Team Name and Member Details

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

FRAUD DETECTION AND PREVENTION SYSTEM FOR E-COMMERCE AND FINANCE

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METHODOLOGY

DATA COLLECTION AND PREPROCESSING

Data ingestion → Data cleaning and preprocessing → Feature extraction

MODEL DEVELOPMENT

Generative model training → Discriminative model training

REAL TIME MONITORING

Data streaming → Real-time fraud detection → Anomaly flagging

PREDICTIVE ANALYSIS

Historical data analysis → Risk prediction → Proactive risk mitigation

VISUALISATION AND REPORTING

Dashboard updates → Reporting → Continuous monitoring

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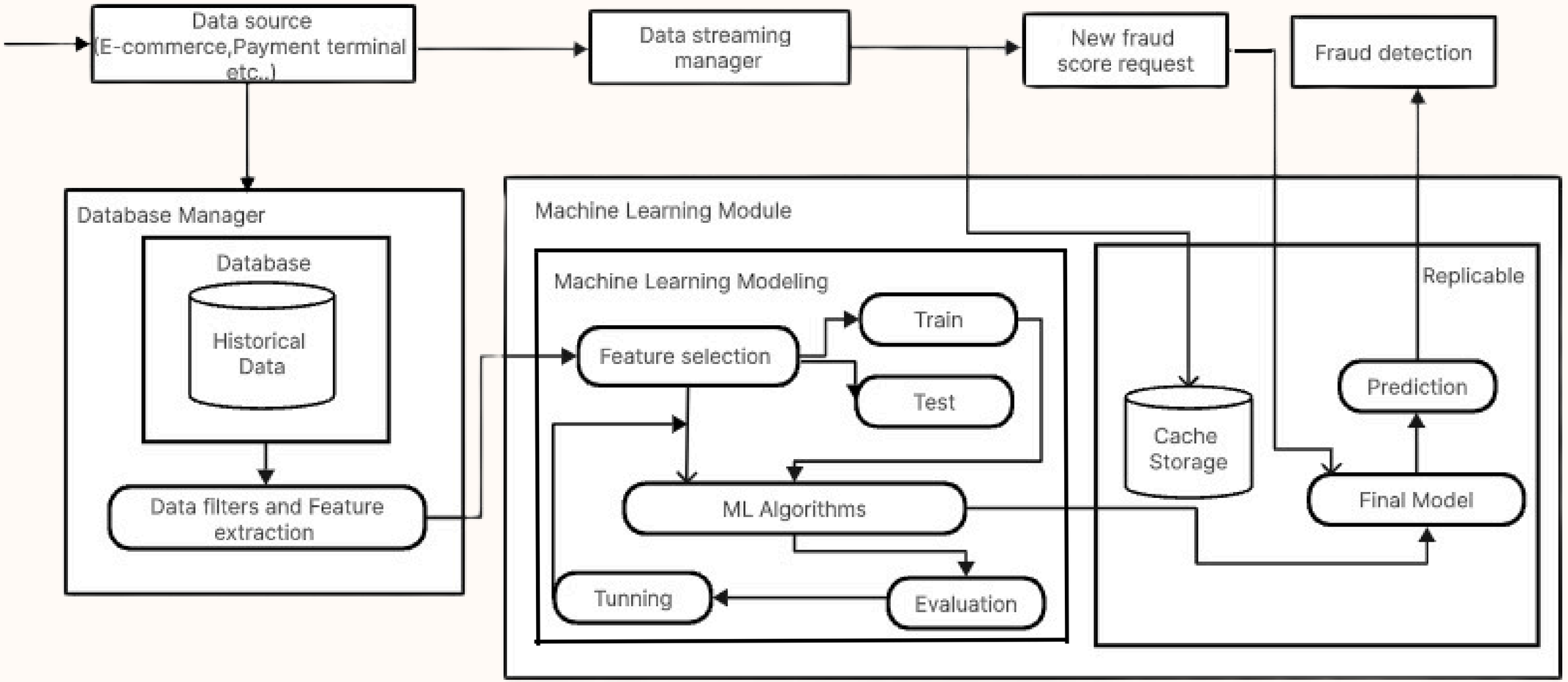
ARCHITECTURE



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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
oldbalanceOrg: 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
i**sFraud**: 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,,,,
```

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
```

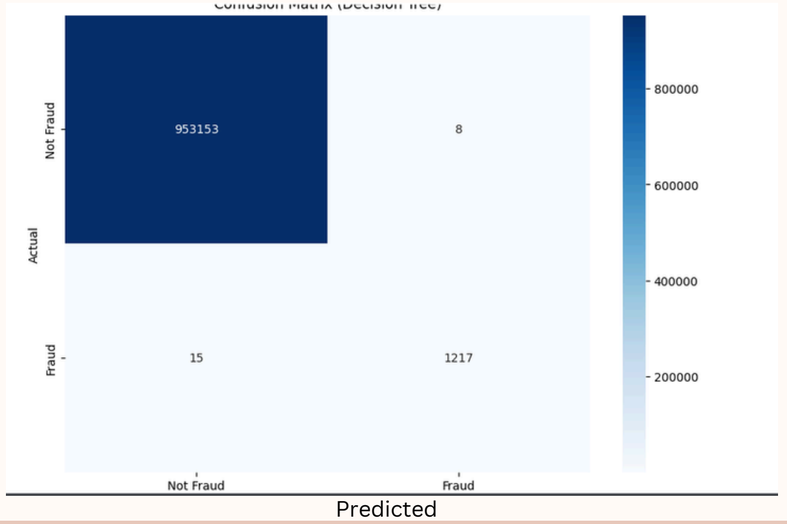
Typing(Keyboard)

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



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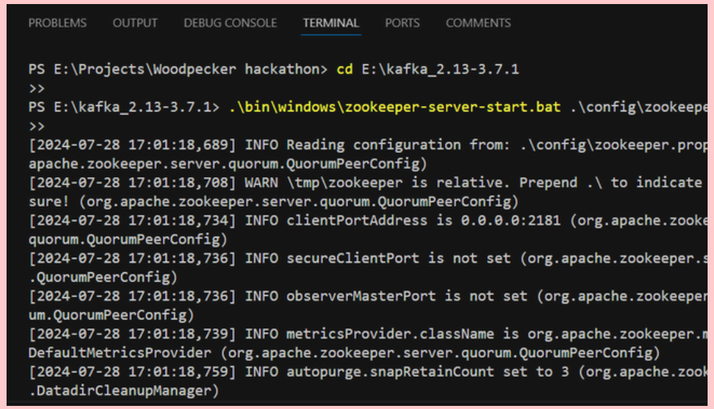
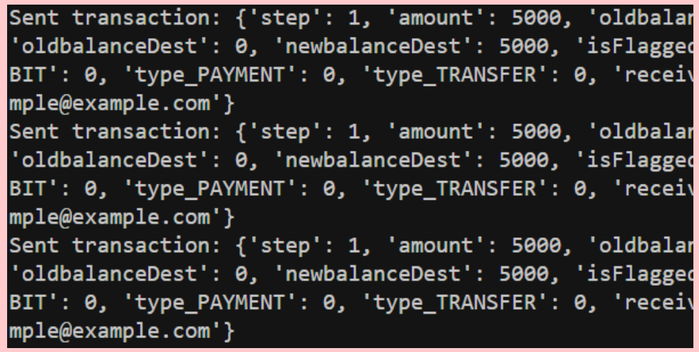
REAL TIME MONITORING

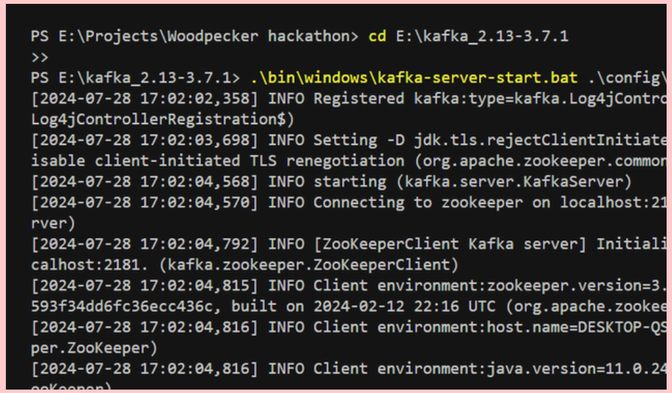
STARTING OF ZOOKEEPER



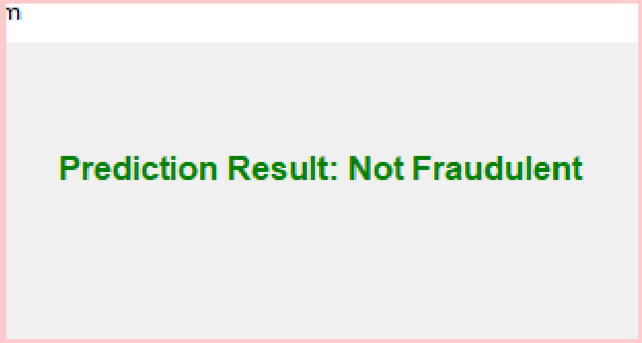
PRODUCER



STARTING OF KAFKA SERVER



PREDICTION



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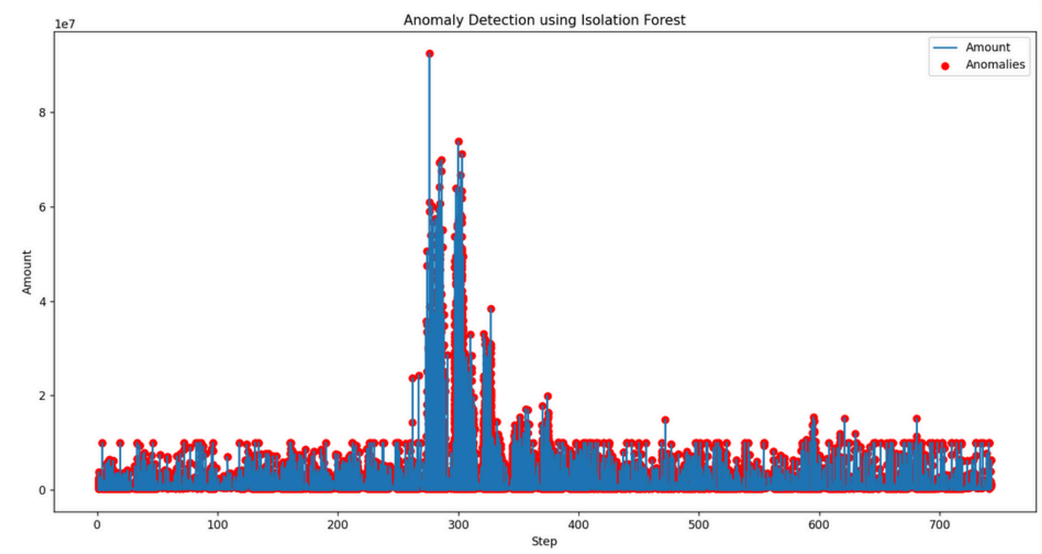
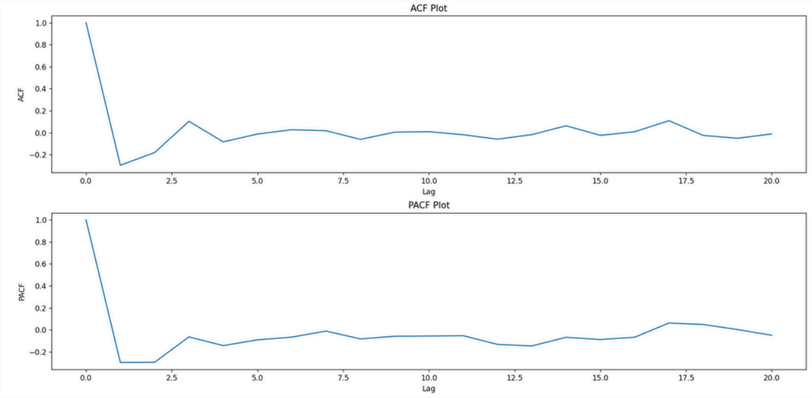
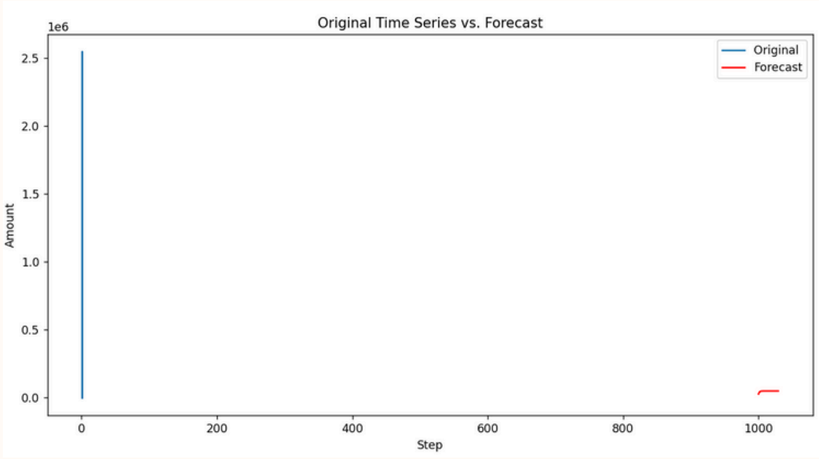
PREDICTIVE ANALYSIS

Anomaly Detection Graph:



Time Series Analysis:





Forecasting Results

```
"C:\Users\URVI GARG\PycharmProjects\video\.venv\S
ADF Statistic: -5.364183143744615
p-value: 4.026107324453343e-06
```

These values indicate Time Series Analysis is stationary

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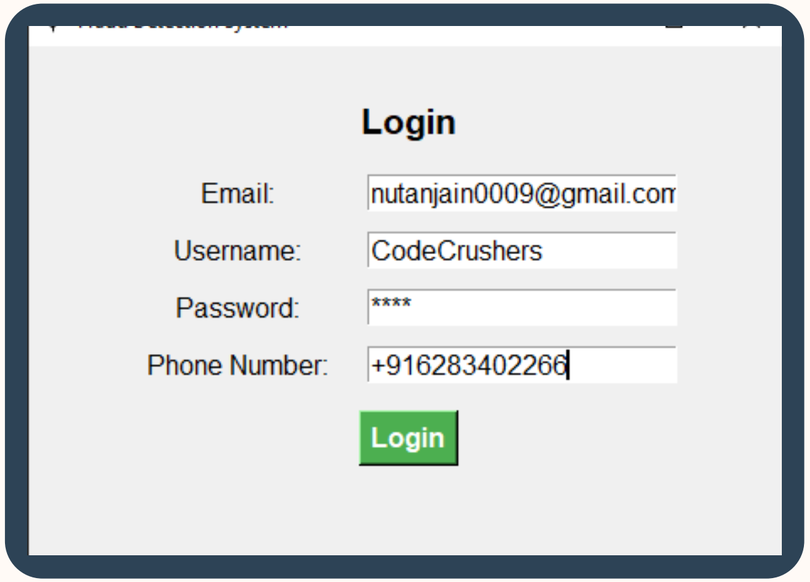
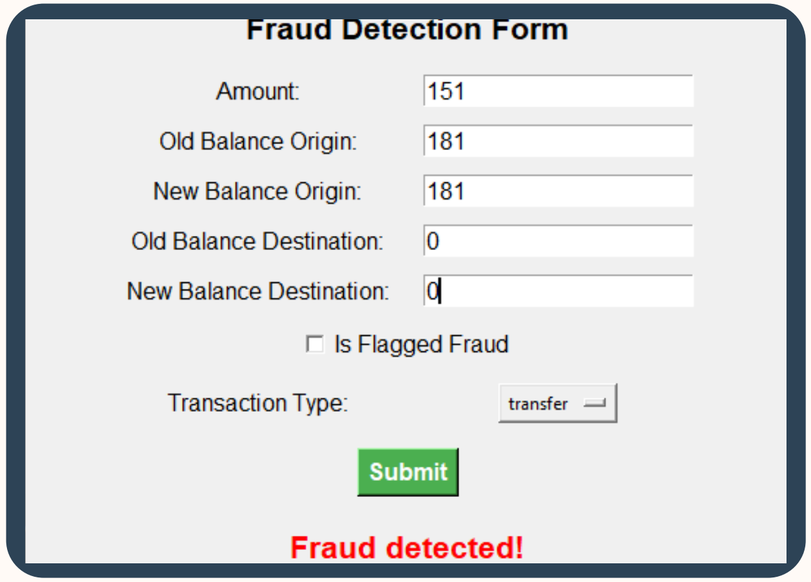
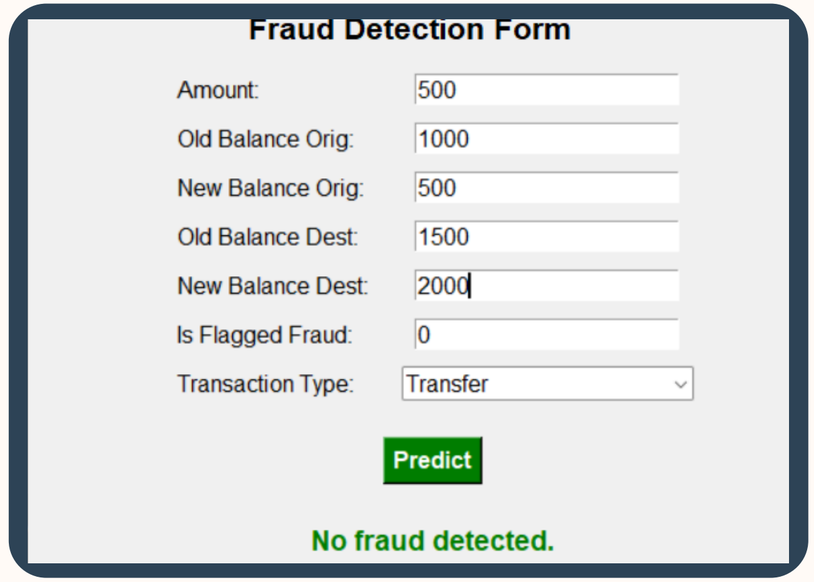
VISUALISATION

Login Credentials

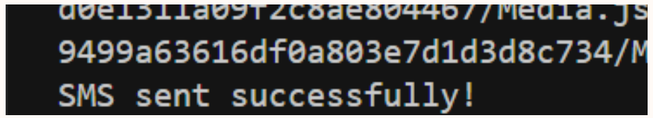


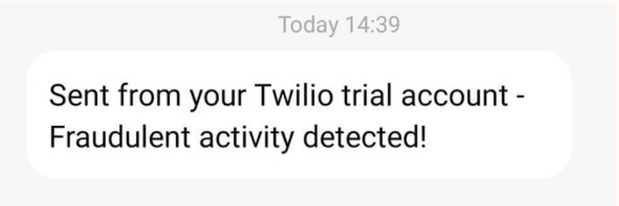
Account Status Details and Prediction





Alerting Through SMS





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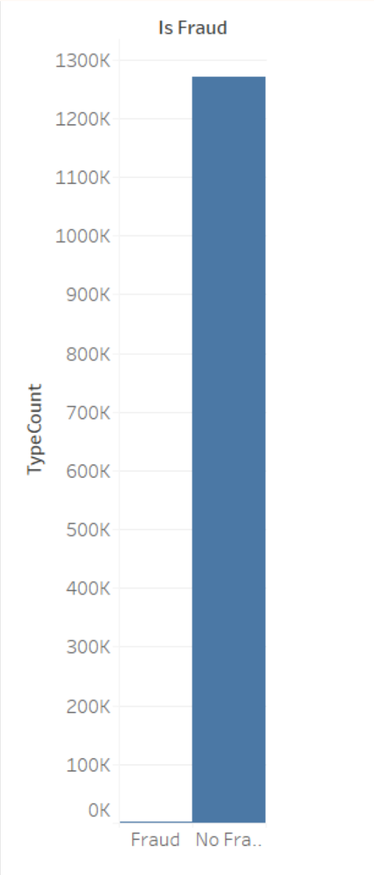
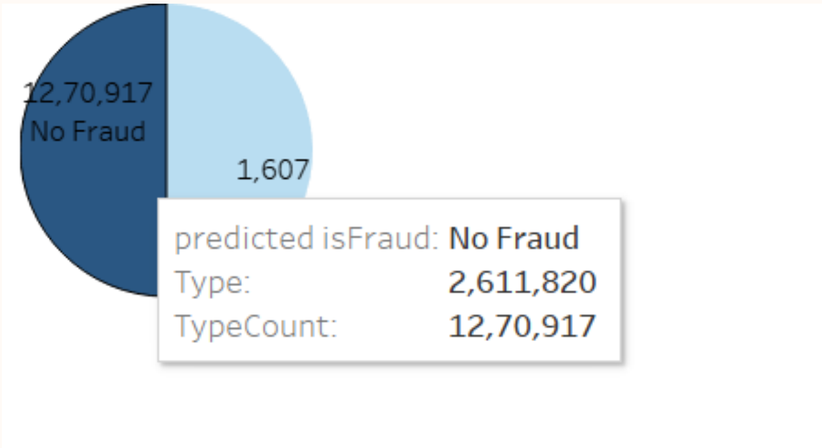
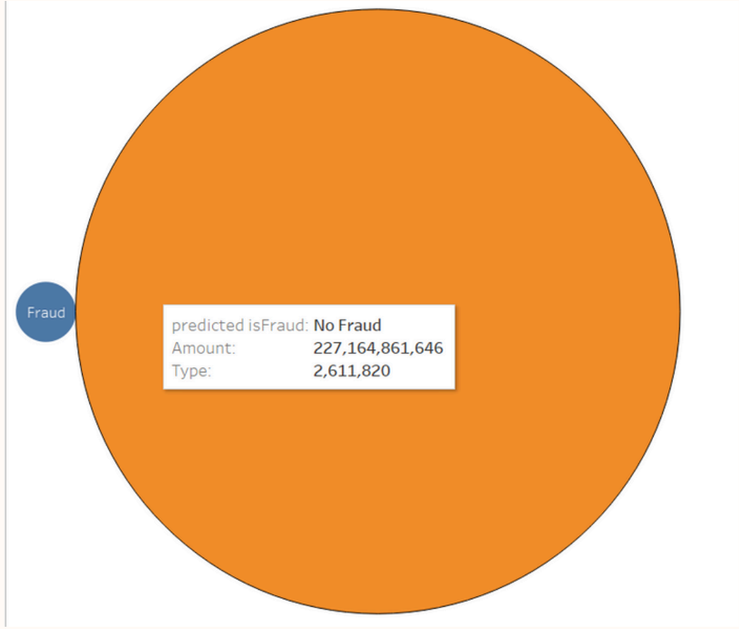
DASHBOARD(TABLEAU)



Fraudlist



Risk Scores



Fraud Pattern

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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

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