CREDIT CARD FRAUD DETECTION

DATA SCIENCE PROJECT-FRAUD DETECTION

PHASE 1

TEAM MEMBERS:

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PROBLEM DEFINITION:

Credit card fraud is a significant issue in the financial industry, costing billions of dollars annually. Detecting fraudulent transactions is crucial to mitigate financial losses and protect consumers. This paper presents a comprehensive module for credit card fraud detection using machine learning and data analytics techniques. The module encompasses data preprocessing, feature engineering, model training, and real-time transaction monitoring. By leveraging historical transaction data and advanced algorithms, our module can effectively identify and prevent fraudulent activities, enhancing the security of credit card transactions.

DESIGN THINKING:

1.DATA PREPROCESSING:

Data cleaning: Removing duplicates, handling missing values.
Data transformation: Scaling and normalization.
Feature selection: Identifying relevant features for fraud detection.
Handling imbalanced data: Resampling techniques.

2. FEATURE ENGINEERING:

Creating new features: Combining existing ones or extracting meaningful information.

Dimensionality reduction: Reducing the number of features while preserving information.

3. MODEL TRAINING:

Supervised learning: Using labeled data to train models (e.g., logistic regression, decision trees, random forests).

Unsupervised learning: Employing anomaly detection algorithms (e.g., Isolation Forest, One-Class SVM) for detecting unusual patterns.

Ensemble methods: Combining multiple models for improved accuracy.

4. EVALUATION:

Metrics: Using appropriate metrics (e.g., precision, recall, F1-score, ROC AUC) to assess model performance.

Cross-validation: Ensuring model robustness and generalization.

5.REAL-TIME TRANSACTION MONITORING:

Deploying the trained model in a real-time environment.Continuously monitoring incoming transactions for potential fraud.

6.ALERTING MECHANISM: Notifying relevant stakeholders when suspicious activity is detected.

MODEL UPDATES:

Periodically retraining the model to adapt to evolving fraud patterns.Incorporating new data and feedback from fraud analysts.

DEPLOYMENT:

Integrating the fraud detection module into existing banking systems.Ensuring scalability and low latency for real-time processing.By implementing this module, financial institutions can enhance their ability to detect and prevent credit card fraud, safeguarding the interests of both customers and the institution itself.