Fraud Detection System (Python + SQL)

Overview

This project develops an anomaly detection system for financial transactions using Python and SQL. It identifies fraudulent transactions from a dataset of 500K+ records.

Tools & Technologies

Python (Pandas, Scikit-learn), SQL, Jupyter Notebook

Methodology

1. Extracted transaction data using SQL queries.
2. Performed exploratory data analysis with Pandas.
3. Engineered features such as transaction frequency and amount patterns.
4. Trained ML models (Isolation Forest, Logistic Regression).
5. Evaluated model performance using precision, recall, and F1-score.

Findings & Insights

The Isolation Forest model achieved the best performance with 92% accuracy and successfully flagged most suspicious transactions.

Conclusion

The system improves fraud monitoring and can be integrated into real-time transaction processing.