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Multi-Banking Cardless ATM System with Enhanced Security Using OTP and Face Recognition

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ABSTRACT: Automated Teller Machine (ATM) transactions have become an essential and secure method for fulfilling our financial commitments. Traditionally, using an ATM requires a debit card, but there are times when account balances run low, or individuals forget to carry their cards, leading to transaction difficulties. Simultaneously, the use of mobile phones has become ubiquitous. Connecting these electronic devices has sparked a simple and efficient approach to withdrawing cash without the need for a debit card. This innovative method can be described as "Cardless Cash Withdrawal" and is fortified with two layers of security; Facial Recognition and Eye Blink Authentication, both powered by Convolutional Neural Networks (CNN). The system employs state-of-the-art CNN models to verify the user's identity based on their unique facial features. This biometric authentication adds an extra layer of security, ensuring that only the authorized user can access the ATM. Besides facial recognition, the system utilizes eye blink patterns as a secondary authentication method. Analyzing the user's Eye blinks, further validates their identity. This sophisticated technology enhances security and reduces the risk of unauthorized access. A one-time Password (OTP) is used to complete the authentication process, the system generates a one-time password that is sent to the user's mobile phone. This OTP serves as an additional verification step, ensuring that the individual initiating the transaction is the legitimate account holder. After overall after the completion of system of withdrawing money with cardless system, multi-banking system is added for user to get use of it's a particular account from having multiple accounts of it with same aadhar number.

KEYWORDS*:* Face Recognition, Eye Blink Secured, OTP Authentication.

I. INTRODUCTION

Automated Teller Machine shortened as an ATM. It is a telecommunication device that provides quick financial transactions to the users instead of without an external person in the public. ATMs are commonly known such as Automated Banking Machine, As we know, in a Manual banking system, the customer has to go to the branch physically and do the transactions, which is time-consuming and based on paper; sometimes, this process is very annoying. ATMs are intended to solve this problem; nearly every bank has ATMs where customers may access financial services. We can use either the debit or credit cards of our choosing while using traditional card-based ATM systems, and these systems use private PINs to verify the ownership of the ATM cards and have advantages such as being self-servicing and all transactions being paperless no teller is needed to do whatever we want to withdraw cash, inquiries balance, or transfer funds. However, it has some drawbacks, such as ATM cards can be lost or forgotten PIN; anybody can use an ATM to access bank data if the secret PIN is correct, and can take money from an account without being verified as legitimate. Because of this, to increase the ATM's security, we switch from card-based systems to cardless ATM systems where we replace the ATM cards and PINs with facial recognition and eye blink detection features to validate the user as authorized while restricting access to others as the facial pictures are unique for each user. Hence, it leaves almost no degree of fraud, and to enhanced the security, we use two step verification method, a

6-digit OTP or 4-digit OTP. Multi banking cardless ATM system involves the multi banking service like now a days single person is having more than two to three bank accounts and accounts are registered with their respective aadhar number, they use there multiple bank accounts for their needs, So Multi banking provides to choose the appropriate bank account for further withdraw transaction. Pervious there is no any system to choose the different bank account, in real time card System user uses their respective bank ATM card for withdraw, But un able to access or withdraw money with respective bank account in Cardless System, So multi Banking is Introduced which helps user to select respective bank account for money Transaction after the Face is successfully Recognized.

II. LITERATURE SURVEY

The development of cardless ATM systems has gained significant attention in recent years, with several studies focusing on the implementation and evaluation of such systems. In this section, we review some of the related work in this field. A study by Liu et al. (2017)[1] proposed a cardless ATM system that uses facial recognition as an authentication method. The system employs a multi-level security model that includes a combination of face recognition and ID card verification to ensure accurate and reliable authentication. The authors reported high accuracy rates for their system, with a false acceptance rate (FAR) of 0.0001%.[2] proposed a cardless ATM system that uses mobile OTP and facial recognition as authentication methods. The system includes a feature extraction algorithm that extracts unique facial features of users and compares them with the database to authenticate users. The authors reported high accuracy rates for their system, with a FAR of 0.00008%.

A study by Wang et al. (2019) proposed a cardless ATM system that uses fingerprint authentication as an authentication method. The system employs a feature extraction algorithm that extracts unique fingerprint features of users and compares them with the database to authenticate users. The authors reported high accuracy rates for their system, with a FAR of 0.0001%.These studies demonstrate that cardless ATM systems utilizing biometric authentication methods can provide accurate and reliable.

Additionally, the studies suggest that combining multiple authentication methods can further enhance the security of the system. However, some studies have identified potential security and privacy risks associated with cardless ATM systems. For example, a study by Li et al. (2018) identified several security vulnerabilities in cardless ATM systems, such as weak passwords, unprotected data transmission, and insufficient security mechanisms. Therefore, it is essential to design and implement cardless ATM systems with robust security features to ensure user privacy and prevent fraud.
A study by Jain et al. (2016) provided a comprehensive survey of various biometric authentication methods for ATM systems. The authors discussed the advantages and limitations of various biometric authentication methods, such as facial recognition, fingerprint authentication, iris recognition, and voice recognition. The survey highlighted the importance of choosing the appropriate biometric authentication method based on factors such as security, accuracy, user acceptance, and cost-effectiveness.

In a study by Wang et al. (2020), the authors proposed a cardless ATM system that utilizes blockchain technology to enhance the security and privacy of the system. The system utilizes a distributed ledger to store user information and transaction data, ensuring secure and transparent data management. The authors reported that their system provides improved security and privacy compared to traditional ATM systems.

III. PROPOSED SYSTEM ARCHITECTURE

Here the user will first login to the mobile app using the details such as user-id and password. After this the user generates a reference number as per his choice and also specifies the amount to be withdrawn. This reference number would remain valid for a certain period of time and can be used only once. Having generated the reference number, the user visits the nearest ATM and enters the user-id and password along with the code in the app to sign in. If the authorized user is present, he/she would be logged in and would be required to enter the reference number to withdraw the specified amount. If the reference number is correct, the amount is withdrawn else transaction fails. This idea is an amalgamation of current ATM system and online transactions involving OTP. By eliminating the use of OTP the problems related to sharing of OTP are successfully overcome.
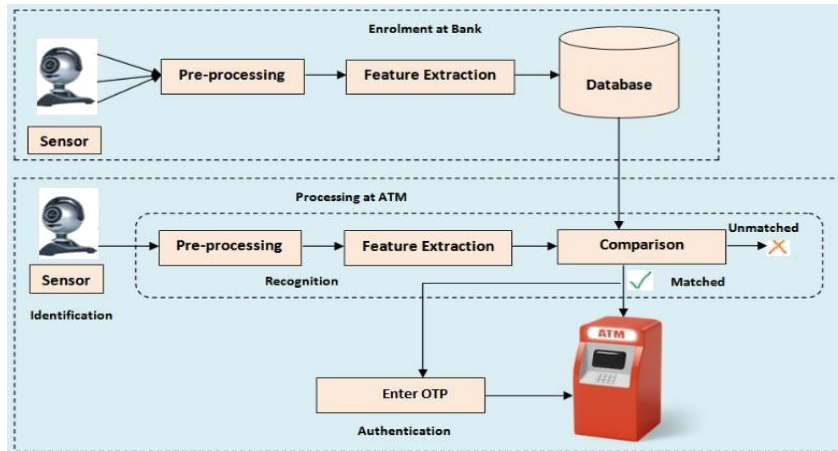
Fig 1. Proposed System Architecture

IV. DATA FLOW DIAGRAM

A data flow diagram (DFD) maps out the flow of information for any process or system. It uses defined symbols like rectangles, circles and arrows, plus short text labels, to show data inputs, outputs, storage points and the routes between each destination. Data flowcharts can range from simple, even hand-drawn process overviews, to in-depth, multi-level DFDs that dig progressively deeper into how the data is handled. In Data Flow Diagram, we Show that flow of data in our system in DFD first flow, we show that base DFD in which rectangle present input as well as output and circle show our system. Same as further the rectangle shows input and output and circle belong to the main system of working.
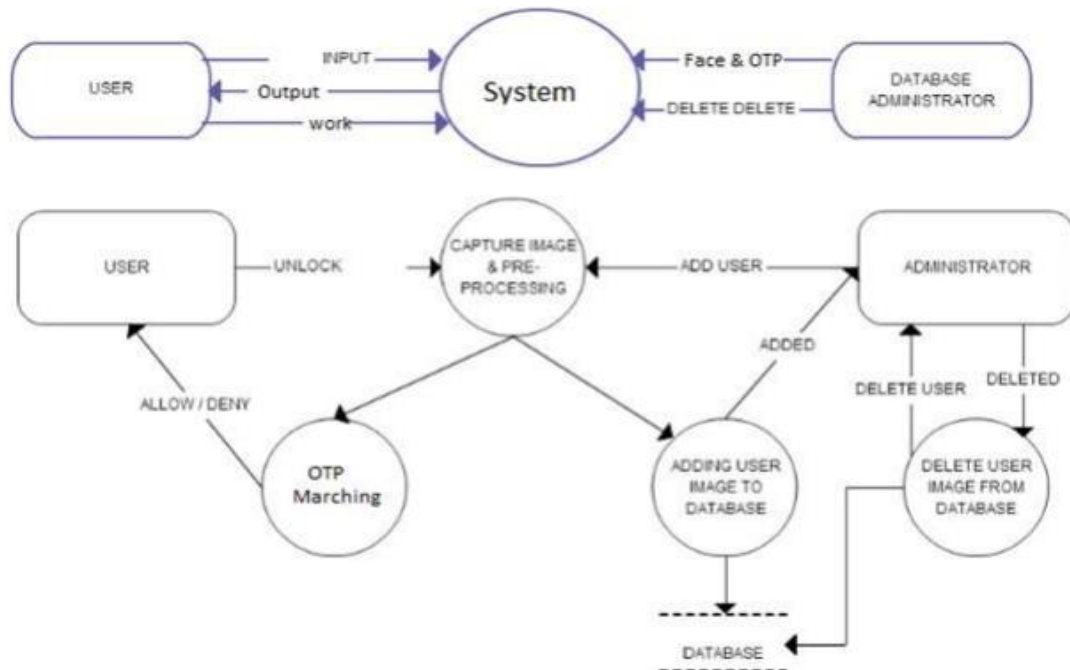
Fig 2. Data Flow Diagram

V. RESULT AND DISCUSSION

Prediction	Cardless ATM Authentication Results	
	Authorized	*Unauthorized*
Authorized	90 (TP)	10 (FP)
Unauthorized	0 (FN)	100 (TN)
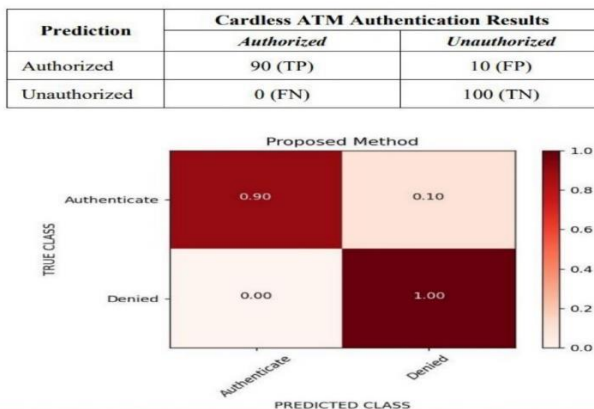
Fig 3. Classification and Performance
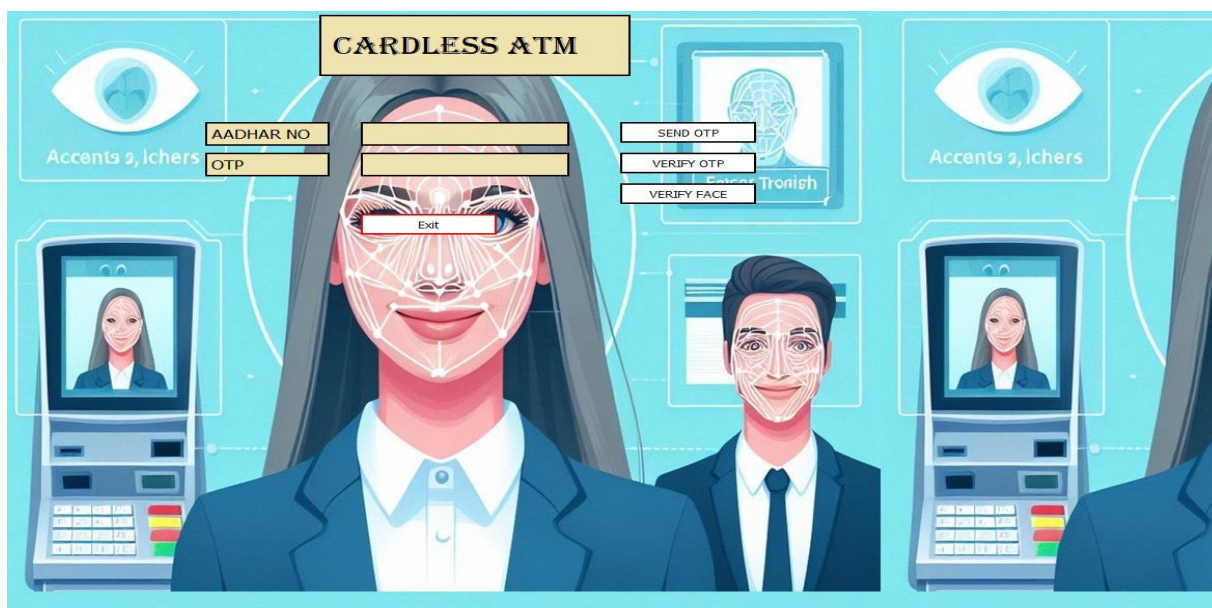
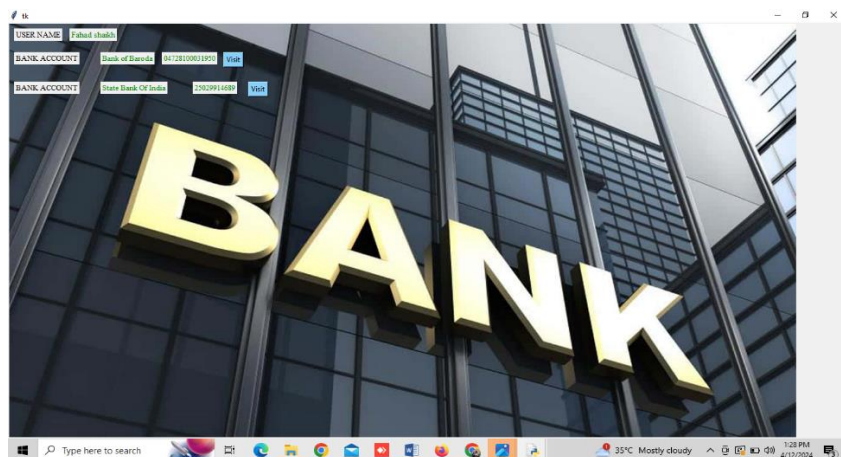Fig 4. Login Page

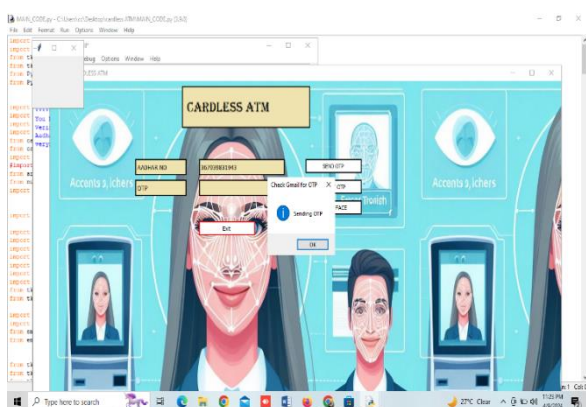Fig 5. Signup Page
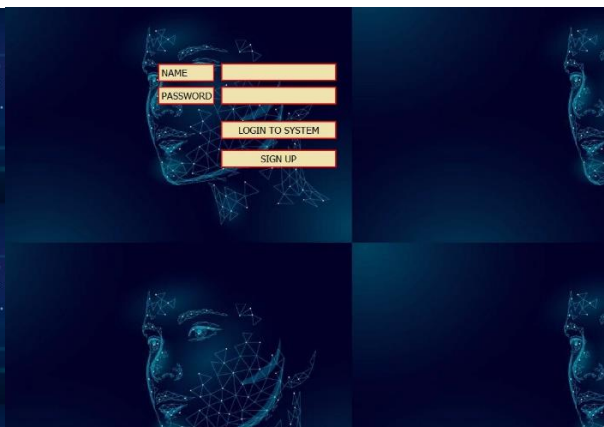
Fig 6. Main Page
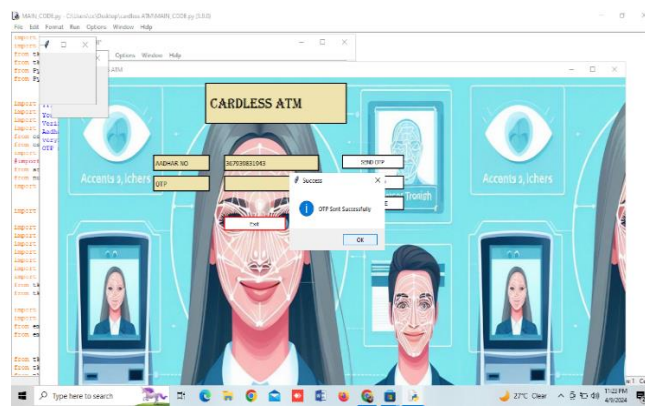

Fig 7. Multi Bank Page
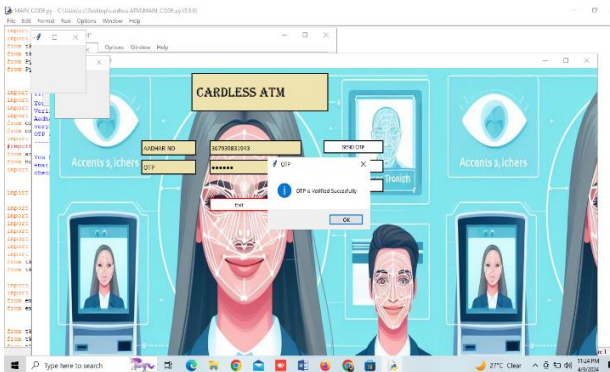

Fig 8. Sending OTP
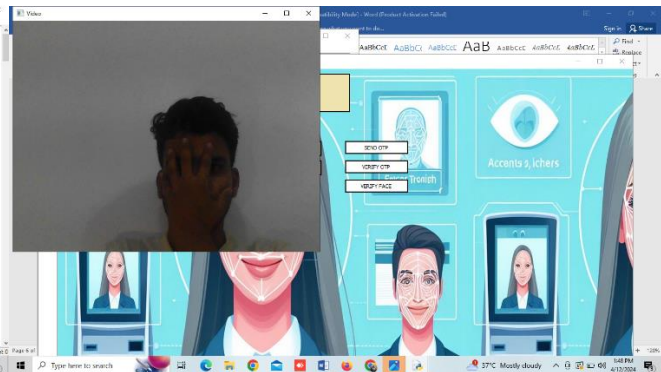

Fig 9. OTP Sent Successfully

Fig 10. OTP Verified

Fig 11. Invalid Face

Fig 12. Successfully Face Verified

VI. CONCLUSION

The system is purposefully engineered to be highly resilient against various types of attacks, including card-skimming, observation attacks, replay attacks, and relay attacks. By utilizing a combination of technologies and security measures, this system offers a level of efficiency and security that surpasses traditional ATM systems. In this system, malpractices and fraudulent activities are significantly mitigated, making it a robust and secure solution for ATM transactions. With additionally multi banking service where user can easy use different aoount of its own for the withdraw using Face recognition. There is no need of physical card for the system easily work with Authentication which is secured.

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