

OTP-BASED CARDLESS TRANSACTION SYSTEM USING FACE RECOGNITION FOR SECURE FINANCIAL OPERATIONS

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ABSTARCT

OTP-Based Cardless Transaction System using Face Recognition for Secure Financial Operations allows users to perform ATM transactions without a physical card by using two-factor authentication, one-time-password (OTP) authentication with AI-based facial recognition to ensure multi factor verification of users during financial operations. Traditional card-based transaction systems are vulnerable to security threats such as card theft, skimming, duplication and pin leakage. Users may also forget or lose their cards. Therefore there is a need for a secure, reliable, and cardless transaction system that ensures strong user authentication while maintaining ease of use. In this project Python, Opencv, Mysql, Technologies are used and face detection , recognition models are used. It is provide a secure and convenient method for financial transactions without using physical cards.

KEYWORDS: *Python, OpenCV, Flask, MYSQL.OTP Cardless, Face Recognition*

INTRODUCTION

The OTP-based cardless transaction system using face recognition is an advanced solution designed to overcome these challenges. This system eliminates the need for physical cards by integrating OTP authentication with biometric technology. The rapid advancement of digital banking has increased the demand for secure and reliable transaction systems. Traditional card-based financial transactions are vulnerable to fraud, theft, and unauthorized access, creating the need for safer alternatives. Cardless transaction systems help eliminate risks associated with physical cards while improving user convenience. OTP-based authentication provides secure, time-bound verification for every transaction. Face recognition adds an additional biometric security layer by verifying the user's unique facial features. The combination of OTP and face recognition ensures strong multi-factor authentication. This integrated approach significantly reduces financial fraud and identity misuse. Biometric verification is more secure than traditional PIN-

based methods. Overall, the proposed system enhances both security and efficiency. It offers a

dependable solution for modern financial operations.

LITERATURE SURVEY

In recent years, numerous researchers have explored advanced authentication techniques to enhance the security of financial transactions. Traditional methods such as ATM cards and PINs have proven susceptible to threats like skimming, shoulder surfing, and cloning, leading to increased interest in cardless and biometric-based systems.

Survey on Cardless Transactions using Face Recognition in ATM Authors: Prof. Chayashree G., Rahul L., Ruchitha Bindhu H. B., Prajwal R. D., Rakshitha S. **Summary:** This paper proposes a cardless ATM system that enhances security and convenience by integrating mobile OTP, face system aims to reduce fraud and improve secure access to ATM services. recognition, and fingerprint authentication. It uses Convolutional Neural Networks (CNN) for reliable face and fingerprint matching. Upon successful authentication, users can perform banking transactions, with joint account holders receiving notifications of activity.

Cardless Multi-Banking ATM System Services using Biometrics and Face Recognition. Authors: Ashwini C., Shashank P., Shreya Mahesh Nayak, Siri Yadav S., Sumukh M. **Summary:** This research describes a multi-bank cardless ATM system that uses biometric face

and fingerprint recognition to replace ATM cards and PINs..

Smart Transaction through an ATM Machine using Face Recognition”

Authors: Akshay Kumar, Pooja Joshi, Anju Bala, Pravinkumar S. Patil, Dilip K. J. B. Saini, Kapil Joshi. **Summary:** This study proposes a smart ATM transaction system using face recognition and OTP. A registered mobile number triggers OTP generation, then the ATM camera captures the user’s face. The system verifies the facial image with the stored database using a YOLO-based algorithm, and upon successful OTP verification, allows ATM operations. The model achieved over 99% accuracy in authenticating users. **Enhanced Security for ATM Machine with OTP and Facial Recognition Features”** Authors: Manikandan B., Kishore R., Saran Kumar K., Suriya S., Vivek K V. **Summary:** This paper focuses on reinforcing ATM security by combining face recognition and One-Time Password (OTP) authentication. By verifying the user’s facial identity and sending a unique OTP for each session, the approach aims to eliminate fraud caused by card theft or duplication. Using facial recognition as the primary identity key enhances both privacy and transaction integrity.

EXISTING METHOD

Several methods have been developed to secure ATM and financial transactions. Traditionally, ATMs rely on card and PIN-based authentication, where users insert a physical card and enter a personal identification number. While simple and widely used, this method is vulnerable to card theft, skimming, shoulder surfing, and PIN Compromise.

To address these issues, biometric authentication methods such as fingerprint, iris, and face recognition have been introduced. In these systems, users are identified based on unique physiological features rather than relying on cards. For example, fingerprint or iris scanners verify identity before allowing access to account functions. Face recognition, in particular, offers a contactless solution that is convenient for users while maintaining a high level of security. Another approach is **OTP (One-Time Password) based authentication**, commonly used in online banking and mobile transactions. OTPs are dynamically generated codes sent via SMS, email, or authentication apps and are valid for a single transaction. They reduce the risk of unauthorized access caused by stolen or leaked credentials.

PROPOSED METHOD

The proposed system is an OTP-based cardless transaction system using face recognition designed to enhance the security and convenience of financial operations. Instead of using a physical card, the user can initiate a transaction by providing their facial biometric data, which is verified against the stored database using advanced face recognition algorithms.

Simultaneously, a One-Time Password (OTP) is sent to the user's registered mobile number, adding an extra layer of security. Only after both the face recognition and OTP verification are successful can the user perform transactions. This multi-factor authentication approach significantly reduces risks associated with card theft, PIN compromise, and unauthorized access. The system also includes real-time notifications to alert users of transaction activity, improving transparency and fraud detection.

ARCHITECTURE

The system architecture integrates user interface, face recognition, OTP authentication, transaction processing, notification, and database modules to enable secure cardless transactions. Data flows sequentially from user verification to transaction completion, ensuring multi-factor authentication and real-time monitoring.

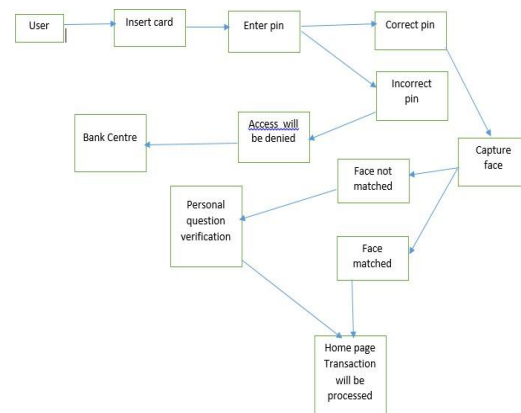


Fig 1: Architecture Diagram

RESULTS AND DISCUSSION

INPUT PAGE:

The Input Page allows the user to enter basic details such as the registered mobile number to initiate a card less transaction. It validates the input and forwards the user to face recognition authentication if the entered details are correct.



Fig 2: INPUT PAGE

OTP PAGE:

An **OTP (One-Time Password) page** is a screen where users enter a temporary code to verify their identity.

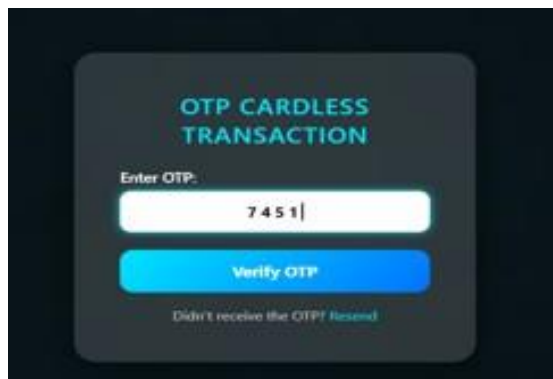


Fig 3: OTP PAGE

If user details are correct then capture the face with username and you are allowed message will be displayed in system. Then transaction will be done.

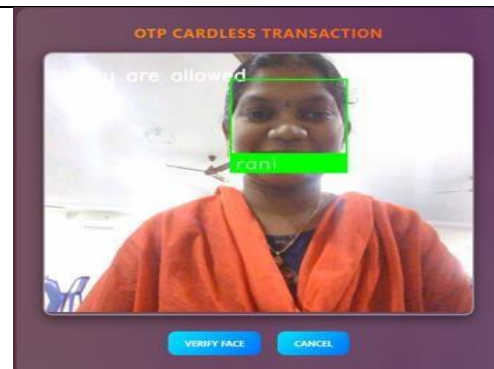


Fig 4: Known User

If the user details are incorrect then capture the face with unknown you are not allowed message will be displayed in system. Then transaction is not done.

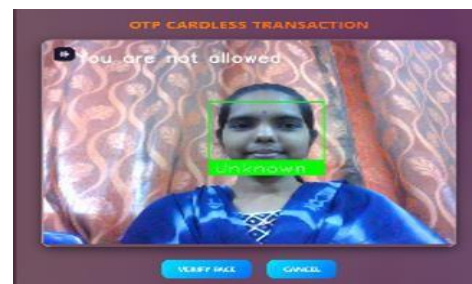


Fig 5: Unknown User

Transaction Page: Transaction Page shows the details of a payment or transfer before and after it is completed. It all allows users to review, confirm, or cancel the transaction securely. After completion, it displays the transaction status and receipt details. Debit Transaction means money is deducted from your account to make a payment or transfer. It reduces your available balance immediately or after processing. Debit transactions are used for purchases, bill payments, and money transfers.

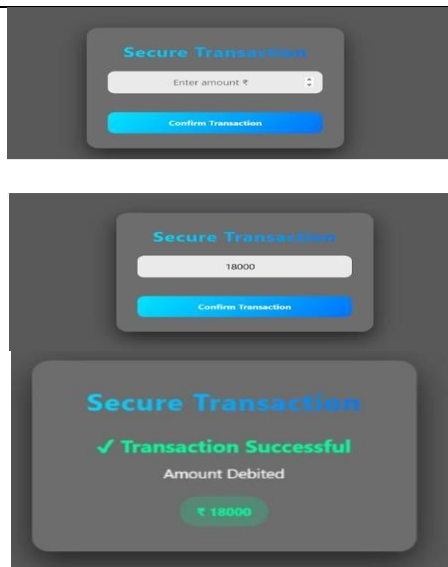


Fig 6: Transaction Page

CONCLUSION and FUTURE SCOPE

The proposed system provides a secure and convenient cardless transaction method using face recognition and OTP-based authentication. It reduces fraud, theft, and unauthorized access, ensuring safe financial operations. Transactions are fast, contactless, and user-friendly, making the system suitable for modern banking. In the future, the system can be extended to mobile banking and e-wallets, integrating additional biometric features like iris or voice recognition for enhanced security. AI-based fraud detection can be added to monitor suspicious activities in real time. Cloud-based storage can improve scalability and accessibility, and support for multiple languages and accessibility features can make the system more inclusive. Overall, the system

represents a reliable and efficient solution for secure financial operations.

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