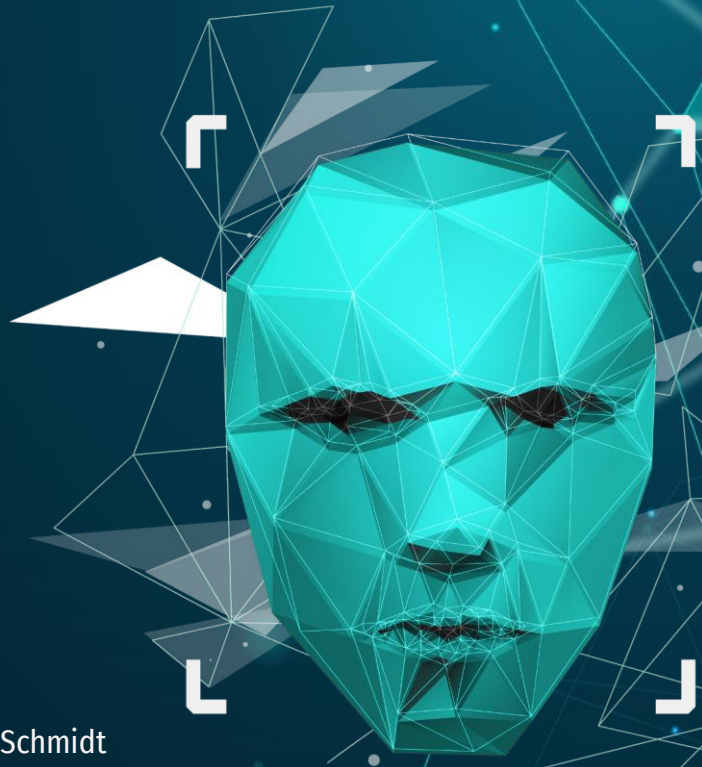


Fraud Detection

Data Exploration Project WWI18SB

Bjarne Gerdes, Georg Schieck, Anabel Lilja, Raphael Schmidt

01 **INTRODUCTION**
What is Mobile Fraud?

02 **ECONOMIC PERSPECTIVE**
Why is it relevant?

03 **RELATED WORK**
What has been done so far?

04 **DATASET**
Where is the data from?

05 **OUR WORK**
How does our model work?

06 **Demo**
Seeing our model in action.

What is Mobile Fraud?

01

Introduction

Mobile Fraud

Fraudulent transaction made by an unauthorized person on someone else's account while the accountholder and its provider are not aware of it at the time of its realization

Why is it relevant?

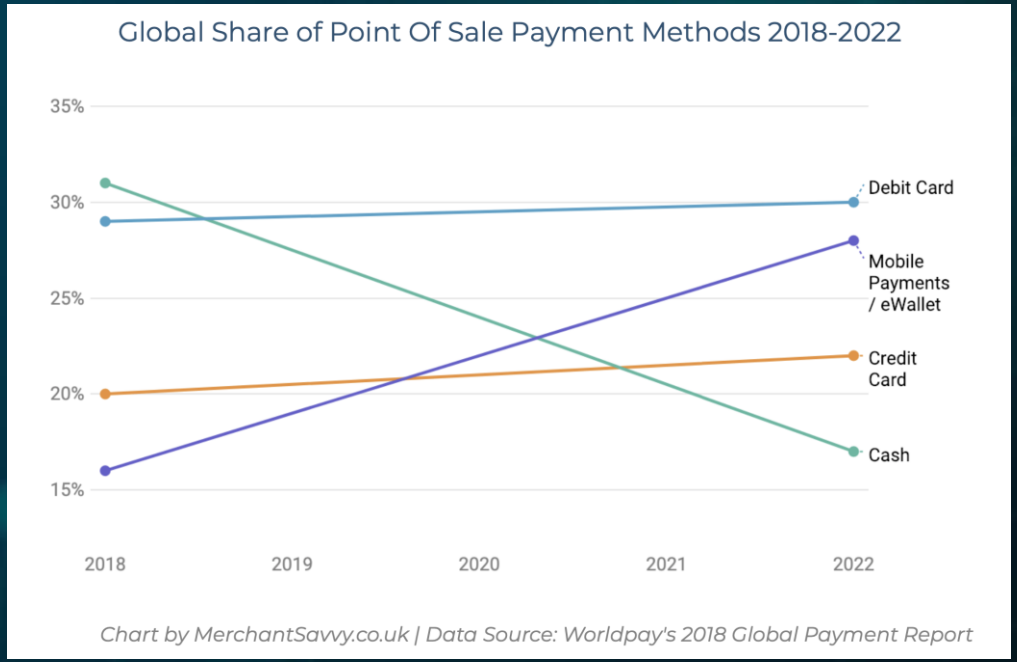
02

Economic Perspective

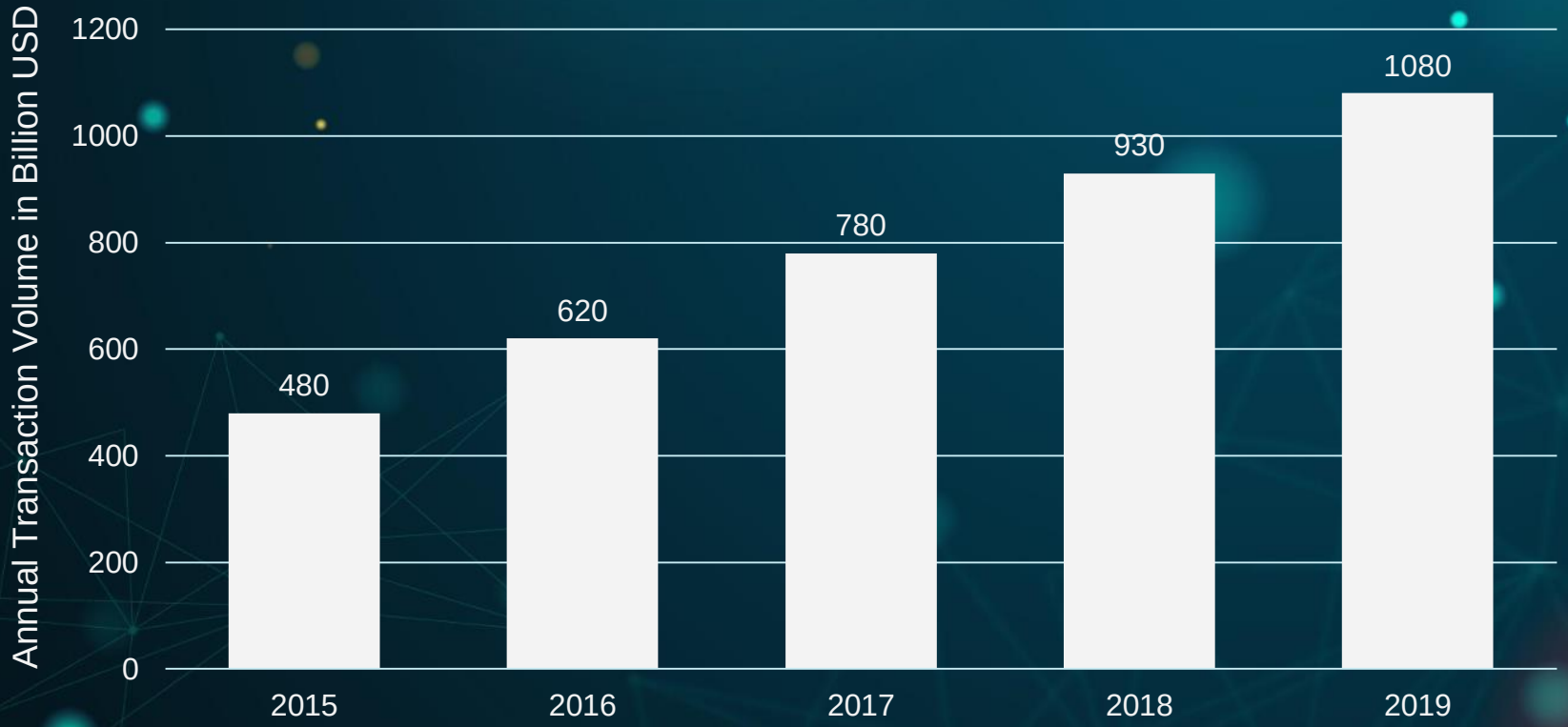
WHY IS IT RELEVANT?

New technologies and consumer behavior result in millions of payment transaction every day

Mobile payment is the one of the most predominate payment methods



Total Revenue of global mobile payment market from 2015-2019



THE STATS

2015
Mobile apps source of only 5% of fraudulent online transactions

2018
Mobile apps source of 39% of fraudulent online transactions

2020
Total Value of mobile payments reaches one trillion USD

2021
Number of mobile user will reach 7 Billion worldwide

Related Work

03

What has been done so far?

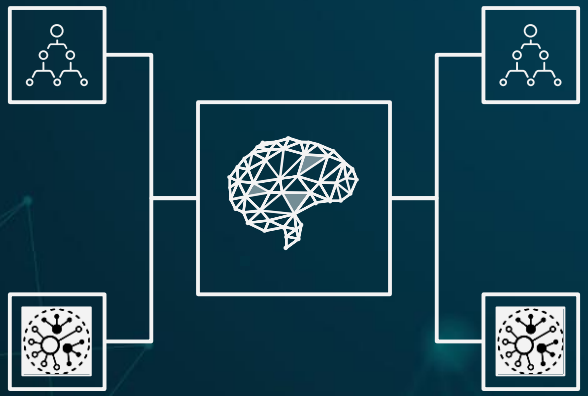
Related Work

Classification using a Random Forest Algorithm

M. Suresh Kumar (2019)

Husojinovic (2020)

Combined approach of Naïve Bayes and a C4.5 Decision Tree



Classification using a Random Forest Algorithm

D. Meenakshi et al. (2019)

Bharati Vidyapeeth's College of Eng. (2018)

Combined approach on Naïve Bayes and KNN

The Dataset

04

Where is the data from?

Where is the data from?

The Company

- Based in Africa
- Operates internationally in over 14 countries
- Customers can make mobile payment tansactions

What data do we have?

6.362.620
payment transactions
in a CSV file

Synthetic Data
Simulating real payment transactions

11 Entities
Used to uniquely identify a transaction

The Entities

Step
Unit of time in the real world

Type
Type of Transaction

Amount
Amount of transaction in local currency

isFraud
Identifies a fraudulent transaction

nameOrig
Customer making the transaction

oldbalanceOrg
Customer balance before transaction

newbalanceOrg
Customer balance after transaction

isFlaggedFraud
Flags illegal attempts to transfer too much money

nameDest
Recipient ID

oldbalanceDest
Recipient balance before transaction

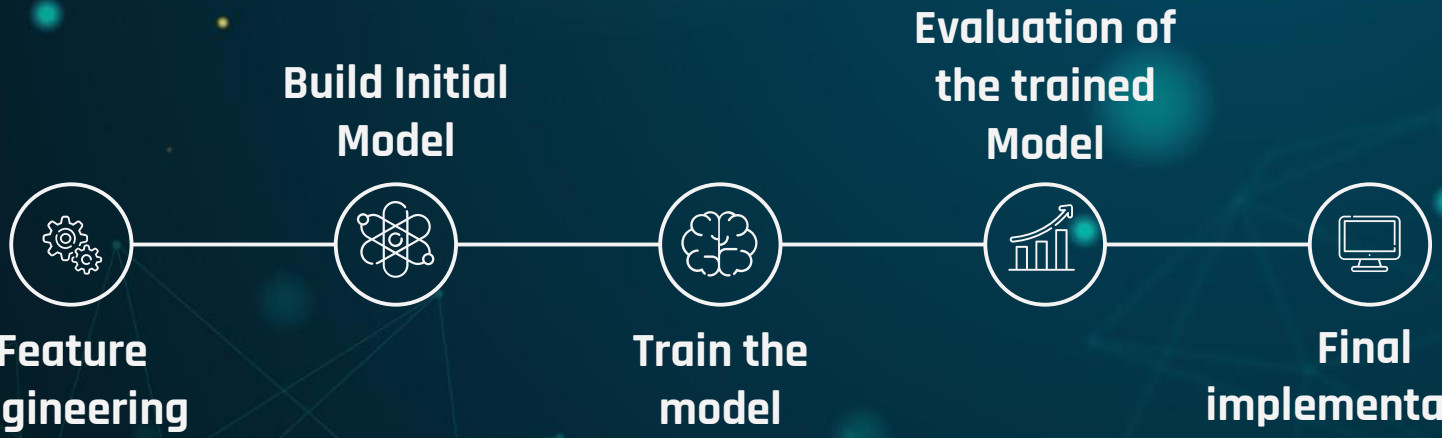
newbalanceDest
Recipient balance after transaction

Our Work

05

How does our model work?

What did we do?



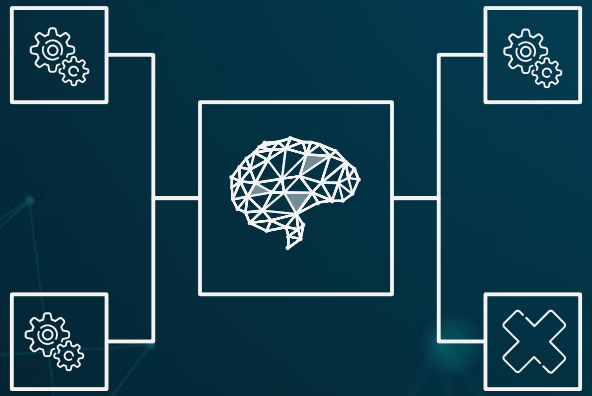
Feature Engineering

Percentage change of the customers account balance

PctChangeOrg

HourOfTheDay

Time of day in hours – derived from the entity *step*



Shows the proportion of transactions to the recipient

relativePctTxToDest

Type

represented transaction types - was coded with its characteristics to dummy variables

What algorithm did we use?

Ensemble of a large number of individual decision trees

RANDOM FOREST

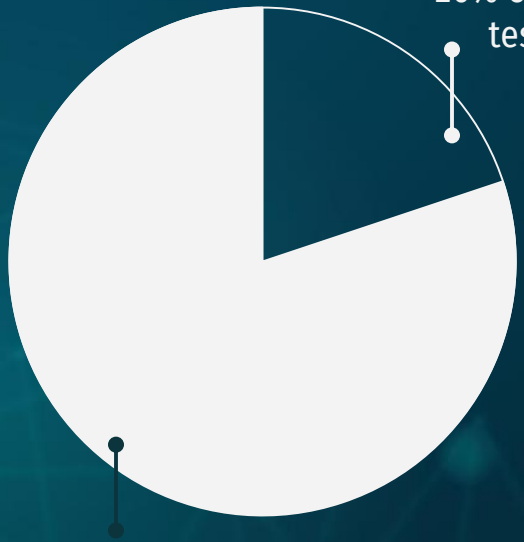
Standard model for binary classification that models a probability outcome for a class

LOGISTIC REGRESSION

Binary Classifier that is used to find the best separating hyperplane

SUPPORT VECTOR MACHINES

Training and Validation



- Data was NOT split randomly
- Grid Search and Cross-Validation where used to find the optimal parameter settings

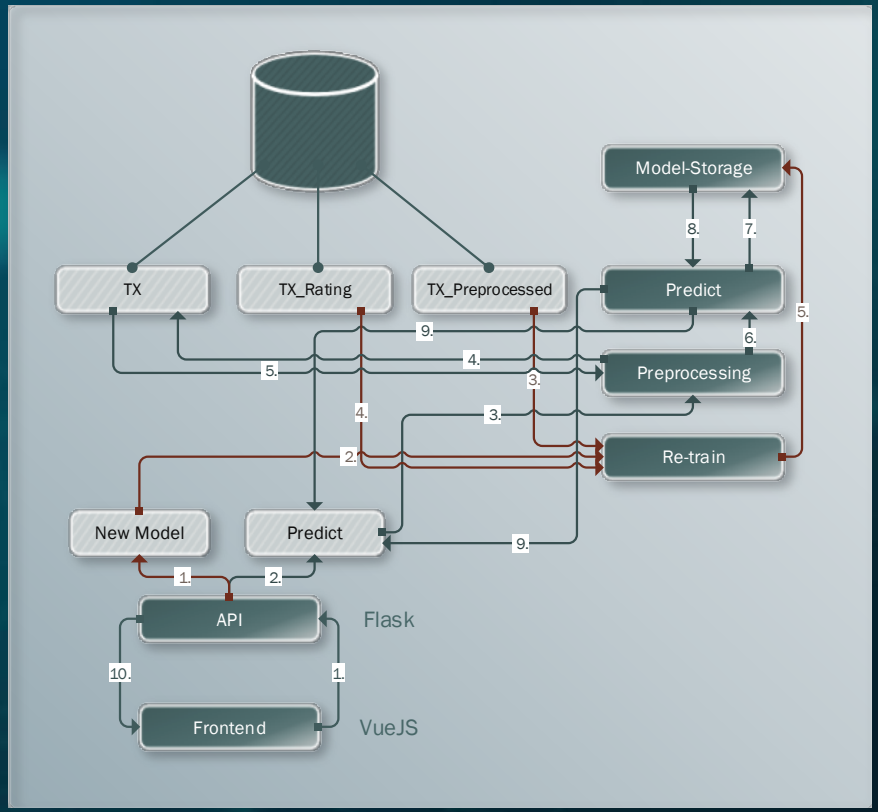
Evaluation of the models

	F1-Score	Average Precision	AUC Score
Random Forest	0.99976	0.99953	0.99999
Logisitc Regression	0.65353	0.45305	0.96342
Support Vector Machine	0.88205	0.78382	-

6,684 Mrd. USD

worth of fraudulent transactions were correctly blocked by our model during testing

The final architecture



Demo

06

This is how it works.

Sources

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https://dataprot.net/statistics/mobile-banking-statistics/