International Journal of Scientific Research in Science, Engineering and Technology
Print ISSN: 2395-1990 | Online ISSN : 2394-4099 (www.ijsrset.com)
doi : https://doi.org/10.32628/IJSRSET

Histogram of Oriented Gradients Based Face Recognition To Secure ATM Transactions

Jyothika Allenki[1], Anusha Vemireddy[1], Neha Korukanti[1], Dr. Sunil Bhutada[2]
[1]Student, [2]Professor
Department of Information Technology, Sreenidhi Institute of Science & Technology, Hyderabad, Telangana, India

Article Info
Volume 9, Issue 3

Page Number : 377-381

Publication Issue :
May-June-2022

Article History
Accepted : 01 June 2022
Published: 10 June 2022

ABSTRACT

Automated Teller Machine (ATM) is very convenient machine for everyone to use to withdraw money, checking balance etc. As all sectors of people are highly dependent on ATM's, this made ATMs are in demand. To improve security we have added an extra layer called "Face recognition", which uses high quality images for authentication purpose. Firstly, the person can enter the card number, pin then a video for a period of time is captured and face of the user is detected which gets transformed into data and validated with the image data in the bank database. In case any unauthorized person tries to withdraw the money, access to the withdrawal will be halted. If cardholder is validated as the user, it is considered as authorized transaction and they can do any transactions like money withdrawal, checking balance etc. This face recognition process will add an extra layer and provides greater security. In this project we are using Histogram of Gradient algorithm, python libraries like OpenCV for Face Detectionand Local Binary Pattern for Face recognition.

KEYWORDS : Automated Teller Mchine(ATM), Face Recognition, Local Binary Pattern, Histogram, OpenCV

I. INTRODUCTION

An ATM is an electronic telecommunications machine which allows customers to perform many operations like withdrawing of cash, depositing money, transferring of funds, or information of our without any third person like bank staff at any time.,. Covering the ATM booth with Closed-Circuit Television Camera (CCTV) and security guard (human) are physical security measures along with other technology-based securities like firewalls, data encryptions, network security etc. are already implemented to ensure safe ATM service for the clients. However, scams like stolen cards, fake cards, card cloning, skimming, etc. have become very common recently and these could deceive existing security measures easily.

II. LITERATURE SURVEY

Many research papers have been published by many people, explaining different types of authentications.

Authentication is very important for any computing Automatic teller machine(ATM).Generally authenticates using ATM card and pin .In this paper authentication was done by the combination of "One time password" and "Personal Identification number" in order to improve security and to avoid certain scenarioslike when our ATM card in wrong person hands , if they know our pin they may utilize that opportunity and withdraw money.[1]

Previously user signature method was replaced by ATM pin number, but due to high risks this pin number is replaced by human biometric system. The biometric system includes fingerprint checking, retina, iris, veins. So when it is authorized, cash will be dispersed. A lot of spoofing attacks may seen in our day to day life make us to take care more about Security.[2]

III. PROBLEM STATEMENT

In an ATM card transaction, there is never 100% proof to "authenticate" a customer. Authentication is used to verify an ATM card holder's identity during ATM transactions. Authentication is typically accomplished with a physical signature that is physically verified at the moment of transaction. Without appropriate authentication, the following issues may arise: fraudulent transactions, slow transaction processes, customer distrust, greater transaction costs, and so on.

IV. METHODOLOGY

1. Installing IDE, Tools and Libraries:

Python programming language is used to implement this project. The version of python used is python 3.8.3 .The IDE used is PyCharm Community Edition 2021.1.3. The libraries required for the project are OpenCv, sqlite3, tkinter and face_recognition. The OpenCv module is used for reading the image or video.sqlite3 library is used to store the details of customer into database. Tkinter module is used to create faster GUI application for both admin and user.Face_recognition algorithm is used to identify and verify the identity of the user.

2. Architecture

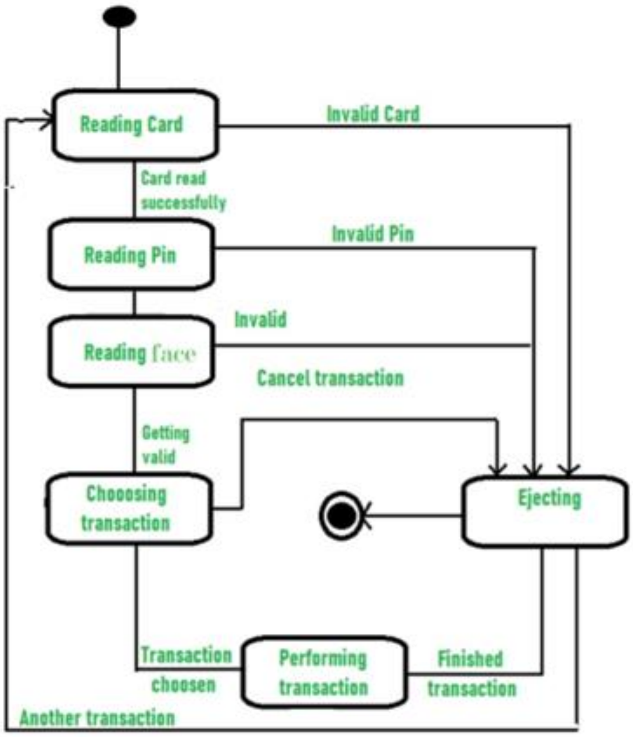


Figure 1: Shows the Architecture of the Project

3. Pseudo code:

Admin:

```
Start
For every customer insert these into accounts table of the database
account_number<- read the account number
account_pin<- read the account pin
customer_img<- read the customer image in .jpeg format
contact_number<- read the customers contact number
  End
```

User:

```
Start
  For every user
      Card <- insert the card into machine
      If card is valid
            Pin <- enter the card pin
            If valid pin
                  video <- capture_video()
                  Face_match<- matchFace()
            If Face_match= true
                Amount <- enter the amount
                Process()
                Message <- “Transaction Successful”
            Else
                response<- "No Face,Could not detect any face\nTry Again?"
                if response = true
                    Start()
                else
                    Quit the transaction
        Else
            Response <- "Incorrect Pin, Incorrect Pin\nTry Again?"
            If response = true
                Start()
            Else
                Quit the transaction
    Else
        Response <- "Invalid Account Number,\nTry Again?"
        If Response = true
            Start()
        Else
            Quit the transaction
End
```

4. Data set description

- **Account number:**A bank account number is a unique number given to every account holder and no two banks or users can have same account number. It is a primary identifier for a back account.
- **Account PIN:**A personal identification number, or PIN, is a number given to every debit or credit card holder which is necessary to access the funds of a bank account with a debit or to receive a cash advance with a credit card. The length of PIN is at least 4 digits long.
- **Image:** Image of the customer which is used to validate the customers face during any ATM transaction.
- **Contact number:** Contact number of the customer which is linked to the customer’s bank account.

V. EXPERIMENTAL SETUP

1. User Details

Initially, when a new user registers with the bank, bank collects image of the user along with his/her details. This image is stored in the database for verification of the user while making transactions through ATM.

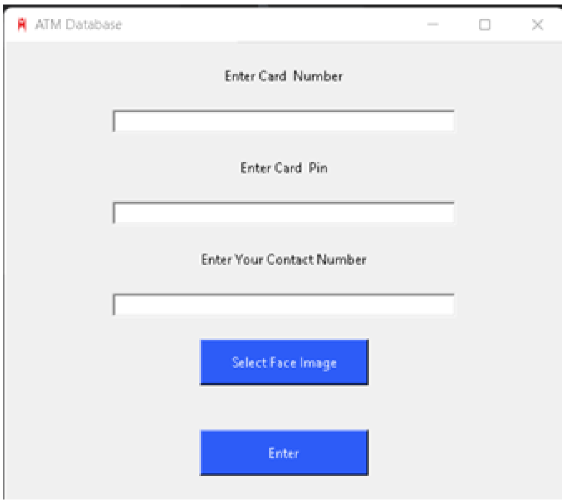


Fig.1 registration details

The user has to give the card details like card number and PIN to carry out the transaction. Once the user clicks next or proceeds further, the live capturing of the user starts.

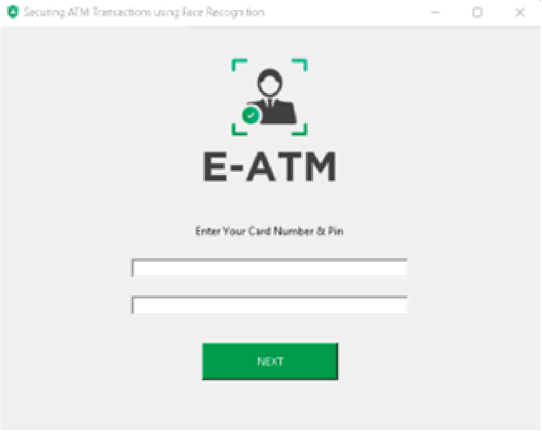

Securing ATM Transactions using Face Recognition
E-ATM
Enter Your Card Number & Pin
NEXT

Fig.2 verification details

2. Capture Video

An inbuilt camera or an external device can be used to capture the live video for stipulated amount of time to verify the user with the authorized face of the cardholder. A new camera frame will open, once the user submits the card details, which detects the face and feeds the video to the system.

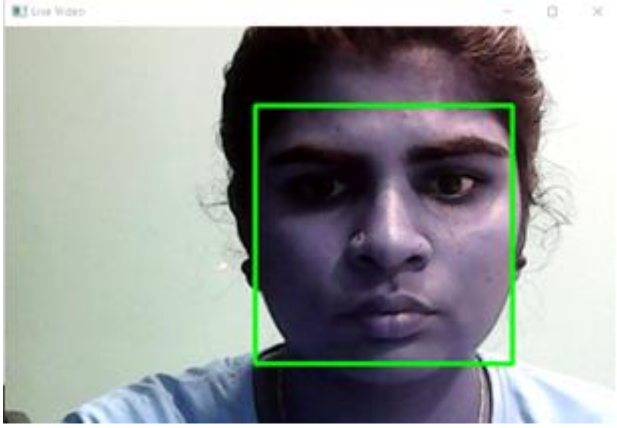


Fig.3 Face detection through video capture

3. Face Recognition

When the user uploads the image while registering, the human face is identified using the Histogram of Oriented Gradients (HOG) method. Dlib library is used to transform the base image of the user. Training of a Deep Convolutional Neural Network is made with several other face images to get unique measurements from the human face (128unique measurements from an individual face), and Support Vector Machine (SVM) for feature classification of the face.

Local Binary Pattern (LBP) is used as the base algorithm of face recognition. It is an efficient algorithm which can be molded as required to meet our purpose. An efficient texture operator used in labeling the image pixels with the neighboring threshold values of every single pixel taking the binary value.

The LBPH algorithm is implemented in python using OpenCV library. As OpenCV supports various algorithms in Computer Vision, Machine Learning and many other technologies, it has become easy to extract, study and compare different features of images. This comparision can now be used for authorization.

4. Verification & Withdrawal

Once the affine transformation of the initial face image is done for identification, the data is stored in pixels and histograms. The features extracted using Local binary pattern algorithm from the video captured are compared with the stored image. If the features match from both the images, then the user is identified as authorised user and given access to withdrawal as shown below.

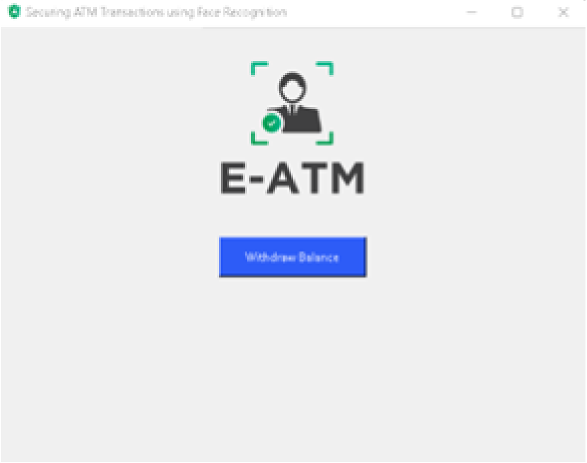
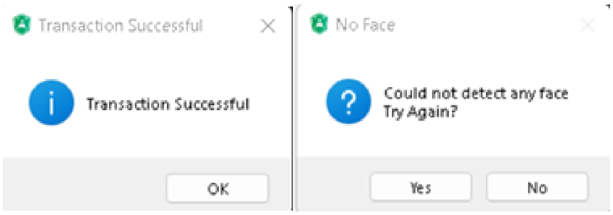


Fig.4 withdrawal access after successful verification

VI. CONCLUSION & RESULTS

With this implementation, we can resolve the issue of ATM fraud. This method enables two factor authentications to ensure that the actual owner carries out the transaction. It prevents the unauthorized or fraud usage of card by others who have access to the PIN. This is possible through face recognition. Using the live camera, the video of the user is captured and pixel data is generated to match with database image of the cardholder. After successful validation, the user is allowed to withdraw balance and a Transaction Successful dialog box will be displayed. If the faces do not match, the user will not be able to access the withdrawal. Hence, this verification system identifies and confirms the authorized user and can scale back fraud transactions to a great extent.



Transaction Successful

Transaction Successful

No Face

Could not detect any face
Try Again?

Fig5. Shows the successful transaction on authorised transactions (Right) Shows denial of access to unauthorized user as no matching face found

VII. REFERENCES

[1]. A Survey on the Security of an ATM Transaction Joyce Soares1 ,Dr. A. N. Gaikwad2https://www.ijsr.net/archive/v5i1/NOV153180.pdf

[2]. A SURVEY ON THEFT PREVENTION DURING ATM TRANSACTION WITHOUT ATM CARDS Sistu Sudheer Kumar,A. Srinivas Reddy https://ijret.org/volumes/2015v04/i18/IJRET20150418007.pdf

[3]. E.Derman, Y.K.Gecici and A.A.Salah, Short Term Face Recognition for Automatic Teller Machine (ATM) Users, in ICECCO 2013, Istanbul, Turkey, pp.111-114.https://dx.doi.org/10.21172/1.841.20

[4]. JinfangXu, Khan, Rasib and RasibHasan, SEPIA: Secure-PIN-authentication-as-a-service for ATM using Mobile and wearable devices, 3 rdIEEE International Conference on Mobile Cloud Computing, Services, and Engineering IEEE, June 2015,pp. 41-50.

[5]. Marilou O. Espina1, Arnel C. Fajardo, Bobby D. Gerardo, RujiP. Medina, Multiple Level Information Security Using Image Steganography and Authentication, International Journal of Advanced Trends in Computer Science and Engineering, Volume 8, No.6, November – December 2019, pp.3297-3303. https://doi.org/10.30534/ijatcse/2019/100862019

[6]. M.Murugesan,S.Thilagamani, Overview Of Techniques For Face Recognition, International Journal Of Life Science and Pharma Reviews , pp.66 - 71 , 2019 ,

[7]. ISSN 2250 – 0480. https://dx.doi.org/10.22376/ijpbs/10.SP01/Oct/2019

[8]. S.Karthikeyan, S.Sainath, K.P.TharunAswin, K.Abimanyu, An Automated Anti-Theft and Misusealerting System for ATM, IOSR Journal of Electronics and Communication Engineering (IOSRJECE), Volume 10, Issue 2, Ver. II (Mar - Apr.2015), PP 97-102.

[9]. P.RajeshKanna, P.Pandiaraja, An Efficient Sentiment Analysis Approach for Product Review using Turney Algorithm, Journal of Procedia, Computer Science ,Volume 165, Issue 2019, PP 356-362. https://doi.org/10.1016/j.procs.2020.01.038

[10].Sri Vasu, Subash, Sharmila Rani, Udhayakumar,ATM Security using Machine Learning techniques in IOT, International Journal of Advance Research, Ideas and Innovations in Technology, Volume 5, Issue 2, pp. 150- 153, 2019.

[11].S.Thilagamani , N. Shanthi, Object Recognition Based on Image Segmentation and Clustering, Journal of Computer Science, Vol.7, No.11, pp. 1741-1748, 2011. https://doi.org/10.3844/jcssp.2011.1741.174

Cite this Article

Jyothika Allenki, Anusha Vemireddy, Neha Korukanti, Dr. Sunil Bhutada, "Histogram of Oriented Gradients Based Face Recognition To Secure ATM Transactions ", International Journal of Scientific Research in Science, Engineering and Technology (IJSRSET), Online ISSN : 2394-4099, Print ISSN : 2395-1990, Volume 9 Issue 3, pp. 377-381, May-June 2022.
Journal URL : https://ijsrset.com/IJSRSET2293155