INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X
Impact factor: 4.295
(Volume 5, Issue 2)
Available online at: www.ijariit.com

ATM- Security using machine learning technique in IoT

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ABSTRACT

The idea of designing and implementation of the real-time ATM security project came with the incidents of accessing the ATM by the unauthorized users instead of the authorized user. This project will give access to the user only after identifying the image of the user taken by the CCTV in the ATM and compare the identified image with the image of the user that was stored in the database created during the account creation which comes under the banking session of banks. In some cases the authorized user is not able to use the ATM for some emergency purposes, in such cases, the OTP is sent to the users registered mobile number and the person who came instead of the authorized user have to enter the OTP that the authorized user received. This method will reduce the risk in ATM usage by the common people. The face detection and face recognition are done using deep learning techniques and machine learning. The IOT components like Camera, RFID reader, Tag, Relay, Motor were used. The Raspberry pi 3(2015version) is used as the main component. Here the opencv is used as the platform and the python language is used for the deep learning techniques and face detection Haar cascade is used for face detection. The face recognition module is done by Local Binary Patterns (LBP) algorithm. And an alert message is sent to the authorized user as a text message if the user is found to be the third party user.

Keywords— *ATM, Camera, RFID reader, Tag, Relay, Motor, Raspberry Pi 3 deep learning, Open CV, Python, Haar cascades, CCTV, Local binary patterns, Alert message*

1. INTRODUCTION

In today's technology world, the Internet of Things was in rapid development and popularity. As the IOT projects were implemented in various sectors of our society in government as well as the private sectors.

The ATM machines and withdraws money using the debit & credit cards are introduced, installed and spread to the vast percentages of our society. Also, the crime and illegal access of the cards became a very serious threat to both the finance sector and to people. The robbery related to ATM based on unauthorized access is also increased vast in recent years. Among the robbery in the financial sectors had been increasing proportion of about 90 percentage. The ATM robbery is found only after the robbery is done or when the amount gets debited from the account of the authorized user. Therefore, this project deals about the method to prevent the ATM robbery related to unauthorized users by allowing access to the user only after the confirmation of the user identity using the users image taken through the CCTV camera that is mounted on the ATM and the face detection is done using the face Haar cascade, face recognition is done using the Local Binary Patterns algorithm, if the user in the ATM is found to be at the real time when the person another user who is not the authorized user of that card then the OTP is sent to the authorized user that OTP should be entered by the user in the ATM machine to withdrawal of the money. If the OTP entered by the user in the ATM is wrong then the alert message is sent to the authorized user immediately. In this IOT project, the raspberry pi 3 is mainly used as the component which holds the Face detection Haar cascade used for the face detection and the face recognition Local Binary Patterns algorithm in it. The camera is used for the accurate images of the user for face detection. RFID Reader is used as the ATM card reader. TAG is used as the ATM card. The relay is used as the electromagnetic switch. Relay motor. The OTP and the alert message sent to the user through the normal message SMPP protocol where the code is written in the python language and loaded in the raspberry pi3.

2. LITERATURE REVIEW

Aru, Okereke Eze, and Ihekweaba Gozie. "Facial Verification Technology for Use in ATM Transactions." American Journal of Engineering Research (AJER) 2. This paper highlights the process of avoiding the ATM robbery illegal access of users. This paper says about ATM security by using the biometric where the users have to present theirs physically.

Wiskott, Laurenz, et al. "Face recognition by elastic bunch graph matching." International Conference on Computer Analysis of Images and Patterns. Springer, Berlin, Heidelberg, 1997. This paper highlights the method of matching the face by using the magnitudes of the coefficient. The rectangular grapy is used to represent the individual faces.

Khan, Rasib, Ragib Hasan, and Jinfang Xu. "SEPIA: Secure-PIN-authentication-as-a-service for ATM using mobile and wearable devices." 2015 3rd IEEE International Conference on Mobile Cloud Computing, Services, and Engineering. IEEE, 2015**.** This paper highlights the securely sending the pin number authentication to the users mobile or other devices using the secure obfuscated PIN authentication protocol through the cloud services.

3. PROPOSED SYSTEM

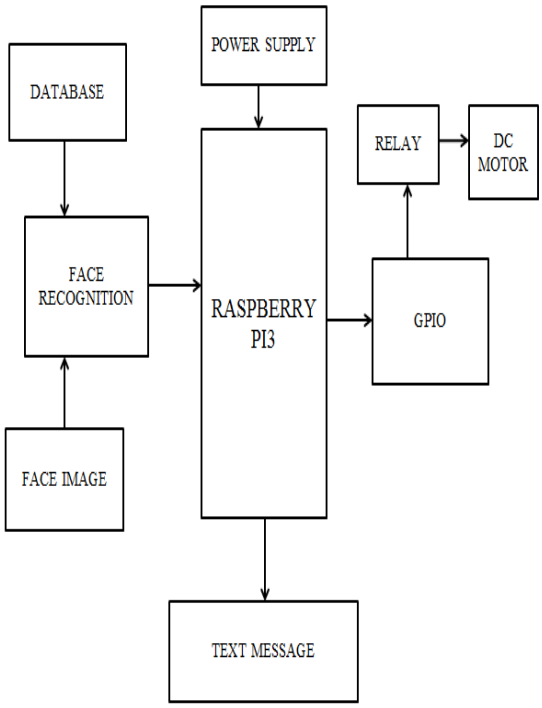

Fig. 1: Block diagram of our project

Here we present the theory of the ATM-security using machine learning technique in IOT the overall block diagram of the proposed system is explained. each block of the block diagram is explained.

4. IOT COMPONENTS

4.1 Raspberry Pi 3

Fig. 2: Raspberry pi 3 (2015).

The raspberry pi 3 is a mini computer and user-friendly .it is very compact. The raspberry pi 3 holds the operating system, programs for the compilation and running of a project also holds the documents.in our project, the raspberry pi 3 is used to store the code for the face detection, face recognition and for the alert message module with other IOT components.

4.2 RFID (Reader and TAG)

Fig. 3: RFID (Radio Frequency Identification) Reader

The RFID reader is used for the tracking of the tag, which contains the data of the user's account.

Fig. 4: RFID (Radio Frequency Identification) Tag

The RFID tag is used to store the information of the user account through which the respected information in the database is detected using the RFID reader.

4.3 Resister

Fig. 5: Resistor (1k)

Resister is mainly used to regulate the flow of current in electronic circuit terminate transmission lines, reduce current flow, and divide voltages, adjust signal levels.

4.4 DPDT Relay

Fig. 6: DPDT Relay

DPDT (double pole double throw relay) used to get the input from two inputs and connect them to the same output of one.

4.5 Transistor

Fig. 7: Transistor (BC 547)

The transistor is a semiconductor device which is used to control the current flow which flows through its one terminal.

4.6 DC Motor

Fig. 8: DC Motor (12 volts)

The DC motor is the device used to convert the electrical energy into mechanical energy.in our project, the DC MOTOR is used to rotate if the user details are correct or the entered OTP is correct.

4.7 Camera

Fig. 9: CCTV Camera (25 MP)

In our project, the 25mb camera is used to obtain the images of the user approaching the atm.

5. RESULT AND DISCUSSION

We implemented the IOT model by using suitable components with the raspberry pi 3.first the user is subjected to the photograph of various angles while issuing the debit or credit card. The images taken are stored and converted into the grayscale images for reducing the errors occur while the face recognition the grayscale image of the user is split up into many pieces and each piece is given a value and get stored. The one of the component camera is used to detect the face the person approaching the ATM by using the face detection Haar cascade which is an trained xml file while holds the xml code for the detection of the face of a person of any gender and accrue the image of the users face who is approaching the ATM machine. The accrued images of the user are also changed into the grayscale image and split down into various pieces and given values. Based upon the data stored in the card of the user the given values of the approaching user's image is compared with the respected values of the image of the user that were processed and stored while the card issuing process.

5.1 Output

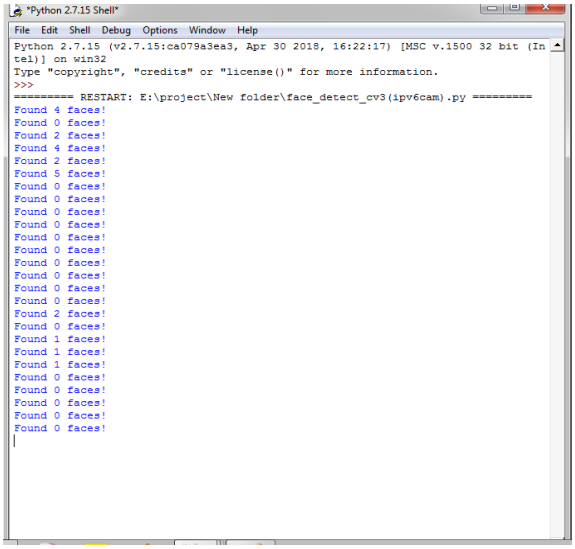

Fig. 10: Detecting the number of faces found.

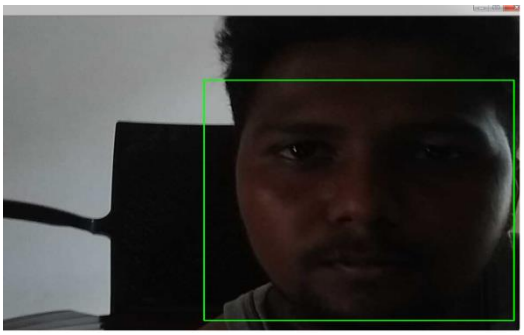

Fig. 11: Rectangle is drawn on the vertices of the face

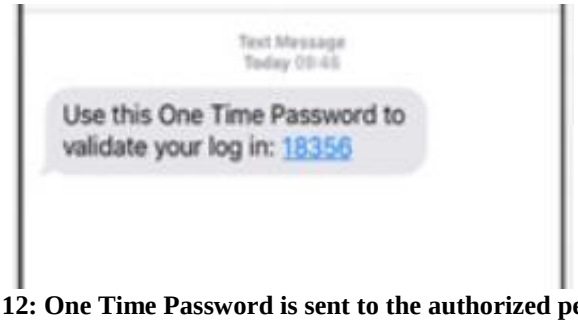

Fig. 12: One Time Password is sent to the authorized person

7. CONCLUSION AND FUTURE SCOPE

Thus the IOT project using the raspberry pi and its components with some face detection Haar cascade the face of the user approaching ATM is found and recognized if found wrong then the OTP is sent to the user, if the approaching user enters the wrong OTP then the alert message is sent as a text message to the user.

7.1 Future scope

- Can be implemented in many government purposes.
- Can be used for security purposes in various fields.
- Can be added some more modules for more security purposes.

8. REFERENCES

[1] Khan, Rasib, Ragib Hasan, and Jinfang Xu. "SEPIA: Secure-PIN-authentication-as-a-service for ATM using mobile and wearable devices." 2015 3rd IEEE International Conference on Mobile Cloud Computing, Services, and Engineering. IEEE, 2015.

[2] Wiskott, Laurenz, et al. "Face recognition by elastic bunch graph matching." International Conference on Computer Analysis of Images and Patterns. Springer, Berlin, Heidelberg, 1997.

[3] https://docs.opencv.org/3.4.3/d7/d8b/tutorial_py_face_detection.html

[4] https://becominghuman.ai/face-detection-using-opencv-with-haar-cascade-classifiers-941dbb25177

[5] http://www.scholarpedia.org/article/Local_Binary_Patterns

[6] https://www.raspberrypi.org/documentation/configuration/

[7] Aru, Okereke Eze, and Ihekweaba Gozie. "Facial Verification Technology for Use In ATM Transactions." American Journal of Engineering Research (IJER).

