

**A Project Report**  
on  
**Securing ATM Transactions with ML in IOT**

*Submitted in partial fulfillment of the  
requirement for the award of the degree of*

**Bachelor of Technology in Computer Science and  
Engineering**



(Established under Galgotias University Uttar Pradesh Act No. 14 of 2011)

**Under The Supervision of**  
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**SCHOOL OF COMPUTING SCIENCE AND ENGINEERING**  
**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**  
**GALGOTIAS UNIVERSITY, GREATER NOIDA, INDIA**

**DECEMBER – 2021**



**SCHOOL OF COMPUTING SCIENCE AND  
ENGINEERING  
GALGOTIAS UNIVERSITY, GREATER NOIDA**

**CANDIDATE'S DECLARATION**

I/We hereby certify that the work which is being presented in the project, **entitled “ Ur Info: A cross-platform Application ”** in partial fulfillment of the requirements for the award of the **BACHELOR OF TECHNOLOGY IN COMPUTER SCIENCE AND ENGINEERING** submitted in the School of Computing Science and Engineering of Galgotias University, Greater Noida, is an original work carried out during the period of **JULY-2021 to DECEMBER-2021**, under the supervision of **Mr.V. ARUL, Assistant Professor, Department of Computer Science and Engineering** of School of Computing Science and Engineering , Galgotias University, Greater Noida

The matter presented in the project has not been submitted by me/us for the award of any other degree of this or any other places.

19SCSE1010627 – ABHISHEK GUPTA

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This is to certify that the above statement made by the candidates is correct to the best of my knowledge.

Supervisor

(Dr. Arvind Dagur, Professor)

## **CERTIFICATE**

The Final Thesis/Project/ Dissertation Viva-Voce examination of **19SCSE1010627 – ABHISHEK GUPTA, 19SCSE1010627 – DEEPTI MKITTAL** has been held on \_\_\_\_\_ and his/her work is recommended for the award of **BACHELOR OF TECHNOLOGY IN COMPUTER SCIENCE AND ENGINEERING.**

**Signature of Examiner(s)**

**Signature of Supervisor(s)**

**Signature of Project Coordinator**

**Signature of Dean**

Date:

Place:

## **ABSTRACT**

Securing ATM Transactions with ML in IOT idea is specially design to create fearless and safe environment for cash transactions

In today's era of technology, as much as we have developed, the facilities have increased, the crime has also increased.

As much as ATMs have made money matters more convenient, they have also attracted the attention of cyber criminals.

Our project is to tackle ATM security challenges and make them more secure. 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. This will done using ML. In this project the ATM maintenance has be done with the help of various sensors like smoke sensor, Accelerometer, PIR sensor , light sensor and temperature sensors act as an input devices and the relay circuit act as an output device which help to ON and OFF the external devices.

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 an algorithm that is Local Binary Patterns (LBP). And an alert message is sent to the authorized user in form of text message if the user is found to be the third party user

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# CHAPTER-1 Introduction

## 1.1 REQUIREMENT OF ATM

**An automated teller machine (ATM)** ATM is an electronic banking outlet that allows customers to complete basic transactions without the aid of a branch representative or teller. Anyone with a credit card or debit card can access cash at most ATMs

The first ATMs appeared in the mid- to late-1960s and have grown in number to over millions worldwide.

In September 2020, there were over 860 million active debit cards in India. This number was much higher than the number of credit cards, which amounted to around 60 million that same month.

Fees are commonly charged for cash withdrawals by the bank where the account is located, by the operator of the ATM, or by both. Some or all of these fees can be avoided by using an ATM operated directly by the bank that holds the account.

ATMs are known in different parts of the world as automated bank machines (ABM) or cash machines.

ATMs are convenient, allowing consumers to perform quick self-service transactions such as deposits, cash withdrawals, bill payments, and transfers between accounts. Apart from cash withdrawal and checking account balance, ATMs today offer multiple facilities for

the convenience of bank customers. Fees are commonly charged for cash withdrawals by the bank where the account is located, by the operator of the ATM, or by both. Some or all of these fees can be avoided by using an ATM operated directly by the bank that holds the account. 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.

This project prevent the ATM fraud 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 wrong OTP entered by the user in ATM then the alert message is sent to the authorized user immediately.

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

## **1.2 DISADVANTAGE OF CURRENT SYSTEM**

Some general problem with ATM Some will retain damaged cards, or any card if its owner fails to enter a correct PIN after three attempts.

A cardholder can usually reclaim her card if it's been retained by a machine owned by her bank. However, if the card is kept by another bank's ATM, there's no guarantee she'll ever see it again.

As the use of ATMs has increased significantly 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.

The biggest problem of this ongoing ATM trend is that, if anyone has its PIN and card, then money can be withdrawn. And other hand if we talking about fraud then Criminals can fit skimming devices and small cameras to ATMs. These machines record account details and personal identification numbers (PIN), which the crook uses to withdraw money from those accounts. ATM skimming costs the U.S. banking system around \$1 billion each year, or \$350,000 a day, according to the Secret Service. In January 2012, Mike Urban, director of product management for Fiserv's Financial Crimes

division, told "Bank Info Security" ATM skimming had reached "epidemic" levels and continued to grow.

It has become very necessary to improve this machine related to everyone's life, so that we can transact our money without fear.

### **1.3 MERITS OF PROPOSED SYSTEM**

With this project, the problems of ATM related crime will end to a great extent. When the users are taking advantage of this project of ours, then they will have satisfactory confidence in it because its process is like this . When the biometric process barks in front of the user, then they will be satisfied.

There will be no fraud in this as it will be real time biometric at the time of transaction. No one can transact the money without crossing the full biometric processes.

## **LITRATURE SURVEY**

The ATM provides service round the clock. The customer can withdraw cash up to a certain limit during any time of the day or night. The ATM gives convenience to the customers of bank . ATMs provide convenience to the customers . To use an ATM with facial recognition system, all you need is walk to the atm. its digital camera is on 24hours a day, and its computer will automatically initiate a face recognition procedure, whenever the computer detects a human face in camera obtains a picture of your face, the computer compares the image of your face to the images of registered customers in its database created during the account creation which comes under the banking session of banks. If your face (by the ATMs camera) matches the picture of the in the data base you are automatically recognized by the machine.. The entire process of Image Processing and starting from the receiving of visual information to the giving out of description of the scene As per the changing demand of the customers, innovative software solutions are regularly released. Similarly, banks are deploying CRM technology to facilitate personalized needs of customers on one to one basis. Suppliers of ATMs are also under pressure to provide ATMs to banks which can meet the latest customer needs. Design/methodology/approach - This paper is primarily based on a review of literature. Findings - The articles were categorized under two main themes- Adoption of ATM

Technology and Impact of Adoption of ATM Technology .Impact of ATM Technology is further categorized into three sub themes- Customer's Perspectives, Bank's Perspectives and Supplier's Perspectives. This study reveals that there is a dearth of academic literature on Multi Vendor ATM Technology in developing countries .The ATM Software is to be customized with the help of personalized Technology option so as to fulfill the needs of multiple cultures in countries like India. Popularizations of biometric and multilingual ATMs are also required in Rural Areas . . ATM are widely used nowadays by people. But It's hard if we forget the PIN number or it may get damaged and users can have a situation where they can't get access to their money. In this the use of biometrics for authentication instead of PIN and ATM card is encouraged. Here, The Face ID and Fingerprint are preferred to high priority. The fingerprint is preferred to high priority. The fingerprint of the user is identified and face image is verified, and the appropriate user is given authentication. For the prototype of the system, Raspberry pi microcontroller is used [8]. 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 similarity function. Phase information is used for accurate node positioning. Object-adapted graphs are used to handle large rotations in depth [5].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

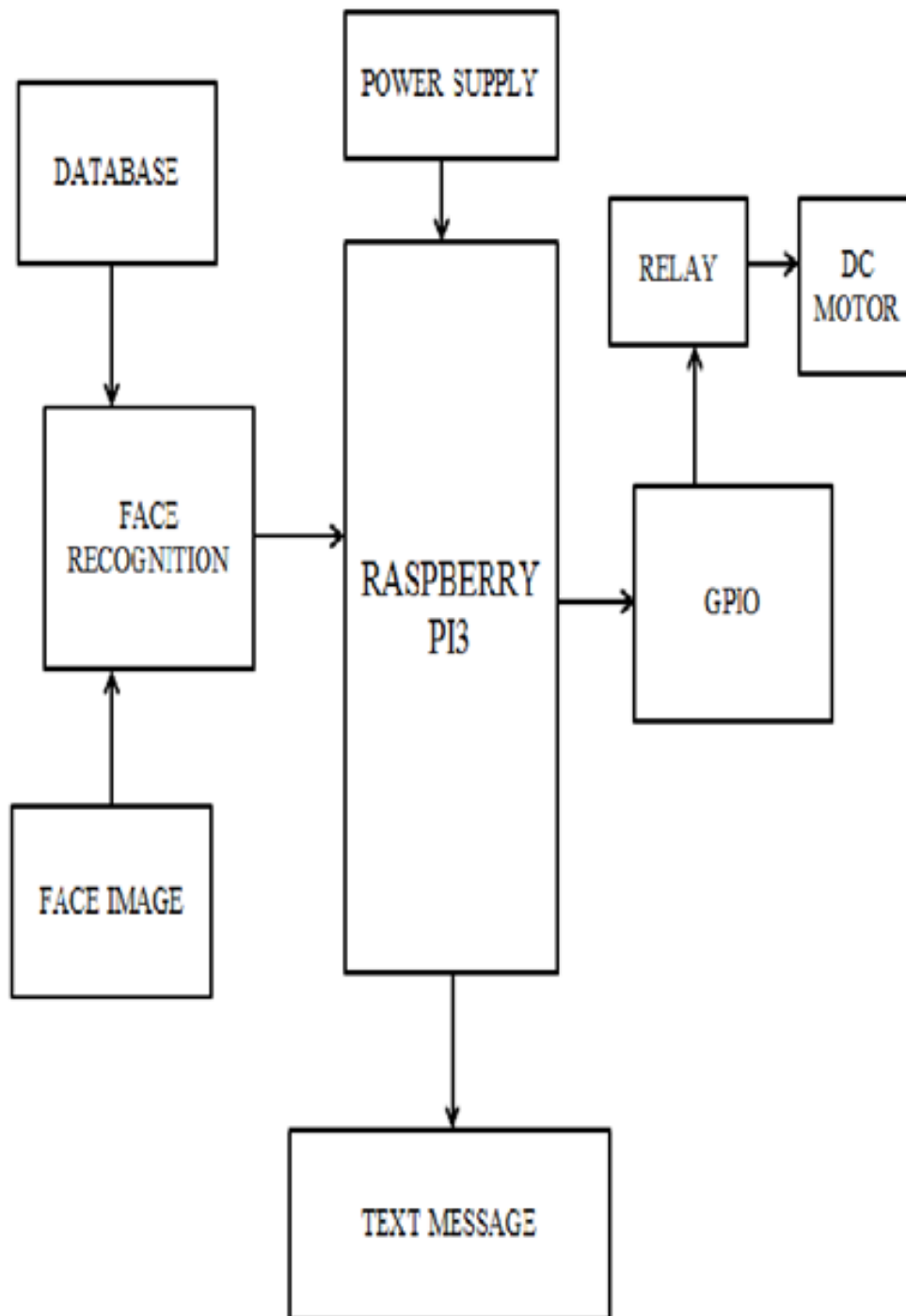
magnetic stripe card reader. It is able to prevent the missing of the ATM card and dispensed money by the customer inside the ATM centre after the transaction . An automatic teller machine security model that would combine a physical access card, a PIN, and electronic facial recognition having access only to actual owner of the card explores the difficulties in Blockchain IoT applications, and outlines the huge work in order to analyze how Blockchain could be utilized in real money coordination. The author in has examined the different error codes thrown by various ATM machines produced by different manufacturers and proposed a common code for very similar malfunctions made by the machine.



# Chapter 3

## Functionality/Working of Project

### PROJECT PROPOSED SYSTEM



# **IOT COMPONENTS IN PROJECT**

## **1. Raspberry Pi 4 Model B**

Raspberry Pi is a series of small single-board computers (SBCs) developed in the United Kingdom by the Raspberry Pi Foundation in association with Broadcom. The Raspberry Pi project originally leaned towards the promotion of teaching basic computer science in schools and in developing countries.

The Raspberry Pi is a low cost, credit-card sized computer that plugs into a computer monitor or TV, and uses a standard keyboard and mouse.

Raspberry Pi 4 Model B was released in June 2019 with a

1.5 GHz 64-bit quad core ARM Cortex-A72 processor, onboard 802.11ac Wi-Fi,

Bluetooth 5,

full gigabit Ethernet (throughput not limited),

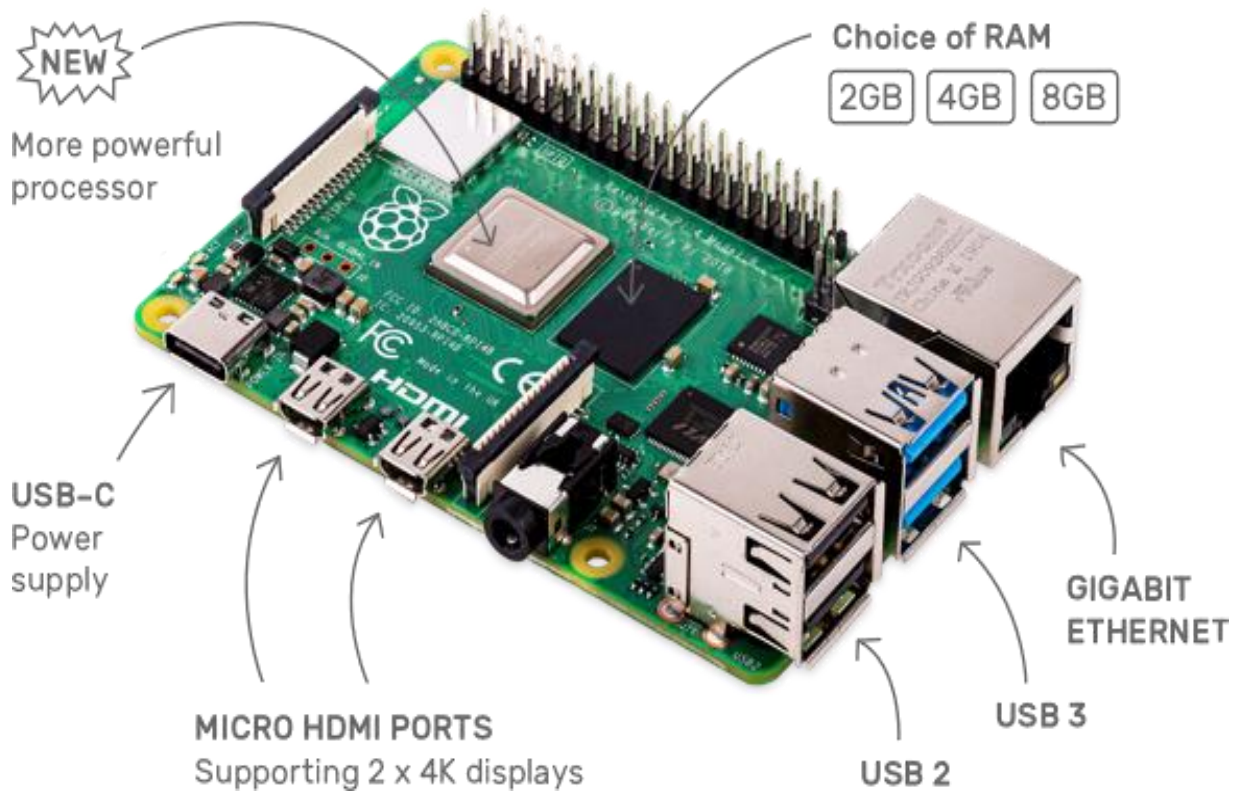
two USB 2.0 ports, two USB 3.0 ports,

2-8 GB of RAM and

dual-monitor support via a pair micro HDMI (HDMI Type D) ports for up to 4K resolution.

The version with 1 GB RAM has been abandoned and the prices of the 2 GB version have been reduced. The 8 GB version has a revised circuit board. The Pi 4 is also powered via a USB-C port.

It is a capable little device that enables people of all ages to explore computing, and to learn how to program in languages like Scratch and Python. 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.



(The Raspberry Pi 4 B, updated in 2019)

## **2 RFID (Reader and TAG)**

Radio Frequency Identification (RFID) is the wireless non-contact use of radio frequency waves to transfer data. RFID systems usually comprise an RFID reader, RFID tags, and antennas.

### **WORKING OF RFID**

Tagging items with RFID tags allows users to automatically and uniquely identify and track inventory and assets. RFID takes auto-ID technology to the next level by allowing tags to be read without line of sight and, depending on the type of RFID, having a read range between a few centimeters to over 20 -plus meters

RFID has come a long way from its first application of identifying airplanes as friend or foe in World War II. Not only does the technology continue to improve year over year, but the cost of implementing and using an RFID system continues to decrease, making RFID more cost-effective and efficient.

**In our project we use the reader and tag :**

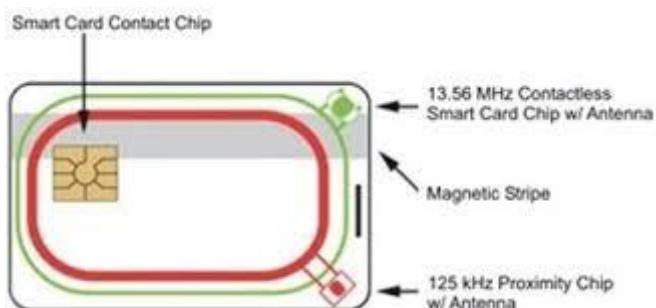
**a. RFID (Radio Frequency Identification) Reader :**

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



## b. 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.



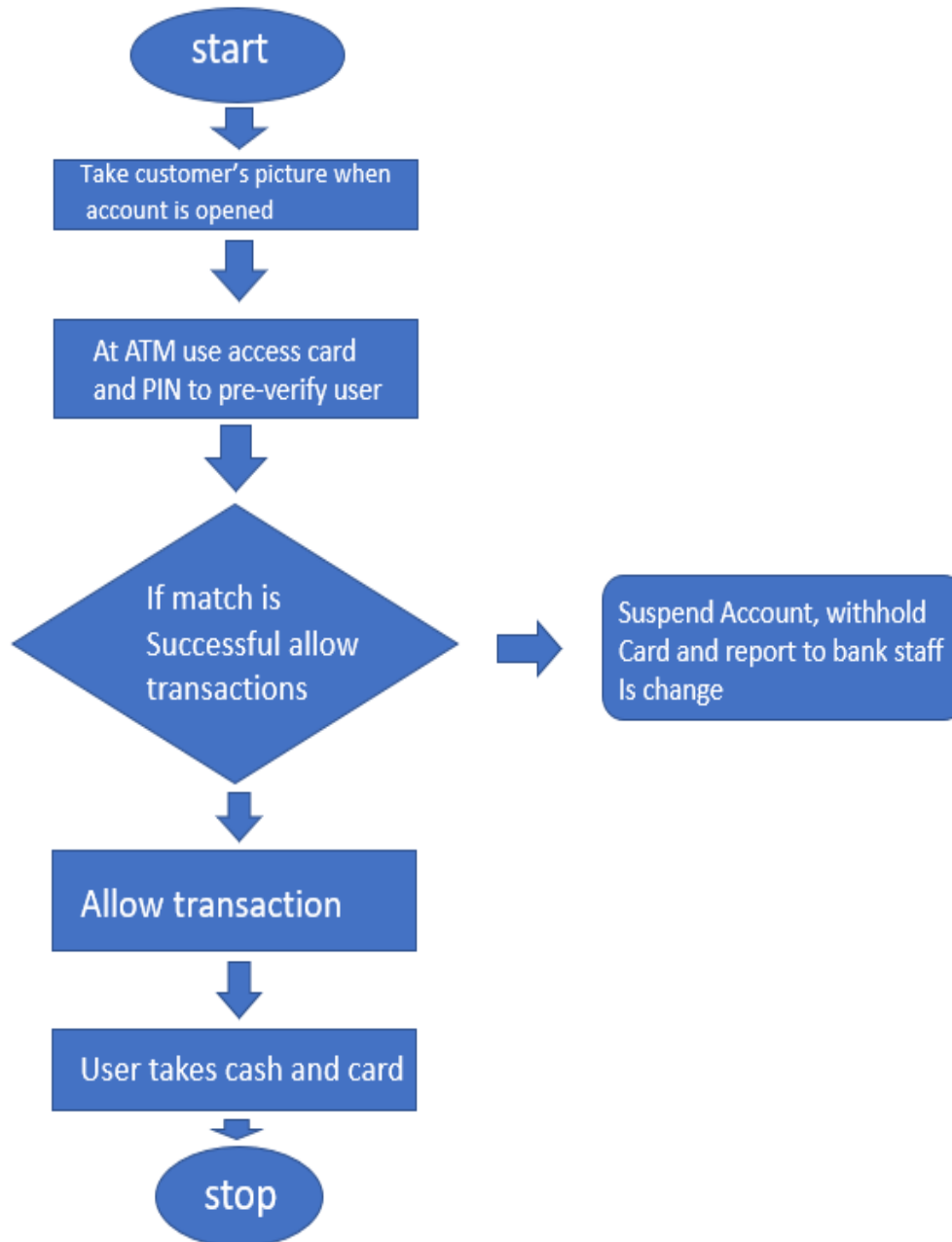
## **CAMERA**

In my project, the 32 mb camera is used to obtain the images of the user approaching the atm





## Flow Chart of The Project



## **Chapter 4**

### **Results and Discussion /functions**

#### **FACE DETECTION TECHNOLOGY**

Facial recognition is a way of using software to determine the similarity between two face images in order to evaluate a claim. The technology is used for a variety of purposes, from signing a user into their phone to searching for a particular person in a database of photos.

Facial recognition uses computer-generated filters to transform face images into numerical expressions that can be compared to determine their similarity. These filters are usually generated by using deep “learning,” which uses artificial neural networks to process data.

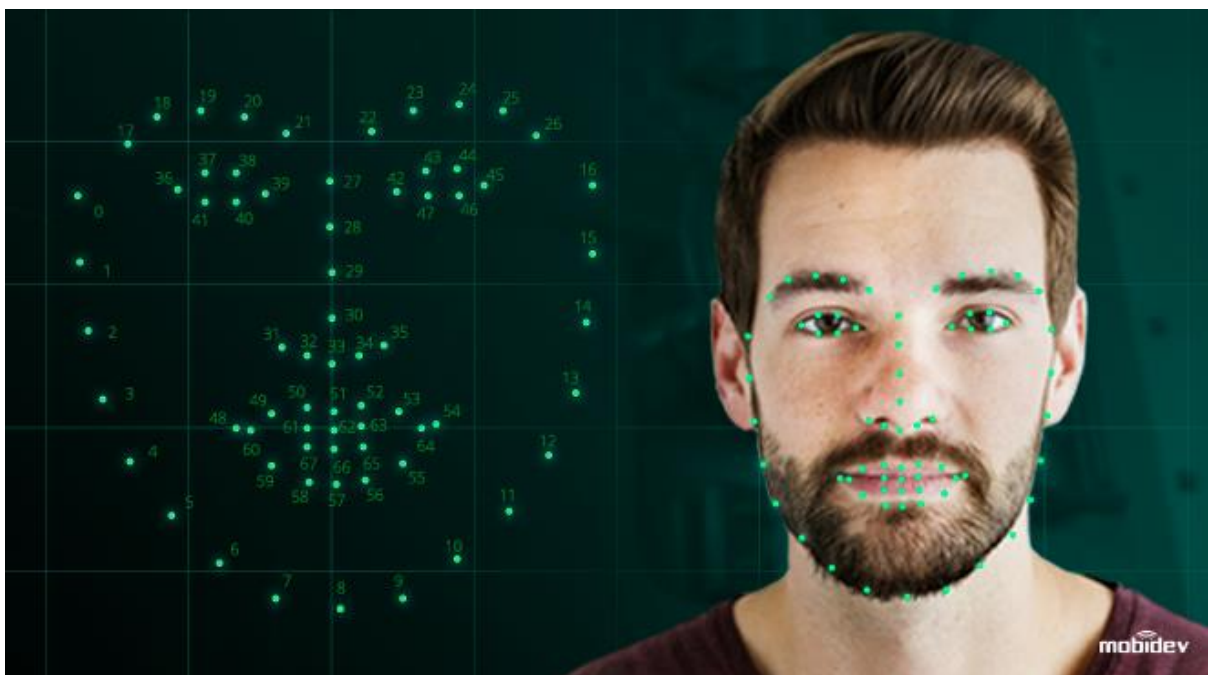
Facial recognition is improving rapidly, but while algorithms can achieve very high performance in controlled settings, many systems have lower performance when deployed in the real world.

Summarizing the accuracy of a facial recognition system is difficult, however, as there is no single measure that provides a complete picture of performance.

The facial recognition process begins with an application for the camera, installed on any compatible device in communication with said camera

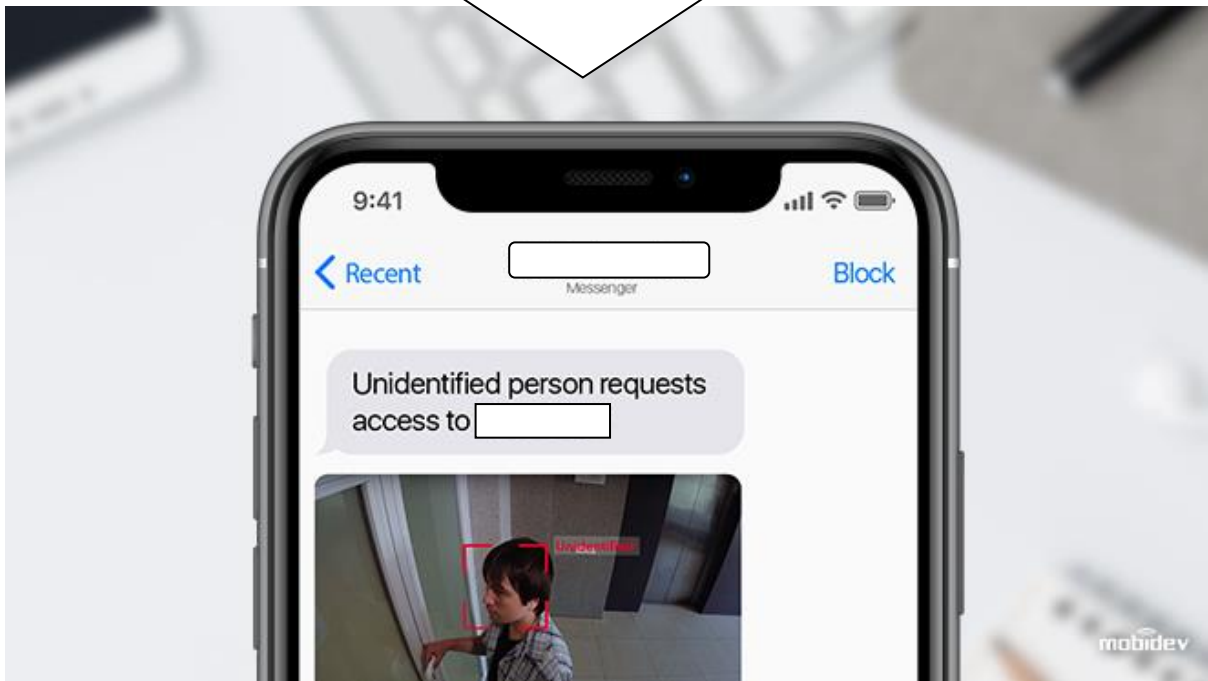
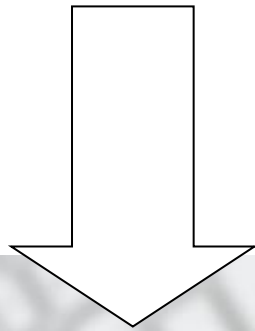


With back end



## **If the user unidentified the this will going to be**

When a face turns up as unidentified, this image can be relayed to a right user and if the person is not recognized by the user then message will send to bank manager along with a notification via a chatbot in a messenger program, or some other means. The manager would be presented with an array of options on how to handle the situation from that point forward.



## **Face Detection algorithm used in our project is :**

### **OpenCV**

OpenCV is a great tool for image processing and performing computer vision tasks. It is an open-source library that can be used to perform tasks like face detection, objection tracking, landmark detection, and much more. It supports multiple languages including python, java C++. Although, For this article, we will be limiting to python only.



The library is equipped with hundreds of useful functions and algorithms, which are all freely available to us. Some of these functions are really common and are used in almost every

computer vision task. Whereas many of the functions are still unexplored and haven't received much attention yet.

## **HAAR CASCADES**

Face Detection, a world wide popular subject with a huge range of applications. Modern day Laptops and Smartphones come with in-built face detection softwares, which can authenticate the identity of the user. There are numerous apps that can capture, detect and process a face in real time, can identify the age and the gender of the user

So Haar Cascade

It is an Object Detection Algorithm used to identify faces in an image or a real time video. Haar Cascade classifiers are an effective way for object detection. This method was proposed by Paul Viola and Michael Jones in their paper Rapid Object Detection using a Boosted Cascade of Simple Features .Haar Cascade is a machine learning-based approach where a lot of positive and negative images are used to train the classifier.

Facial detection via haar cascades is a common method used due to its high detection rate and fast processing speed.

The algorithm can be summed up in four steps:

- feature selection
- feature evaluation
- feature learning to create a classifier

cascading classifiers

## **WORKING OF Facial Recognition Algorithm**

Your face is detected and a picture of it is captured from a photo or video.

The software reads your facial features.

The algorithm verifies your face by encoding it into a facial signature (a formula, strain of numbers, etc.) . and comparing it with databases of known faces, looking whether there is a match



## 6.2 CODE FOR THE FACIAL RECOGNITION (HAAR CASCAD)

### 1. code for face detect

```
main.py
1 # ABHISHEK GUPTA DEEPTI
2 |
3 # Importing all required packages
4 import cv2
5 import numpy as np
6 import matplotlib.pyplot as plt % matplotlib inline
7
8
9 # Read in the cascade classifiers for face and eyes
10 face_cascade = cv2.CascadeClassifier('../DATA / haarcascades / haarcascade_frontalface_default.xml')
11 eye_cascade = cv2.CascadeClassifier('../DATA / haarcascades / haarcascade_eye.xml')
12
13
14
15 # create a function to detect face
16 def adjusted_detect_face(img):
17
18     face_img = img.copy()
19
20     face_rect = face_cascade.detectMultiScale(face_img,
21                                               scaleFactor = 1.2,
22                                               minNeighbors = 5)
23
24     for (x, y, w, h) in face_rect:
25         cv2.rectangle(face_img, (x, y),
26                       (x + w, y + h), (255, 255, 255), 10)
27
28     return face_img
29
30
31 # create a function to detect eyes
32 def detect_eyes(img):
33
34     eye_img = img.copy()
35     eye_rect = eye_cascade.detectMultiScale(eye_img,
36                                             scaleFactor = 1.2,
37                                             minNeighbors = 5)
38
39     for (x, y, w, h) in eye_rect:
40         cv2.rectangle(eye_img, (x, y),
41                       (x + w, y + h), (255, 255, 255), 10)
42     return eye_img
43
44 # Reading in the image and creating copies
45 img = cv2.imread('../sachin.jpg')
46 img_copy1 = img.copy()
47 img_copy2 = img.copy()
48 img_copy3 = img.copy()
49
50 # Detecting the face
51 face = adjusted_detect_face(img_copy)
52 plt.imshow(face)
53 # Saving the image
54 cv2.imwrite('face.jpg', face)
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```



## 2. Code for eye detect

```
main.py
1 # ABHISHEK GUPTA DEEPTI
2
3
4
5 eyes = detect_eyes(img_copy2)
6 plt.imshow(eyes)
7 cv2.imwrite('face_eyes.jpg', eyes)
```

output



### 3. Code for face and eye

```
main.py
1 # ABHISHEK GUPTA DEEPTI
2
3
4
5 eyes_face = adjusted_detect_face(img_copy3)
6 eyes_face = detect_eyes(eyes_face)
7 plt.imshow(eyes_face)
8 cv2.imwrite('face+eyes.jpg', eyes_face)
```

### Output



Assessment is made



			0.9	0.7	0.9
			0.7	0.9	0.8
0.2	0.2	0.2	0.7	0.8	0.7
0.1	0.2	0.4	0.7	0.8	0.6
0.2	0.4	0.1	0.8	0.5	0.6
0.3	0.4	0.1	0.7	0.8	0.9

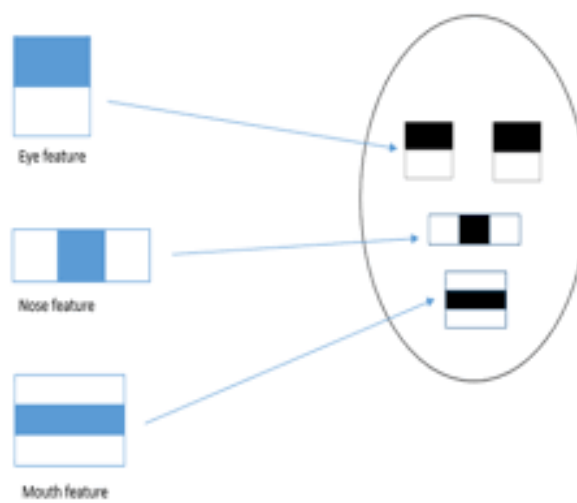


Fig 6.2



Fig 6.3

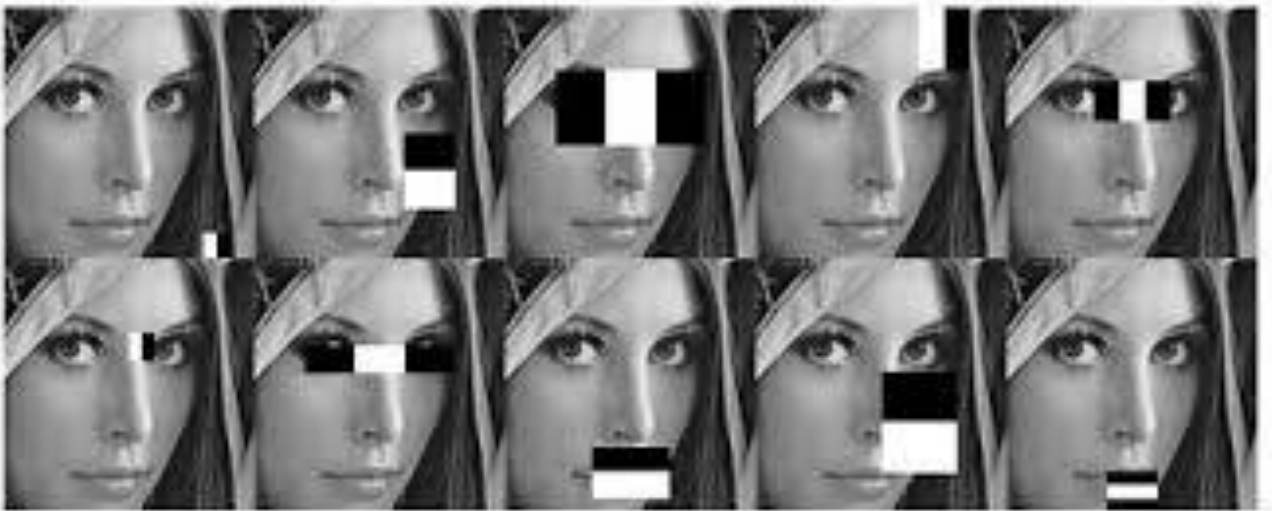


Fig 6.4

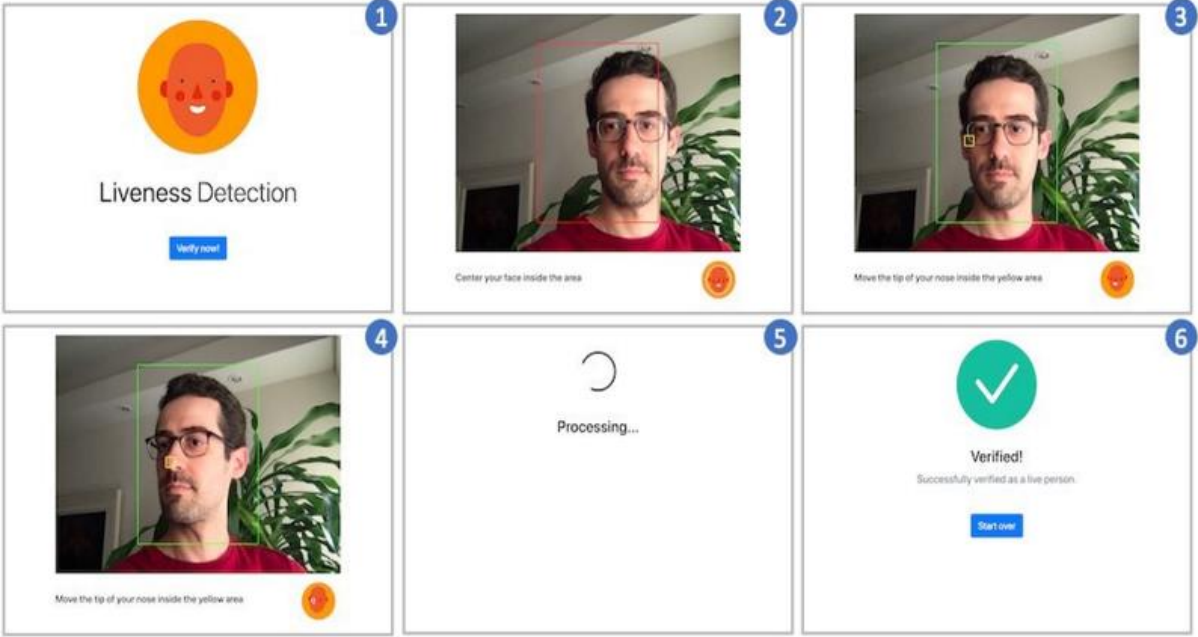
## NOW THE PROCESSES TO TRANSACT IN ATM

First of all we have to swipe our atm debit/credit card



Fig: Feature Detection on an Image containing a face

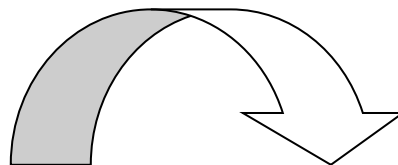




Once your biometric round (successfully face detection ) has been completed successfully then the second round option is there

select the amount that

You want to be withdrawal





Rest processes also be continue the same ...

you can collect you cash in very safe mode



**Fig**

## **Chapter 5**

### **Conclusion and Future Scope**

#### **Conclusion**

With this project, the problems of ATM related crime will end to a great extent, also user will have satisfactory confidence in it. Our project is like a two factor authentication method which is used to confirm that the transaction is done by the card holder or the persons trusted by the owner using face recognition We have proposed different approaches by different researches for ATM monitoring and security. Generally in all other papers they use the sensors to monitor the unusual activities by GSM, but in our project we update the unusual activities by using IOT and ml . This ATM concept provides security against exploitation of identity and reliance.

## **Future Scop**

Preventing the frauds at ATMs. Deliver a practical and workable solution that addresses the requirements of the regulatory authorities.

Limit the financial risks given that they were forced to take responsibility for financial loss.

Provide a framework that still allowed for high withdrawal limits to cater for the demands of a cash-focused customer base

Take societal responsibility to reduce rising levels of crime that were associated with cash-card transactions

Increase customer satisfaction

Different charges for transactions given that the transaction takes place in a more secure manner

Higher withdrawal and transaction limits.

Peace of mind given the higher level of security applied to the account

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