APPLIED DATA SCIENCE

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CREDIT CARD FRAUD DEDECTION

Introduction

Different analysis

Matplotlib

Read data set

- Column names

Create series

Plt.plot(score ,expectancy)

#addcolor,style.....

Plot()function

Title()function show() functions

conclusion

INTRODUCTION

Machine learning algorithms play a crucial role identifying fraudulent transactions by analyzing patterns and anomalies in credit card data.

Commonly used machine learning algorithms for credit card fraud detection include logistic regression, decision trees, random forests, and neural networks.

PROBLEM DEFINITION

- THE PROBLEM IS TO DEVELOP A MACHINE LEARNING-BASED SYSTEM FOR
- REAL-TIME CREDIT CARD FRAUD DETECTION.
- THE GOAL IS TO CREATE A SOLUTION THAT CAN ACCURATELY IDENTIFY FRAUDULENT TRANSACTIONS
- WHILE MINIMIZING FALSE POSITIVES.
- THIS PROJECT INVOLVES DATA PREPROCESSING, FEATURE ENGINEERING, MODEL SELECTION, TRAINING, AND
- EVALUATION TO CREATE A ROBUST FRAUD DETECTION SYSTEMS

What the Credit Card Fraud Detection?

Credit card fraud is the act of using another person’s credit card to make purchases or request cash advances without the cardholder’s knowledge or consent.

These criminals may obtain the card itself through physical theft, though increasingly fraudsters are leveraging digital means to steal the credit card number and accompanying personal information to make illicit transactions

Types of credit card fraud

Credit card fraud falls into two basic categories:

1) Card present fraud

2) Card-not-present fraud

DIFFERENT ANALYSIS

Deep Learning for Fraud Detection

- Explore advanced neural network architectures like convolutional neural. networks (CNNs) and recurrent neural networks (RNNs) for more.

- sophisticated feature extraction and time series analysis. You can use deep learning models, such as a neural network,

- to capture complex patterns in the data.

PROGRAM

```
from tensorflow.keras.models import Sequential
 from tensorflow.keras.layers import Dense
model = Sequential([
                Dense(128, input_dim=X_train.shape[1],
activation='relu'),
                Dense(64, activation='relu'),
                Dense(1, activation='sigmoid') ])
model.compile(optimizer='adam',
loss='binary_crossentropy', metrics['accuracy'])
 model.fit(X_train, y_train, epochs=10, batch_size=32)
```

Real-time Monitoring

To detect fraud in real-time, you can set up an automated system that continuously monitors incoming transactions and applies your trained model to identify anomalies.

IMPLANCED DATA HANDLNG

Credit card fraud datasets are often imbalanced, with a majority of non-fraudulent transactions. You may need to use techniques

Like oversampling, under sampling, or Synthetic Minority Over-sampling Technique (SMOTE) to handle this imbalance .

PROGRAM

```
from imblearn.over_sampling
import SMOTE sm =
SMOTE(sampling_strategy=0.5)
X_resampled, y_resampled =
sm.fit_resample(X_train, y_train) # Train
the model with the resampled data
model.fit(X_resampled, y_resampled)
```

Descriptive Analytics

- Data Exploration:
- Initial analysis to understand
- data characteristics.
- Data Visualization:
- Using charts to spot trends and patterns.

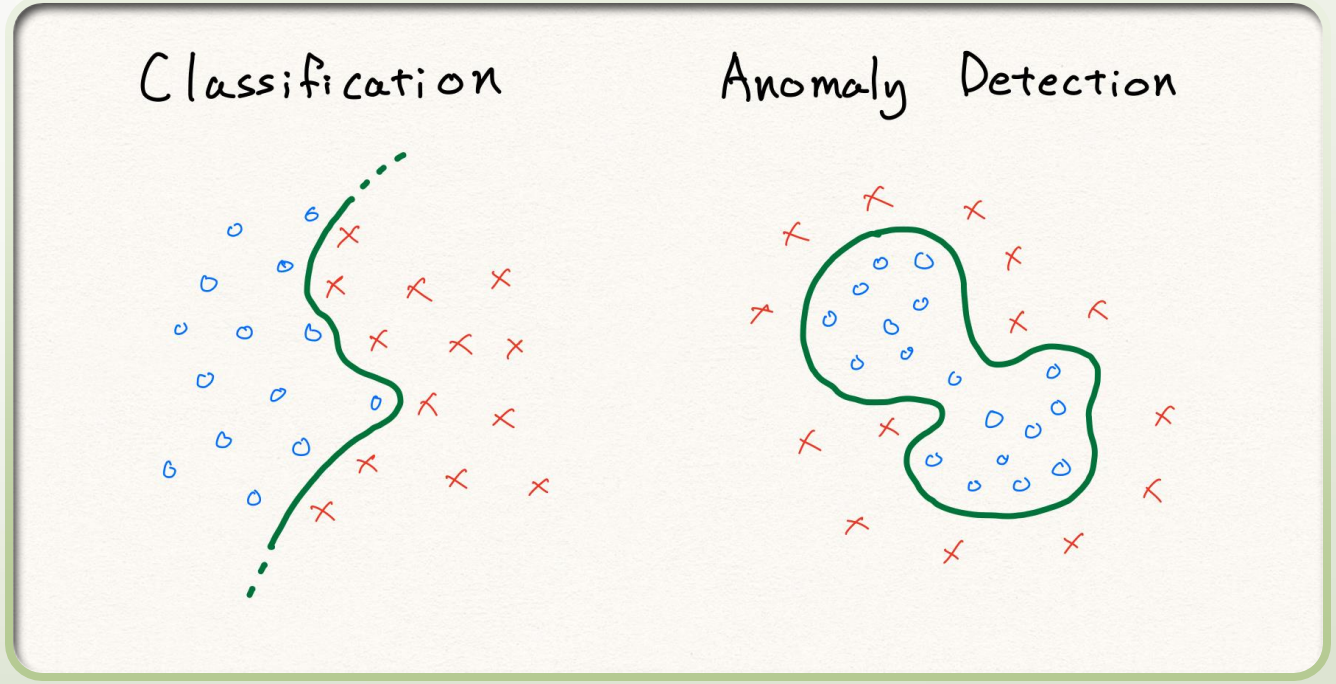
PROGRAM

```
# Data Exploration

 legitimate_transactions.describe()

fraudulent_transactions.describe()

# Data Visualization import matplotlib.pyplot as plt
plt.scatter(legitimate_transactions['amount'],
legitimate_transactions['hour'],

label='Legitimate', color='green')
plt.scatter(fraudulent_transactions['amount'],
fraudulent_transactions['hour'], label='Fraudulent',
color='red') plt.legend() plt.show()
```

Anomaly Detection

Identifying outliers in data using Isolation Forest.

Set a contamination parameter for the expected proportion of outliers.



Predictive Analytics

Using logistic regression to predict fraud.

Split data into training and test sets for model evaluation.

Program:

```
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LogisticRegression
from sklearn.metrics import accuracy_score,
confusion_matrix X_train,
X_test, y_train, y_test = train_test_split(X, y, test_size=0.2)
model = LogisticRegression() model.fit(X_train, y_train)
predictions = model.predict(X_test)
accuracy = accuracy_score(y_test, predictions)
cm = confusion_matrix(y_test, predictions)
```

Rule-Based System

Define rules to classify transactions as legitimate or fraudulent.

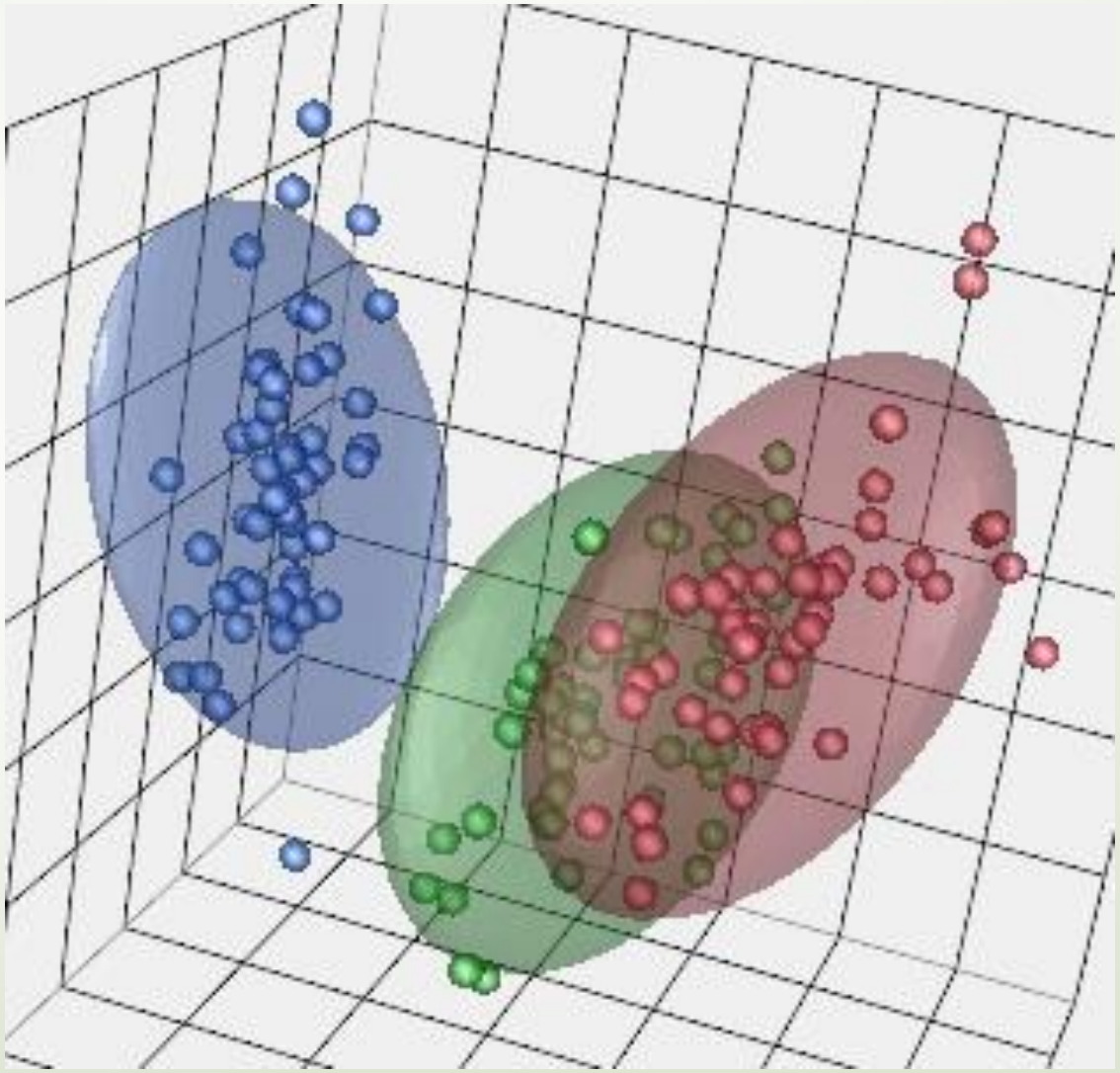
Rules may be based on transaction amount, location, or other factors.

```
m:

ased_fraud_detection(transaction):
saction['amount'] > 1000 and
ction['location'] not in
d_locations:
 "Fraudulent" else:
 "Legitimate" result =
ased_fraud_detection(transaction_d
```

Unsupervised Learning (K-Means Clustering)

Grouping transactions into clusters.

Requires specifying the number of clusters.



PROGRAM

```
from sklearn.cluster
import KMeans kmeans = KMeans(n_clusters=2)
kmeans.fit(X) labels = kmeans.labels_
```

Deep Learning (Using TensorFlow and Keras)

Building a neural network model for fraud prediction.

Training the model using labeled data and an appropriate loss function.

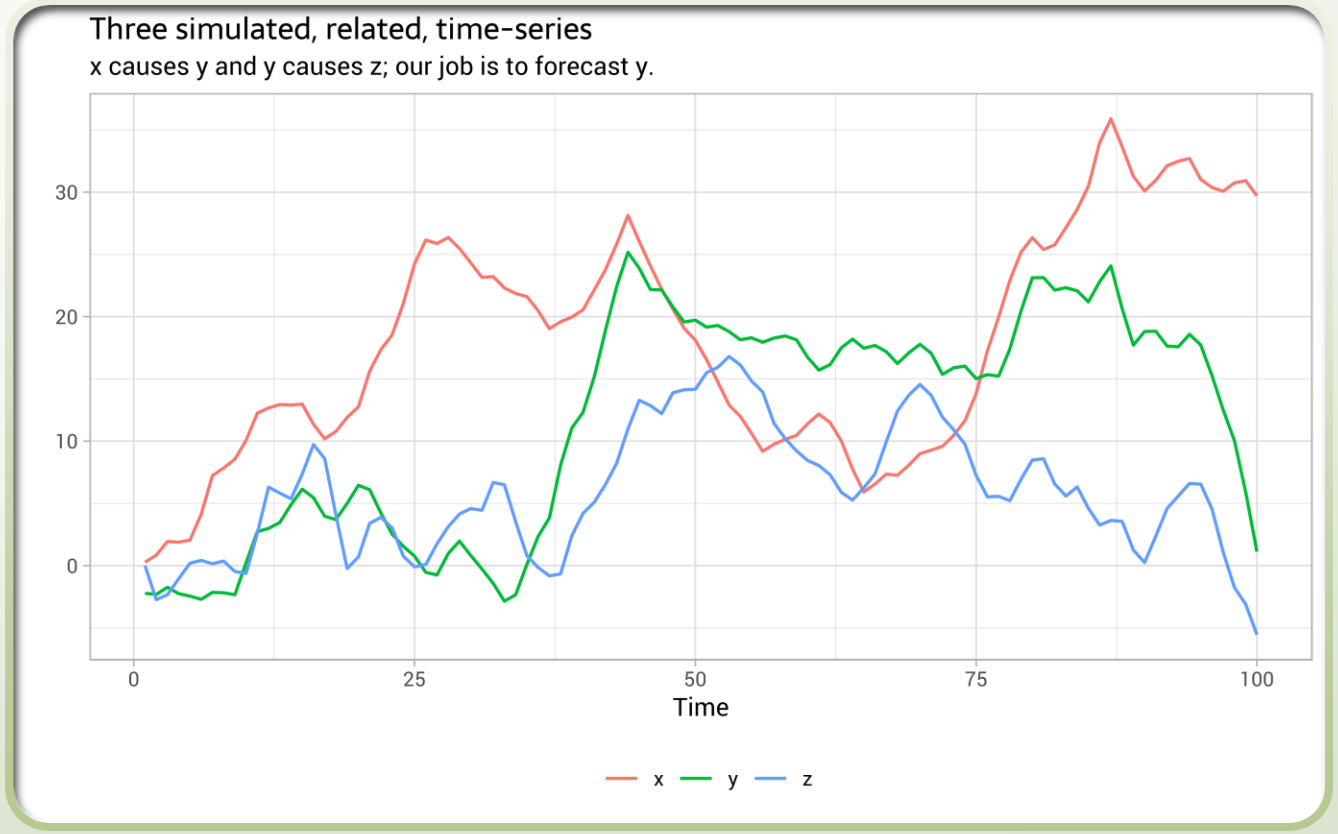
Network Analysis:

Examining transaction networks and relationships to identify

patterns of fraud, especially in cases of organized fraud rings.

Time Series Analysis

Studying transaction time series data to detect anomalies and seasonality in fraud patterns.



Pandas Library

Pandas is a widely used Python library for data manipulation and analysis.

It provides functions to read, clean, and preprocess datasets.

Receiver Operating Characteristic (ROC) Curve

The ROC curve is a standard tool to evaluate the performance of binary classification models, like fraud detection models.

It shows the trade-off between true positive rate and false positive rate.

THANK YOU