



# Fraud Detection Analysis

Analyzing transaction data to detect fraud patterns using Python, SQL, and Power BI

# Project Objectives



## Identify Fraud

Distinguish legitimate vs fraudulent transactions



## High-Risk Detection

Detect high-risk customers and patterns



## Pattern Analysis

Analyze fraud by location, type, and time



## Visual Insights

Interactive dashboards for decision-makers



# Dataset Overview

500

Total Rows

13

Columns

## Key Fields

- Transaction ID & Customer ID
- Amount & Transaction Time
- Transaction Type (ATM, Payment, Transfer, Online)
- Location & Device Type
- International Flag & Fraud Indicator

Transactional data  
including customer IDs,  
amounts, timestamps,  
locations, device types,  
and fraud indicators



Ent	Nanpherd	\$0,000	Finanew	\$5,000								
\$6/50//1140	\$2 ses	\$0,000	\$2.87k	\$17,000								
\$42577/2010	\$5 ses	\$0,000	\$1.59k	\$12,000								
\$50072/1200	\$1 ses	\$0,000	\$9.34k	\$15,000								
160007/2015	\$1 ses	\$0,000	\$3.54k	\$12,000								
\$606071/20110	\$1 ses	\$1,000	\$5.54k	\$25,000								
50002/5911	\$1 ses	\$5,600	\$1.54k	\$15,000								
\$66.../1751	\$2 ses	\$0,000	\$5.54k	\$15,000								
...2011	\$2 ses	\$2,600	\$1.54k	\$12,000								
...305/1111	\$1 ses	\$2,500	\$3.54k	\$15,000								

# Data Preparation Process



## Data Cleaning

Removed duplicates, handled missing values



## Type Conversion

Converted data types for analysis



## Feature Engineering

Created high\_amount\_flag, risk score, international\_flag

```
df['hour'] = df['transaction_time'].dt.hour
df['day_of_week'] = df['transaction_time'].dt.day_name()
df['high_amount_flag'] = (df['amount'] > 50000).astype(int)
df['international_flag'] = (df['is_international'] == 'Yes').astype(int)
```

# SQL Analysis Highlights

Top 5 Fraud Transactions

Transaction ID	Amount
147	₹99,297
62	₹99,051
377	₹98,997
190	₹98,729
333	₹98,653

Fraud by Day of Week

Day	Count
Saturday	25
Thursday	25
Sunday	23
Friday	20

Total Fraud Loss: ₹10.42M

# Dashboard Overview

Three-page interactive Power BI dashboard providing comprehensive fraud insights

01

## Fraud Overview

KPIs, charts, and filters for transaction analysis

02

## Fraud Insights Table

Detailed transaction data with multiple filters

03

## Deep Insights

Risk scores, heatmaps, and high-risk accounts





# Page 1: Key Performance Indicators

500

Total Transactions

147

Fraud Count

10.4...

Fraud Amount

29%

Fraud Rate

## Dynamic Filters

Quarter, Transaction Type, Location, Device Type

## Visual Charts

Monthly trends, day-of-week patterns, amount flags, fraud rates





# Key Insights & Findings



## Transaction Patterns

High fraud in Online & Payment channels. International transactions show significantly higher fraud amounts.



## Location Risk

Bangalore, Chennai, Hyderabad show elevated fraud. Metro cities at higher risk.



## Time Trends

Fraud peaks on weekends. Evening hours show more suspicious activity.



## Customer Risk

Top 5 high-risk customers contribute majority of fraud. High amounts correlate with fraud probability.



# Business Recommendations

## Strengthen Authentication

Add 2-factor authentication, device binding, behavioral analysis for Online and Payment channels

## Monitor High-Risk Locations

Set up real-time alerts for suspicious activity in metro cities

## Weekend Monitoring

Add rules for weekend-based fraud pattern detection

## Flag High Amounts

Set dynamic thresholds based on customer history

## Risk Scoring

Use risk score model to prioritize investigations

# Project Deliverables

- Clean Dataset

Preprocessed transaction data

- Python Code

Data preprocessing scripts

- SQL Queries

Fraud analysis queries

- Power BI Dashboard

Interactive .pbix file

- Documentation

Full project report

## Project Success

Successfully demonstrated fraud detection using data analytics. Enables financial institutions to identify fraud faster and take preventive actions.