# Problem Statement - Fraud Detection System

Title: Fraud Transaction Detection using Machine Learning  
  
Objective:  
To build a predictive model capable of detecting fraudulent transactions based on transaction metadata such as type, amount, sender/receiver info, and flags. The model aims to reduce false positives while maximizing detection accuracy using Decision Tree and Random Forest classifiers.  
  
Background:  
Fraud detection is a crucial challenge for financial institutions, particularly with the growing volume and speed of digital transactions. Traditional rule-based systems are no longer sufficient for identifying complex fraud patterns. This project leverages machine learning algorithms to provide a more adaptive and intelligent approach to identifying fraudulent activity.  
  
Scope:  
- Use a labeled dataset with features such as transaction type, amount, origin and destination balances, and fraud flags.  
- Preprocess the data with normalization and encoding.  
- Train models (Decision Tree, Random Forest) to classify transactions as fraudulent or not.  
- Evaluate the models using ROC curves and AUC scores.  
- Visualize feature correlations and model performance.  
  
Expected Outcome:  
A machine learning model that accurately detects fraudulent transactions with high AUC and balanced precision-recall performance.