Credit Card Fraud Detection System

Detecting Fraud with Machine Learning & Streamlit

Your Name | Date

Project Overview

Goal: Detect fraudulent credit card transactions using machine learning.

Features:

- Data analysis & visualization
- Model training & evaluation
- Real-time fraud prediction
- User-friendly Streamlit GUI

Dataset

Source: Kaggle Credit Card Fraud Dataset

Size: 284,807 transactions, 492 frauds (0.17%)

Features:

- Time, Amount
- V1–V28 (PCA components)
- Class (0: Non-Fraud, 1: Fraud)

Tech Stack

Python 3

pandas, numpy

scikit-learn

matplotlib, seaborn, plotly

Streamlit (GUI)

Exploratory Data Analysis (EDA)

Fraud vs. Non-Fraud distribution

Correlation heatmap

Boxplots for amount

Feature distributions

Time-based fraud analysis

[Insert EDA screenshots here]

Data Preprocessing

Handle missing values

Feature scaling (StandardScaler)

Outlier removal (optional)

Class balancing (under/over-sampling)

Train/test split (70/30)

Model Building

Logistic Regression

Random Forest Classifier

Hyperparameter tuning via GUI

Model training and saving

Model Evaluation

Metrics:

- Accuracy
- Precision
- Recall
- F1-Score
- ROC-AUC

Visuals:

- Confusion Matrix
- ROC Curve
- Precision-Recall Curve
- Feature Importance

Streamlit GUI Demo

Data overview & EDA

Model training

Fraud prediction (single, batch, random)

Model evaluation

[Insert GUI screenshots or demo video link]

Results

High accuracy and recall for fraud detection

Real-time prediction capability

User-friendly interface for non-technical users

Challenges & Solutions

Imbalanced data: Used resampling techniques

Feature anonymization: Relied on statistical patterns

Real-time prediction: Optimized preprocessing pipeline

Future Work

Add more ML models (XGBoost, Neural Networks)

Deploy as a web service (Docker, cloud)

Integrate with real-time transaction streams

Advanced feature engineering

Conclusion

End-to-end fraud detection system

Modular, extensible, and user-friendly

Ready for real-world applications

Q&A

Questions?

Thank you!