Enhancing Bank Transaction Security: An Accurate Approach to Fraud Detection

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ABSTRACT

- To find a way to improve and control anomaly detection in Bank transactions, our fraud detection software was developed as a solution to better spot and manage unusual activities in bank transactions. Our application uses machine learning to detect anomalies in transaction data.

- We will count on tools such as: Python, with libraries like scikit-learn and TensorFlow, that offer robust machine learning for fraud detection. MySQL securely manages large transactional datasets, supporting efficient data storage and querying essential for fraud detection software development.

INTRODUCTION

- Safeguarding financial transactions is crucial.

Our project is dedicated to refining and managing anomaly detection within transfers. Our solution revolves around the power of machine learning techniques, as machine learning techniques are crucial to avoid transaction fraud.

- We will use open source to develop.

Opensource is free for all users, and this makes OSS classic public good (Anamika Sen, 2022, p.1), that's why we choose for open-source tools like Python and MySQL.

- By following CRISP-DM framework steps, we can effectively develop and deploy a robust fraud detection solution for bank transactions, enhancing security and customer trust.

RESEARCH QUESTIONS

- Q1. How was the proposed solution developed with attention to professional ethics and legality ? (MLO1)

- Q2. What methods were used to analyze project resources, risks, and costs in the detailed report ? (MLO2)

- Q3. How were diverse computing skills applied to design and construct a prototype ? (MLO3 and MLO4)

CONCEPTUAL FRAMEWORK

- **Business Understanding**: Define project objectives and align with business goals. Understand how outcomes will impact organizational success.

- **Data Understanding**: Explore data sources, assess quality, and identify patterns. Acquire insights into data characteristics and limitations.

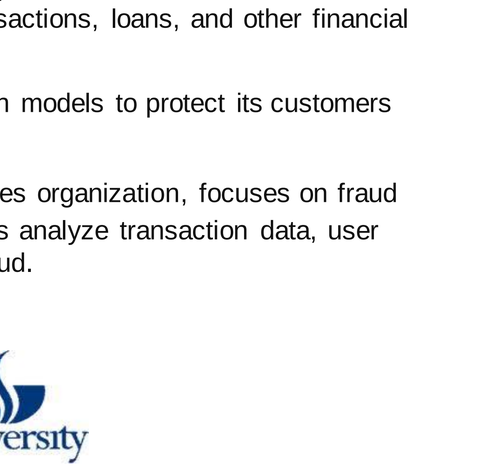
- **Data Preparation**: Cleanse data, handle missing values, and integrate sources. Transform variables to create a structured dataset for analysis.

- **Modelling**: Apply suitable algorithms to build predictive models. Train, tune, and evaluate models for performance and effectiveness.

- **Evaluation**: Assess model accuracy against predefined criteria. Validate results and compare alternative models for suitability.

- **Deployment**: Implement selected model into operational environment. Monitor performance and refine model as needed for continuous effectiveness.

Supervised Machine Learning and CRISP-DM Frank Lee (2023)



WHO USE FRAUD SERVICE

- Financial Institutions and Banks:

Banks and financial institutions actively employ fraud prediction models to detect and prevent fraudulent activities related to credit card transactions, loans, and other financial services.

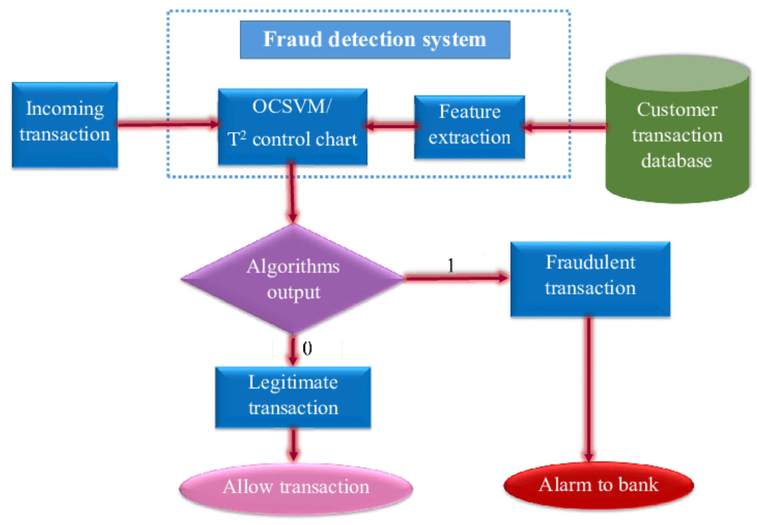
- Bank of America employs advanced fraud detection models to protect its customers from unauthorized transactions.

- HSBC, a multinational banking and financial services organization, focuses on fraud prevention by using predictive analytics. Their systems analyze transaction data, user profiles, and historical patterns to identify potential fraud.

DATA FLOW

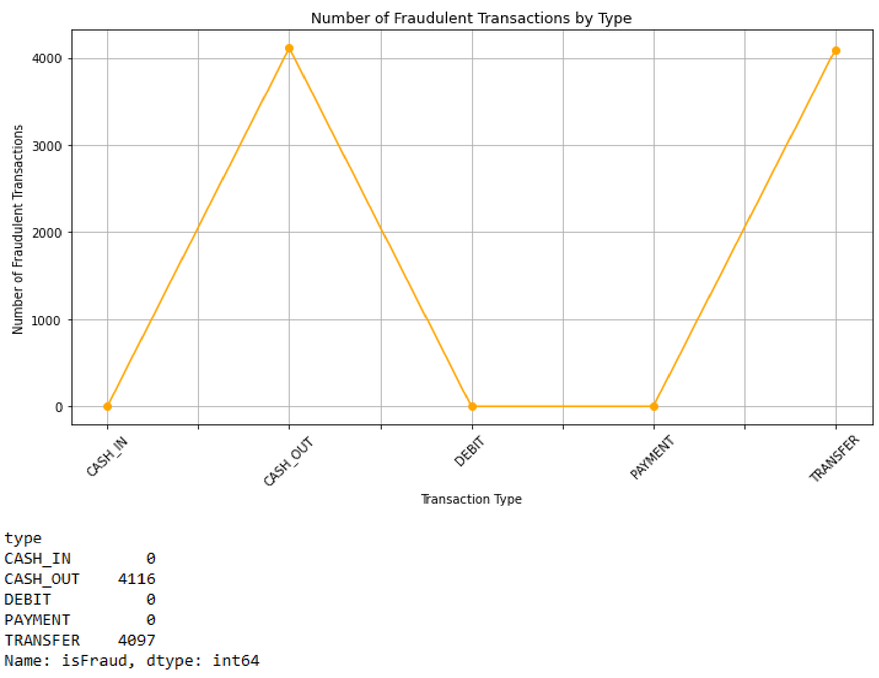
- "Data preparation and cleaning enhances dataset quality" Kartikay Goyle (2023) .Thinking that, our approach begins with thorough data preprocessing, which involves addressing missing values, outliers, and inconsistencies to achieve our goals.

Kim Phuc TRAN (2018).



FRAUD GRAPH

Eliabe Baliero de Moura (2024).




```
type
CASH_IN       0
CASH_OUT    4116
DEBIT          0
PAYMENT        0
TRANSFER    4097
Name: isFraud, dtype: int64
```

Dataset link: Fraudulent Transactions Prediction(kaggle.com)

COCLUSION

- Q1. In developing fraud detection software for banking transactions, safeguarding customer data privacy is vital. Compliance with data protection laws like GDPR or CCPA requires robust security measures and ethical usage of data solely for fraud detection purposes.

- Q2.

- Q3. In order to build the prototype, it requires skills of some computing disciplines, the design and construction of the prototype such as: Requirement Analysis, Programming and Development, Data Analysis and Modelling.

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