

# Credit Card & Fraud Detection



Protecting Finances in a Digital World

# Agenda

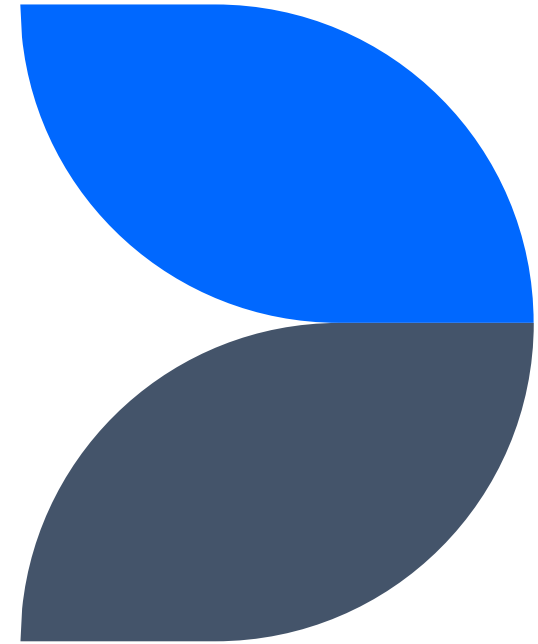
- Introduction
- Data Collection
- Data Preprocessing
- Feature Engineering
- Machine Learning Models
- Model Evaluation
- Real-time Monitoring
- Conclusion

# Introduction:

Credit cards are now the most preferred way for customers to transact either offline or online. There are a number of reasons, as illustrated below, due to which consumers are slowly shifting from debit card transactions to credit cards, especially in developing countries like India.

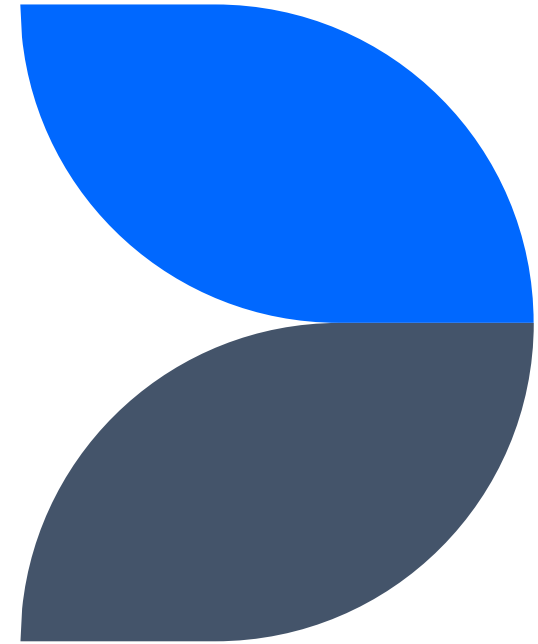
# Data Collection:

- Discuss the need for a robust dataset for fraud detection.
- Mention the sources of data, including transaction records.
- Highlight the importance of data privacy and compliance



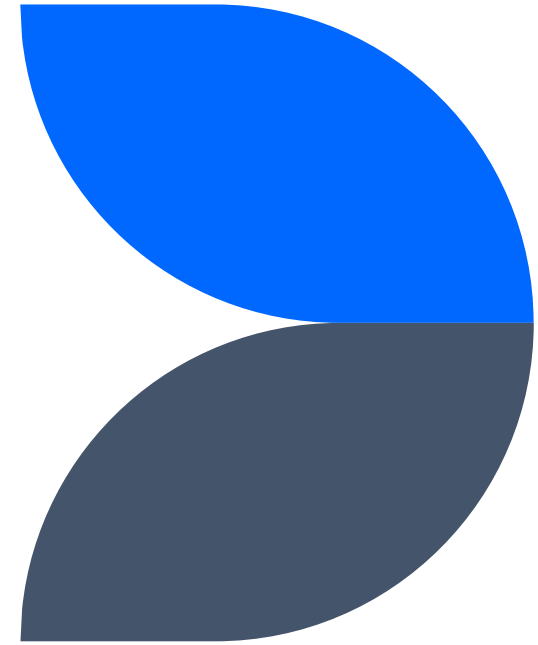
# Source Code:

```
import pandas as pd
from sklearn.model_selection import
train_test_split
from sklearn.ensemble import
RandomForestClassifier from sklearn.metrics
import classification_report, confusion_matrix
# Load a sample dataset
data =
pd.read_csv('credit_card_transactions.csv')
```



# Data Preprocessin g:

- Explain the importance of data preprocessing.
- Mention tasks such as handling missing values and outliers.
- Highlight data normalization and standardization.

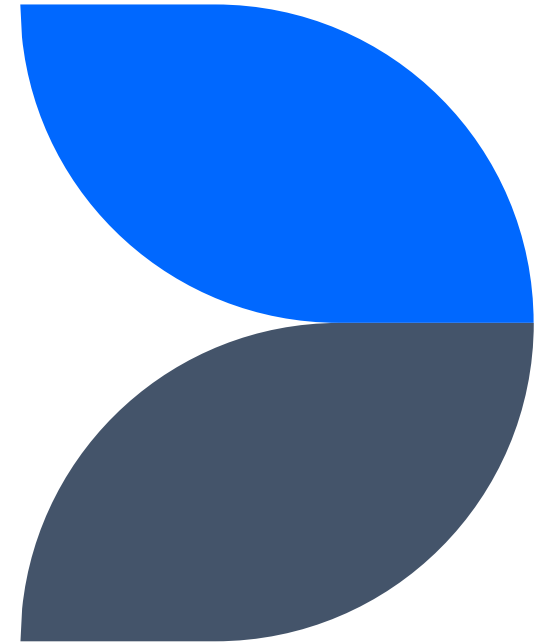


# Source Code:

```
# Data preprocessing
# Handle missing data, encode categorical
features, and normalize numerical features

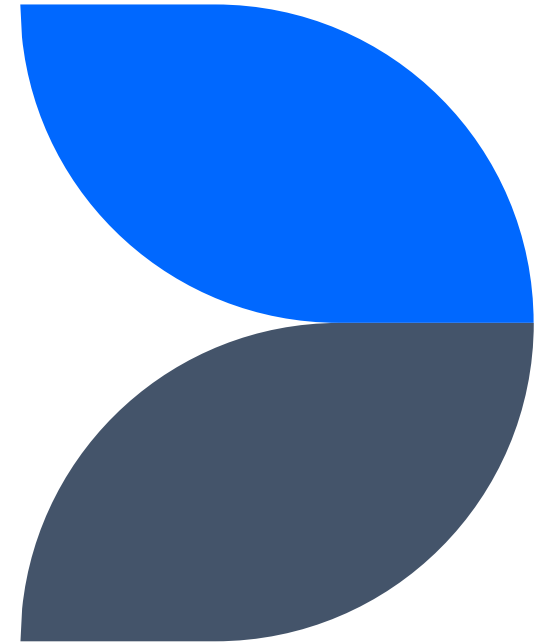
# Feature engineering
# Create relevant features

# Split the data into training and testing sets
X = data.drop('Class', axis=1) # Features
y = data['Class'] # Target variable
X_train, X_test, y_train, y_test =
train_test_split(X, y, test_size=0.2,
random_state=42)
```



# Feature Engineering:

- Discuss the creation of relevant features for fraud detection.
- Examples of features include transaction amount, merchant information, and time of day.
- Explain how feature engineering can improve model performance.

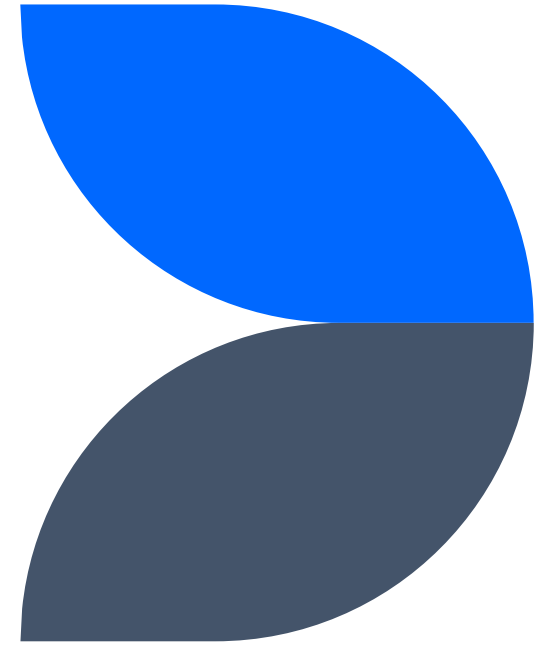




# Source Code:

```
# Train a Random Forest classifier
```

```
rf_classifier = RandomForestClassifier(n_estimators=100,  
random_state=42)  
rf_classifier.fit(X_train, y_train)
```



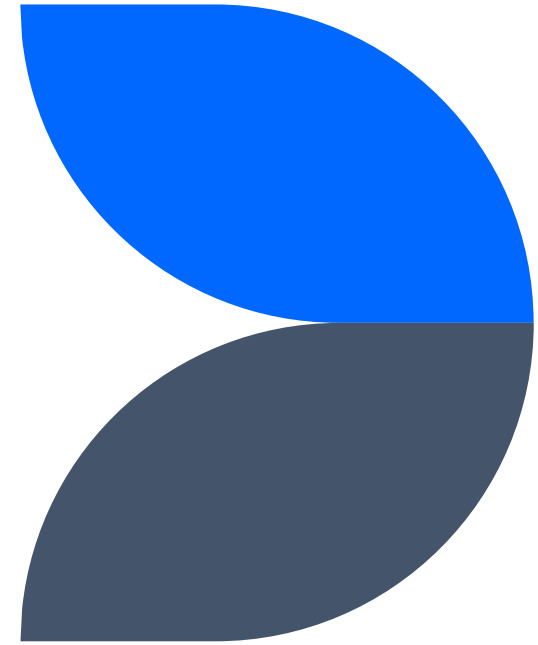
# Machine Learning Models:

- Introduce machine learning as a key tool for fraud detection.
- Present various machine learning algorithms used in the field.
  - Logistic Regression
  - Random Forest
  - Gradient Boosting
  - Neural Networks
  - Anomaly Detection



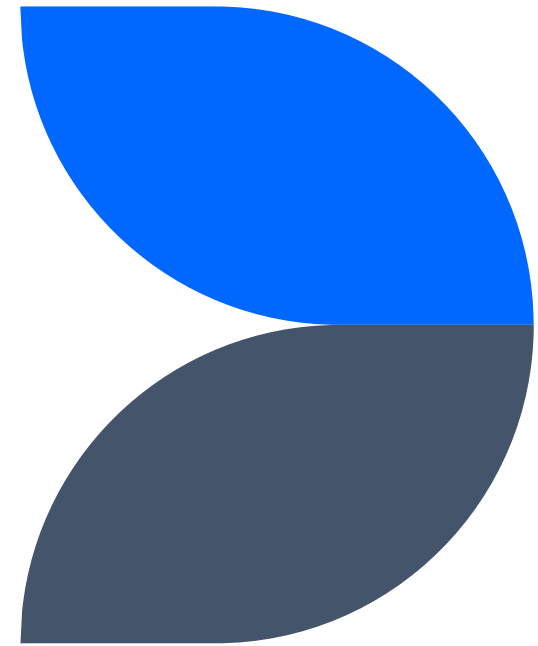
# Model Evaluation:

- Explain the importance of model evaluation.
- Discuss evaluation metrics, including accuracy, precision, recall, F1-score, and ROC AUC.
- Present a confusion matrix as a visual aid.



# Real-time Monitoring:

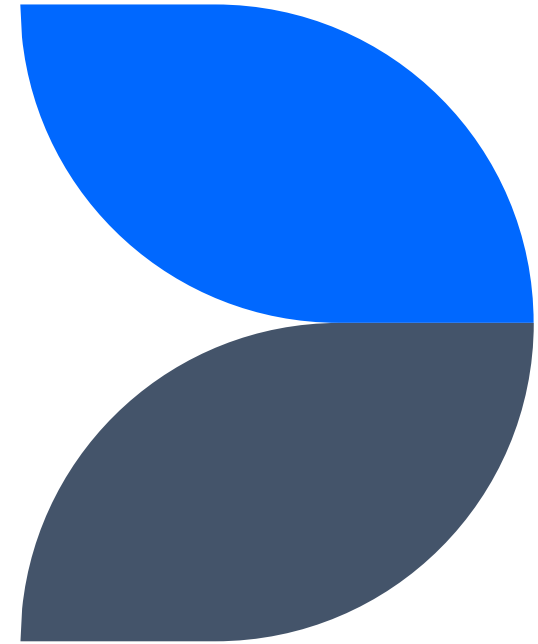
- Discuss the importance of real-time fraud detection.
- Explain the deployment of models in a production environment.
- Highlight the need for continuous monitoring and alerting.



# Source Code:

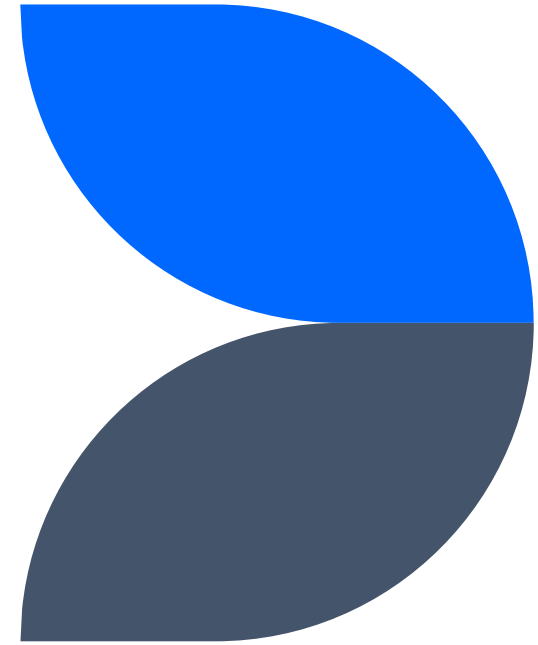
```
# Make predictions on the test set
y_pred = rf_classifier.predict(X_test)

# Evaluate the model
print("Confusion Matrix:\n",
      confusion_matrix(y_test, y_pred))
print("\nClassification Report:\n",
      classification_report(y_test, y_pred))
```



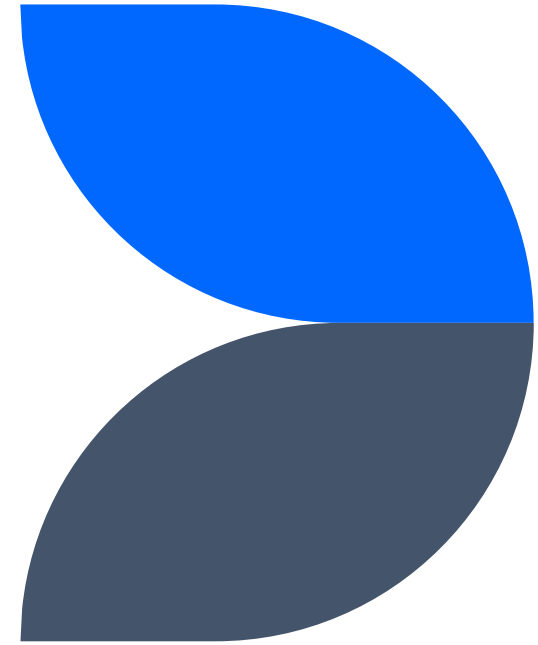
# Challenges:

- Discuss challenges in credit card fraud detection, such as class imbalance and evolving fraud patterns.
- Mention the need for ongoing model retraining.



# Conclusion:

- Summarize the key takeaways from the presentation.
- Emphasize the importance of credit card fraud detection in today's digital world.



# Thank You

- Express gratitude for the audience's attention.
- Provide contact information for further inquiries.

