Banking System with Advanced Fraud Detection

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1 Introduction

This project, **Banking System with Advanced Fraud Detection**, is a secure web-based banking application developed using Python (Flask) that integrates machine learning-based fraud detection. The system provides essential banking functionalities such as user registration, authentication, account management, and transaction processing, while monitoring for suspicious activities in real time.

2 Features

- User registration and login
- Account management and transaction processing
- Real-time fraud detection using machine learning models
- Secure password handling
- Responsive web interface using HTML, CSS, and JavaScript
- Logging of user actions and suspicious activities

3 System Architecture

The application follows a modular structure:

- **Backend:** Python (Flask)
- **Frontend:** HTML, CSS, JavaScript
- **Fraud Detection:** Machine learning models (Python)
- **Database:** (as per your implementation)
- **Password Security:** Custom Python module

4 Project Structure

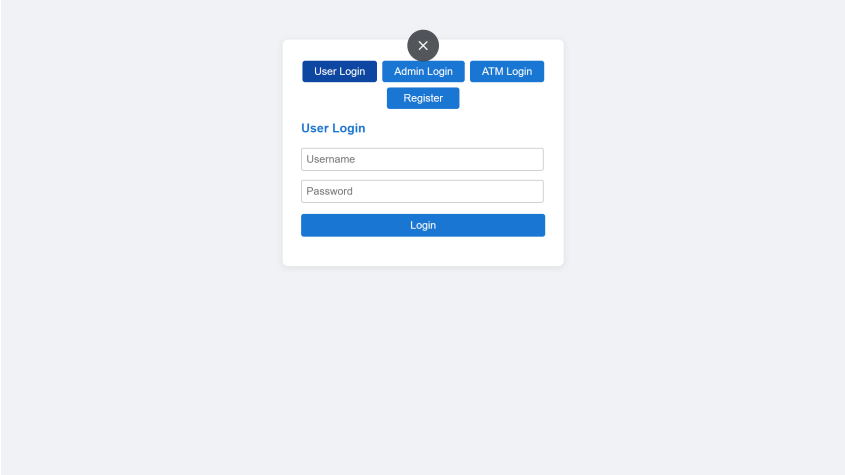
- `app.py`: Main Flask application
- `models/`: Machine learning models for fraud detection
- `routes/`: Flask route handlers
- `templates/`: HTML templates
- `static/`: Static assets (CSS, JS, images)
- `screenshots/`: Application screenshots
- `password.py`: Password management utilities
- `requirements.txt`: Python dependencies

5 Implementation Details

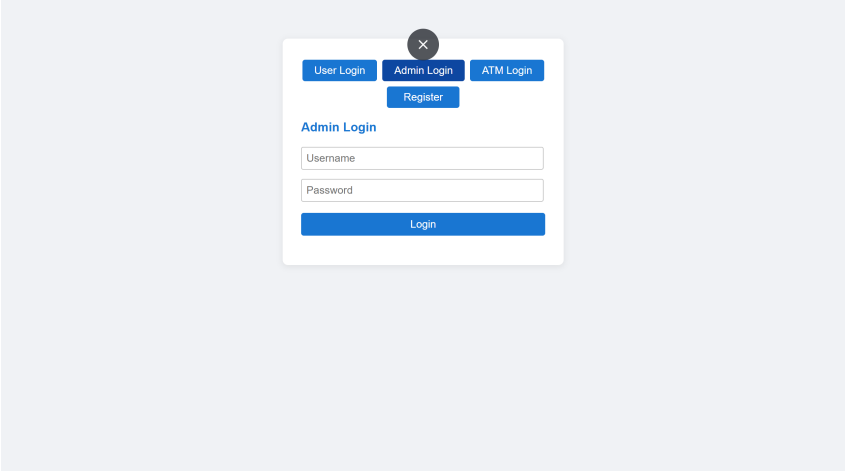
- **Fraud Detection:** Machine learning models are trained on transaction data to distinguish between legitimate and fraudulent activities. Each transaction is evaluated before processing; if flagged as suspicious, the user is alerted.
- **User Interface:** Designed with HTML, CSS, and Bootstrap for a responsive experience.

6 Screenshots

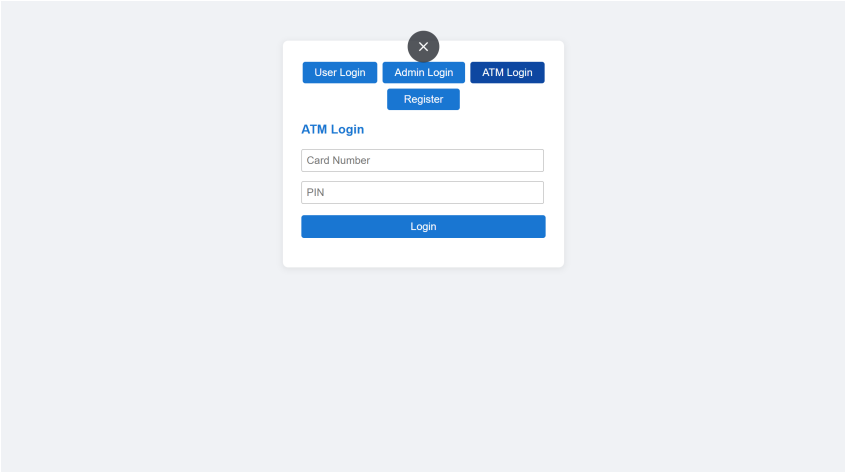
Login Page



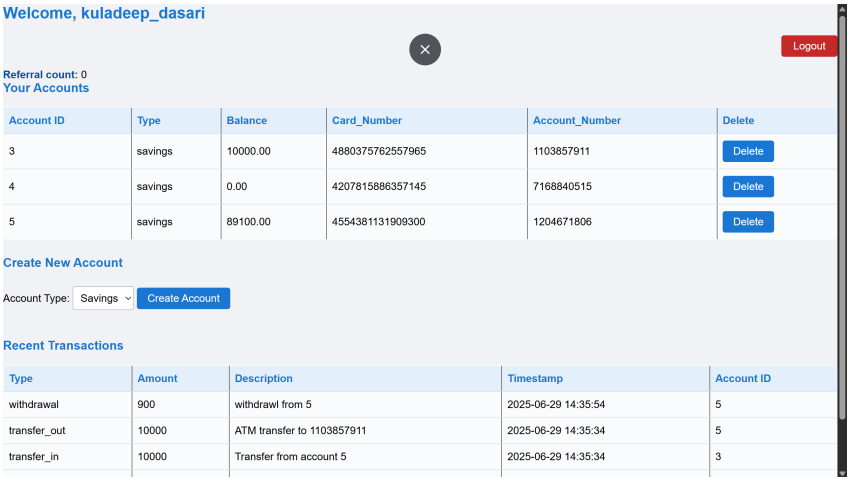
Admin Login



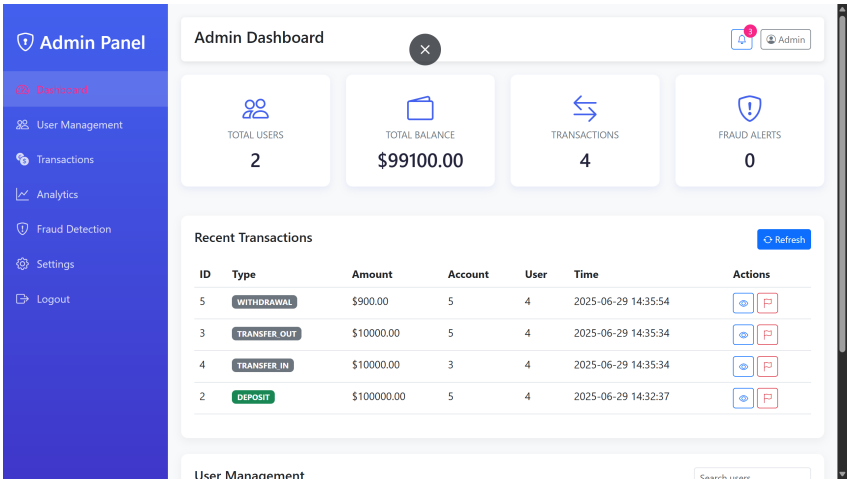
ATM Login



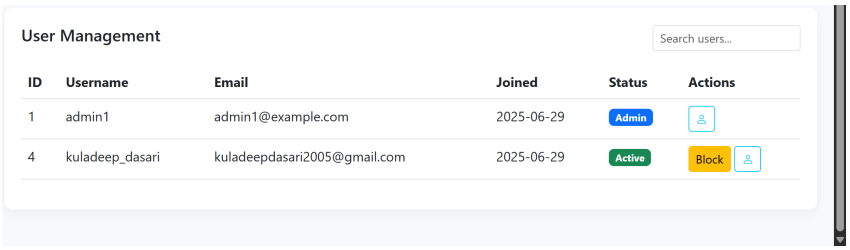
User Dashboard



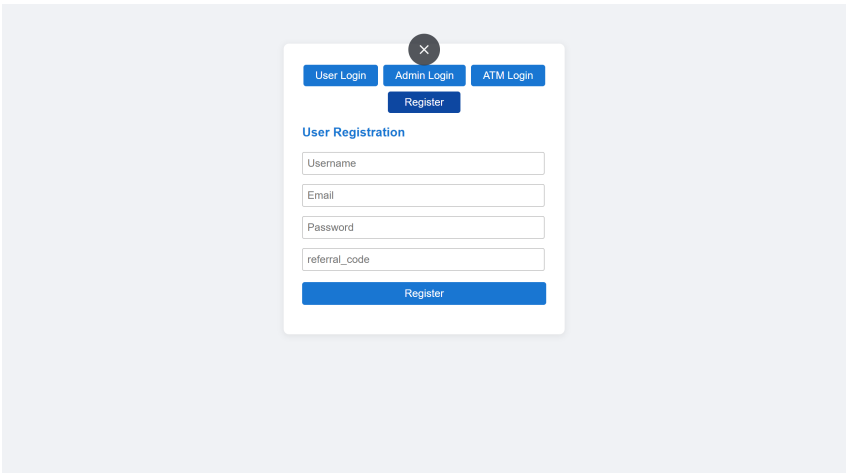
Admin Dashboard



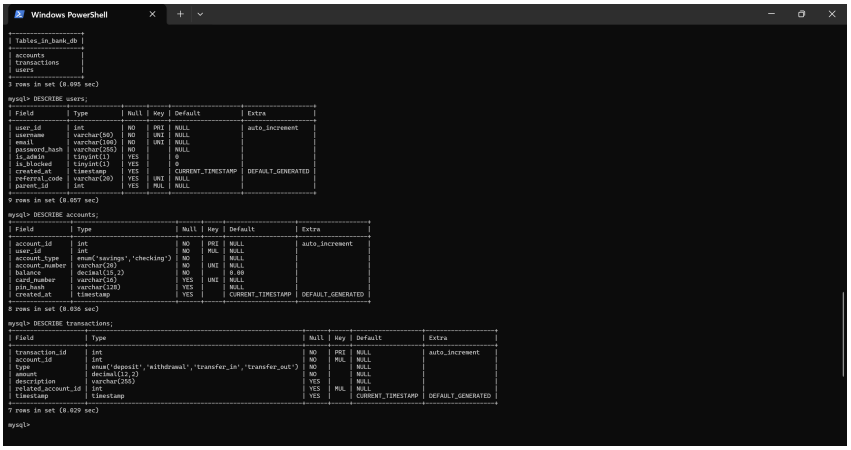
Admin Dashboard (Alternate View)



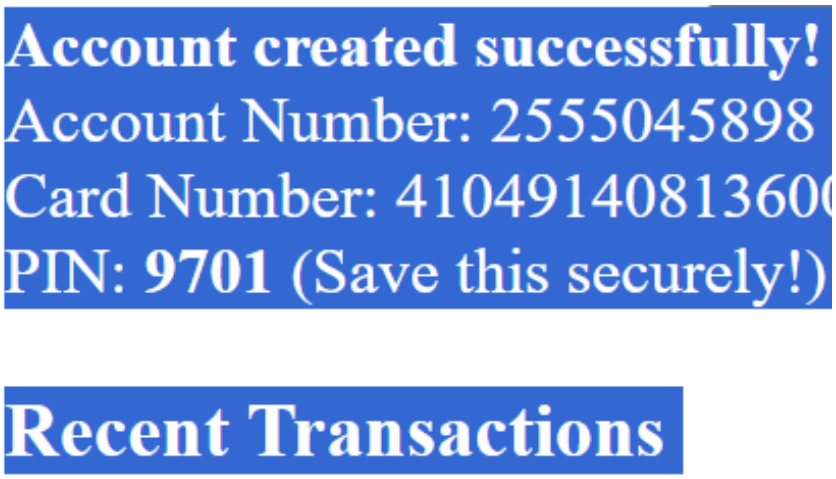
Registration Page



Database Schema



Additional Screenshot



7 Conclusion and Future Work

This project demonstrates a secure, user-friendly banking system with integrated fraud detection. Future enhancements may include advanced ML models, multi-factor authentication, transaction visualization dashboards, and integration with real banking APIs.

8 References

- Project GitHub Repository: `https://github.com/peedaluk/Banking-system-with-Advanced-`
- Flask Documentation: `https://flask.palletsprojects.com/`
- scikit-learn Documentation: `https://scikit-learn.org/`
- Hajdu, L., & Krész, M. (2020). Temporal Network Analytics for Fraud Detection in the Banking Sector. In L. Bellatreche et al. (Eds.), ADBIS/TPDL/EDA 2020 Workshops and Doctoral Consortium, CCIS 1260, pp. 145–157. Springer Nature Switzerland AG. `https://www.researchgate.net/publication/343701757_Temporal_Network_Analytics_for_Fraud_Detection_in_the_Banking_Sector`