

One Steps Towards Mitigating Bank Fraud Using Data Mining Techniques

Himani*, Dr. Lakshmi Shankar Singh

*Department of CSE, Sir Chhotu Ram Institute of Engineering and Technology Chaudhary Charan Singh University (Campus), Meerut India.
Email: himanichoudharybca623@gmail.com, shanker.laxmi@gmail.com

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ABSTRACT

Background: — In today's world when practically everyone interacts with banks either in person or virtually, the banking industry is crucial. When addressing there is a possibility that scammers will ensnare the banks, their clients, and themselves.

Bank account verification is the process of confirming the authenticity and ownership of a bank account. It typically involves providing certain information and document to the bank, such as identification, proof of address, and sometimes a signature. This verification process helps ensure the security of your account and prevent fraudulent activities.

Objective: As time goes on, we hope to discover a better solution because; our challenge is approached as a classification problem, traditional data mining algorithms are not directly applicable.

Methods: In this process bank hiring other a team to verifying the bank user document and identification, finding from the negative culture within the bank, amid allegations and fraud deception, and money laundering, money their among various crimes. . The bank does not know what is going on in the user's mind. And who is going to commit fraud? This is process helps to verifying user account and this process help user transaction. The work of this team will also be to check transaction of user, nothing else

Result:

Bank should create and follow AML policies as per regulatory guidance & update the policies time to time to over all loopholes. Bank should hire Professionals in the field of AML and KYC to overcome / combat from fraud or any terrorist funding. Verify customer time to time as per customer risk both individuals and entities. There are many multinational bank who has hired AML / KYC specialties to keep close eyes on customer and their activities not only to save bank image as well to save from sanction / fine from regulators, prevent criminal activities.

Keywords: Authentication, Security, E-banking identification, Data analysis, identity verification, security Data mining, security, identity verification for online banking, and authentication.

Introduction:

The second collegiate edition of The American Heritage dictionary defines fraud as a purposeful lie used to obtain unfair or illegal gain. Detecting fraud is the detection of fraud signs in cases where there has been no prior suspicion or there is a tendency to commit fraud. Examples include of credit card fraud and insurance fraud. Both book keeping and credit card fraud [1].

In response to a right to information (RTI) request, the Reserve Bank of India (RBI) stated that thought out the period of June 1, 2014, to march 31, 2023, there were around 65017 frauds registered across Indian banks, resulting in a loss of Rs. 4.69 lakh core.

The RBI Annual Report 2022-2023 which evaluates bank group-wise cases fraud cases over the previous three tears, states that public sector banks continued to contribute the most to the total amount of fraud in 2022-2023, even while private sector banks recorded the highest number of frauds.

Bank account verification is the process of confirming the authenticity and ownership of bank account. Customer verification in a bank account a process to confirm the identity of the account holder. It is ensure the security of the account and prevent. Verifying customer account is necessary to ensure the security and authenticity of the account holder. It is helps protect against fraud and unauthorized access establishing trust and maintaining the integrity of the customer base. To monitor customer bank account transaction for suspicious activity, you can use fraud detection software or work with your banks security team. They have systems in place to identify unusual pattern and protect customer. Bank has advanced systems that use algorithms and machine learning to keep on eye customer transaction. These systems analyze the patterns of transaction and look for any unusual or suspicious activity. If they detect something fishy, they flag it for further investigation.

Data mining is like being a detective in the world of banking .it involving digging deep into uncovers hidden patterns and irregularities that might suggest fraudulent behavior. By using sophisticated algorithm and techniques banks can detect suspicious transaction, unusual spending patterns, or unauthorized account access. This helps banks take proactive measures to prevent fraud and protect their customer hard earned money.

Information-Mining Framework:

Once patterns or relationships in the data have been identified, the descriptive model investigates the characteristics of the data studied. Tasks and models for data mining are displayed.

Tasks in Data Mining:

Data mining results are widely used to ascertain the task that has to be completed is data mining. Jobs involving data mining are divided into the following categories [4].

1. **Exploratory Data Analysis** is exactly what its name suggests. Without knowing exactly what is being searched for, data is investigated.
2. **Descriptive Modeling:** It provides a description of all the relevant data and simulates the relationship between each and every variable.
3. **Predictive Modeling:** This methodology allows for one to variable that will be forecast using other variables' known values variables.
4. **Finding Patterns and Rules:** With the help of locations where data points differ noticeably from the rest, patterns can be found and fraudulent activity can be exposed.

The fifth method is Retrieval by Content, which identifies patterns in the data set that are comparable to the pattern of interest. With text and image data sets, it works best.

The purpose bank customer account verification operation is :

Customer can commit bank fraud in various ways, such as by providing false information, forging document, or engaging in unauthorized transaction. It is important for bank to have security measures in place to detect and prevent such fraudulent activities.

In this paper, we are going to we will keep an eye on bank customers transaction. Banks will check customer's transaction time slot (period) transaction. This will helping in knowing whether the customer has made any transaction in any suspicious area or not.

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Bank can divide customer into parts according to the occupation and salary like low risk, medium risk, and high risk. We need this because to help to help stopping suspicious transaction.

First bank identify high risky users who make more transactions. Firstly we will do authentication and identification of high profile bank user. One main purpose of checking user transactions is to stop suspicious transactions and identifying the suspected user.

These systems analyze the patterns of transaction and look for any unusual or suspicious activity. If they detect something fishy, they flag it for further investigation. This helps banks protect their customer's account and prevent fraud. So rest assured that banks are actively working to ensure the security of your transactions.

Literature review:

Authentication is banking usually involves multiple layers of security to ensure the safety of your account. This can include a combination of passwords, PINs, security question, and sometimes even biometric authentication like fingerprint or face recognition. It is important to keep your banking information secure [5]. While it is evident that security prioritizes less on customer convenience, there is still room for improvement. Banks are facing difficulties safeguarding the online/internet banking channel. The difficulty lies in maintaining the security of customers' accounts while avoiding complexity in the login process. Nevertheless, the numerous passwords, hardware token devices, and other out-of-bound communication tools introduced by some banks have greatly discouraged some customers.

Fractal properly detects suspicious conduct by applying complex analytical models and regulations. Banks must choose fraud prevention systems that produce the fewest false positives since clients may become quite irate if a transaction is mistakenly rejected.

Verifying that the data provided is a request for authenticity from a specific person is the goal of authentication.

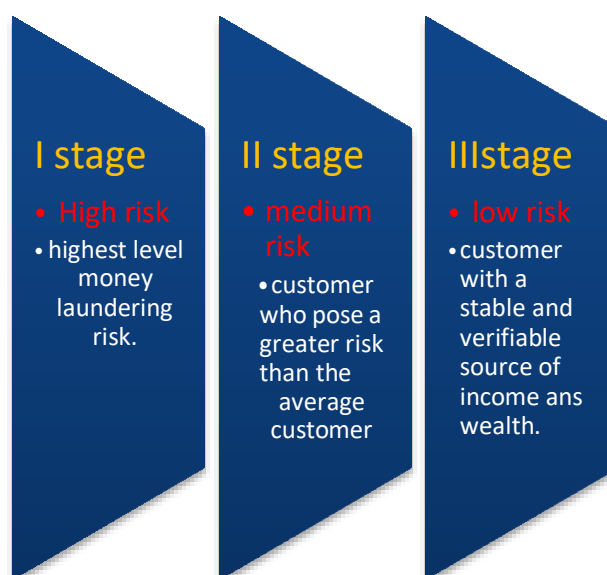


Figure 1. Category of customer risk.

FIRST STAGE: High risky—

In this stage we select the high risky bank customer based on occupation, geography, length of relationship with bank and income like Political leader, banker, lawyer, Jeweler and businessman etc. Banks have various mechanisms in place to detect and monitor international transactions. They use sophisticated systems that analyze transaction patterns, flags suspicious activities, and comply with anti-money laundering and counter-terrorism financing regulations. Banks prioritize customer safety and work closely with regulatory authorities to identify and prevent any potential risks associated with terrorism financing.

It's possible for anyone, regardless of their occupation or position, to suspect of involvement in illegal activities like black money. Being a businessman, leader or any powerful position men are in a position or power that misconduct / misuse the financial position for their personal advantage/gain. It's important to remember that suspicion doesn't imply guilty, and investigations are conducted to determine the truth. The focus should be on promoting transparency and accountability in financial practices for everyone, regardless of their occupation or background.

Bank fraud can happen in different ways, such as someone stealing your account information or using your account / personal information without your permission. It's important to protect your card details, be cautious when sharing them, and regularly check your statement for any unauthorized transaction. And be up to date on regulatory guideline for account safety.

In this case if someone is a new user then he is high risk customer. Because the new user's bank may be suspicious. (For example Rakesh has opened a new account in the bank. So the user will be in the high suspect list because Rakesh is new to the bank and the bank will ask to submit all the documents of the user and keep close eyes on transactions as bank might not be aware of the nature of transactions of customer. Therefore the new user will be at high risk compared to well existing customer).

SECOND STAGE: Medium risky—

In this stage, people come to the jobs section from various sources such as online job portals, recruitment agencies, networking, and referrals from friends or colleagues. In this stage if the bank user is old then he uses the bank's services / products regularly. Therefore user cannot be much high risky.

In this stage we check user transaction just like large amount (lakhs), and, small amount. Example Ram has conducted the transaction of 5 lakhs in a year but his salary is 3 lakhs per annum, that's why bank has right to block his account for temporary period. Bank will give time to Ram to justify the transactions. Banks check user transaction time to time if customer doing transaction is high risk / sanction country. Like Rakesh doing small transaction (5k, 10k) but suspect area (Pakistan, Syria, Iran, North Korea etc.) but some time user conduct

Transaction to restricted country or originations however not directly for example customer might show the transaction as donation.

THIRD STAGE: low risky—

In the banking industry, lower risk customer are those who are with bank from longer period of time, belong to lower risk locations as per FATF, OFAC, EU country list, provides valid doc and justification of transactions. Banks provide services and account based on various needs and preferences of customer to satisfy customer requirement and demand. It's more about finding the right banking solution that suits specific requirements. In this stage come users with income justify customer occupation and Source of wealth and income.

Even though customer belongs to low risk customer, still bank monitor customer transactions if customer perform transactions in a huge amount all of the sudden, these transactions may trigger bank to keep an eye on the account for any unusual or suspicious activity and take action accordingly if bank needs to approach customer for justification or block the account until further notice. If the person wants to use or access the money, they can do so as long as the funds are legitimate.

Statistics on banking frauds in India:

The RBI reports that over the previous 11 years, bank fraud totaled \$2.05 trillion. In response to an RTI request, the RBI said that over 50,000 banking fraud cases were discovered in India between 2009 and 2019. ICICI Bank recorded the highest number of scams (6,811), totaling \$5,033 crore. The RBI's data indicates that in the last 11 fiscal years, SBI, HDFC Bank, and ICICI Bank were the banks with the highest number of incidents of over 50,000 scams that caused harm to Indian firms.

Table – 1 Frauds involving Bank Loans as of March 31, 2021, according to Indian Banks:

S.NO.	Name of the bank	No. of fraud case	Amount involved
1.	State bank of India	6793	78072
2.	ICICI banks	6811	5033.81
3.	HDFC banks	2497	1200.79
4.	Banks of Baroda	2160	39733
5.	Punjab National Bank	2047	5301.69
6.	Axis bank	1944	12358.2
7.	Bank of India	1872	5830.85
8.	Syndicate Bank	1783	5830.85
9.	Central bank of India	1613	9041.98
10.	IDBI Bank Ltd	1264	5978.96

Source: <https://www.inventiva.co.in/trends/top-10-biggest-bank-frauds-in-india/>

Also, the RBI reports that over the course of the previous 11 financial years, several international banks operating in India, including The Royal Bank of Scotland Plc, the American Express Banking the company, City Bank, and Hong Kong and Shanghai Banking, have admitted to fraud cases involving billions of rupees. Firm (HSBC) Ltd., and so on.

Table – 2 Number of fraud cases reported and amount involved from 2008 to 2022.

S. no.	Year	Number of cases reported	Amount involved (in crores)
1.	2012-2013	4235	8591
2.	2013-2014	4306	10171
3.	2014-2015	4639	19455
4.	2015-2016	4693	18699
5.	2016-2017	5076	23934
6.	2017-2018	5916	41167
7.	2018-2019	6798	71534
8.	2019-2020	8703	185468
9.	2020-2021	7359	138442
10.	2021-2022	9103	60414

Source: [Bank frauds worth ₹2.05 trillion happened in last 11 years, reveals RBI data | Mint \(livemint.com\)](#)

Transactions in secured Banking:

The banking industry can employ a variety of data mining techniques to detect fraud. Several of the most widely used techniques are as follows:

- 1. Rule-based systems:** These systems use a collection of guidelines, or heuristics, to spot possible fraud. A rule-based system might, for instance, highlight any transaction to an offshore account or one that exceeds a specific amount.
- 2. Anomaly detection:** This approach searches the data for odd or surprising patterns. It is possible to distinguish between genuine and fraudulent transactions using anomaly detection.
- 3. Neural networks:** Finding patterns in data can be accomplished through the use of machine learning algorithms such as neural networks. The identification of phony and authentic transactions is possible with neural networks.
- 4. Support vector machines:** Finding patterns in data can be accomplished through the use of machine learning algorithms such as neural networks. The identification of phony and authentic transactions is possible with neural networks.
- 5. Decision trees:** A class of machine learning technique called a decision tree is useful for finding patterns in data. It is possible to distinguish between genuine and fraudulent transactions using decision trees. [5]

In order to discover the most significant links, criteria support and confidence are used to analyze data for frequent if/then patterns. This process creates association rules. The support serves as a gauge for how frequently the data items surface within the database. The confidence expresses how many times the if/then statements have been confirmed to be accurate.

Conclusion:

Due to advancements in technology, the traditional banking transaction is shifting from utilizing bank books over the counter to conducting business online. The bank's current online user access structure was reviewed in this report. Furthermore presented was the factor-based categorization of the current framework. Banks are the lifeblood of an economy; they are necessary to initiate and maintain growth in the economy, particularly in developing nations such as India. As of March 31, 2021, 90 banks and financial institutions reported 45,614 cases of loan scam totaling 4.93 trillion rupees, according to the RBI's most recent assessment.

Future Work:

Future work on this research paper may focus on both the authentication system's ongoing evolution and the security of methods for continuously training and authenticating user behavior data.

As time is keep on changing day by day, new technologies are also coming to combat from financial crime. On same hand criminals in financial crime finds loopholes in technologies and commit fraud with bank customer. Hence to combat from this, bank should conduct and provide trainings and update guidance on regular bases. Bank should hire specialist in KYC / AML to handle fraud to protect bank and customer from financial fraud. And to comply with this, the bank will have to give training to its employs. We will have to upgrade our banks system from to time to time.

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