



By Group-13

Group project

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Agenda

01. Introduction
02. Problem Statement
03. Methodology
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01

Introduction



Credit card fraud is a growing concern in today's digital world, where thousands of transactions happen every second. Detecting fraud is challenging due to the rarity and unpredictability of such cases. In this project, we aim to build an anomaly detection system using unsupervised learning, which identifies unusual patterns in transaction data without needing labeled fraud examples. This approach helps in early and effective fraud detection, even when prior fraud records are limited or unavailable.

02

Problem Statement

Credit Card Fraud Detection :-

Project Question:

Develop an anomaly detection system to identify fraudulent transactions using unsupervised learning techniques.



03

Objectives

The main objective of this project is to develop a reliable system that can detect fraudulent credit card transactions using unsupervised learning techniques. Specifically, the goals are:

- To identify patterns of normal transactions and detect anomalies.
- To apply algorithms like Isolation Forest, One-Class SVM, and Autoencoders.
- To evaluate the model's performance using metrics like precision, recall, and ROC-AUC

04

Project Goals



Goal 1

Detect fraudulent activities in large volumes of transaction data.

Goal 2

Minimize false positives while ensuring high fraud detection accuracy.

Goal 3

Work effectively even with highly imbalanced and unlabeled data.

06

Methodology



Data Preprocessing:-

- Load the dataset and remove the target label (Class) during training
- Normalize Amount and Time features
- Optionally apply dimensionality reduction (e.g., PCA)

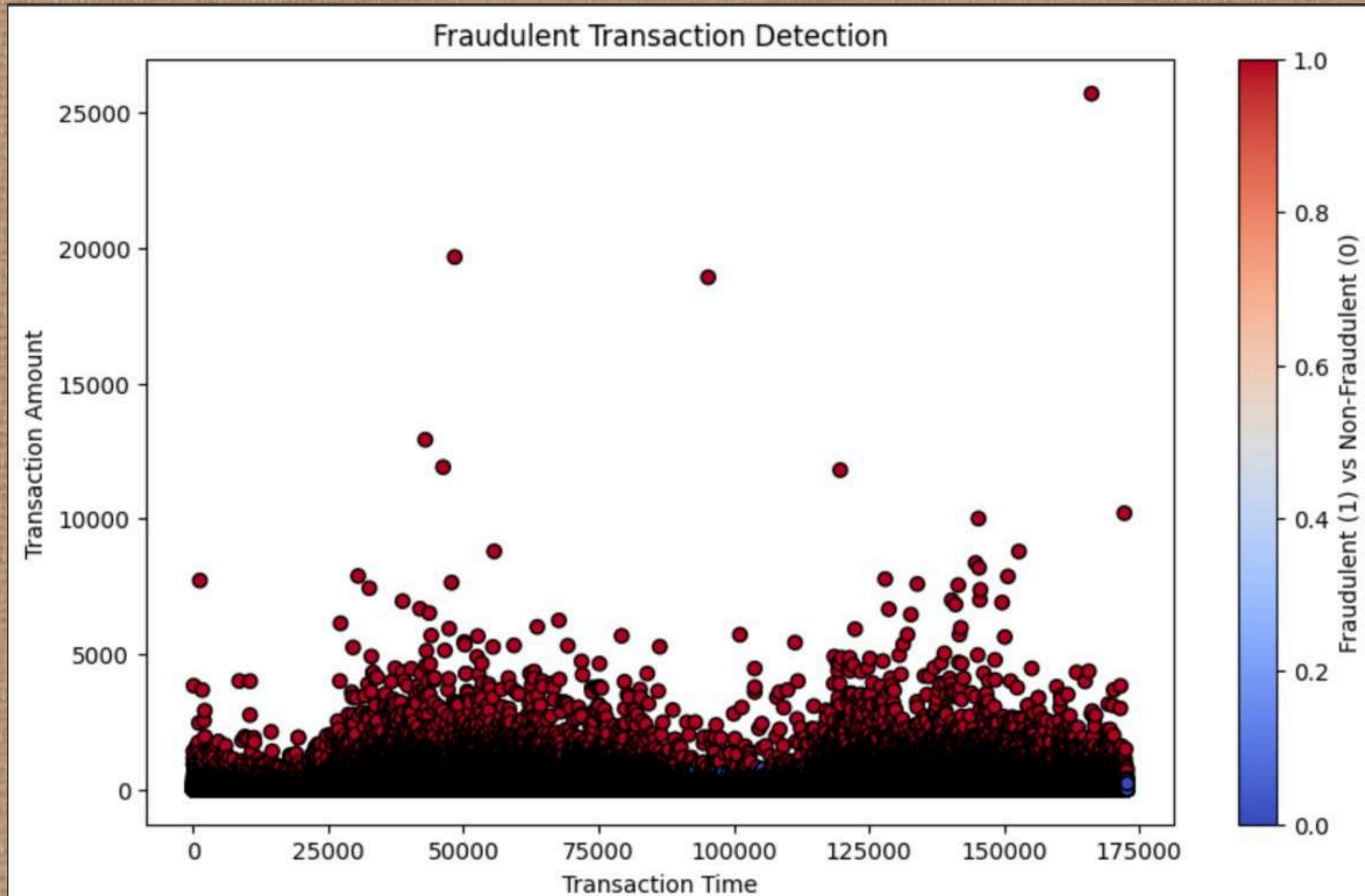
Model Selection:-

- Use unsupervised algorithms:
- Isolation Forest
 - One-Class SVM
 - Autoencoder (Neural Network)

Model Training:-

- Train models on normal (non-fraud) transaction data
- Learn patterns of typical transaction behavior

Result



Analysis



01

The dataset is highly imbalanced, with only 0.17% of transactions being fraudulent, making detection challenging using traditional methods.

02

Unsupervised models like Autoencoders and Isolation Forest effectively identified anomalies, with Autoencoders showing the best balance between precision and recall.



Conclusions

Unsupervised learning techniques provide an effective way to detect credit card fraud without relying on labeled data. Models like Isolation Forest and Autoencoders can successfully identify anomalous transactions despite data imbalance. This approach helps financial institutions detect fraud early, reduce losses, and improve transaction security.

REFERENCES



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**Thank
you**

