UPI Spam Detection Using Machine Learning

Under the guidance of

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Introduction

- This project focuses on developing a robust model for detecting fraudulent transactions within the Unified Payments Interface (UPI) system. UPI, a popular real-time mobile payment system in India, has witnessed a surge in usage, making it crucial to implement effective fraud detection mechanisms.

- This project leverages a dataset containing transaction details, including payment gateways, transaction types, locations, device information, and merchant categories, to identify patterns indicative of fraudulent activities. The analysis involves exploring various features, visualizing transaction trends, and employing machine learning algorithms to build a predictive model.

Motivation

Combating Fraud

UPI spam can be a precursor to fraudulent activities.

Protecting users from financial loss is paramount.

Enhancing User Experience

Reducing spam improves the overall UPI experience.

Users can focus on legitimate transactions.

Maintaining System Integrity

Spam can overload the UPI system, impacting performance.

Detection helps maintain a stable environment.

Data Preprocessing

- Handling missing values

- Feature scaling & encoding categorical variables

- Removing duplicates & outliers

- Splitting data into training & testing sets

1.Data Flow Diagram (DFD)

- Data flows from user transactions to a database. The machine learning model analyzes the data. This process identifies and flags potential spam transactions.

Output

```
Training feature shape:  (517, 53)
Testing feature shape:  (130, 53)
Training target feature shape:  (517,)
Testing target feature shape:  (130,)
```

	Model	Accuracy	Precision	Recall	F1_score	ROC_AUC
0	DecisionTreeClassifier	0.913706	0.900990	0.928571	0.914573	0.913781
1	RandomForestClassifier	0.954315	0.949495	0.959184	0.954315	0.954339
2	GradientBoostingClassifier	0.939086	0.947917	0.928571	0.938144	0.939033
3	XGBClassifier	0.954315	0.949495	0.959184	0.954315	0.954339

F1 Score of Models
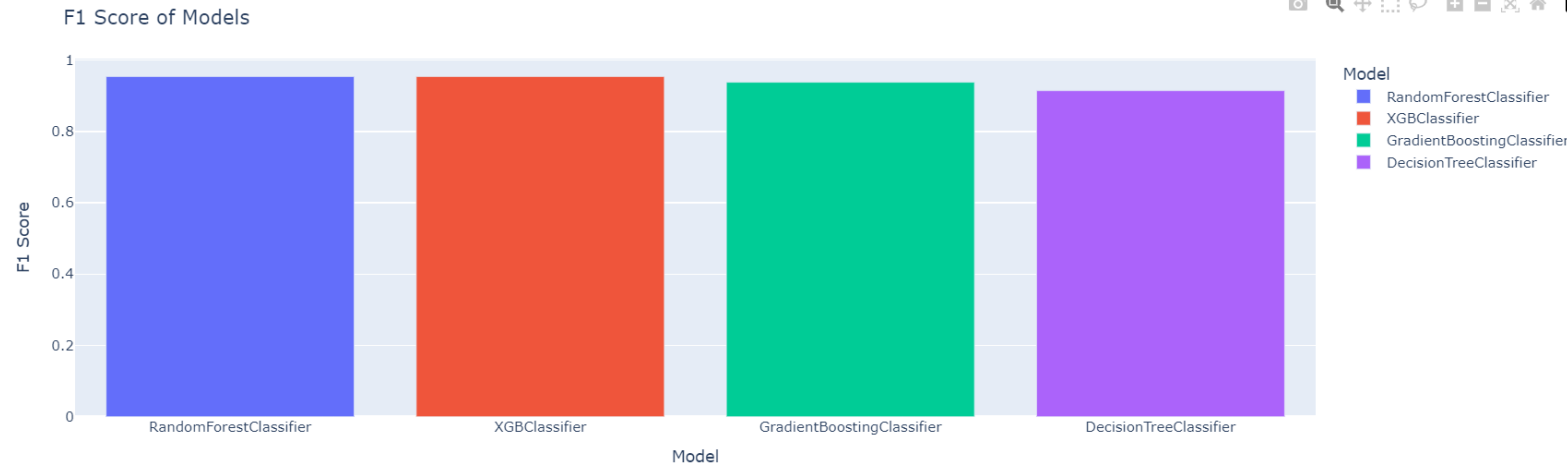
Conclusion

Effective Detection

Machine learning models can effectively detect UPI spam.

Improved Security

Spam detection enhances overall UPI security.

Better User Experience

Users benefit from a cleaner, safer transaction environment.

Future Scope

Mobile Integration

Directly integrate spam detection into UPI apps.

Advanced Algorithms

Employ deep learning for enhanced accuracy.

Global Models

Adapt models to detect spam across diverse regions.

integrated into banking systems

Can be integrated into banking systems for real-time fraud detection.