

## Face Recognition Based New Generation ATM Machine

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### Abstract

Automated Teller Machines are widely used nowadays by people. But it's hard to carry their ATM card everywhere, people may forget to have their ATM card or forget their PIN. The ATM card may get damaged and users can have a situation where they can't get access to their money. The main aim of the project is to design a Face Recognition Based New Generation ATM Machine using MATLAB. This application is processed in the ATM security framework to improve the verification strategies to improve innovation.

**Keywords** - PC with MATLAB, Arduino, GSM module, DC motor, Face recognition technology.

### 1. Introduction

The rise of technology brings into force loads of types of tools that aspire to more customer pleasure. ATM is a machine that made money transactions effortless for customers. But it has both advantages and disadvantages. Current ATMs make use of naught more than an access card and PIN for uniqueness confirmation. This ATM Using the Face Recognition System demonstrate the way to a lot of fake attempt and mistreatment through card theft, PIN theft, stealing, and hacking of customers' account details and another part of security.

Face Recognition is an application to naturally distinguish an individual in the wake of contrasting and a database of pictures. A test picture is taken with the assistance of a camera from a still source or video outline, and in the wake of representing different conceivable face appearance varieties, is contrasted and the database pictures for character. Analysis have an extraordinary enthusiasm for this field for its applications in different spaces. One of the business utilizations of the face acknowledgement frameworks could be begin with little essential login applications and prompting the improvement of a high security get to control framework, secure biometric based exchange or exceptionally verified observation framework A information and procedure acclaimed affirm or check the character of an individual or totally security requirements.2 confirmation could be a framework wherever in 2 or a great deal of different elements zone until wont to exhibit the people exploitation higher than issue is ordinarily alluded to as "Solid Confirmation". The technique for

numerous responses to challenge inquiries similarly you as recovers 'something you have' or 'something you are' is taken into thought multifaceted voltage supplies through the power jack , get to it through this pin.5V-this stick directs the yield 5V from the controller on the board. The board can be provided with the power either from the DC control hack (7-12), USB board (7-12Volt). Providing voltage by means of and can harm your board. We don't exhort it. 3V3, A 3.3 volt supply created by the onboard controller.

## **2. Objectives**

### **2.1 What Are Face Recognition Systems?**

FRS is an application that mechanically identifies a person from a digital image or a video outline from a video source. One of the behaviors to do this method is to match chosen facial features from a facial database and the image.

Various facial recognition algorithms be familiar with faces by extracting features, from a snap of the subject's face. For example, an algorithm may examine the size, and relative position, in addition to/or outline of the nose, eyes, cheekbone, and jaw. These facial appearances are then used to search for other imagery across matching features. Another algorithm manages a balcony of face images and then compresses the image's face information and it saves only the data in the image that is used for face detection. A searched image is then compared with the face record.

The project makes use of ARDUINO UNO, DC motor GSM and PC with MATLAB. In this DC motor an ATM for money transactions and a GSM module are used to send and receive the OTP to the customer and the Arduino microcontroller is a mediator between input and output modules. Based on the input the microcontroller takes the necessary action on the system.

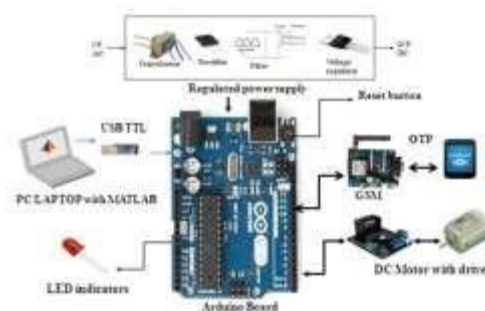
### **2.2 Literature Survey :**

Financial institutions have registered major losses till today due to users being exposed to their credit and debit card information. For secure PIN authentication, in this paper, we propose Secure-PIN Authentication-as-a-Service (SEPIA), a secure obfuscated PIN authentication protocol for ATMs and other point-of-service terminals using cloud-connected personal mobile and wearable devices. It protects the user from intermediate transaction attacks. A SEPIA user utilizes a mobile device for scanning or QR code on the terminal screen to prove co-location to the cloud-based server obtain a secure PIN template for point-of-service authentication . Features like face recognition and one-time password are used for the enhancement of the security of accounts and the privacy of users. Face recognition technology helps the machine to identify every user uniquely thus making face a key. This eliminates the chances of fraud due to theft and duplicity of ATM cards. Moreover, the randomly generated OTP frees the user from remembering PINs as it acts as a PIN .

ATMs are widely used nowadays by people. But it's hard if we forget the PIN 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 as a high priority. The fingerprint is preferred as a 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, the Raspberry Pi microcontroller is used . 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 .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 can prevent missing the ATM card and dispense money by the customer inside the ATM center 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 an actual owner of the card . Denis et. al., explore the difficulties in Blockchain IoT applications, and outline the huge work to analyze how Blockchain could be utilized in real money coordination. The author in has examined the different error codes thrown by various ATMs produced by different manufacturers and proposed a common code for very similar malfunctions made by the machine.

### 2.3 Implementation:

The design can be implemented with an Arduino microcontroller. The interfaced devices to the Arduino microcontroller are PC with MATLAB, GSM, and DC motor along with driver.



Whenever a customer or an account holder faces the LAPTOP CAMERA . The MATLAB code is running inside the laptop and the image is captured and compared with a facial database, if it is matched then OTP (one-time password) will be sent to the customer's registered mobile number through a GSM modem. The customer in turn needs to forward the same code to the GSM modem to withdraw the money. Once the code is forwarded by the customer, the controller checks the received code with the generated code. If it matches then the Arduino transaction that amounts through the DC motor. After the transaction, the

remaining balance will be again sent to the customer's registered mobile number via GSM modem.

#### **2.4 Related Work:**

A brief introduction of the different modules used in this project is discussed below:

#### **2.5 ARDUINO UNO:**



The Arduino Uno is a microcontroller board that has ATmega328 from the AVR family. There are 14 digital input/output pins, 6 Analog pins, and a 16MHz ceramic resonator. USB connection, a power jack, and also a reset button are used. Its software is supported by several libraries that make programming easier.

#### **2.6 GSM MODULE :**



GSM, which stands for Global System for Mobile Communications, reigns (important) as the world's most widely used cell phone technology.

SIM800 is a quad-band GSM/GPRS module designed for the global market. It works on frequencies GSM 850MHz, EGSM 900MHz, DCS 1800MHz, and PCS 1900MHz. SIM800 features GPRS multi-slot class 12/ class 10 (optional) and supports the GPRS coding schemes CS-1, CS-2, CS-3, and CS-4. With a tiny configuration of 24\*24\*3mm, SIM800 can meet almost all the space requirements in users' applications, such as M2M, smartphones, PDAs, and other mobile devices. SIM800 has 68 SMT pads and provides all hardware interfaces between the module and customers' boards. SIM800 is designed with a power-saving technique so that the current consumption is as low as 1.2mA in sleep mode. SIM800 integrates TCP/IP protocol and extended TCP/IP AT commands which are very useful for data transfer applications.

Its works with AT commands.

Commands always start with AT (which means Attention) and finish with a <CR> character. In this project, we are using two commands:

**Read message +CMGR**

**Send message +CMGS**

## 2.7 DC Motor:



An electric **motor** is an electrical machine that converts electrical energy into mechanical energy. The basic working principle of a **DC motor** is: "Whenever a current-carrying conductor is placed in a magnetic field, it experiences a mechanical force". In this project, we are using a DC motor as an ATM.

## 2.8 MATLAB:

The name MATLAB stands for matrix laboratory. MATLAB (matrix laboratory) is a numerical computing environment and fourth-generation programming language. Developed by Math Works, MATLAB allows matrix manipulations, plotting of functions and data, implementation of algorithms, creation of user interfaces, and interfacing with programs written in other languages, including C, C++, Java, and Fortran.

MATLAB can be used in a wide range of applications, including signal and image processing, communications, control design, test and measurement, financial modeling and analysis, and computational biology. For a million engineers and scientists in industry and academia, MATLAB is the language of technical computing.

## 3. Methods

### Software description

Installing Arduino IDE: The Arduino IDE keeps running on all the most recent versions of the Microsoft windows. To download the most up to date form of the IDE from the download page get to the Arduino site [www.arduino .cc](http://www.arduino.cc). In the Arduino IDE new forms of the windows IDE are accessible as an installer that we can download and run, rather than downloading a ZIP record. Introduce drivers to the Arduino USB port and this procedure relies upon the Arduino board. After the drivers have been introduced, begin the executable from the documents fundamental index by double tapping on it.

### Features

1. Rated Voltage: Max 30 Vp-p
2. Current Consumption: 12mA @ 10Vp-p Square Wave 4.1kHz

3. Sound Pressure Level(10cm): 90dB @ 10Vp-p Square Wave 4.1kHz
4. Flying Leads Fitted.
5. Voltage: range 2.25~4.8V, nominal 3.6V.
6. No-load: 16500rpm, 0.68A (at 3.6V).
7. High and Clear Sound, audible for many metres - KPE-110
8. Dimensions: 24mm Diameter, 5mm High, 29mm between mounting holes.

### **Relay and Motor**

The DPDT relay or handoff (Double Pole Double Throw) is very fascinating and can be utilized in different situations, including for altering the course of an engine as should be obvious in the course of the engine as should be obvious in the image underneath. It has 2 terminals and 4 connectors and you can take a ground at the DPDT relay as what might be compared to 2 Single Pole Double Throw SPDT transfers between the control circuit and the circuit being controlled.

1. Coil input pin1. This is commonly associated with the positive terminal of your flag source
2. Coil input pin2. This is commonly associated with the negative terminal of your signal source.
3. Typically Open pin. This stick is ordinary not associated with the regular stick ,it is associated when the transfer is activated.
4. Ordinarily shut pin . This stick is typically associated with the regular stick and it is removed when the relay is started.
5. In many of the cases, this stick is associated with the ground of the source we use to drive the apparatus.

### **Haar Cascade Classifier Recognition Method for Face**

It is an AI based technology where a course work is prepared from a great deal of positive and a negative pictures. It is then used to distinguish protest in different images. Here we all work with face recognition .First of it the calculation needs a great deal of positive and negative images to prepare the classifier. At the point they have to extricate highlights from it. For this, hear highlights appeared underneath image are utilized. They are similar to our convolutional

region .Every element is solitary esteem gotten by reducing whole of pixels under white square shape from total of pixels under dark square shape.

Indeed even a 24x24 window results over than 16000 highlights). Or each component computation. We have to discover total of pixels under white and dark square shapes.

- To solve this, they presented the necessary images. It streamlines figuring o whole pixels.
- How large might be the quantity of pixels, to a task including only four pixels. Decent, would it sat isn't? It make things super-fast
- However, every one of these highlights we determined, a large of them are useless

- The principle include chose appears to concentrate on the property that the local of the eyes is regularly darker than nose in the cheeks.
- The Second element chose depends on the property that eyes are darker than the scaffold of the nose.
- For instance, considered the picture underneath top line demonstrates two grade highlights.

### Arduino UNO Programming:

The Arduino board can be modified utilizing the Arduino IDE programming. The publications window will open when the Arduino IDE programming is opened. This window accepts o two critical parts, one is setup part and second is the principle circle. The Arduino ports, or example, into yield, and consistent capacities are characterized in setup part and circling conditions are coded in the principle circle. At the point the program is assembled or blunders and alerts. On fruitful investigating, the code is inserted to the controller through the transfer choice.

## 4. Results

### Figures And Tables

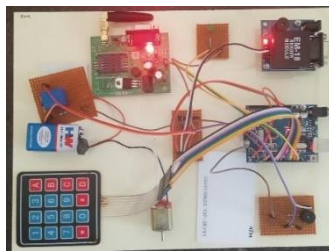
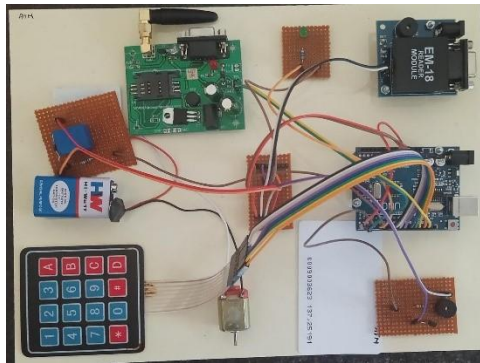


Fig 4.1 Collect Image

```
Arduino IDE window showing code for image processing:  
#include <opencv2/opencv.hpp>  
using namespace cv;  
Mat img;  
Mat img_gray;  
int main()  
{  
  Serial.begin(9600);  
  while(1)  
  {  
    if(Serial.available())  
    {  
      char c = Serial.read();  
      if(c == 's')  
      {  
        img = imread("img.jpg");  
        img_gray = cimg2gray(img);  
        imshow("Original Image", img);  
        imshow("Grayscale Image", img_gray);  
        waitKey(0);  
      }  
    }  
  }  
}
```

Fig 4.2 Select the first user image



**Fig 4.3 Project output image**



**Fig 4.4 A GSM module sends the OTP to the customer**



**Fig 4.5 After the transaction user gets the message about the remaining balance**

## 5. Conclusions

The existing model presents an Integrating feature of all the hardware components which has been used and developed in it with Arduino. The Presence of every module has been reasoned out and placed very carefully. Hence contributing to the best working unit for the "Face Recognition Based New Generation ATM Machine" has been designed perfectly. Secondly, using MATLAB for face recognition technology and Arduino ide studio for dumping the code into the Arduino. And also the system makes it more secure the system can send the OTP (one-time password) to the customer for confirmation. After the transaction, the system can send a message about the remaining balance with GSM. Thus, the project has been successfully designed and tested.

We would like to thank all the authors of different research papers referred to during the



writing of this paper. It was very knowledge-gaining and helpful for further research to be done in the future.

This paper has exhibited the adequacy of ace recognition framework perceiving aces utilizing a view based methodology actualized with Haarcascade. Haar course based ace acknowledgement is vigorous and has better execution. Also combination of various Haar execution. Also combination of various Haar chose organizes classifiers improves the general execution of ace acknowledgement. Joined with other open CV with the Haar course organizes strategies, this strategy gives better outcomes and acknowledgement rate is expanded. Further research is conceivable to expand execution issues and estimation and correlations of different calculations as portrayed in the displayed structure.

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