Credit Card Fraud Detection – Mini Project Report

1. Project Title

Credit Card Fraud Detection using Machine Learning and Streamlit

2. Objective

To build a machine learning-based system that detects fraudulent transactions from credit card datasets, and deploy it as an interactive web app using Streamlit.

3. Tools & Technologies

- **Python** – Programming language
- **Pandas, NumPy** – Data handling
- **Scikit-Learn, XGBoost** – Machine learning
- **Streamlit** – Web application
- **Jupyter Notebook / VS Code** – Development Environment

4. Dataset Details

- **Source**: Kaggle – Credit Card Fraud Detection Dataset
- **Rows**: 284,807 transactions
- **Fraudulent Cases**: 492 (~0.17%)
- **Features**:
    - Time, Amount
    - V1–V28: PCA-transformed features
    - Class: Target (0 = Normal, 1 = Fraud)

5. Methodology

- **Preprocessing**:
    - Load dataset using Pandas
    - Normalize 'Amount' column
    - Undersample non-fraud class to balance the dataset
- **Modeling**:
    - Apply **Isolation Forest** and **Local Outlier Factor** (Anomaly Detection)

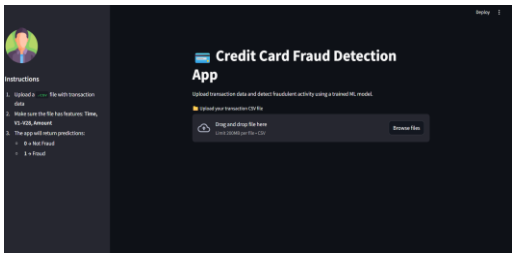
- Use **XGBoost Classifier** for supervised classification
- Evaluate model using **Confusion Matrix** and **ROC Curve**

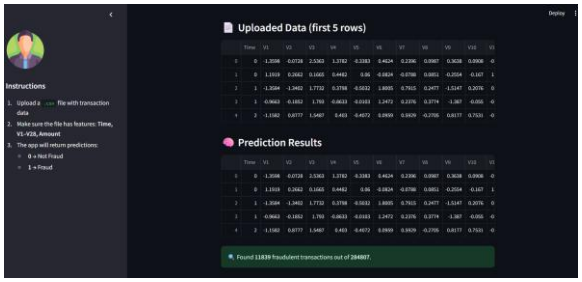
- **Web App**:
  - Built using Streamlit
  - Allows user to upload .csv file
  - Displays prediction results and fraud summary

6. Output & Results

- **Accuracy**: ~99.9% on test data
- **AUC Score**: ~0.98
- **Output**:
  - Fraud detection from uploaded transaction data
  - Web app interface shows fraud count and prediction table

7. Screenshots





8. Conclusion

The project successfully detects fraudulent credit card transactions using machine learning. It demonstrates both anomaly detection and supervised learning, and presents the results through a simple Streamlit web interface.

10. References

- Kaggle Dataset: https://www.kaggle.com/datasets/mlg-ulb/creditcardfraud
- Scikit-learn Docs: https://scikit-learn.org
- XGBoost Docs: https://xgboost.readthedocs.io
- Streamlit Docs: https://docs.streamlit.io

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