Credit Card Fraud Detection Using Machine Learning

This exhibit provides a complete description of my credit card fraud detection project, highlighting its objectives, methodology, and results to demonstrate my ability to translate theoretical concepts into practical applications.

Objectives:

The project aimed to identify fraudulent transactions in a dataset of over 284,000 credit card records using machine learning models. By analyzing patterns and anomalies, the goal was to determine the most effective algorithms for detecting fraud and ensuring robust generalization.

Methodology:

1. **Data Preprocessing:** Applied cleaning techniques and used Principal Components Analysis (PCA) for dimensionality reduction to maintain data confidentiality.
2. **Algorithms Evaluated:** Examined Support Vector Machines (SVM), K-Nearest Neighbors (KNN), Logistic Regression, and Decision Trees.
3. **Evaluation Metrics:** Measured performance using accuracy, precision, recall, and confusion matrices.

Results:

- **Model Performance:**
    - SVM achieved 99.94% accuracy in one study, excelling in handling non-linear and high-dimensional data.
    - KNN and Decision Trees achieved 100% accuracy in a separate study, demonstrating strong performance in imbalanced datasets.
- **Insights:** The comparison of methods revealed the importance of data preprocessing, model selection, and evaluation strategies for effective fraud detection.

Exhibit 35.3 DFA Fraudulent Transaction Detection Project

Relevance to Practical Challenges:

This project demonstrates my ability to bridge theoretical knowledge with real-world problem-solving. The application of advanced statistical techniques and machine learning models showcases my capacity to address critical challenges like pattern detection and anomaly identification, aligning directly with my proposed AI-driven initiative to predict and prevent homelessness.

For a detailed breakdown of the project, including its code and supporting documentation, visit:

For more details, visit the full project documentation:
GitHub Repository:
https://github.com/ewache04/DFA-Fraudulent-Transaction-Detection-Project