Credit Card Fraud Detection

This project involves building a machine learning model to detect fraudulent credit card transactions. We use a dataset containing information about credit card transactions and experiment with three algorithms: Logistic Regression, Decision Trees, and Random Forests to classify transactions as fraudulent or legitimate.

Steps :

1. Import Necessary Packages
Import libraries for data manipulation (`pandas`, `numpy`), model building (`sklearn`), and evaluation (`seaborn`, `matplotlib`).

2. Load the Dataset
Load the dataset using `pandas` and perform initial exploration to understand the structure and contents of the data.

3. Data Preprocessing
Handle Missing Values: Check for and fill any missing values with the mean. Feature Scaling: Scale the features using `StandardScaler` to standardize the data.

4. Split the Dataset
Split the dataset into training (80%) and testing (20%) sets using `train_test_split`.

5. Model Building and Training
Train three different models:
- Logistic Regression
- Decision Tree
- Random Forest

6. Model Evaluation
Evaluate each model using the following metrics:
- Accuracy
- Recall
- Precision
- F1 Score

Display a confusion matrix and ROC curve for visual evaluation.

7. Model Comparison
Compare the performance of the three models based on the evaluation metrics. Select the best model based on the highest F1 Score.

8. Save and Load the Best Model
Save the best model using `joblib`. Load the model to verify predictions.