Team Adroit: Nawaz Sayyad Project Report: Z+ Guard

**1. Introduction** This project aims to develop an intelligent fraud detection and transaction monitoring system that ensures secure and reliable financial transactions. The system effectively monitors account activities, identifies fraudulent patterns, and takes necessary actions to prevent unauthorized transactions.

## 2. Objectives

- To create a robust account transaction database for secure financial monitoring.
- To simulate transactions with different scenarios.
- To detect account status (Active, Suspended, or Blocked).
- To implement machine learning-based behavior detection for anomaly identification.
- To analyze transaction patterns and detect fraudulent activities.
- To provide real-time feedback and response mechanisms for fraud prevention.
- To automatically generate a summary of detected fraud incidents and save it as a PDF for reporting.
- To achieve a cost-effective solution using open-source technologies.

## 3. System Implementation

## 3.1 Account Status Monitoring

- The system classifies accounts into three states:
  - Active: The account is fully operational. o Suspended: The account has limited functionality.
  - **Blocked:** The account is completely restricted due to suspicious activity.
  - Suspended: The accounts Access is Temporarily Stopped due to suspicious activity.
- A database structure is implemented to store account status and track changes dynamically.

## 3.2 Transaction Simulation & Database Management

- A comprehensive database schema is designed, including:
  - **User Accounts Table Transaction Logs Table**
  - Fraud Detection Flags Table
- Transactions are simulated to test different use cases and edge scenarios.

## 3.3 Behavior-Based Detection System

- A machine learning model is trained to analyze transaction behaviors.
- If a transaction behavior is classified as "unbelievable," the system flags it for further inspection.

#### 3.4 Pattern-Based Fraud Detection

- Server-side transaction logs are analyzed for suspicious patterns.
- If fraudulent patterns are detected, the system takes immediate action:
  - Blocks suspicious transactions. O Notifies the user of potential fraud.
  - Suggests security measures to prevent future fraud attempts. 
    Automatically generates a summary report of the incident using AI-based intelligence and saves it as a PDF for further analysis.
  - Sends the generated PDF report to the cybersecurity team for review and action.

## 4. Key Features

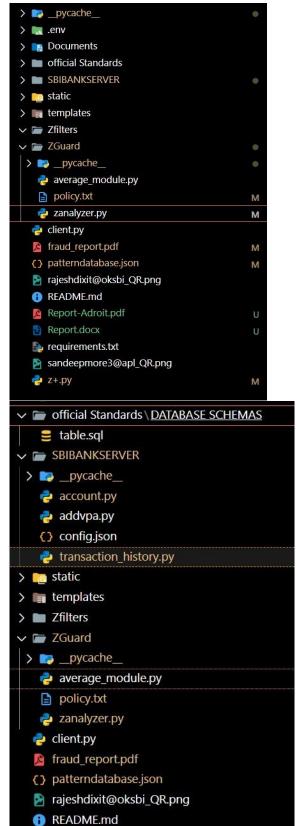
- Real-time Monitoring: Instant analysis and fraud detection.
- **Automated Account Management:** Blocking, suspending, or activating accounts based on user behavior.
- **Automated Report Generation:** Summarizes fraud incidents and creates a PDF report for cybersecurity teams.
- Cost-Effective Solution: Fully implemented using open-source technologies with zero additional costs.
- Scalability: Designed to handle a high volume of transactions efficiently.
- Frontend (if applicable): React/Angular
- **6. Conclusion** This project successfully delivers a secure and intelligent fraud detection system with real-time monitoring and preventive measures. By leveraging machine learning for behavior analysis and pattern detection, it enhances security in financial transactions. Additionally, the open-source approach ensures a cost-effective and scalable solution for organizations seeking fraud prevention mechanisms.

#### 7. Future Enhancements

- Integration with blockchain for enhanced security.
- Implementing advanced deep learning techniques for fraud detection.
- Real-time user authentication mechanisms using biometrics.

#### Modules:

Here z+ is the Main file from which DB are Manipulated when Fraud is Detected

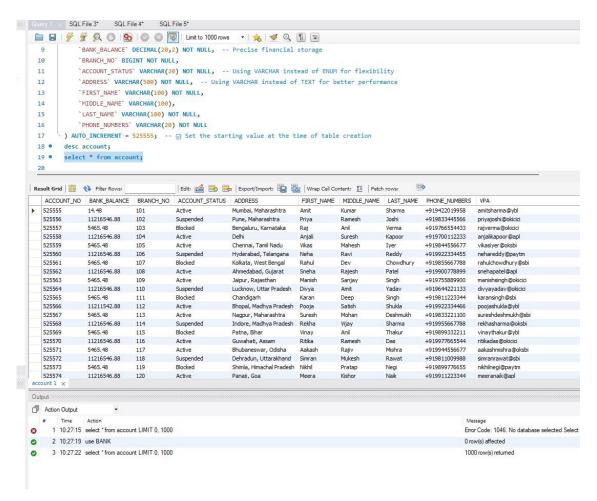


average module is ML model to predict Unusual Behaviour

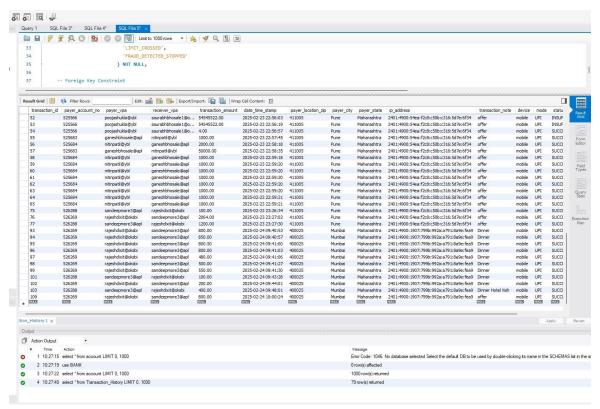
```
zanalyzer.py M
                                                                                                                                                               policy.txt M
                                                                                                                                                                                                                                fraud_report.pdf M
uard > 🕏 average_module.py > 🛇 check_transaction
           import numpy as np
import pandas as pd
from sklearn.ensemble import IsolationForest
          import json
from datetime import datetime
           def preprocess_text(text):
    return " ".join(text.lower().split())
            def time_to_minutes(timestamp):
    dt = datetime.strptime(timestamp, "%Y-%m-%d %H:%M:%S")
    return dt.hour * 60 + dt.minute
                  prepare_dataset(transactions):
    df = pd.DataFrame(transactions)
    df["time_in_minutes"] = df["date_time_stamp"].apply(time_to_minutes)
    df["transaction_note"] = df["transaction_note"].fillna("Unknown").apply(preprocess_text)
    return df
           def train_model(df):
    X_train = df[["ransaction_amount", "time_in_minutes"]].values
    model = IsolationForest(contamination=0.2, random_state=42)
    model.fit(X_train)
           def check_transaction(new_tx, df, model):
                  check_transaction(new_tx, 01, modes).
reasons = []
new_tx_time = time_to_minutes(new_tx["date_time_stamp"])
is_new_location = new_tx["payer_location_zip"] not in df["payer_location_zip"].values
is_new_up! = new_tx["receiver_yen"] not in df["receiver_yen"].values
new_tx_vector = np.array([[new_tx["transaction_amount"], new_tx_time]])
is_amount_anomaly = model.predict(new_tx_vector)[0] == -1
                     if is_amount_anomaly:
                     reasons.append("Due to high amount, this is fraud.")
if is_new_location and new_tx["transaction_amount"] > df["transaction_amount"].mean() * 1.5:
reasons.append("New location and significantly high amount, potential fraud.")
if is_new_upi and new_tx["transaction_amount"] > df["transaction_amount"].mean() * 2:
    reasons.append("New UPI ID with an unusually high transaction amount, possible fraud.")
                           turn {
    "is_fraudulent": is_fraud,
    "reasons": reasons
           def is_the_user_normal(transactions, new_transaction):
    df = prepare_dataset(transactions[:100]) # Use top 100 recent transactions
    model = train_model(df)
    result = check_transaction(new_transaction, df, model)
    return json.dumps(result, indent=4)
```

## AI model To generate Report and Email

```
need the last 100 transaction
 f100rows = tdb.get_transactions_by_vpa((transaction.payer.vpa)) # 🗹 Directly use the list
 exact_timestamp = datetime.now().strftime("%Y-%m-%d %H:%M:%S")
print("her Transactions "+str(f100rows))
latestQ = {
  "receiver_vpa":transaction.payee.vpa,
"transaction_amount":transaction.amount,
 "date_time_stamp": exact_timestamp,
"payer_location_zip":transaction.payer.zipcode,
"transaction_note": transaction.description
print((result))
  is_fraudulent = result["is_fraudulent"] # Correct way to access
 reasons = result["reasons"]
 print("Fraud Or not ?"+str(is_fraudulent))
 with open("patterndatabase.json", "r") as file:
    patterndb = str(json.load(file))
               now here is the one of the important and last Step to analayze the patterns at Human level
        fffresult = (zanalyzer.send\_to\_z\_analyze(patterndb\_tdb\_get\_transactions\_by\_vpa\_combined(transaction.payer.vpa)\_str(latestQ) + (zanalyzer.send\_to\_z\_analyze(patterndb\_tdb\_get\_transactions\_by\_vpa\_combined(transaction.payer.vpa)\_str(latestQ) + (zanalyzer.send\_to\_z\_analyze(patterndb\_tdb\_get\_transactions\_by\_vpa\_combined(transaction.payer.vpa)\_str(latestQ) + (zanalyzer.send\_to\_z\_analyze(patterndb\_tdb\_get\_transactions\_by\_vpa\_combined(transaction.payer.vpa)\_str(latestQ) + (zanalyzer.send\_to\_z\_analyze(patterndb\_tdb\_get\_transactions\_by\_vpa\_combined(transaction.payer.vpa)\_str(latestQ) + (zanalyzer.send\_to\_z\_analyze(patterndb\_tdb\_get\_transactions\_by\_vpa\_combined(transaction.payer.vpa)\_str(latestQ) + (zanalyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to\_z\_analyzer.send\_to
         print(fffresult)
   append_fraud_summary_to_pdf(fffresult,transaction)
# blocking Fruadlant account
# and suspending the User
         adb.update_account_status(transaction.payer.vpa, "Suspended")
         adb.update_account_status(transaction.payee.vpa, "Blocked")
             updating the logs
                                                               'INSUFFICIENT_BALANCE',
                                                               'NETWORK_DOWN',
'BLOCKED_ACCOUNT',
                                                               'SUSPENDED',
'LIMIT_CROSSED',
                                                               'FRAUD_DETECTED_STOPPED'
         tdb.insert_transaction(
              payer_account_no=payer_accountno,
               payer_vpa=transaction.payer.vpa,
               receiver_vpa=transaction.payee.vpa,
               transaction_amount=transaction.amount,
               payer_location_zip=transaction.payer.zipcode,
              payer_city=transaction.locationDetails.city,
payer_state=transaction.locationDetails.state,
               ip_address=transaction.payer.ipAddress,
transaction_note=transaction.description,
               device=transaction.payer.deviceInfo.deviceType,
               mode="UPI",
status="FRAUD_DETECTED_STOPPED"
```



#### Transaction DB:



Payment System



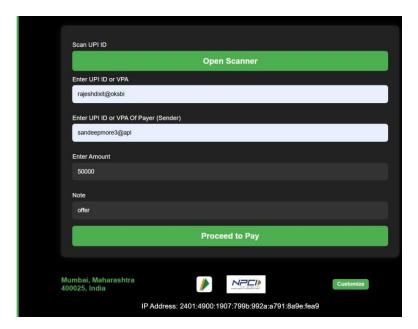
## **Payment Gateway**

SBI Life

Powered by Security of Z+ Guard

Developed By Adroit

Transaction processed successfully with status: SUCCESSFUL





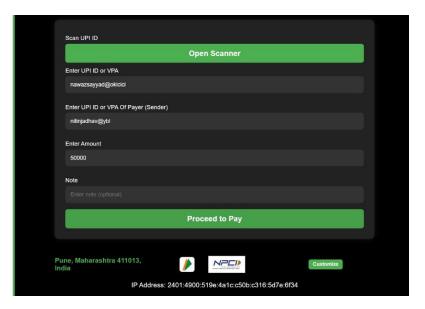
## **Payment Gateway**

SBI Life

Powered by Security of Z+ Guard

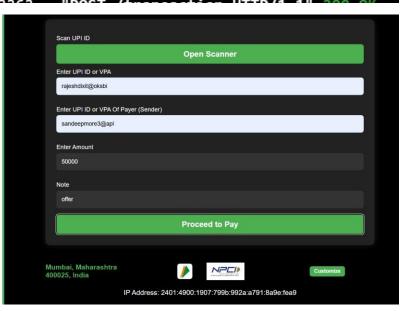
Developed By Adroit

X WARNING :: Unusal Behavior Check the Values and Amount Again, TNew location and significantly high amount, potential fraud.', 'New UPI ID with an unusually high transaction amount, possible fraud.'



```
{'is_fraudulent': True, 'reasons': ['Due to high amount, this is
Fraud Or not ?True
Request received
    "fraud or scam happened": "true",
    "summary": "The scammer initially sends small amounts to gain
then convinces the victim to send increasingly larger amounts, pr
g multiplied returns. Once the victim sends a significant amount,
ammer disappears with the money.",
    "name": "Double Scam Fraud"
Database connection established successfully.
PDF updated: Double Scam Fraud
Executing query: SELECT COUNT(*) FROM account WHERE account_no = 9
TRIM(LOWER(vpa)) = TRIM(LOWER(%s)) with values (526288, sandeepmore
Query result: 1
Executing query: SELECT COUNT(*) FROM account WHERE TRIM(LOWER(vpa
RIM(LOWER(%s)) with values (rajeshdixit@oksbi)
Query result: 1
Transaction inserted successfully.
```





Fraud Detetecd

# PDF Generated:

| env .env             | 16-02-2025 18:55 | File folder      |        |
|----------------------|------------------|------------------|--------|
| igit .git            | 24-02-2025 10:18 | File folder      |        |
| pycache              | 24-02-2025 09:16 | File folder      |        |
| Documents            | 23-02-2025 14:12 | File folder      |        |
| official Standards   | 23-02-2025 16:18 | File folder      |        |
| SBIBANKSERVER        | 22-02-2025 16:03 | File folder      |        |
| static               | 22-02-2025 19:44 | File folder      |        |
| templates            | 22-02-2025 19:07 | File folder      |        |
| Zfilters             | 20-02-2025 12:05 | File folder      |        |
| ZGuard               | 23-02-2025 21:59 | File folder      |        |
| dient                | 24-02-2025 10:01 | Python Source    | 3 KB   |
| patterndatabase      | 24-02-2025 08:16 | JSON Source File | 3 KB   |
| rajeshdixit@oksbi_QR | 23-02-2025 23:10 | PNG File         | 1 KB   |
| README               | 22-02-2025 18:20 | Markdown Sou     | 1 KB   |
| requirements         | 23-02-2025 17:17 | Text Document    | 1 KB   |
| sandeepmore3@apl_QR  | 24-02-2025 09:03 | PNG File         | 1 KB   |
| z+                   | 24-02-2025 09:16 | Python Source    | 13 KB  |
| Report               | 23-02-2025 23:47 | Microsoft Word   | 0 KB   |
| Report-Adroit        | 23-02-2025 23:51 | Brave HTML Do    | 219 KB |
| fraud_report         | 24-02-2025 10:43 | Brave HTML Do    | 3 KB   |

#### Fraud Detection Report

#### Fraud Summary

Transaction: Double Scam Fraud

Summary: The scammer initially sends small amounts to gain trust, then convinces the victim to send increasingly larger amounts, promising multiplied returns. Once the victim sends a significant amount, the scammer disappears with the money.

### Payer Details

Account Details:

ACCOUNT NO: 526288

BANK\_BALANCE: 103696277.96

BRANCH\_NO: 122

ACCOUNT\_STATUS: Active

ADDRESS: Kolhapur, Maharashtra

FIRST\_NAME: Sandeep

MIDDLE\_NAME: Gopal

LAST\_NAME: More

PHONE\_NUMBERS: +918739428084

VPA: sandeepmore3@apl

#### Payee Details

Account Details:

ACCOUNT\_NO: 526269

BANK\_BALANCE: 62570253.72

BRANCH\_NO: 156

ACCOUNT\_STATUS: Active

ADDRESS: Mumbai, Maharashtra

FIRST\_NAME: Rajesh

MIDDLE\_NAME: Madhukar

LAST\_NAME: Dixit

PHONE\_NUMBERS: +917630614594

VPA: rajeshdixit@oksbi

## **Transaction Details**

Timestamp: 2025-02-24 10:43:37

Amount: INR 50000.0

Note: offer

Location: Mumbai, Maharashtra, India

Zipcode: 400025

Device Type: mobile

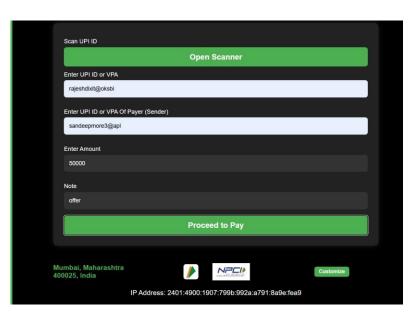
Mobile Carrier: CarrierName

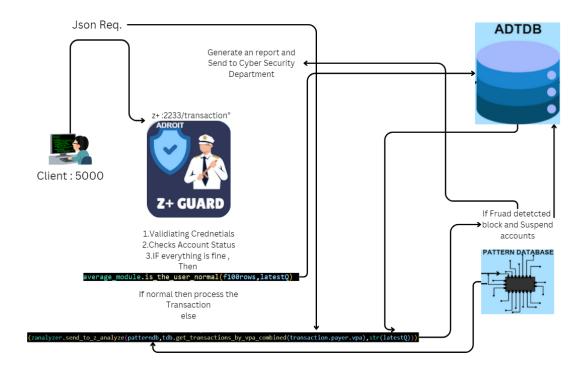
Latitude: 18.5204, Longitude: 73.8567

IP Address: 2401:4900:1907:799b:992a:a791:8a9e:fea9

## Even if tried Again







So this is The Best Approach:

**USP of the Project:** The project's biggest strength lies in its **zero-cost**, **open-source implementation** while providing **real-time fraud detection with automated response mechanisms**. The combination of **AI-driven behavioral analysis**, **automated reporting**, **and seamless scalability** makes it a unique and powerful solution for modern financial security challenges.