Durgapur Institute of Advanced Technology & Management

Final Year Project Presentation

On

Online Payment Fraud Detection Using Machine Learning:

Real-time Analysis with OCR and Flask

Bachelor of Technology in Computer Science and Engineering

Under the Support & Guidance of

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INTRODUCTION

- UPI and online payments are growing fast in India.
- But along with convenience, frauds are increasing too.
- We made a system using **Machine Learning (ML)** and **OCR** to detect fraud in real-time.
- It can help banks, apps, and users stay safe from online payment scams.

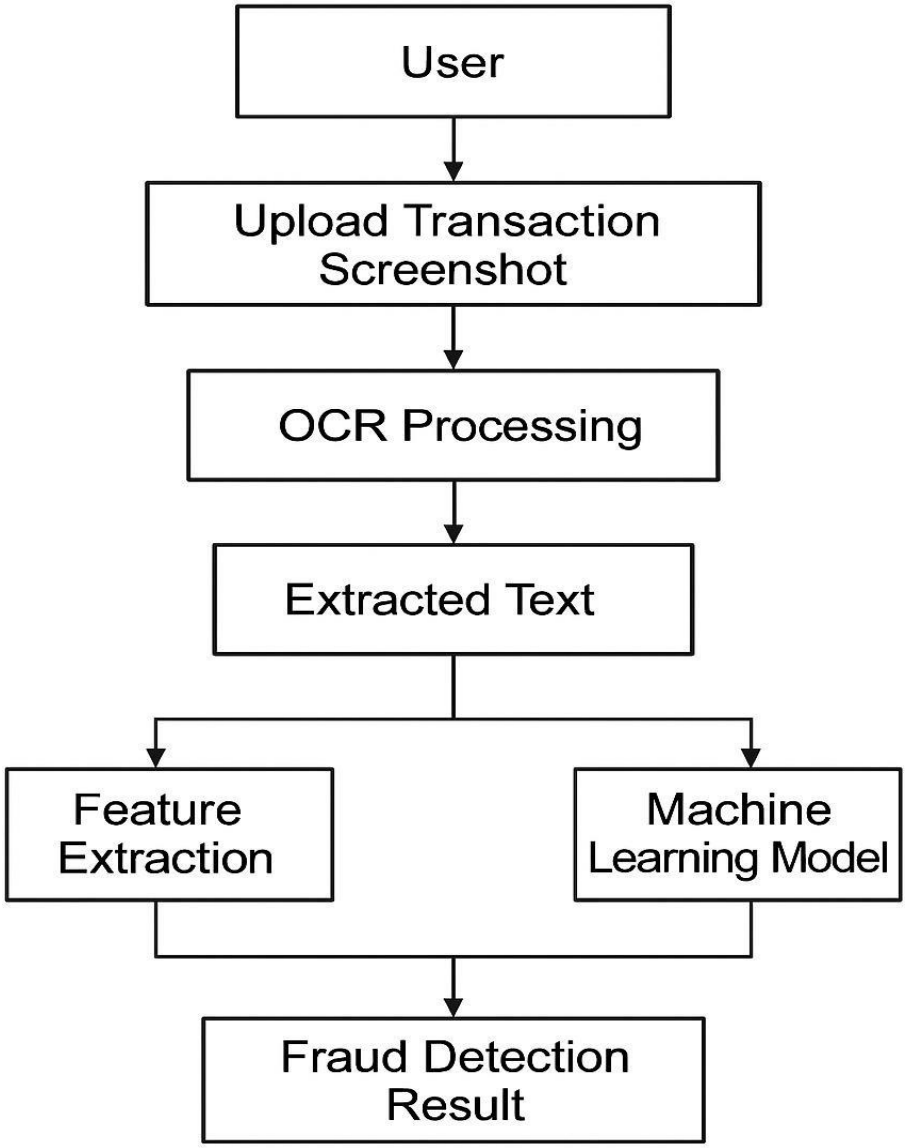
LITERATURE REVIEW

- **Old Methods:** Rule-based and statistical systems. Not flexible, can't detect new types of fraud.
- **Modern Methods:** ML algorithms like Random Forest.
- **OCR (Optical Character Recognition):** Helps read data from screenshots.
- Our system combines **ML + OCR + geolocation** to improve fraud detection.

METHODOLOGY

Steps in Process:

- User uploads a UPI screenshot.
- OCR extracts data (amount, ID, etc.)
- Features sent to ML model.
- ML model predicts: **Fraud** or **Genuine**
- Stores result with geolocation and time.



SYSTEM FEATURES

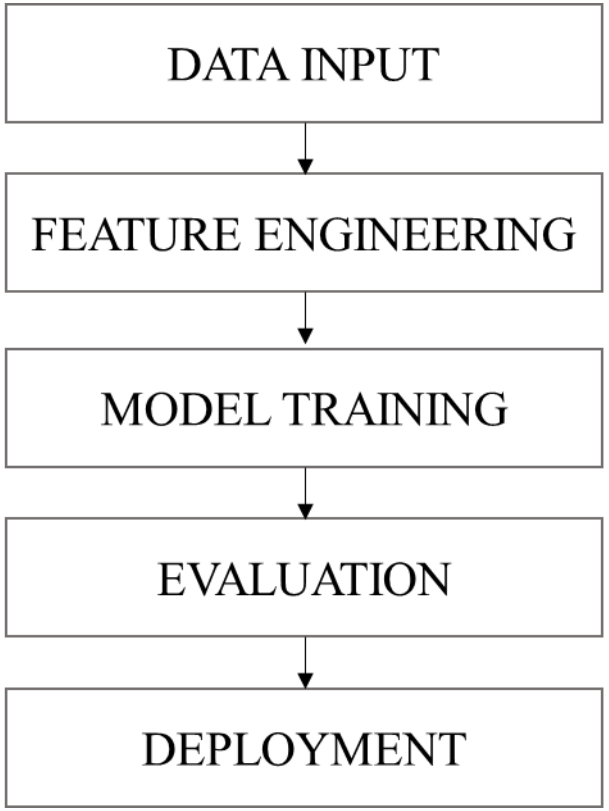
- **Frontend Validation** (Strong passwords, form checks)
- **Real-time Dashboard** (Shows prediction & data)
- **Age-Restricted Signup** (At least 18 years old)
- **Upload History** with Google Maps link.
- **Consistent Fraud Score** for same image.

DATA COLLECTION & PREPROCESSING

Dataset: Online Payments Fraud Detection Dataset (Kaggle Link)

Preprocessing:

- Resizing and cleaning images using **OpenCV**.
- Extracting text using **Tesseract OCR**.
- Data formatted to feed ML model.



FEATURE ENGINEERING

From OCR, we collect:

- Amount
- UPI ID
- Date, Time
- Transaction ID

Extra features added:

- Location
- User behavior patterns

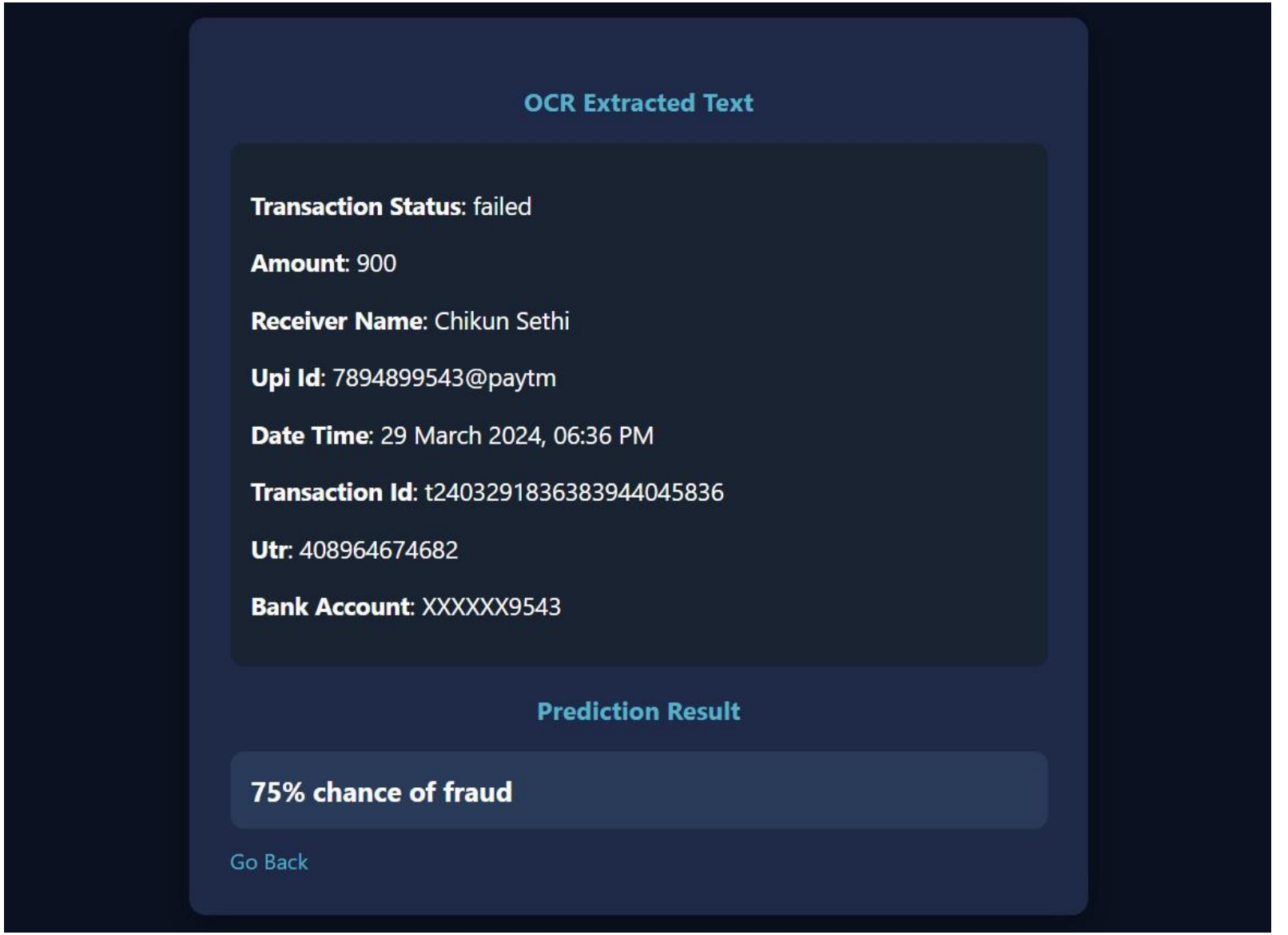
MODEL TRAINING

- **Algorithm used:** Random Forest.
- **Also tried:** Decision Tree, Logistic Regression.
- **Random Forest** gave best results with high accuracy.
- Hyperparameter tuning done for better performance.

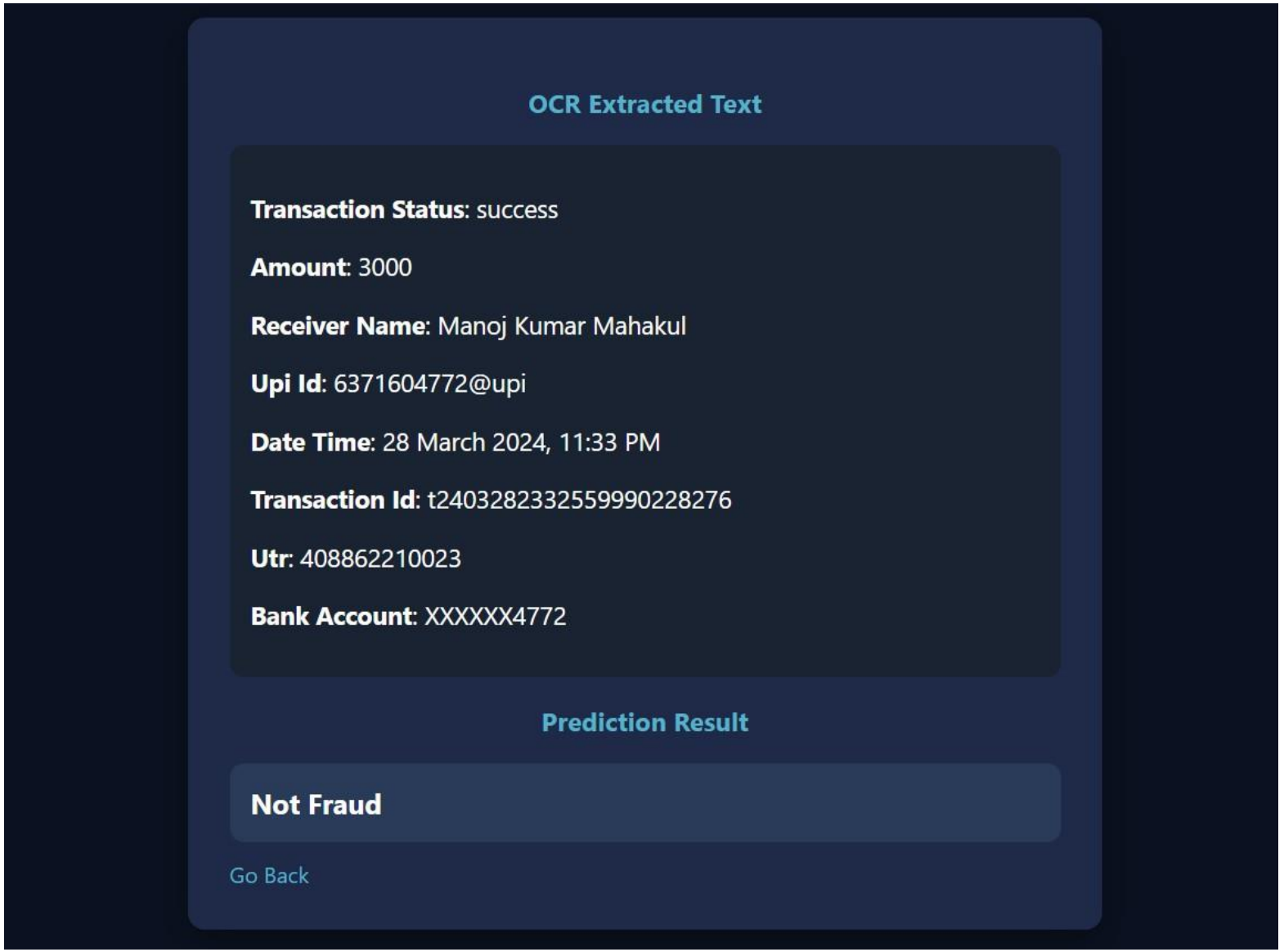
RESULTS

- High accuracy on test data.
- Predicts fraud probability (e.g., 72%).
- Works well on different UPI screenshots.
- Same image = same fraud result (hash logic).

RESULTS (cont.)



RESULTS (cont.)



DISCUSSION

Insights:

- Behavior + location improves detection.

Challenges:

- Fraud techniques keep changing.
- Detecting fraud in real-time is hard.

Limitation:

- Limited real-world datasets.

Future:

- Try deep learning for more advanced results.

APPLICATIONS

- **Banking:** Detect suspicious transactions in real-time.
- **E-commerce:** Prevent fake orders and fraudulent payments.
- **Mobile Payment Apps:** Protect digital wallets.
- **Cryptocurrency Platforms:** Detect phishing and unauthorized access.
- **Subscription Platforms:** Secure recurring payments.
- **Government Portals:** Monitor public transaction systems.

CONCLUSION

- Our project helps **reduce UPI fraud**.
- **ML + OCR** makes detection fast and reliable.
- Can be used in banking apps, wallets, e-commerce.
- Improves **user trust** and **system safety**.

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REFERENCES

1 Chang, V., Di Stefano, A., Sun, Z., & Fortino, G. (2022). Digital payment fraud detection methods in digital ages and Industry 4.0. *Computers and Electrical Engineering*, 100, 107734.

2 Sable, S. B. (2022). Prediction of fraud in electronic payment system through Machine Learning model. *Journal of Positive School Psychology*, 2340-2349.

3 Karthikeyan, T., Govindarajan, M., & Vijayakumar, V. (2023). An effective fraud detection using competitive swarm optimization based deep neural network. *Measurement: Sensors*, 27, 100793.

4 Hajek, P., Abedin, M. Z., & Sivarajah, U. (2023). Fraud detection in mobile payment systems using an XGBoost-based framework. *Information Systems Frontiers*, 25(5), 1985-2003.

5 Pavan, U. Y., Prakash, B. B., Sasidhar, P., Charan, K. S., & Mounika, P. Fraud Detection in Online Transactions Using Machine Learning.

6 Ahola, I. (2023). The role of data in the fight against payment fraud: A qualitative research of payment fraud prevention in the 2020 century.

7 Stojanović, B., Božić, J., Hofer-Schmitz, K., Nahrgang, K., Weber, A., Badii, A., ... & Runevic, J. (2021). Follow the trail: Machine learning for fraud detection in Fintech applications. *Sensors*, 21(5), 1594.

8 NARREN, D. K. Detecting Financial Fraud in the Digital Age: The AI and ML Revolution.

REFERENCES (cont.)

9 Siddiqui, M. K., & Goyal, K. K. (2023). A Study of the Use of E-Payment Systems Based on Artificial Intelligence. *Computing & Intelligent Systems (SCTS)*, 1063-1076.

10 Mishra, K. N., & Pandey, S. C. (2021). Fraud prediction in smart societies using logistic regression and k-fold machine learning techniques. *Wireless Personal Communications*, 119(2), 1341-1367.

11 Kumar, A., Choudhary, R. K., Mishra, S. K., Kar, S. K., & Bansal, R. (2022). The growth trajectory of UPI-based mobile payments in India: Enablers and inhibitors. *Indian Journal of Finance and Banking*, 11(1), 45-59.

12 Kolodiziev, O., Mints, A., Sidelov, P., Pleskun, I., & Lozynska, O. (2020). Automatic machine learning algorithms for fraud detection in digital payment systems. *Восточно-Европейский журнал передовых технологий*, 5(9-107), 14-26.

13 Shpyrko, V., & Koval, B. (2019). Fraud detection models and payment transactions analysis using machine learning. SHS Web of Conferences, 65, 02002.

14 Vuppula, K. (2021). An advanced machine learning algorithm for fraud financial transaction detection. *Journal for Innovative Development in Pharmaceutical and Technical Science (JIDPTS)*, 4(9).

15 Vanini, P., Rossi, S., Zvizdic, E., & Domenig, T. (2023). Online payment fraud: From anomaly detection to risk management. *Financial Innovation*, 9(1), 66.

THANK YOU

Any Questions?
Feedback Welcome!