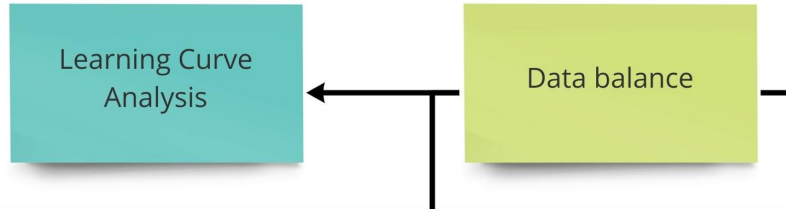
- What Is It?
- Outlier Detectors:
 - Isolation Forest
 - LSCP
 - KNN
- Create Features





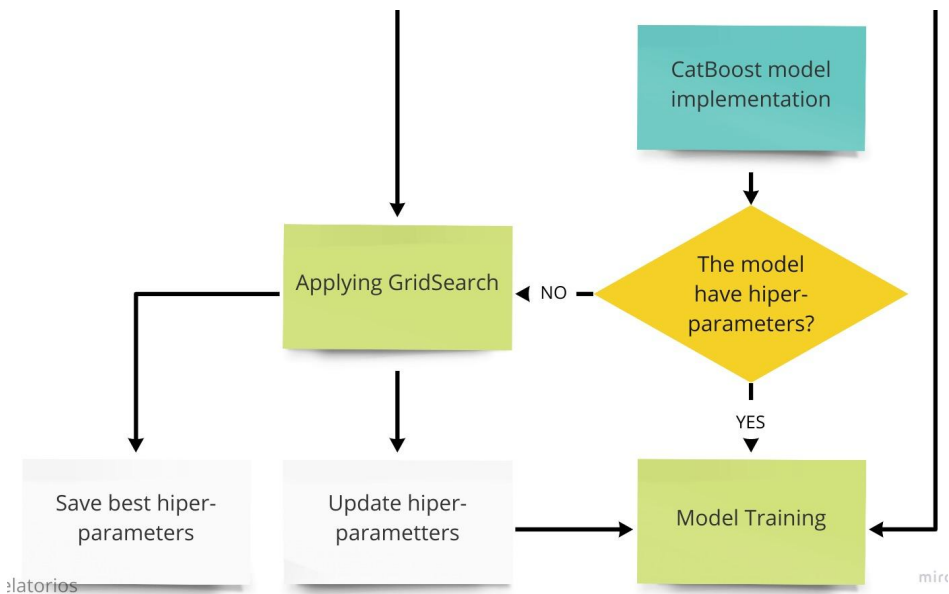
Data Balance

- Unbalanced Dataset
- SMOTENC
 - Oversampling

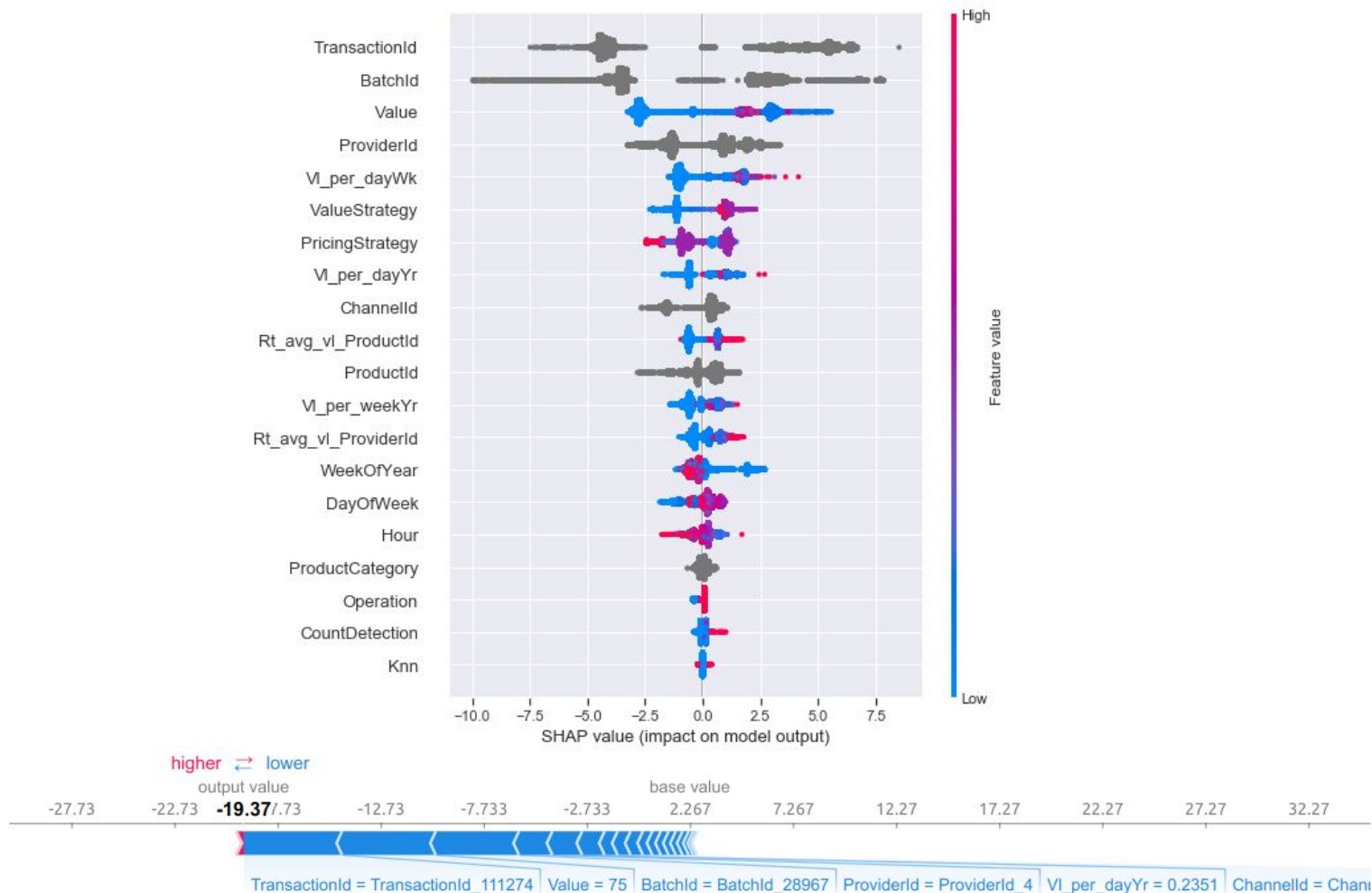




Model Training

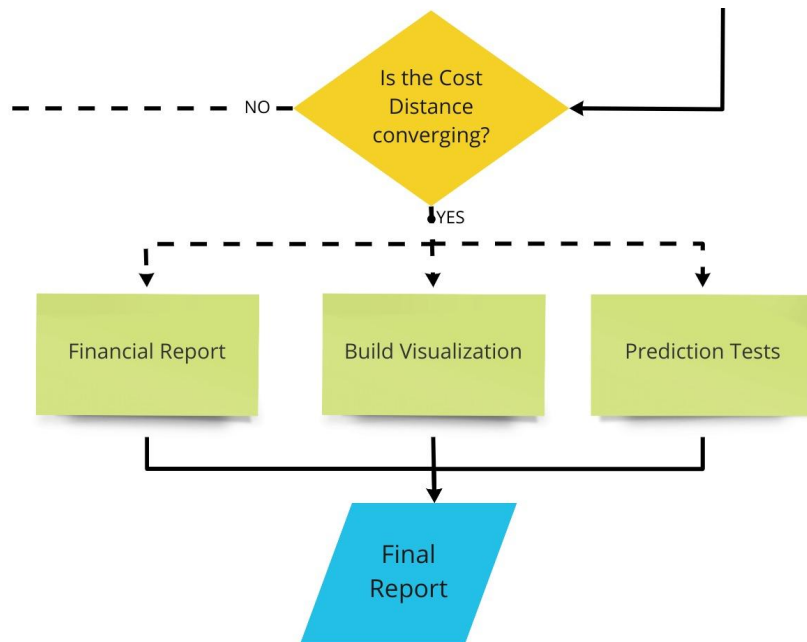


- CatBoost
 - GridSearch
- Training Model
 - Features Importance





Evaluation Online



EVALUATE INTO TOP 70
(/547 evaluated/+2000 submitted)

ID	SUBMITTED	FILE	COMMENT	SCORE
nxDJfRgF	~2 hours ago	xente_predictions.txt	—	0.75

<https://zindi.africa/competitions/xente-fraud-detection-challenge/leaderboard>



Report





Classification and Response in Validation Step

Result		Classification	
		Genuine	Fraud
Transaction Response	Genuine	28639	5
	Fraud	16	39

Accuracy **99.92%** - Recall **99.94%** - Precision **99.98%**

Avg Value of Genuine Classified as Fraud: U\$ 1,004,000.00

Avg Value of Fraud Classified as Genuine: U\$ 955,238.10

Avg Value of Fraud: U\$ 2,005,711.70



Financial Report

Fraud transactions < **0.01%** total transactions

- **False Negative:** a fraud transaction that happens but was not detected.
 - **Integral bank responsibility**
- **False Positive:** a genuine transaction that happens but was not detected.
 - **Lost intermediate transaction**

\$ 45 Bi losted

By the Model:

Lost \$25,080,000.00

Save \$19,920,000.00 (44.2%)