Credit Card Fraud Detection

**Phase 1: Problem Definition and Design Thinking**

**Problem Definition:**

The problem at hand is to develop a credit card fraud detection system that can accurately and efficiently identify fraudulent transactions in real-time, thereby minimizing financial losses for both credit card companies and cardholders. Credit card fraud is a significant and growing concern, with criminals constantly evolving their tactics. To address this problem, we aim to create a robust and adaptive fraud detection system that can distinguish between legitimate and fraudulent transactions, while also minimizing false positives that could inconvenience genuine cardholders.

**Design Thinking:**

**Data Collection:** To collect dataset containing transaction data, including features such as transaction amount, merchant information, and card details and defining the scope of data collection, including what types of transaction data are relevant and which time periods to consider.

**Data Preprocessing:** To clean and Identify potential issues like missing values, outliers, and data format discrepancies and Set data preprocessing goals, such as data cleansing, normalization, and handling missing values, to ensure the data is suitable for analysis.

**Feature Engineering:** To create additional features that could enhance fraud detection, such as Transaction frequency, Amount deviations andCardholder Profile**.**

**Model Selection:**  To Choose a suitable machine learning algorithms including logistic regression, decision trees, random forests, support vector machines, and deep learning architectures for fraud detection. Implement multiple model prototypes with different algorithms to assess their performance.

**Model Training:** To train the selected model using preprocessed data.

**Model Evaluation**: To Understand the consequences of false positives and false negatives in credit card fraud detection by using evaluation metrics, such as accuracy, precision, recall, F1-score, and ROC AUC, to assess model performance.