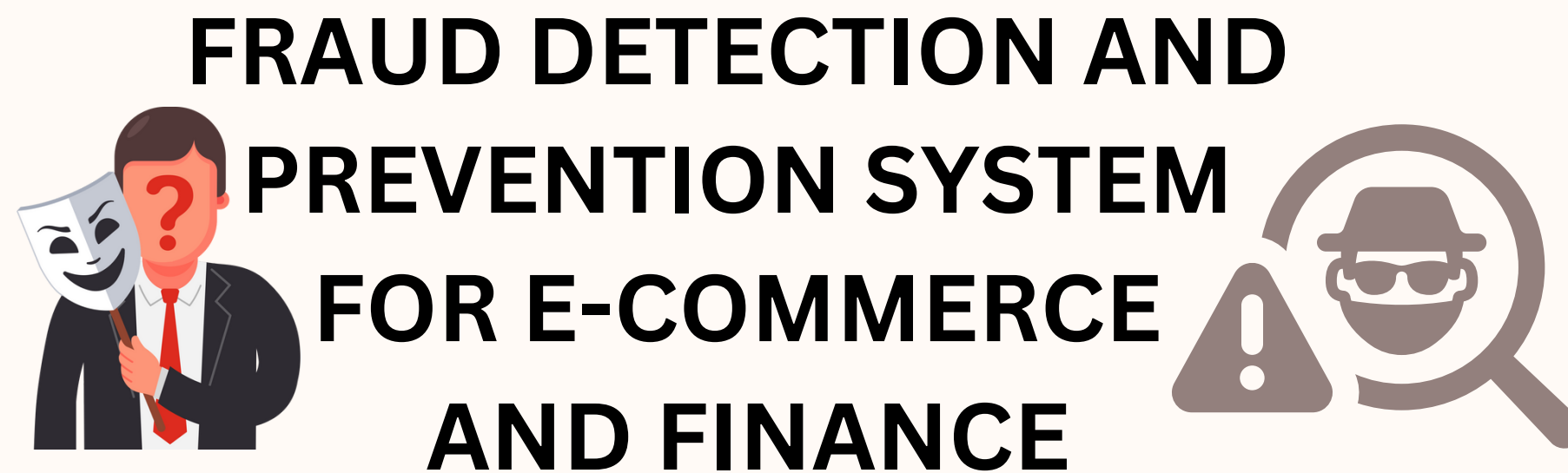
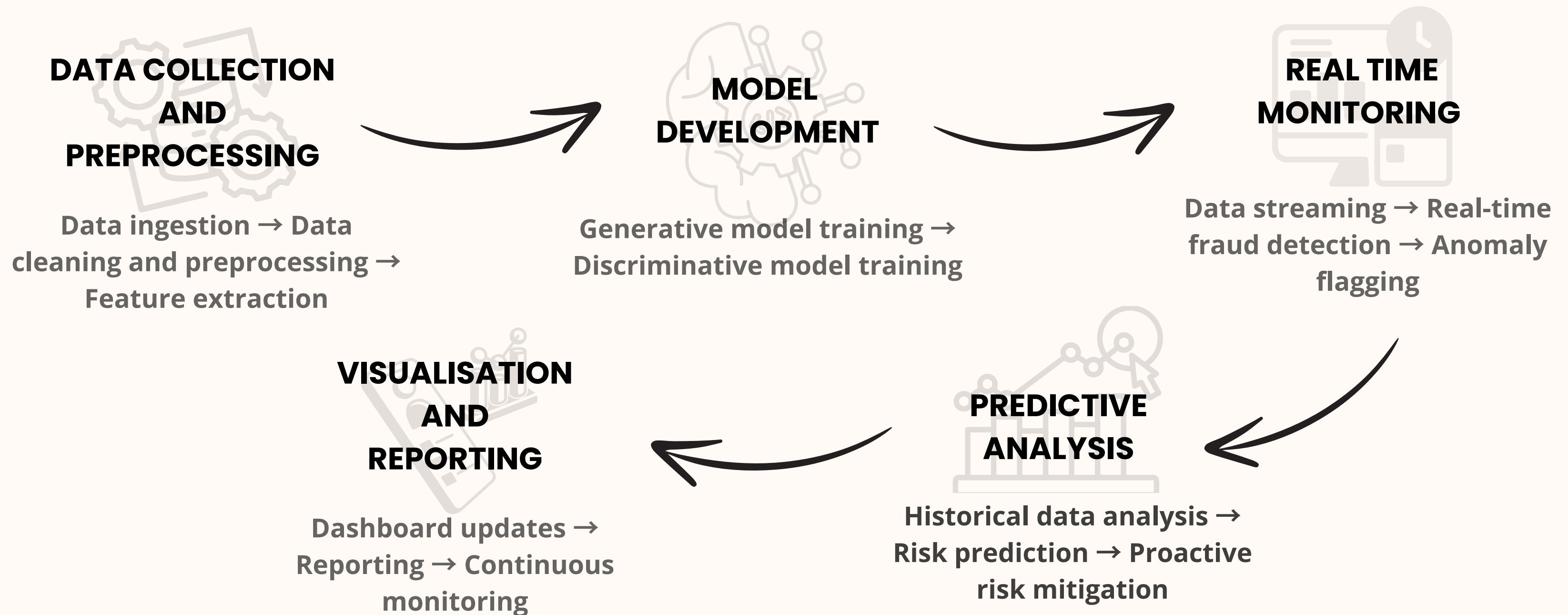


## Team Name and Member Details

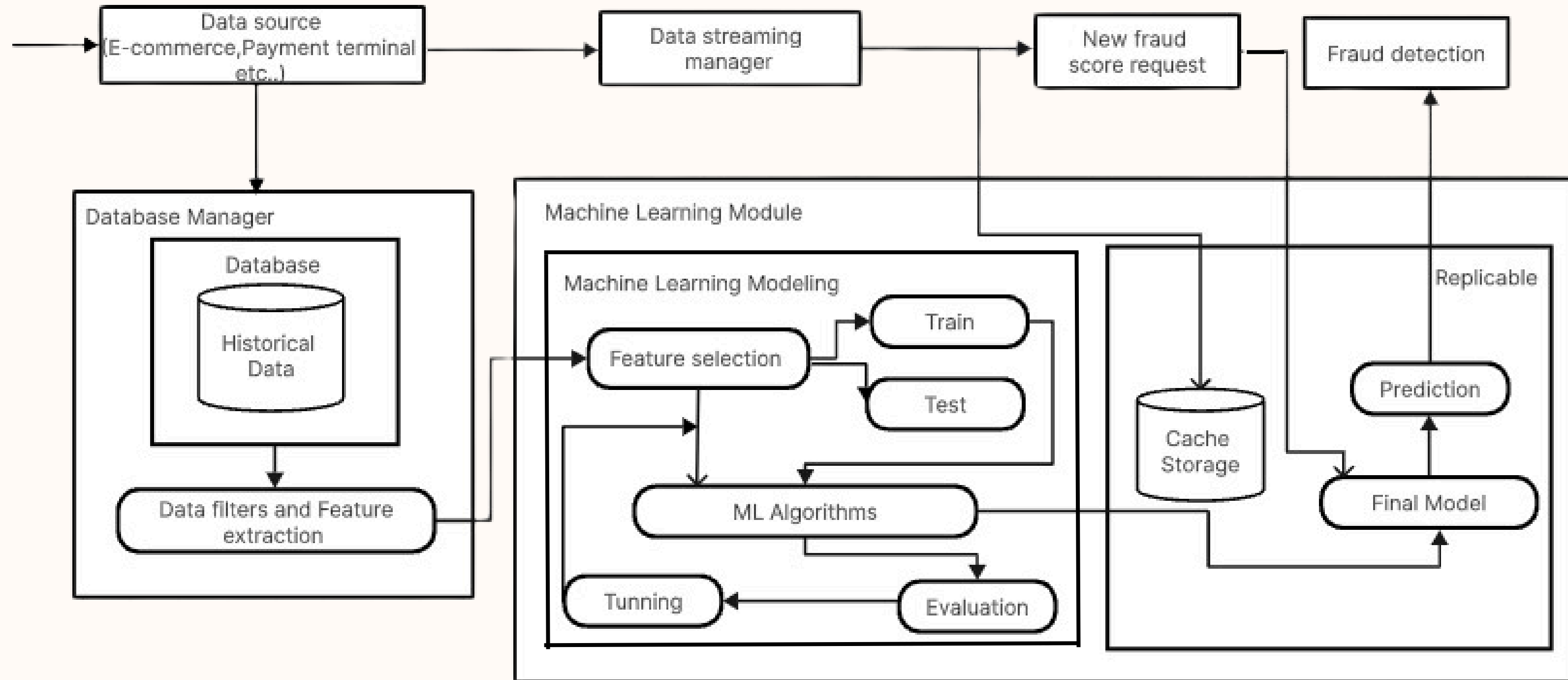
- **Team Name: CodeCrusher**
- **Member 1: Nutan**
- **Member 2: Urvi Garg**



# **METHODOLOGY**



# ➤ ARCHITECTURE



# CSV DATASET

## ► From Kaggle: /KAGGLE/INPUT/ONLINE-PAYMENT-FRAUD-DETECTION

**step:** represents a unit of time where 1 step equals 1 hour

**type:** type of online transaction

**amount:** the amount of the transaction

**nameOrig:** customer starting the transaction

**oldbalanceOrig:** balance before the transaction

**newbalanceOrig:** balance after the transaction

**nameDest:** recipient of the transaction

**oldbalanceDest:** initial balance of recipient before the transaction

**newbalanceDest:** the new balance of recipient after the transaction

**isFraud:** fraud transaction

## ► Self Collected(Snippet):

```
x,y,time,button,pressed,dx,dy
579,546,1721765155.9245741,,,,
540,561,1721765155.9377573,,,,
496,578,1721765155.9447803,,,,
456,599,1721765155.9513707,,,,
424,617,1721765155.9573758,,,,
390,635,1721765155.9649253,,,,
352,657,1721765155.9716823,,,,
310,683,1721765155.9799006,,,,
272,707,1721765155.9857697,,,,
239,731,1721765155.9926686,,,,
201,753,1721765155.9995758,,,,
```

Mouse movements

```
key,type,time
'4',press,1721765153.385224
'4',release,1721765153.51245
'5',press,1721765153.5271168
'5',release,1721765153.66609
'6',press,1721765153.6700814
'6',release,1721765153.783517
'7',press,1721765153.790425
'7',release,1721765154.05187
Key.backspace,press,1721765154.7043726
Key.backspace,release,1721765154.7763689
Key.backspace,press,1721765154.8989978
Key.backspace,release,1721765154.9792159
```

Typing(Keyboard)

# MODEL TRAINING

## ► Hyperparameters

Decision Tree - Precision: 0.9935, Recall: 0.9878, F1-Score: 0.9906, ROC-AUC: 0.9939

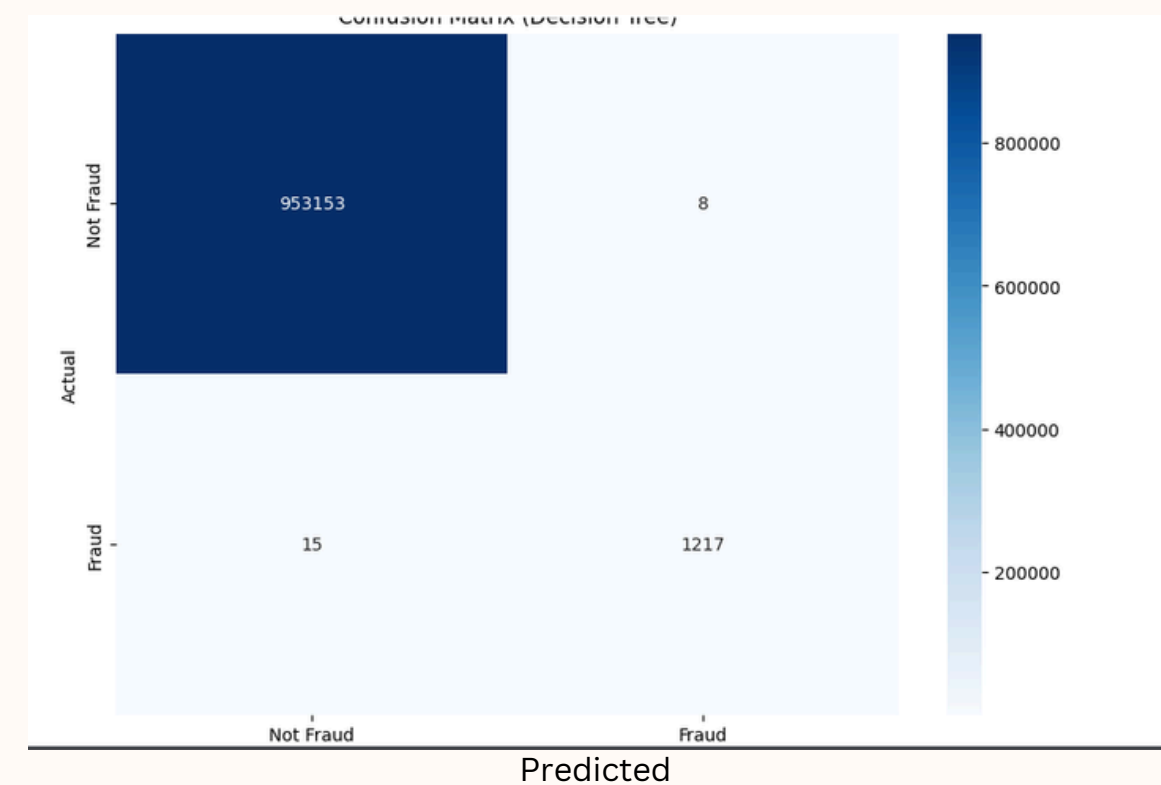
Confusion Matrix (Decision Tree):

```
[[953153    8]
 [   15  1217]]
```

Classification Report (Decision Tree):

	precision	recall	f1-score	support
0	1.00	1.00	1.00	953161
1	0.99	0.99	0.99	1232
accuracy			1.00	954393
macro avg	1.00	0.99	1.00	954393
weighted avg	1.00	1.00	1.00	954393

## ► Confusion Matrix





# REAL TIME MONITORING

## STARTING OF ZOOKEEPER

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS COMMENTS
PS E:\Projects\Woodpecker hackathon> cd E:\kafka_2.13-3.7.1
>>
PS E:\kafka_2.13-3.7.1> .\bin\windows\zookeeper-server-start.bat .\config\zookeep
>>
[2024-07-28 17:01:18,689] INFO Reading configuration from: .\config\zookeeper.prop
apache.zookeeper.server.quorum.QuorumPeerConfig)
[2024-07-28 17:01:18,708] WARN \tmp\zookeeper is relative. Prepend .\ to indicate
sure! (org.apache.zookeeper.server.quorum.QuorumPeerConfig)
[2024-07-28 17:01:18,734] INFO clientPortAddress is 0.0.0.0:2181 (org.apache.zooke
quorum.QuorumPeerConfig)
[2024-07-28 17:01:18,736] INFO secureClientPort is not set (org.apache.zookeeper.s
.QuorumPeerConfig)
[2024-07-28 17:01:18,736] INFO observerMasterPort is not set (org.apache.zookeeper
um.QuorumPeerConfig)
[2024-07-28 17:01:18,739] INFO metricsProvider.className is org.apache.zookeeper.m
DefaultMetricsProvider (org.apache.zookeeper.server.quorum.QuorumPeerConfig)
[2024-07-28 17:01:18,759] INFO autopurge.snapRetainCount set to 3 (org.apache.zook
.DatadirCleanupManager)
```

## PRODUCER

```
Sent transaction: {'step': 1, 'amount': 5000, 'oldbalar
'oldbalanceDest': 0, 'newbalanceDest': 5000, 'isFlagged
BIT': 0, 'type_PAYMENT': 0, 'type_TRANSFER': 0, 'receiv
mple@example.com'}
Sent transaction: {'step': 1, 'amount': 5000, 'oldbalar
'oldbalanceDest': 0, 'newbalanceDest': 5000, 'isFlagged
BIT': 0, 'type_PAYMENT': 0, 'type_TRANSFER': 0, 'receiv
mple@example.com'}
Sent transaction: {'step': 1, 'amount': 5000, 'oldbalar
'oldbalanceDest': 0, 'newbalanceDest': 5000, 'isFlagged
BIT': 0, 'type_PAYMENT': 0, 'type_TRANSFER': 0, 'receiv
mple@example.com'}
```

## STARTING OF KAFKA SERVER

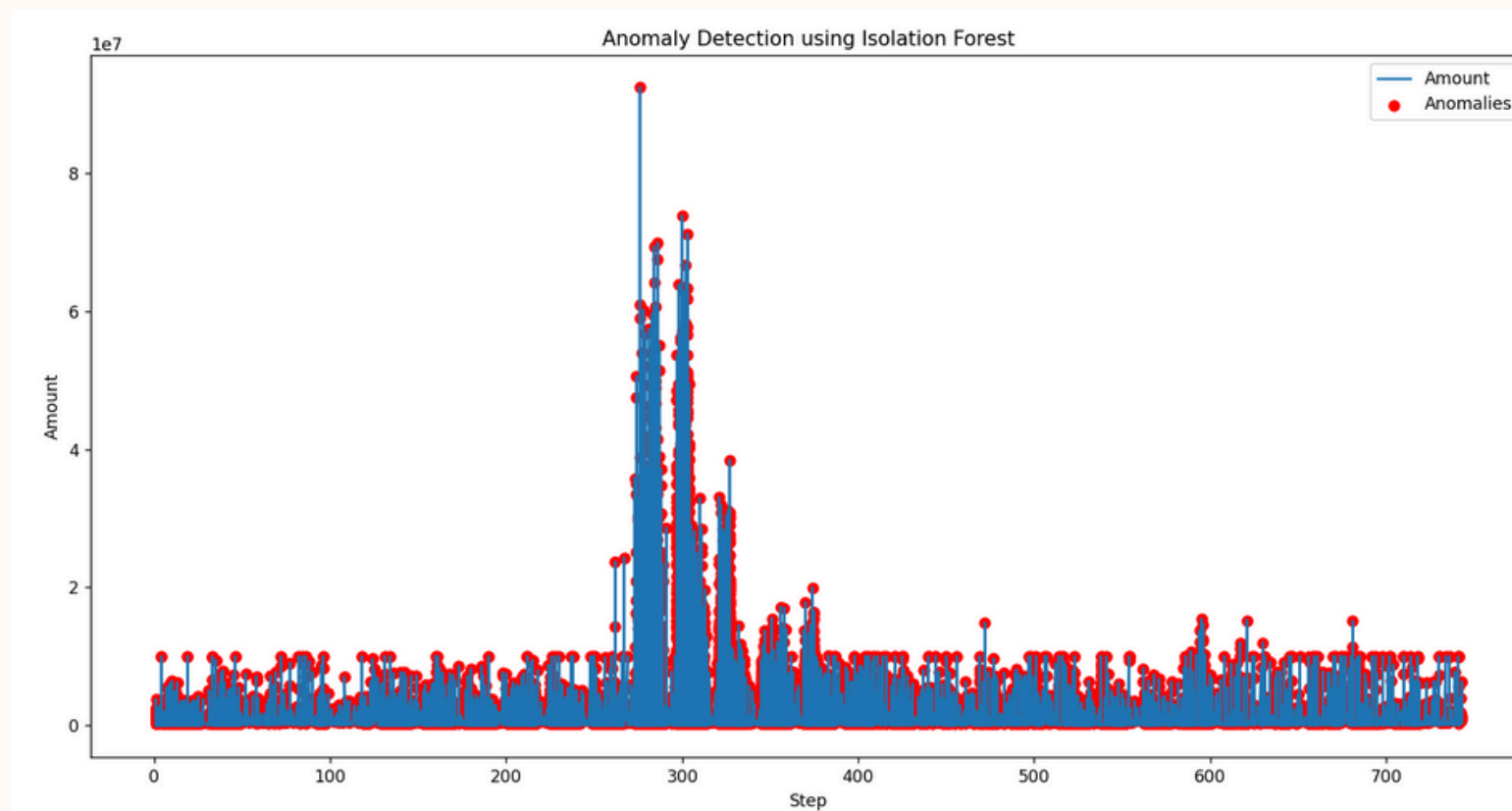
```
PS E:\Projects\Woodpecker hackathon> cd E:\kafka_2.13-3.7.1
>>
PS E:\kafka_2.13-3.7.1> .\bin\windows\kafka-server-start.bat .\config\
[2024-07-28 17:02:02,358] INFO Registered kafka:type=kafka.Log4jContro
Log4jControllerRegistration$)
[2024-07-28 17:02:03,698] INFO Setting -D jdk.tls.rejectClientInitiate
isable client-initiated TLS renegotiation (org.apache.zookeeper.commor
[2024-07-28 17:02:04,568] INFO starting (kafka.server.KafkaServer)
[2024-07-28 17:02:04,570] INFO Connecting to zookeeper on localhost:21
rver)
[2024-07-28 17:02:04,792] INFO [ZooKeeperClient Kafka server] Initiali
calhost:2181. (kafka.zookeeper.ZooKeeperClient)
[2024-07-28 17:02:04,815] INFO Client environment:zookeeper.version=3.
593f34dd6fc36ecc436c, built on 2024-02-12 22:16 UTC (org.apache.zooke
[2024-07-28 17:02:04,816] INFO Client environment:host.name=DESKTOP-QS
per.ZooKeeper)
[2024-07-28 17:02:04,816] INFO Client environment:java.version=11.0.24
nKeeper)
```

## PREDICTION

Prediction Result: Not Fraudulent

# PREDICTIVE ANALYSIS

Anomaly Detection Graph:

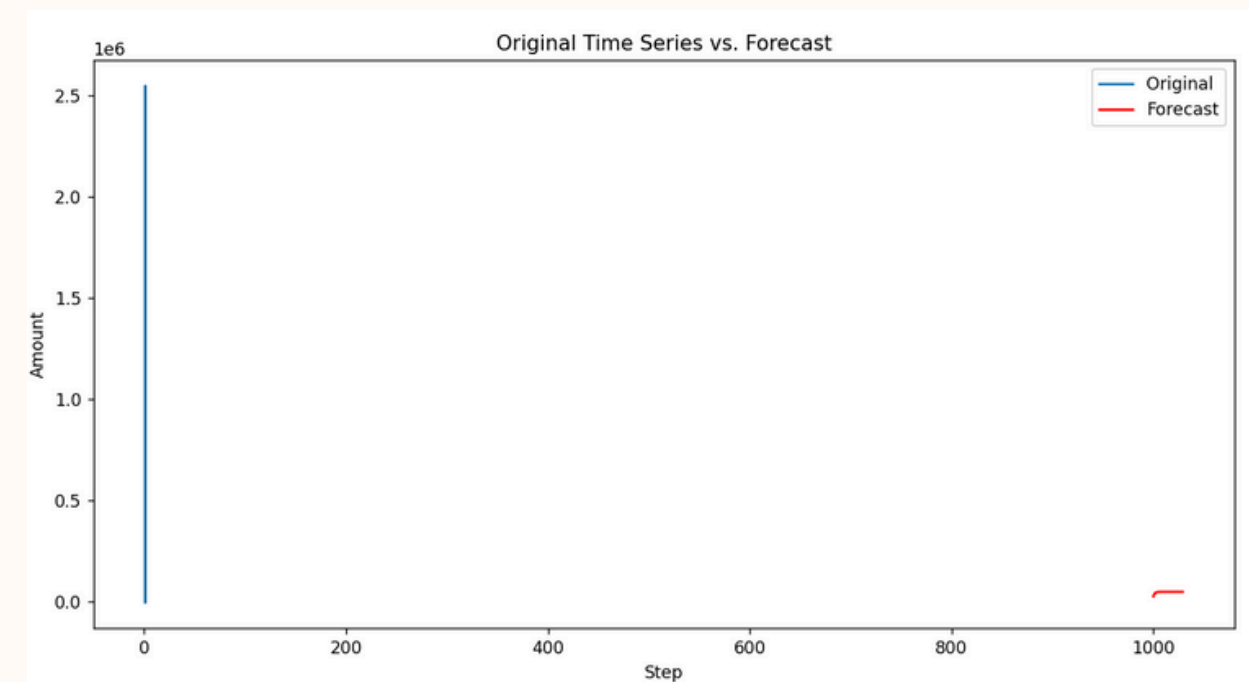
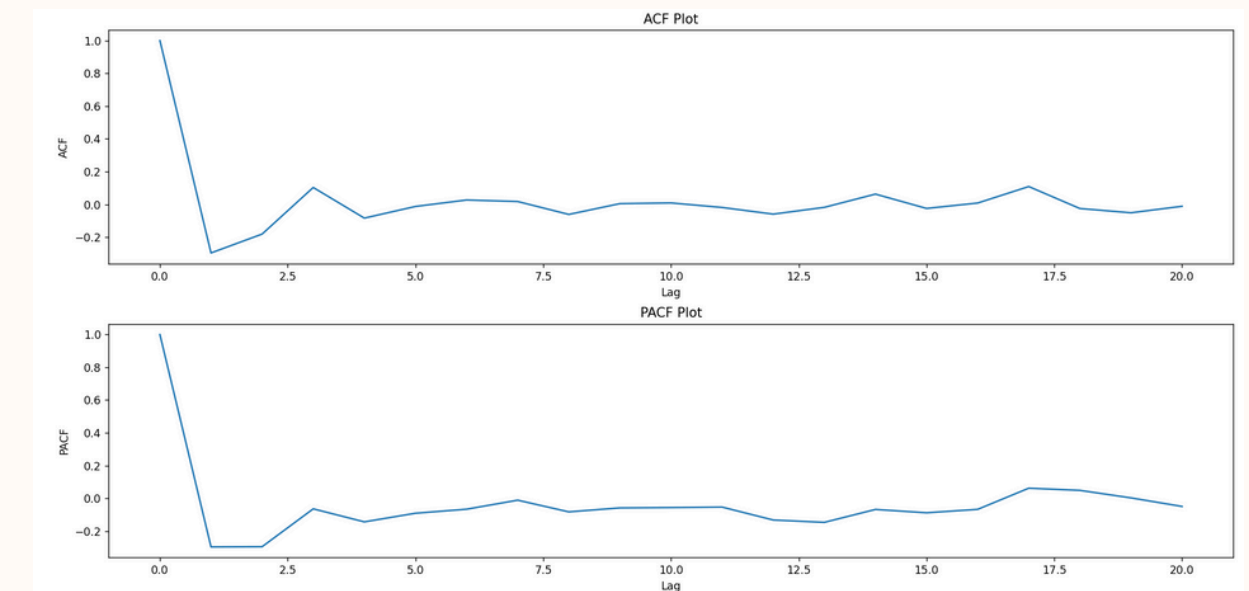


Forecasting Results

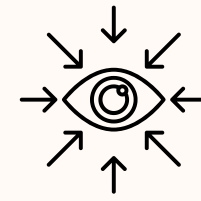
```
"C:\Users\URVI GARG\PycharmProjects\video\.venv\Scripts\python.exe"
ADF Statistic: -5.364183143744615
p-value: 4.02610732445343e-06
```

These values indicate Time Series Analysis is stationary

Time Series Analysis:







# VISUALISATION

## Login Credentials

### Login

Email:

Username:

Password:

Phone Number:

Login

## Account Status Details and Prediction

### Fraud Detection Form

Amount:

Old Balance Origin:

New Balance Origin:

Old Balance Destination:

New Balance Destination:

☐ Is Flagged Fraud

Transaction Type:

Submit

Fraud detected!

### Fraud Detection Form

Amount:

Old Balance Orig:

New Balance Orig:

Old Balance Dest:

New Balance Dest:

Is Flagged Fraud:

Transaction Type:

Predict

No fraud detected.

## Alerting Through SMS

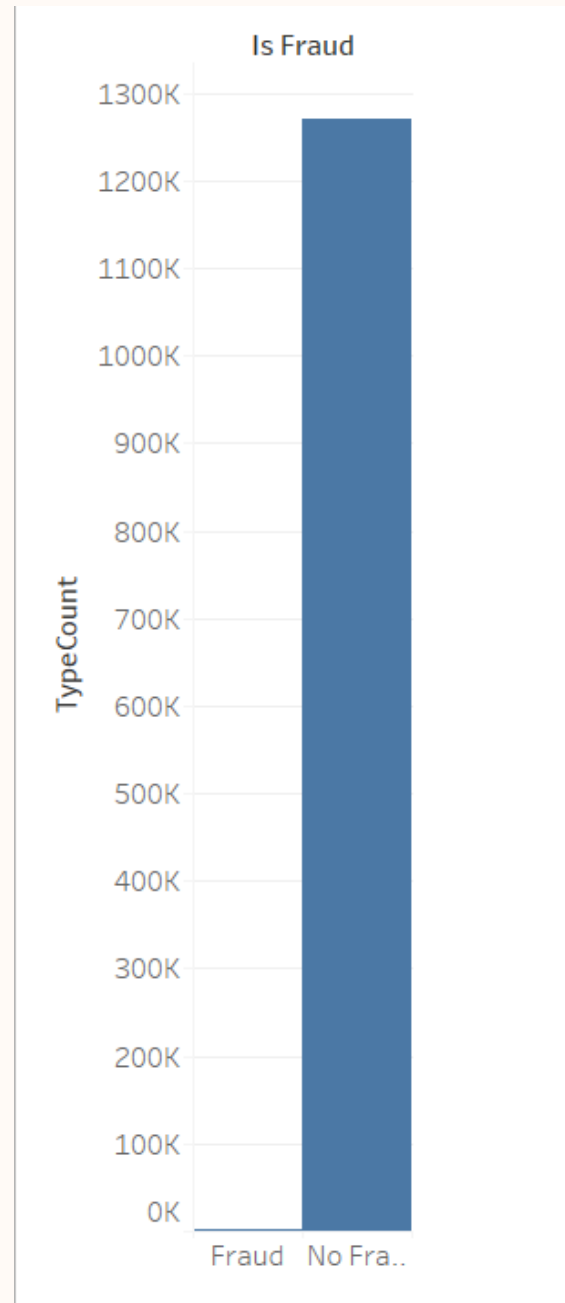
```
d0e1311a09f2c8ae8044677/Media.js
9499a63616df0a803e7d1d3d8c734/M
SMS sent successfully!
```

Today 14:39

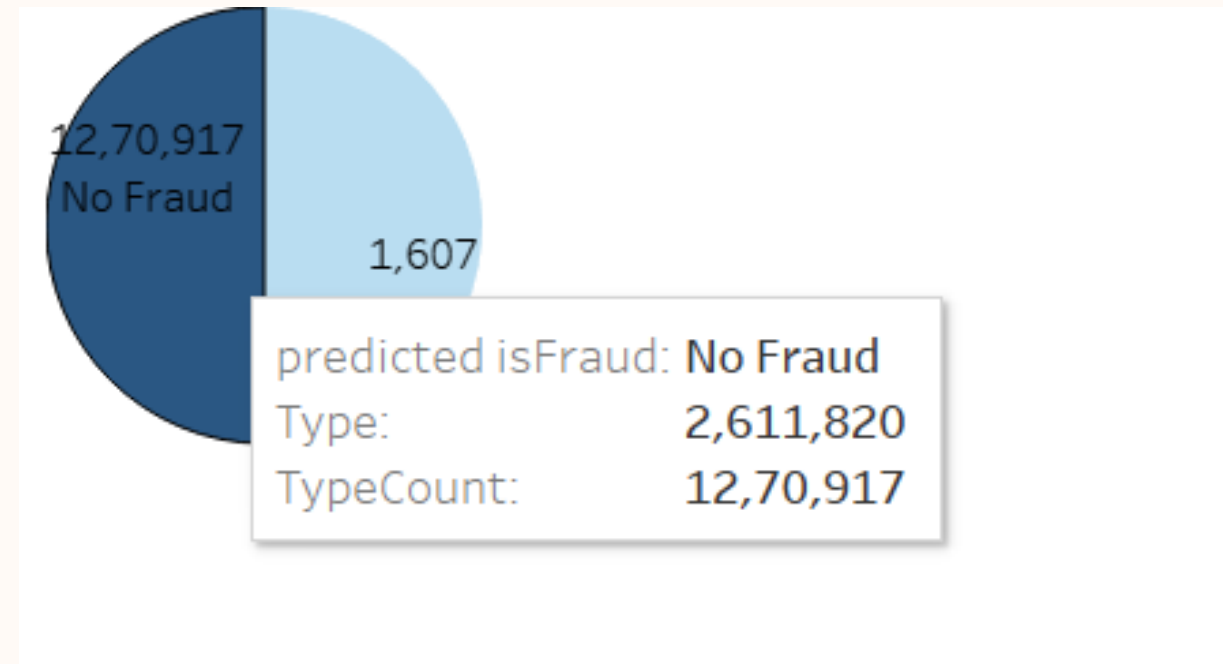
Sent from your Twilio trial account -  
Fraudulent activity detected!



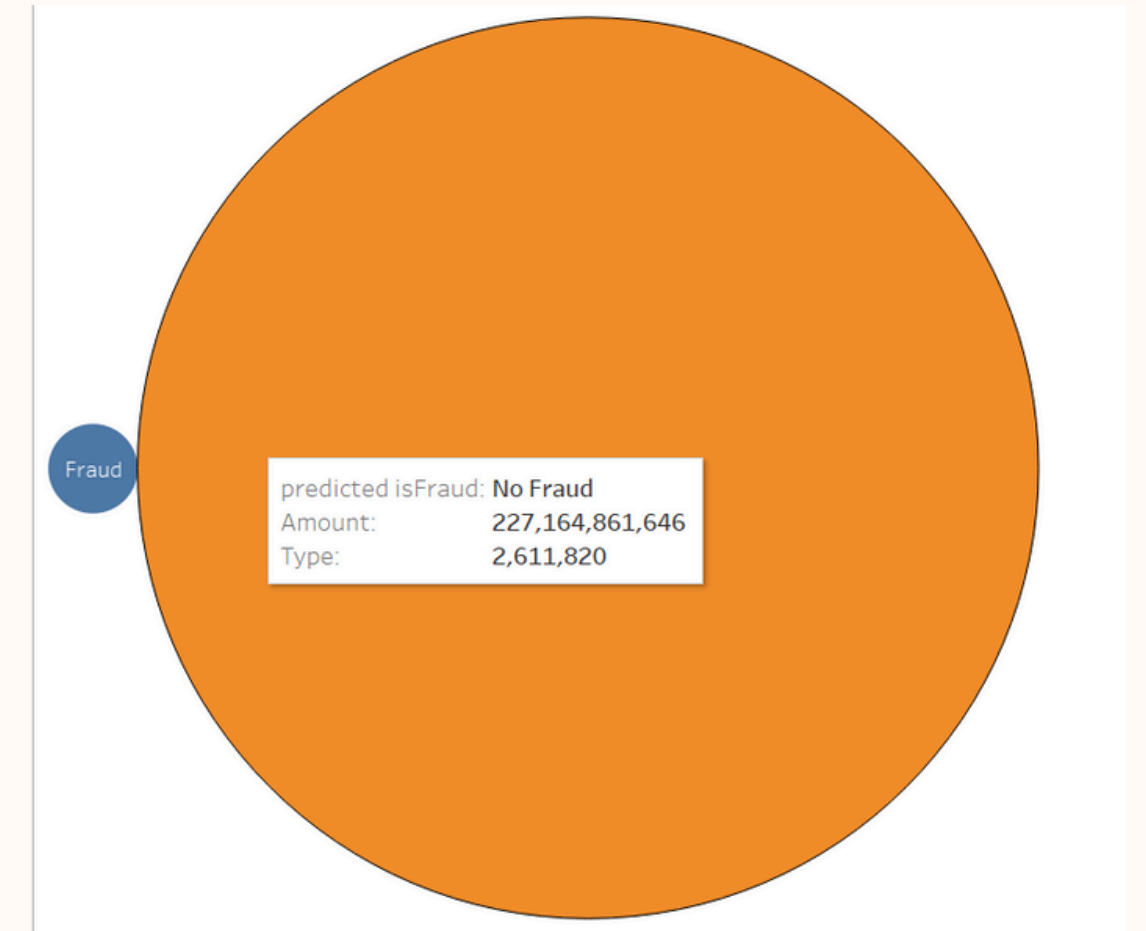
# DASHBOARD(TABLEAU)



**Fraudlist**



**Risk Scores**



**Fraud Pattern**





# POTENTIAL IMPACT

- **Financial Protection**: It helps **prevent losses** from fraudulent transactions, saving money and resources.
- **Efficiency**: Automated systems streamline operations, making **responses faster** and reducing manual work.
- **Customer Trust**: Secure transactions **build trust with customers**, leading to higher satisfaction and loyalty.
- **Compliance**: It ensures businesses meet **legal** requirements and **manage risks** effectively.
- **Competitive Advantage**: Companies with strong fraud prevention stand out by offering **safe and reliable services**.
- **Insights for Improvement**: Data from these systems provides **valuable insights** for **better decision-making** and continuous improvement.



# REFERENCES

- **Model Training and Data Scaling:** The scikit-learn documentation
- **Fraud Detection Concepts:** The ACFE Fraud Examiners Manual
- **Data Preprocessing:** The scikit-learn user guide
- **Twilio API for SMS Alerts:** Twilio API documentation
- **GUI with Tkinter:** Tkinter documentation
- **Time series Analysis:** ARIMA, pandas
- **Dashboard:** Tableau
- **Pandas for Data Handling:** Pandas documentation
- **Real-Time Data Streaming with Apache Kafka:** Apache Kafka documentation

**THANK YOU**