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Multi-cardless ATM Using Face Recognition

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ABSTRACT:The multi-cardless ATM using face recognition project aims to revolutionize traditional ATM transactions by eliminating the need for physical cards and relying solely on facial recognition technology. This innovative system provides a convenient and secure method for individuals to access their bank accounts and perform financial transactions. To use the multi-cardless ATM, customers simply approach the machine, and their face is captured by a camera integrated into the ATM system. The captured image is then processed by the facial recognition software, which compares it with the pre-registered facial template stored in a secure database. If a match is found, the user is granted access to their account and can perform transactions such as cash withdrawals, fund transfers, and balance inquiries. To use the multi-cardless ATM, customers simply approach the machine, and their face is captured by a camera integrated into the ATM system. The captured image is then processed by the facial recognition software, which compares it with the pre-registered facial template stored in a secure database. If a match is found, the user is granted access to their account and can perform transactions such as cash withdrawals, fund transfers, and balance inquiries.

KEYWORDS:CNN Algorithm, Identity Verification, E-mail OTP, Face Recognition, Security and Privacy

I. INTRODUCTION

The multi card less ATM using face recognition project aims to provide a convenient and secure alternative to traditional ATM transactions. The primary objective of this project is to enhance the user experience by eliminating the need for carrying multiple cards and remembering PINs. Users can simply approach the ATM, position their face in front of the camera, and the system will match their facial features against a pre-registered database to verify their identity. Once authenticated, users can access their accounts, withdraw cash, check balances, transfer funds, and perform other banking operations seamlessly. Overall, the multi card less ATM using face recognition project offers a modern and secure approach to banking transactions, simplifying the process for users while maintaining the highest standards of accuracy and data protection.

II. RELATED WORK

The main objective of this project is to develop a system that allows users to access their bank accounts and perform transactions at ATMs without the need for a physical bank card. Instead, the system utilizes facial recognition to verify the user's identity, ensuring a seamless and secure experience. Camera is used for authentication of user. We are using laptop's camera and keyboard as a hardware part. Whenever a person enters in ATM camera captures image and display information about him. GUI (Graphical User Interface) is developed for user and system interactions. An OTP, which along with face recognition comprises two levels of security. Transaction process depends upon face and OTP authentication. User Interface will display user debited money, authentication status, deposit money, Transfer money, history of the transaction etc.

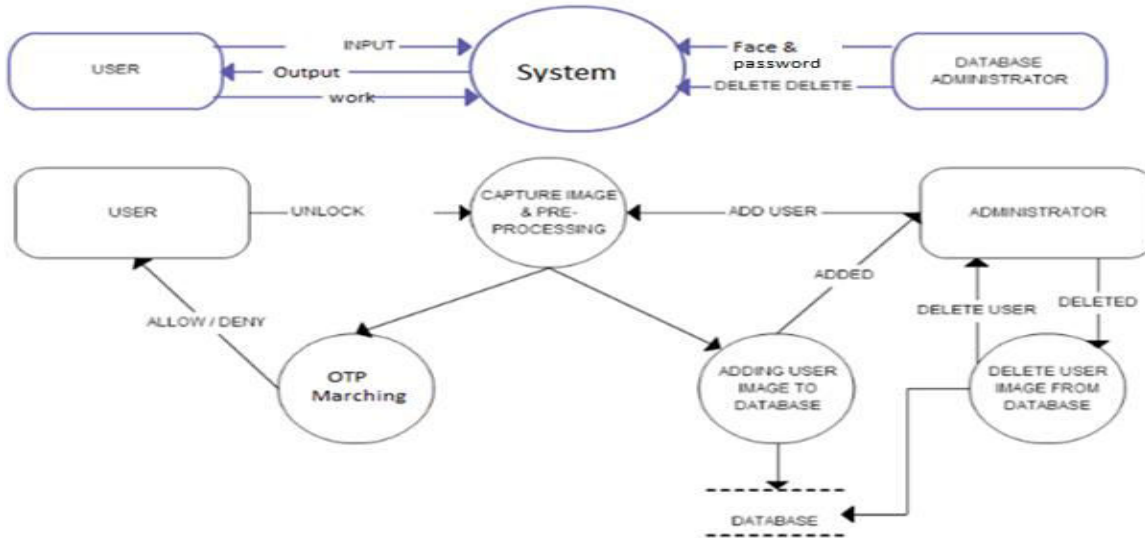


Fig 1. ATM transaction flow

Bank Module:

- I) In the bank module first we login into the system.
- II) There are various transaction options in the bank module.
- III) We can create a new account of user, add all user's details, take a live photo for the unique identity of the user and save it in the bank database system.

ATM-self user:

- I) User will enter the user id and Password.
- II) If the information is correct then user clicks on take photo option.
- III) System will match the photo with the bank database by using the CNN algorithm.
- IV) If the photo is matched Transaction process is complete.

ATM-Guest User:

- I) Guest users create bank account using user id and password.
- II) Then the user clicks on generate OTP and the system will send OTP on the account holder's email id.
- III) If OTP is correct then Recognize the face and proceed to complete transaction process.

III. METHODOLOGY

CNN Algorithm for Face Recognition

The Convolutional Neural Network (CNN) algorithm is commonly used in machine learning for face recognition tasks. CNNs are a type of deep learning algorithm designed to process and analyse visual data efficiently. In face recognition, CNNs are trained on a large dataset of label facial images. The network learns to automatically extract relevant features from the input images through a series of convolutional layers, pooling layers, and fully connected layers. These layers help capture spatial hierarchies and patterns in the facial features. During training, the CNN adjusts its internal parameters through a process called backpropagation, where the network learns to minimize the difference between predicted and actual face identities. Once the CNN is trained, it can be used to recognize faces by feeding it new images and obtaining predictions for the identities of the individuals in the images. CNNs have achieved remarkable success in various computer vision tasks, including image classification, object detection, image segmentation, and more. Their ability to automatically learn meaningful features from raw visual data makes them highly effective for analysing complex images and extracting relevant information.



Steps Involved in Multi-card less ATM Using Face Recognition:

1. Data Collection: Collect a diverse dataset of facial images from different individuals. Ensure the dataset is balanced and represents various ages, genders, ethnicities, and lighting conditions. Each image should be label with the corresponding individual's identity.
2. Pre-processing: Pre-process the facial images to improve their quality and remove any noise or inconsistencies. Common pre-processing steps include resizing, cropping, normalization, and histogram equalization.
3. Facial Feature Extraction: Utilize a facial feature extraction technique, such as the popular method called Convolutional Neural Networks (CNNs), to extract relevant features from the pre-processed facial images. CNNs are widely used in facial recognition tasks due to their ability to learn hierarchical representations.
4. Face Recognition Model Training: Train a face recognition model using the extracted facial features. One commonly used algorithm for face recognition is the Siamese Neural Network, which learns to distinguish between different individuals by comparing their facial feature embedding.
5. Registration Process: Implement aregistration process where users can register their faces with the ATM system. During registration, the system captures the user's facial image and extracts the corresponding facial features. These features are then stored in a secure database linked to the user's bank account.
6. Authentication Process: When a user approaches the multi-cardless ATM, the system captures their facial image. The captured image is pre-processed and fed into the trained face recognition model, which compares it to the stored facial feature database. If a match is found, the user is authenticated.
7. Transaction Processing: Once the user is authenticated, they can perform various banking transactions like withdrawing cash, transferring funds, or checking their account balance. The ATM system securely communicates with the user's bank account to carry out these transactions.
8. Security Measures: Implement robust security measures to ensure the system is resistant to spoofing attacks. Techniques such as liveness detection, which verifies the presence of a live person, can be employed to prevent the use of static images or videos for authentication.

It's important to note that developing a robust and secure multi-card less ATM system using facial recognition technology requires expertise in machine learning, computer vision, and security protocols. Additionally, compliance with legal and ethical guidelines, such as user consent and data privacy, is crucial throughout the project.

Experimental results

1.Home page

Figures shows the results of multiscardless ATM using face recognition by using CNN algorithm. This is the home page of multi card less ATM using face recognition on this page there are two options Enroll new user and withdraw money for existing user.

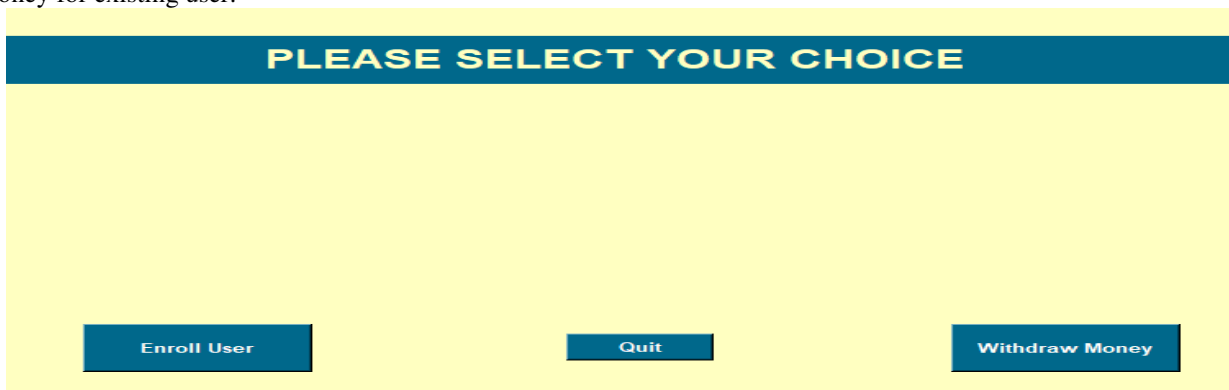


Fig -2 Home page



2.Registration of new User:

In this page we capture the new face for storing in the database and with the help of that face we can process the different functions like check balance, deposit money, withdraw money, transaction history. For the new user face registration, we take the five times pictures of the user and that images are stored in the database

The screenshot shows a registration form on a yellow background. At the top, a dark blue banner contains the text "PLEASE FILL THE FOLLOWING DETAILS" in white. Below this, there are three input fields: "Full Name" with the value "Neha Khomane", "Email ID" with the value "nkhomane237@gmail.com", and "Password" with a masked value "*****". At the bottom, there are three blue buttons labeled "Back", "Quit", and "Next".

Fig-3 Registration Form

3.E-mail OTP verification:

For the more security purpose we add the email verification in email verification process it will send the verification code to the register email address after that we need to enter this OTP for further process

The screenshot shows an OTP verification screen on a yellow background. At the top, a dark blue banner contains the text "PLEASE ENTER VALID OTP" in white. Below this, there is a "Verify OTP" input field. In the center, a dialog box titled "Enrollment Info!" is displayed, showing a blue information icon and the text "Successfully Enrolled!". At the bottom, there are two blue buttons labeled "Back" and "Next", with an "OK" button inside the dialog box.

Fig-4 OTP Verification

4.Face Recognition:

For new user registration and previous user verification we use the face recognition method after clicking on the capture button automatically open the laptop camera and it will start the capturing images for capturing the images we need to click five times space bar key and it will automatically capture the different angel and it will store in the database.

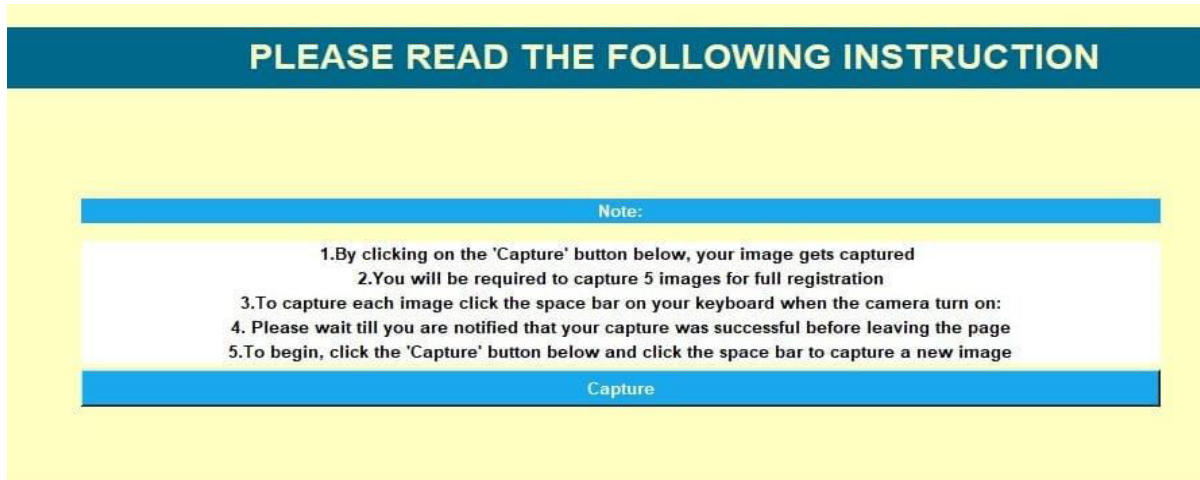


Fig-5 Face capturing



Fig-6 Successfully Register

Transaction options:

Withdraw money:

This is withdrawing functions screen in withdraw function first we give the one input box for entering the amount which is we want to withdraw from the account after the success fully follow the procedure of withdraw money they show the pop up message please take your cash.

Transfer money:

This transfer function is used for the transfer money to the another account for the transfer money we simply take two details first is account number and second is amount to be transfer and after successfully fill this field with correct details click on the transfer button. Transaction is done successfully.

Balance inquiry:

Using this button, we check b account balance and if we perform another transaction it will automatically update it.

Deposit Money:

After the successfully login into system they have the deposit option click on that function or tab we can deposit the money. After the successfully deposited money to the account it will shoes the message successfully deposited.

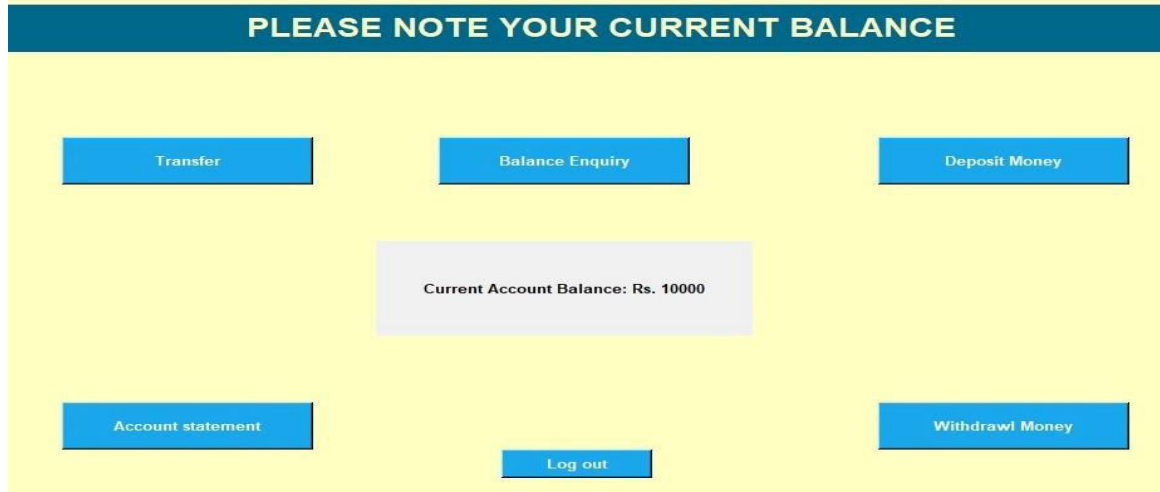


Fig-7 current balance inquiry

Transaction History:

click on the button transaction history it will show the transaction history of current login account basic use of that function is we can check our transaction on that transaction history we can understand the transaction there is no need to do anything else for access the transaction history of self-account.

Account Transactions						
Account Number	Operation Type	Account From	Amount		Date	
9134724244	deposit	nan	200		2023-05-25	
9134724244	withdrawal	nan	400		2023-05-25	

Fig-8 Account Transaction History

IV. CONCLUSION

In conclusion, the multiscardless ATM using face recognition project demonstrates the potential for increased security and convenience in the banking industry. While overcoming integration challenges and addressing privacy concerns are essential, the project provides a solid foundation for further exploration and innovation in biometric authentication systems for financial services.

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