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Third Generation ATM using Advanced Image Processing with Face Recognition

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***Abstract*: Automatic teller Machine (ATM) are widely available for users and procedure the ability to carry-out financial transactions and Banking functions in continuous time basis at any time. It made banking transactions effortless for customers current ATM's have access card and pin authentication for unique information. This explains ATMs to lot of financial theft like card-theft, pin theft and stealing account holders' information. So this project will make the multilevel high end security to find the authorized user in the ATM machine and make secured and more safety transaction and withdrawal money in ATM. High level security mechanism is provided by the consecutive actions after proceeding with pin number such as initially system use OpenCV library to analyze the person authorized identification by capturing the human face initially it begins with the entering the pin number if the entered pin is correct then the process continues with the face recognition. If the entered pin is wrong then it sends OTP to the registered mobile number by using the Twilio platform. If the entered OTP is correct then the process continues or else the transaction is declined. If the person is authorized it continues if the person is unauthorized, it sends the alert mail and alert SMS to the registered user by using the fast2sms messaging platform. After the completion of transaction, it provides persons image which was captured at the Time of withdrawal in the ATM has to be sent to the registered user mail.**

***Keywords*: Open-cv, Python, Twilio, Fast2sms.**

1. Introduction

ATMs are widely available for users and are now found in many locations having a regular or high volume of consumer traffic. As the population over internet increasing, the chance of vulnerabilities too increasing. So, there must be a multilevel high-end security provided for the authorized user to avoid thefts or frauds. So, for this security purpose we are introducing an OTP alert and a picture of withdrawal person along with a text message to his/her respective mail while ATM transactions.

The process initiates with the access of pin number. If an authorized user entered the correct pin, then the transaction would be successful and if an unauthorized user entered the correct pin, then the transaction would be successful but an image of that user which was captured with the help of Open CV during transaction process will be sent through the fast2sms platform with a security message to the registered user. Another condition involved is user entering a wrong pin number. If the user entered pin is wrong, then an OTP will be sent through a Twilio platform to the authorized mobile number. Again, If the OTP entered is wrong, the transaction will be denied otherwise the transaction will be successful for the authorized user and an image with a security text will be sent to authorized mail after transaction by an unauthorized user.

2. Literature Survey

R. Babaei, O. Molalapata and A. A. Pandor-ATM with a currency dispenser includes a contactless card reader that can read data from an RFID tag of a customer's ATM card. The contactless card reader can also be used in conjunction with a magnetic stripe card reader. It is able to prevent the missing of the ATM card and dispensed money by the customer inside the ATM center after the transaction [1].

Aru, O. Eze and I. Gozie-An automatic teller machine security model that would combine a physical access card, a PIN, and electronic facial recognition having access only to actual owner of the card [2].

Moshin Karovaliya, Saifali Karedia, Sharad Oza-Features like face recognition and one time password are used for the enhancement of the security of accounts and privacy of users. Face recognition technology helps the machine to identity each and every user uniquely thus making face as a key. This eliminates the chances of the fraud due to theft and duplicity of the ATM cards. Moreover, the randomly generated OTP frees the user from remembering PINs as itself acts as a PIN.

Laurenz, Wilskott, Jean-Marc Fellokus, Norbert Kruger, Christoph von der Masbur-Faces are represented by labeled graphs, based on a Gabor wavelet transform. Image graphs of new faces are extracted by an elastic graph matching process and can be compared by a simple function.

3. Methodology

A. OpenCv

OpenCv is the huge open-source library for the computer vision, machine learning, and image processing and now it plays a crucial role in real-time operation which is very important in today's systems. It is useful for processing images and videos to identify the objects, faces, or even human

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handwriting also. It can be used for Face detection, Object tracking and landmark detection and any many other. It is used for image processing and video streaming but mostly used for video streaming.

B. Python

Python is a computer program language often used for build websites software and automate tasks and conduct data analysis. It is free and open source with rich standard library functions.

C. Fast2sms

It is an internet communication protocol used for email and text message transmission. The email is transferred from server to other using Fast2sms. It is a program used to transfer info through email to the authorized users. It has 2 main components as user agent (UA) and MTA (mail transfer agent). UA is to make a message (or)info required and it also creates a message envelop. MTA is for mail transferring access internet.

D. Twilio

It is a programmable application which is used for efficient messaging and voice outcomes. It also Provides an easy entry into the telephonic communication. By using Twilio we can get a worldwide connectivity with common internet protocols. It provides a text message to the mobile with the user registered with Twilio containing the OTP and info etc.

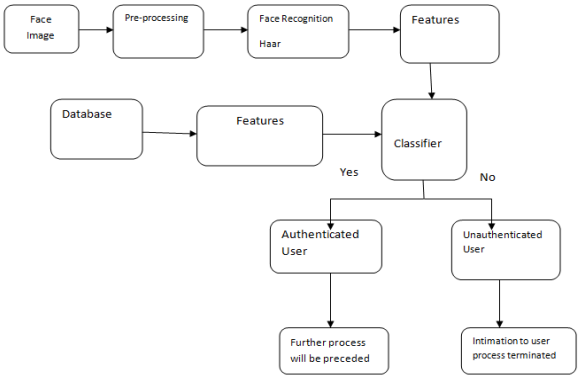

Fig. 1. Block diagram

4. Results

Initially a dataset is created by using cv2, Numpy, urilib, haar cascade classifier in python. It containing of set of images of a person treated as registered user

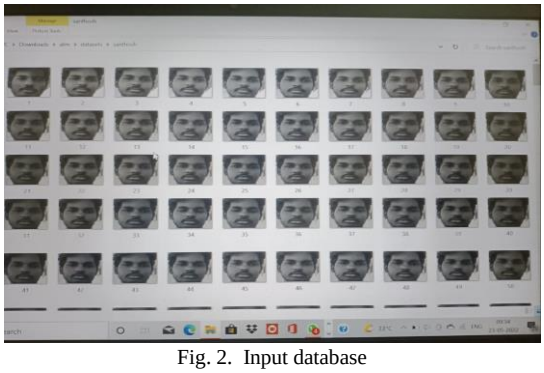

Fig. 2. Input database

Default pin is provided with in a file.

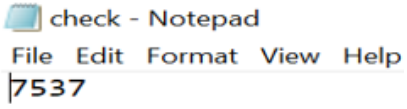

Fig. 3. Default pin

Alert message is predefined provided within in a file.

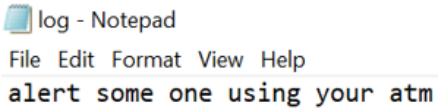

Fig. 4. Alert message containing information

If the entered pin is wrong, then it sends OTP to the registered user mobile number using the Twilio platform for further authentication.

Case-1: If the entered OTP is correct then the process continues.

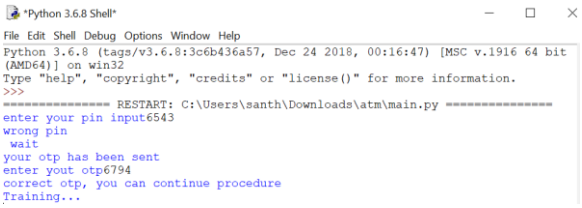

Fig. 5. Correct OTP, transaction continued

Case-2: If the entered OTP is incorrect then the process declines.

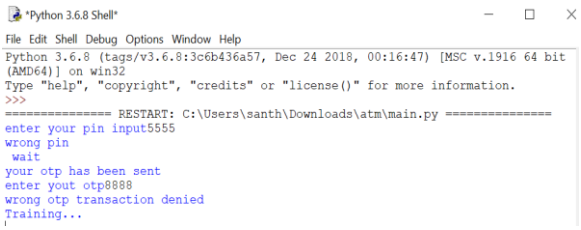

Fig. 6. Incorrect OTP, transaction denied

If the entered pin is correct then it proceeds with the face recognition here it classifies the person who is withdrawing as authorized or unauthorized with the help of input database stored.

Case-1: If the person is authorized then the transaction Continues as shown below.

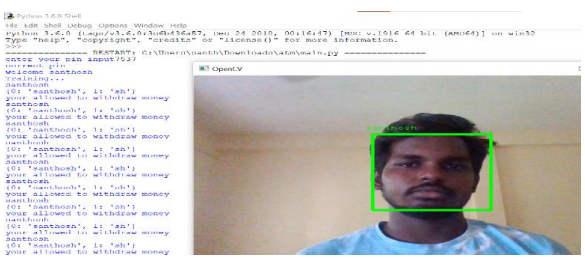

Fig. 7. Authorized user

Case-2: If the person is unauthorized.

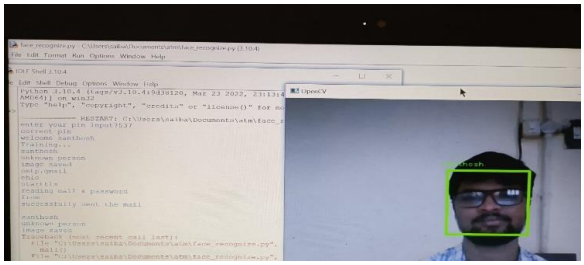

Fig. 8. Unauthorized user

Then an alert mail and alert message is sent to the registered mail id and mobile number as shown in the figure. The mail consists of the image of the withdrawal person at the atm with a security message.

The registered user got a mail with a security message and image of the withdrawal person.

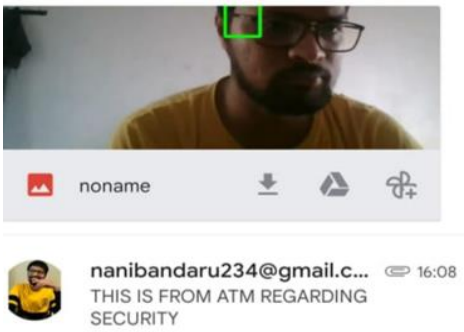

Fig. 9. Alert mail to the registered user

The registered user also receives a text message with a security information.

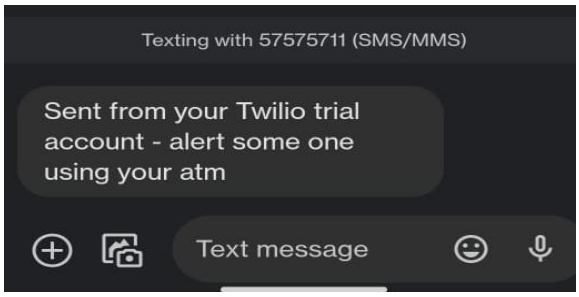

Fig. 10. Alert SMS to the registered user

5. Conclusion

With the risks involved in ATM machines that were installed in remote area, also the issue related to fraudulent transaction like misusing others card to withdraw money and etc.., We bringing the third generation ATM to overcome these challenges, we have developed solution that will leverage the AI & MI to restrict card access to only the authorized users those are identified by the face recognition algorithm. It analyze the person is authorized it continues if the person authorized identification by capturing the human face if the person is authorized it continues if the person is authorized it send the OTP to the registered user by using the Twilio mobile messaging platform. The transaction is completed only after proceeding with the correct OTP. After the completion of transaction, it additionally provides user image. Which was captured at the time of withdrawal in ATM to the registered mail by the SMTP and text message. So, the development in ML and AI helps to provide high and security by face recognition and OpenCV. I think a study on ML and AI coming together with the OpenCV must be added for UG courses of engineering to help students to leverage their talents and imaginations.

6. Future Scope

1. We Instead of using existing ATM for the banking transaction we can use smart ATM then it is easy to alert them from financial thefts and frauds.
2. We can add more features like deploy layered security. It protects the system and ATM physically.
3. In future work, third generation atm can be expanded by adding more features like auto reading of card with the user at the instant.
4. The additional security is provided by sending the facial image to the registered user which is captured at the time of withdrawal.
5. We can add another application like additional alerting system to banks to block card in case of unauthorized transactions.
6. Additional security is provided by sending the image of unauthorized user which is captured at the time of withdrawal is sent to the police officer for further investigation purpose to take action on robber and thereby act accordingly.

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