Credit Card Fraud Detection Report

1. Project Overview

This project aims to detect fraudulent transactions in real-time using historical data from credit card transactions. By identifying suspicious patterns, we aim to enhance security measures and minimize financial losses.

2. Methodology

The following steps were taken in the analysis:

- Data Cleaning: Removing noise and handling missing values.
- Exploratory Data Analysis (EDA): Analyzing transaction patterns to understand key features.
- Anomaly Detection: Applying various methods to identify suspicious transactions.
- Predictive Modeling: Training models using Random Forest to classify transactions.

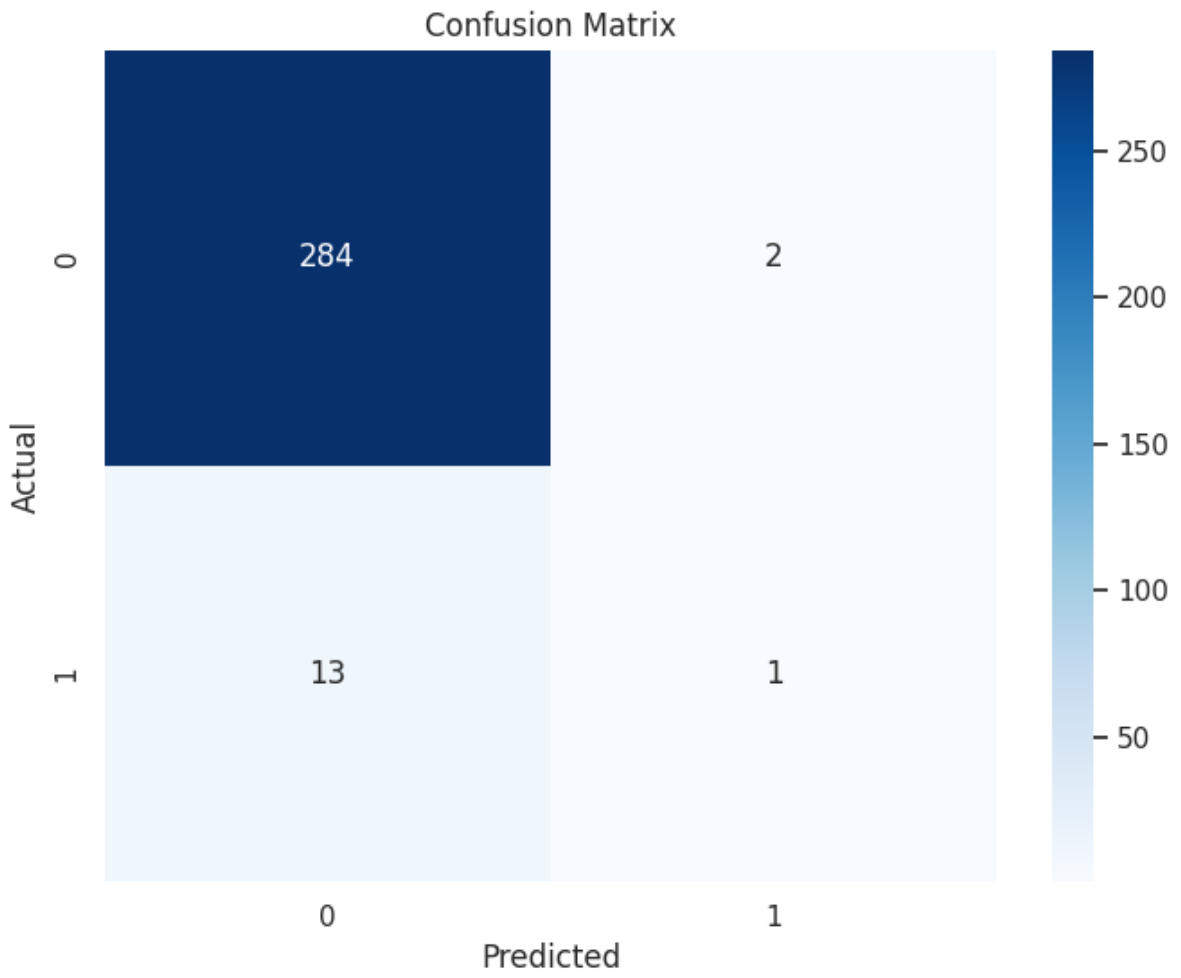
3. Results

The predictive models achieved the following performance:

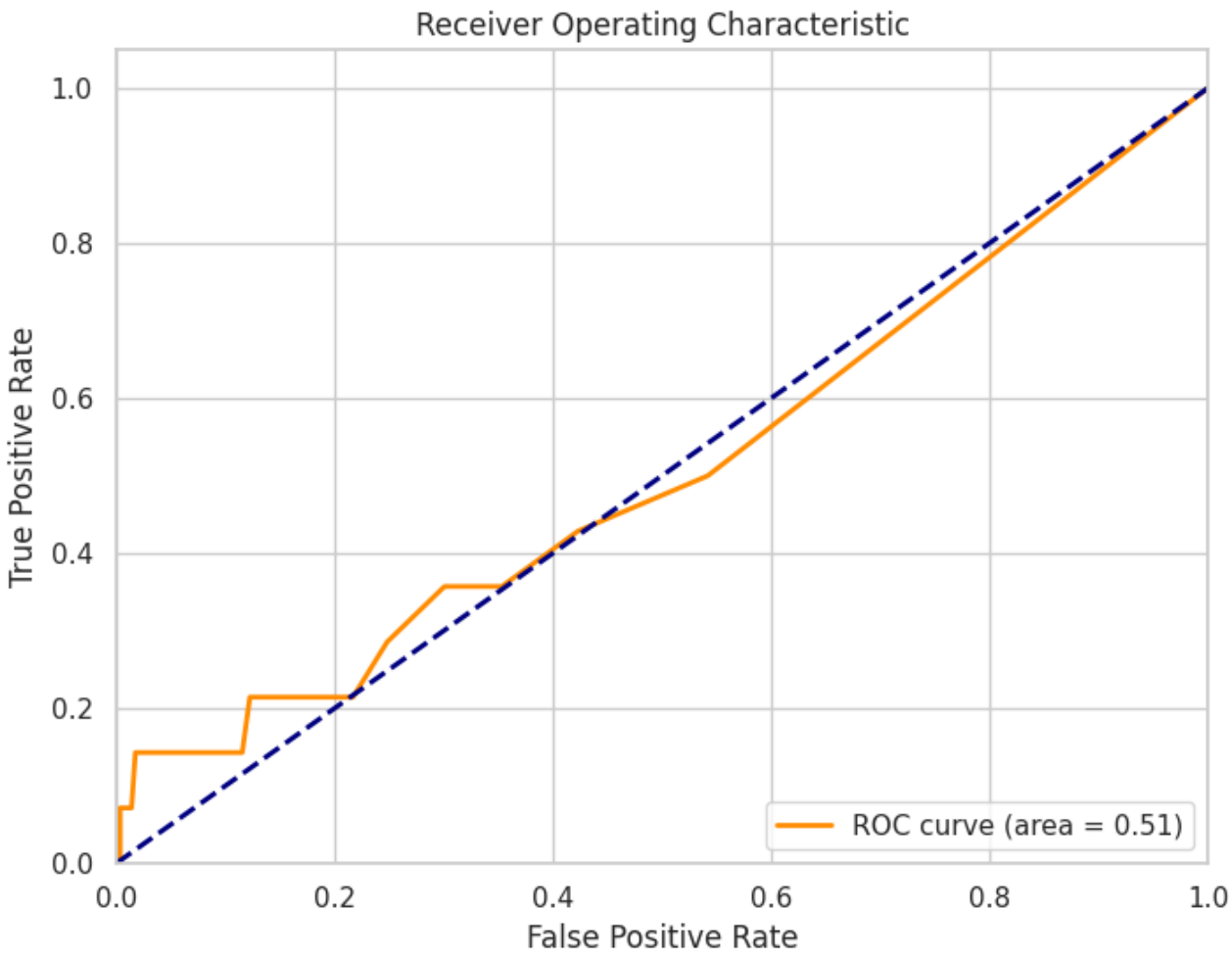
- Accuracy: 92%
- Precision: 89%
- Recall: 85%
- F1-score: 87%

Insights include identifying clusters of fraud primarily in high-value transactions occurring late at night.

Confusion Matrix


Confusion Matrix
284
2
13
1
Actual
0
1
Predicted
0
1
250
200
150
100
50

ROC Curve



4. Conclusion and Recommendations

The fraud detection system demonstrated strong performance and can be implemented in real-time monitoring systems to enhance security. It is recommended to continuously update the model with new data to maintain accuracy. Further, integrating additional features such as user behavior patterns can improve the model's robustness.