Acropolis Institute of Technology & Research, Indore

Department of IT (Information Technology)

A

Synopsis Report

On

Minor Project

Credit Card Fraud Detection

Guided By

Prof. Manish Vyas

Submitted By

Khushi Agrawal (0827IT221076)

Amay Saxena (0827IT221014)

Akshat Soni (0827IT221011)

Ameer Saif Khan (0827IT221015)

Department of IT (Information Technology)

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1. INTRODUCTION:

1.1. Overview:

- **What Is Credit Card Fraud Detection?**

Credit card fraud detection is a set of methods and techniques designed to block fraudulent purchases, both online and in-store. This is done by ensuring that youare dealing with the right cardholder and that the purchase is legitimate. Overall,credit card fraud detection is a critical area of research in the financial industry, with significant potential for improving fraud detection rates and reducing financial losses.

1.2. Purpose of the project/Innovativeness and usefulness:

The purpose of this project is to detect the fraudulent transactions made bycredit cards. The primary purposes of this project are as follows:

- **Prevent Fraud:** By identifying fraudulent transactions early on, organisations can protect their clientele and minimise financial losses.
- **Reduce costs:** Reduce manual intervention and chargebacks to save timeand resources.
- **Ensure Scalability:** Offer a system that complies with financial standardsand can expand across sectors.

2. LITERATURE SURVEY:

2.1. Existing Problem:

The existing systems designed to address sign language recognition have severallimitations:

- **Limitations of Rule-Based Systems:** These systems are only effectivebased on predefined rules and may fail to detect new or evolving types of fraud.
- **Inability to Adapt:** Rule-based systems struggle to adapt to new fraudpatterns as they rely on static, predefined rules.
- **Challenges with Traditional Methods:** While machine learning algorithms and statistical techniques offer improvements, they still face challenges in fully capturing complex and dynamic fraud patterns.

2.2 Proposed Solution:

- **Suggested Solution**
  - The model used must be simple and fast enough to detect the anomalyand classify it as a fraudulent transaction as quickly as possible.

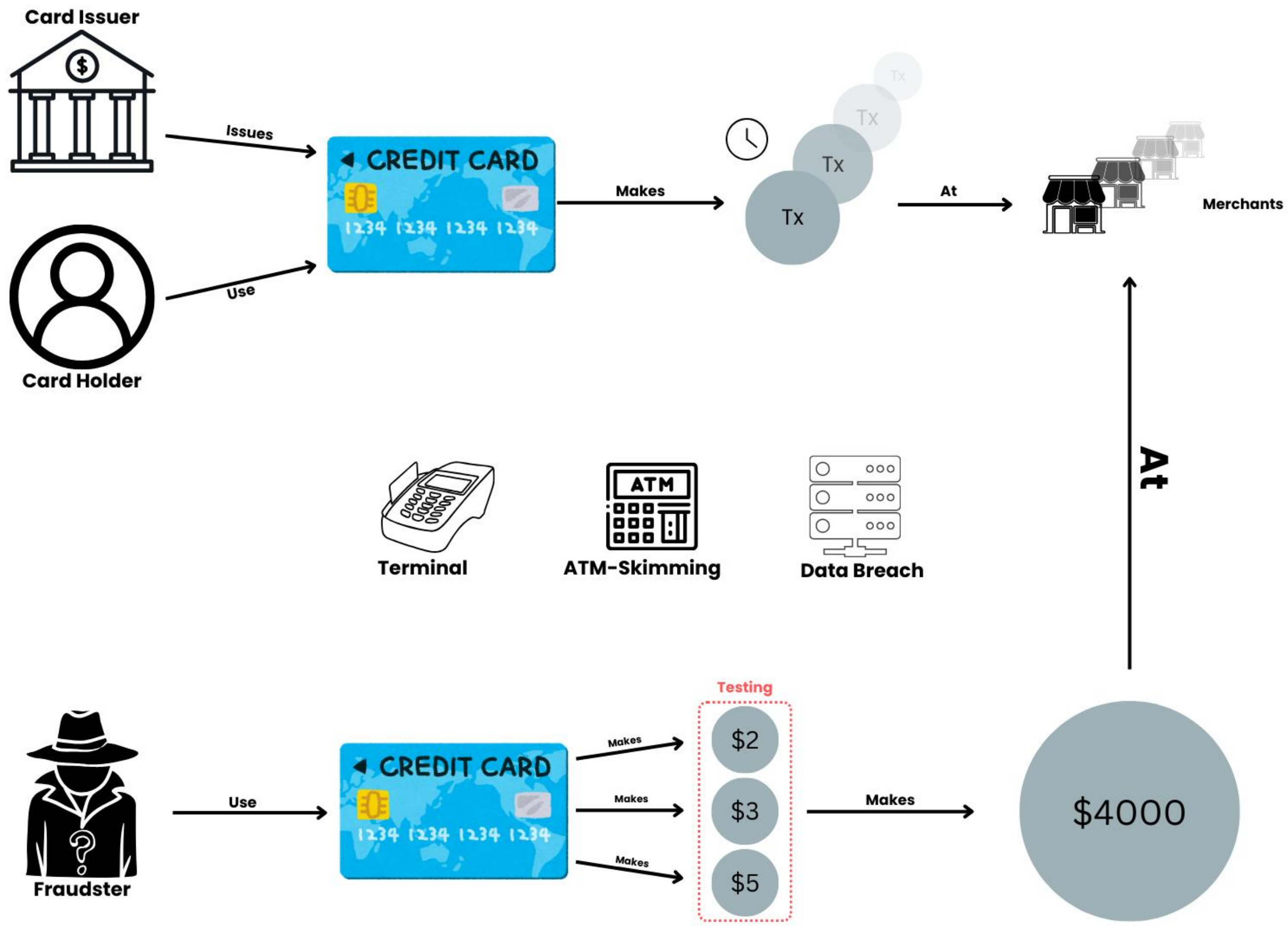
  - Imbalance can be dealt with by properly using some methods whichwe will talk about in the next paragraph.

  - For protecting the privacy of the user the dimensionality of the datacan be reduced.

  - A more trustworthy source must be taken which double-check thedata, at least for training the model.

3. THEORETICAL ANALYSIS:

3.1. Block Diagram:



- **Acquiring Card Information**: Fraudsters obtain credit card details through skimming or data breaches.
- **Initial Testing**: They start with small transactions, around $2-$3, at common merchants like Starbucks.
- **Gradual Increase**: Transaction amounts are increased to test the card's usability.
- **Final Large Purchase**: Once confirmed, they make a big purchase using the card.
- **Switching to New Cards**: After validation, they move on to the next stolen card.
- **Role of Graph Databases**: These databases help detect such testing patterns, preventing large fraudulent transactions.

3.2. Required Resources:

- **Hardware Requirements:**

  1. **Computer/Server:** To develop and train machine learning models, you'll need a computer with sufficient processing power(CPU/GPU) and memory (RAM), especially if you're working with large datasets.

  2. **Storage Devices:** A high-capacity SSD or external storage forlarge datasets.

- **Software Requirements:**

  1. Python (Scikit-learn, TensorFlow, PyTorch).

  2. R: For statistical analysis.

  3. Libraries: Scikit-learn, Pandas, NumPy (data manipulation andmachine learning).

  4. TensorFlow/PyTorch: for advanced models.

  5. Data Storage: MySQL/PostgreSQL (relational databases).

  6. MongoDB (non-relational databases).

4. METHODOLOGY TO BE ADOPTED/ PLANNING OF WORK:

The project methodology and work plan involve the following key phases:

1. **Data Collection:**

   Gather data using past transaction records from financial institutions. Publicdatasets such as those from Kaggle can complement real data.

2. **Data Preprocessing:**

   Clean and preprocess the collected data. This includes data augmentation, normalization, and labeling.

3. **Model Development:**

   Create a credit card fraud detection model using deep learning techniqueslike convolutional neural networks (CNNs) or recurrent neural networks (RNNs).

4. **Real-Time Recognition:**

   Implement the model to provide real-time credit card fraud recognition. This phase involves integrating the trained model into a functional system.

5. **Testing and Evaluation:**

   Rigorously test the system's accuracy, performance, and reliability. Identify and address any issues or discrepancies in the recognition process.

6. **User Interface:**

   Develop an intuitive and user-friendly interface for the system.Ensure that it is accessible and easy to use for the end users.

7. **Documentation:**

   Create comprehensive project documentation, including user manuals, installation guides, and technical documentation for system maintenance.

5. APPLICATIONS:

Credit card fraud detection is used in various applications:

- **Online Retailers:** To prevent unauthorized transactions and protectagainst fraud in e-commerce.
- **Banking and Financial Institutions:** For securing online and in-storetransactions and monitoring account activities.
- **Mobile Payments:** To ensure secure transactions through apps andmobile wallets.
- **Insurance Companies:** To identify fraudulent claims and ensurelegitimate transactions.

6. IMPACT OF THE WORK ON REAL LIFE / END USER:

- **Financial Protection**: Effective fraud detection systems can help prevent unauthorized transactions, protecting users from financial losses.
- **Increased Trust**: When users know that their financial institutions haverobust fraud detection measures in place, they are more likely to trust and use their services.
- **Impact on Credit Scores:** Rapid detection can limit the duration andimpact of fraud on a user's credit score, helping them maintain a healthierfinancial profile.
- **User Experience:** Effective fraud detection can balance security andconvenience, ensuring that legitimate transactions are not unnecessarilyflagged, enhancing the overall user experience.

7. EXPECTED OUTCOMES/BENEFITS:

The expected outcomes and benefits of credit card fraud detection for endusers include:

1. **Financial Security**

- **Prevention of Unauthorized Transactions**: Users are protected from fraudulent transactions, reducing or eliminating potential financial losses.

2. **Quick Issue Resolution**

- **Faster Dispute Settlements**: Fraud detection systems typically notify usersof suspicious activity in real-time, allowing for rapid resolution of disputes.

3. **Better Transaction Experience**

- **Seamless Usage with Security**: With effective fraud detection in place,legitimate transactions are processed smoothly without unnecessary declines, while fraud attempts are flagged instantly.

4. **Enhanced Fraud Awareness**

- **Increased Vigilance Among Users**: Regular alerts and notifications raise awareness about potential threats, encouraging users to adopt better securitypractices like monitoring account activity.

8. REFERENCES:

1. **Bence Jendruszak (2024).** Credit Card Fraud Detection: What is It, How It Works and Its Importance**:** https://seon.io/resources/credit-card-fraud-detection/

2. **Ravindra Saini (2023).** A Survey on Detection of Fraudulent Credit Card Transactions Using Machine Learning Algorithms**:** https://ieeexplore.ieee.org/document/10076122

3. **Malam Alamri (2022).** Survey of Credit Card Anomaly and Fraud Detection Using Sampling Techniques: https://safetyculture.com/topics/data-collection/