Fraud Detection System - Group 10

Banks deal with vast amounts of transactions

Data Complexity and volume

Difficult managing , process and analyze transactions

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Problem Statement

High
Transaction

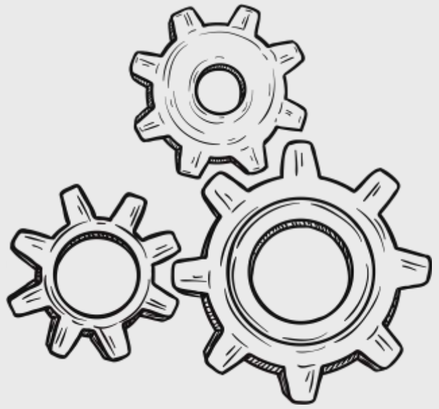
Higher loss due to
fraud activities

Real-time
Detection

Use predictive ML model, and
analytics using SQL & Python

Reduce false positive
(Cust feedbacks)

Overview of Fraud Detection System

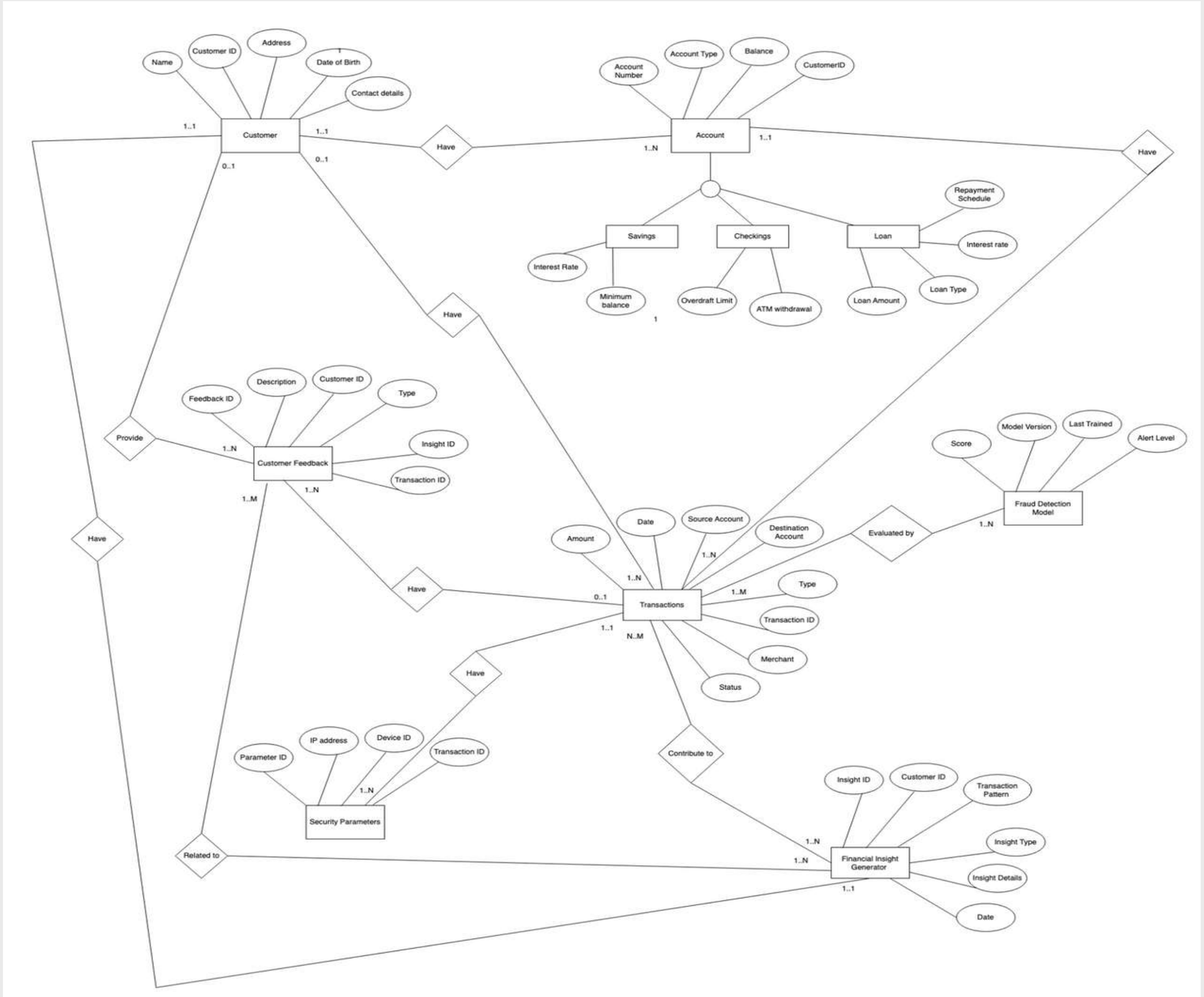


Real-time Monitoring using Fraud Detection ML Model

Customer feedbacks incorporated in ML model

Adaptive threat response mechanisms to adjust its fraud detection strategies based on evolving threats.

EER Diagram


Name
Customer ID
Address
Date of Birth
Contact details
Customer
1..1
0..1
Have
Account Number
Account Type
Balance
CustomerID
Account
1..N
1..1
Have
Repayment Schedule
Interest rate
Loan Type
Loan Amount
Loan
Savings
Interest Rate
Minimum balance
Checkings
Overdraft Limit
ATM withdrawal
1
Have
Description
Customer ID
Type
Feedback ID
Insight ID
Transaction ID
Provide
Customer Feedback
1..N
1..M
1..N
Have
Score
Model Version
Last Trained
Alert Level
Fraud Detection Model
Evaluated by
1..N
Have
Amount
Date
Source Account
Destination Account
1..N
1..N
0..1
1..M
Type
Transaction ID
Merchant
Status
Transactions
1..1
N..M
Have
IP address
Device ID
Parameter ID
Transaction ID
1..N
Security Parameters
Contribute to
Insight ID
Customer ID
Transaction Pattern
Insight Type
Insight Details
Date
1..N
1..N
Financial Insight Generator
1..1
Related to

Scope and Objectives of Analytics

Customer and Account entities at the core of the database.

Fraud Detection Model to evaluate transaction patterns.

- Real-time monitoring of account balances and transactions to detect anomalies.
- Evaluating the performance of fraud detection models over time.
- Gathering insights from customer feedback on flagged transactions.

SQL Analytical Queries

Identify transactions that are high Risk Transaction

```
1
2
3  SELECT TransactionID, Amount, FraudDetectionModel.Sensitivity
4  FROM Transaction JOIN FraudDetectionModel ON Transaction.ModelVersionID = FraudDetectionModel.ModelVersion
5  WHERE Amount > 200 AND FraudDetectionModel.Sensitivity > 0.7
6  LIMIT 10;
7
8
```

1:8

Result Grid | Filter Rows: Search | Export: | Fetch rows:

TransactionID	Amount	Sensitivity
1005	300.25	0.85
1015	325.25	0.88
1018	275.00	0.71
1033	300.75	0.74
1039	270.25	0.83
1042	310.75	0.85
1045	250.00	0.80
1048	225.25	0.82
1051	300.00	0.80
1054	265.75	0.85

Distribution and averages of loan amounts and terms. This can provide insights into the loan products' popularity and the financial behavior of customers taking loans.

```
1
2
3  SELECT AVG(LoanAmount) AS AverageLoanAmount, AVG(LoanTermMonths) AS AverageLoanTerm
4  FROM LoanAccount
5  LIMIT 10;
6
7
```

1:7

Result Grid | Filter Rows: Search | Export:

AverageLoanAmount	AverageLoanTerm
10280.000000	41.2000

Analyze the types and frequencies of feedback provided by customers. This feedback can reveal customer satisfaction levels, usability issues, or areas needing improvement in the system.

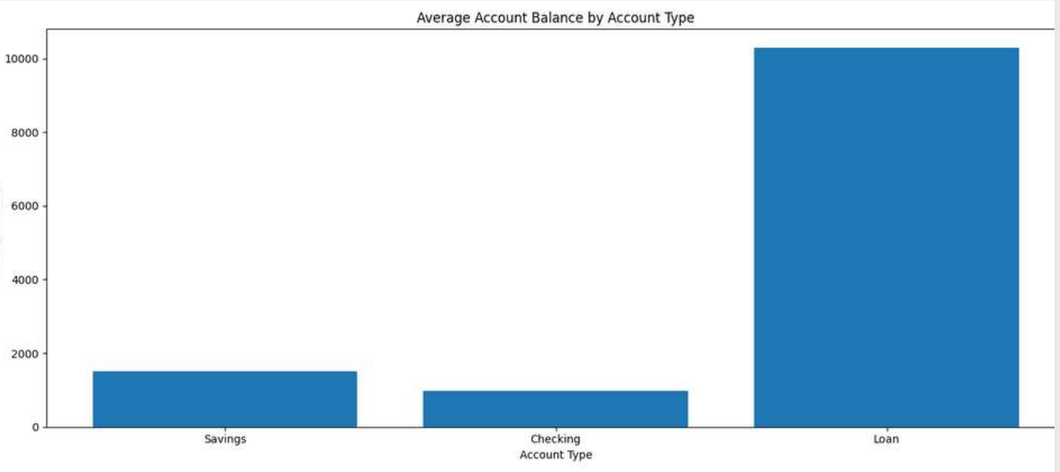
```
1
2
3  SELECT Type, COUNT(*) AS FeedbackCount
4  FROM CustFeedback
5  GROUP BY Type
6  LIMIT 10;
7
8
```

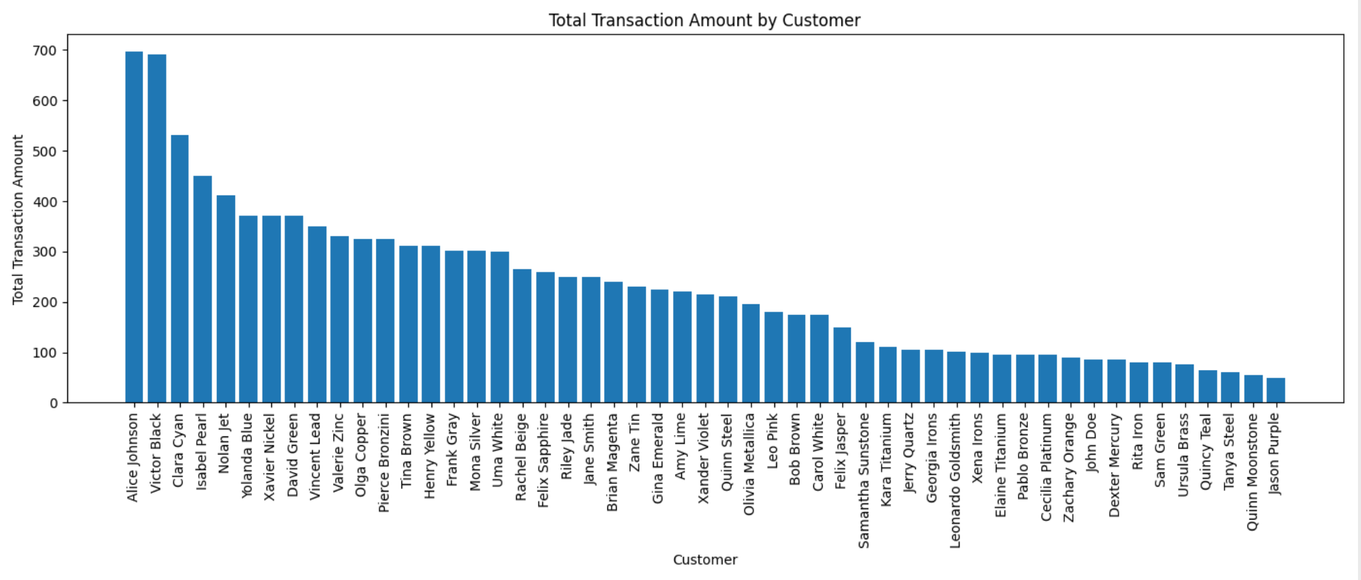
1:8

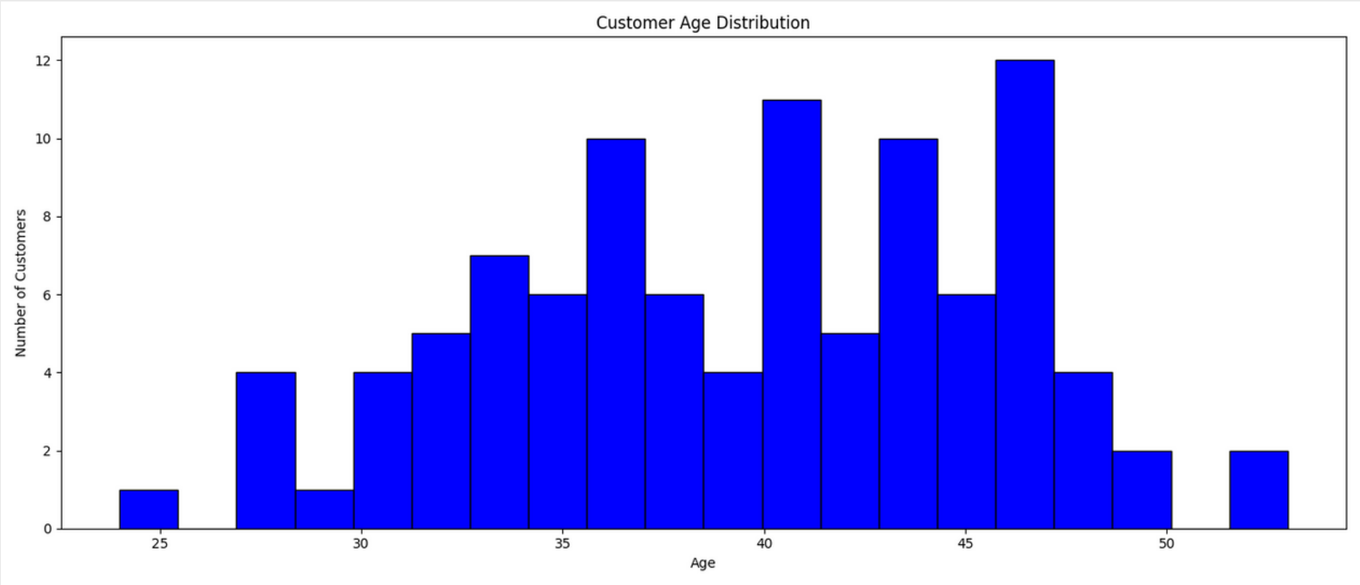
Result Grid | Filter Rows: Search | Export:

Type	FeedbackCount
Positive	52
Negative	48

Python Visualization from the Database







Conclusion

We are committed to strengthen Financial Security by integrating Advanced Fraud Detection models

Thank you!