Project Proposal: Credit Card Fraud Detection Using Machine Learning

Introduction Credit card fraud is a significant issue that causes substantial financial losses globally. This project aims to develop a machine learning model to detect fraudulent transactions effectively and in real-time.

Problem Statement

- The rise in online transactions has led to an increase in credit card fraud.

- Existing methods are either too slow or not accurate enough to detect fraud.

Objectives

- Develop a machine learning model to identify fraudulent transactions with high accuracy.

- Implement the model to process transactions in real-time.

Methodology

- <u>Data Collection:</u> Gather historical transaction data, including both fraudulent and legitimate transactions.
  data source: https://www.kaggle.com/code/gpreda/credit-card-fraud-detection-predictive-models/input

- <u>Data Preprocessing:</u> Clean and preprocess the data for analysis, including handling missing values and feature engineering.

- <u>Model Selection:</u> Implement multiple machine learning algorithms to detect credit card fraud.

- *Supervised Learning Algorithms*: These algorithms learn from labeled data, making predictions based on input-output pairs.

    - Decision tree

    - Random Forest

    - Regression

- *Unsupervised Learning Algorithms:* These algorithms explore unlabeled data to find hidden patterns. Techniques include clustering (like K-mean) and dimensionality reduction (like PCA).

    - K-means

    - Principal Component Analysis(PCA)

- *Deep Learning Models:* These are advanced neural networks with multiple layers. They mimic the human brain to identify patterns in large datasets.

    - Convolution Neural Networks

- Autoencoders

- <u>Model Training:</u> Train the chosen model(s) using the preprocessed data.

- <u>Model Evaluation:</u> Evaluate the model's performance using metrics such as accuracy, precision, recall, and F1-score.

- Comparison of all Models

Expected Outcomes:

- A machine learning model capable of accurately identifying fraudulent transactions.

- Reduction in the number of fraudulent transactions processed.

- Improved financial security for users.

Conclusion:

This project will leverage machine learning to address the critical issue of credit card fraud, providing a robust and scalable solution to enhance financial security.