

# Client Fingerprint Activated ATM with OTP

Chippy Sudhas<sup>1</sup> Poojakrishna<sup>2</sup> Varsha Varghese<sup>3</sup> Minusri T R<sup>4</sup>

<sup>1,2,3</sup>U.G. Student <sup>4</sup>Assistant Professor

<sup>1,2,3,4</sup>Department of Electronics and Communication Engineering

<sup>1,2,3,4</sup>Matha College of Technology

**Abstract**— In the existing ATM method the use of ATM card is of great disadvantage. There is always a chance of losing it or being stolen. In our new proposed method instead of ATM card fingerprint is taken as the authentication, since it is unique for every individual. Also we are giving more security by adding tear gas without harming the individual.

**Key words:** ATmega32, GSM, fingerprint module, MAX232, LCD display, keypad

## I. INTRODUCTION

Nowadays ATM play vital role in everyone's life. Because, instead of standing in the bank queue we can easily does the money transaction through ATM. For this, the user will get an ATM card and for every card there must be a four digit pin number. The user can do money transaction through ATM by using the card and pin number. There are so many disadvantages in the existing ATM technology which include losing the card, forgetting pin number and also the hackers can easily collect the code in the ATM card and its pin number.

To overcome the above difficulties we are implementing a fingerprint activated ATM with OTP. The users fingerprint and his phone number are collected and saved in the database at the time of opening the bank account. A fingerprint module is fixed in the door of the ATM. Fingerprint is checked by the fingerprint module. If the fingerprint is matched the door will be automatically opened and will get an OTP on his phone. By using the OTP he can make money transaction. We also given more security by adding a tear gas if any case of robbery or malpractice have occurred.

## II. LITERATURE SURVEY

In [1], the paper proposes the amalgamation of Face Recognition System in the identify verification process engaged in ATMs to enhance the security system. In this, a database of people's face is maintained by the system that handles face detection. When a face need to be predictable a snap of the one's look is taken and evaluated to the appearance present in the database to observe if a match is found. There are typically three parts related to a face recognition system ie, face detector, eye localizer and face recognizer. The face detector identifies the facial region and leaves the non-facial region in the photo of the person to be identified. The eye-localizer finds the spot of the eyes. Recognizer checks the database to find a match.

In [2], a security based implementation of Hidden Markov model algorithm (HMM) to calculate speech rate, frequency and modulation pitch detection algorithm (PDA) for pitch calculation of voiceprints and Accent Classification (AC) for the accent analysis in voice. The combination of these algorithms allows us to provide a much more secured voice recognition system in ATM machine. This voice recognition system is proven to provide security based access control.

## III. FINGERPRINT ACTIVATED ATM

As we stated above, the current ATM system has many disadvantages. Thus we are implementing our project called client fingerprint activated ATM with OTP. In this work instead of ATM card, fingerprint is taken as the authentication, the main reason for introducing fingerprint recognition to increase the security and to achieve strong authentication along with an OTP. An OTP can be used to withdraw money without using a card- the password is delivered via SMS and should be used instead of bankcard.

## IV. SOFTWARE DESIGN

For the designing of the software, the whole system is divided into two modes,

- Bank mode
- Client mode

Bank mode: The operation in this mode is the client fingerprint is collected and is saved in the database at the time of opening the account.

Client mode: In this mode, the user's fingerprint is being compared with the registered fingerprint of the database and can make further money transaction. The flowchart is given below.

First start the program by initializing port, LCD display, keypad and all other peripherals. Scan the fingerprint using a fingerprint module. Verify that scanned fingerprint with fingerprint that are stored in the database at the time of opening the account. When the fingerprint matches with the one in the database the relay, that are connected to the door get normally closed as a result the door automatically opens. At that time n OTP is send to the mobile num corresponding to that scanned fingerprint. If any case the OTP entered by the user went to wrong, the user will get one more chance to enter the OTP. Again it is wrong the bank authorities will get an alert message. The user can make further transaction by using that OTP. Additional security is

the tear gas. If a person is trying to open the case that the money is kept after entered in to the ATM the relay which is connected to the pump get normally closed and the teargas will be pumped out.

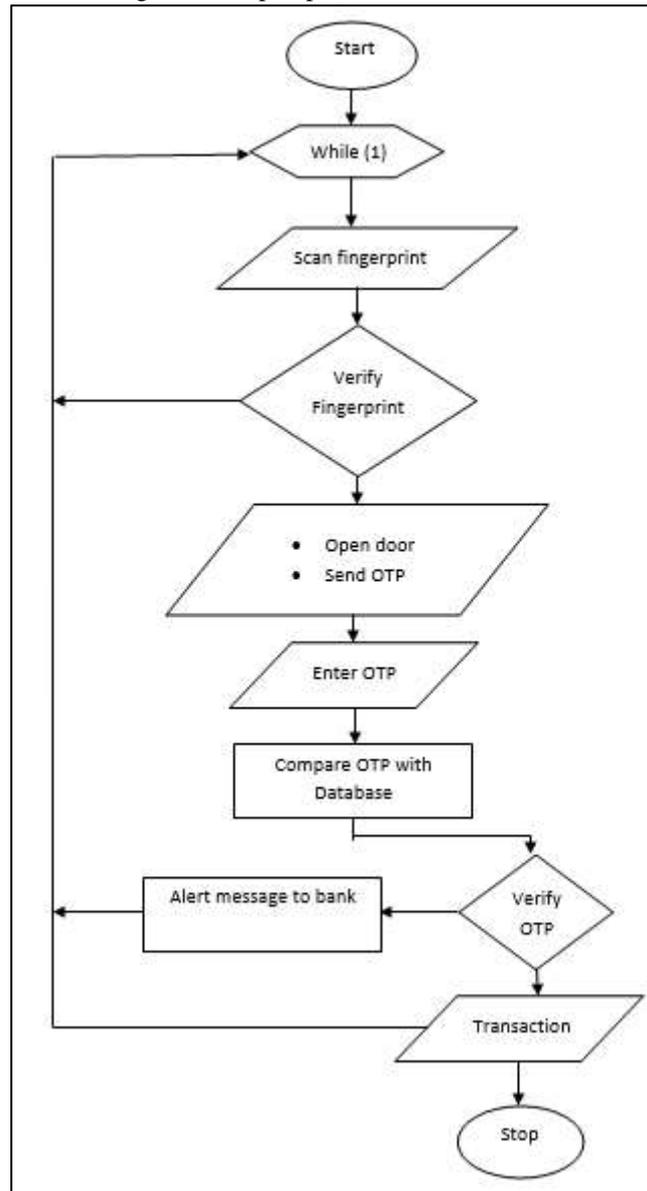


Fig. 1: Flowchart

A. Algorithm:

- Step 1: START
- Step 2: Initialize ports, display, keypad, GSM, fingerprint module.
- Step 3 Wait for fingerprint.
- Step 3.1: Get fingerprint.
- Step 3.2: Compare
- Step 3.3 If yes, go to step 4.
- Step 3.4: Else go to step 3.
- Step 4: Send OTP through GSM to the mobile number corresponding to that fingerprint.
- Step 5: Set keypad.
- Step 6: Wait for OTP.
- Step 7: If the OTP entered is correct, go to step 9.
- Step 9: Allow transaction.
- Step 10: Check OTP for the second time.
- Step 11: Again if it is wrong, relay will be ON and the door automatically closes.
- Step 12: Go to step 3.
- Step 13: STOP.

## V. HARDWARE DESIGN

The proposed client fingerprint activated ATM depends on fingerprint recognition module which is developed after analyzing the existing ATM system. The ATmega 32 microcontroller is used as the brain of the proposed system along with fingerprint recognition module and GSM module. The primary components are given below:

**ATmega32 microcontroller:** It is the central controlling unit of the system. It controls all other peripherals such as GSM module, fingerprint recognition module, relay, LCD display, keypad etc. It is an 8 bit microcontroller.

**Fingerprint recognition module:** It takes the clients fingerprint for authentication. It must verify the features of user fingerprint before accessing the ATM.

**GSM module:** It is used for transmitting and receiving different four digit OTP to the mobile number corresponding to that fingerprint. Global System for Mobile is the second generation cellular system. It operates either in the frequency band 900MHz or 1800MHz

### A. Block Diagram:

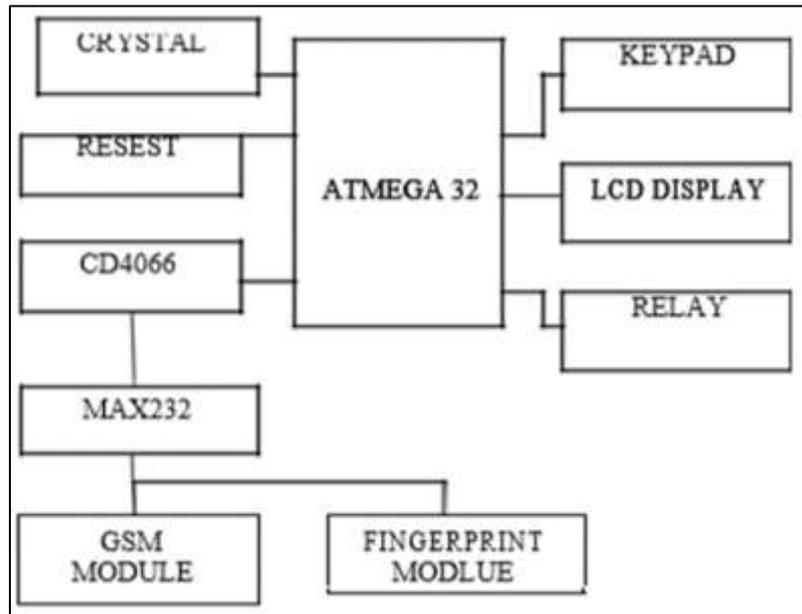


Fig. 2: Block Diagram

The system consists of the following modules:

- 1) LCD module: It is used to display the procedures of ATM
- 2) Keypad: It is used for entering the OTP which is send to the mobile number corresponding to the fingerprint
- 3) Fingerprint recognition module: FIM3030 fingerprint module is used for identifying the fingerprint. Then the fingerprint is compared with the fingerprint in the database. If it matches an OTP will send to the mobile number corresponding to that fingerprint. This module uses optical sensor for capturing and detecting of fingerprint images.
- 4) GSM module: If the users fingerprint matches with the fingerprint in the database an OTP is received by the mobile number corresponding to that fingerprint through GSM module.
- 5) Reset: Microcontroller will be reset when the reset pin is set to high. This pin is used to reset the microcontroller.
- 6) CD4066: It consists of four bilateral switches, each with independent controls intended for the transmission or multiplexing of analog or digital signals. Here two switches are used for GSM module and other two are used for fingerprint module. It contains 4 analog bilateral switch each with high enable input and two input /output. It is called bilateral because it can operate in forward and reverse.
- 7) MAX232: it is an integrated circuit. It consists of 16 pins. Used for serial communication. Used in RS232
- 8) Communication system for conversion of voltage levels on TTL device.
- 9) Relay: it is used for automatic opening and closing of the door. It is also used to emit tear gas in case of any malpractice.

Before providing the ATM access, the fingerprint module compare the scanned fingerprint with the fingerprint in the database take at the time of opening the account. If the scanned fingerprint is matched with the fingerprint in the database, a four digit OTP is send to the registered mobile number of user

Fig 3 shows the circuit diagram of the proposed ATM system. ATmega 32 microcontroller is used as the central controlling unit of the system. All other peripherals are connected to it. ATmega 32 is an eight bit microcontroller. It consists of four ports PORT A, PORT B, PORT C, PORT D. As shown in the circuit diagram, in PORT A, a keypad is connected in order to enter the OTP. A crystal oscillator is also connected to PORT A. Relay is connected to PORT B, LCD display is connected to PORT C, It displays the OTP we enter. Four CD4066 ICs are connected to PORT D, out of which two of them are used to connect GSM module to ATmega 32 microcontroller and another two are used to connect fingerprint module to ATmega 32 microcontroller. MAX 232 is used to provide RS232. In working first of all, the fingerprint of the user is scanned by using fingerprint module, fingerprint module takes the patter of finger and convert it in to binary. This fingerprint is compared

with fingerprint in the database taken at the time of opening the account. When a match is found the first relay is set to ON and door automatically opens, at the same time an OTP is send to the registered mobile number corresponding to the fingerprint through GSM module. Then the user can enter OTP and make his transaction. In any case if the OTP entered went to wrong the user will get one more chance to enter the OTP correctly. Again it is wrong the bank authorities will get an alert message and can take immediate action. We also given more security by the emission of tear gas if any case of robbery.

The main advantage of the proposed ATM system compared to the existing system are, there is no need to carry any ATM card all the time or remember any password. It is safer than conventional ATMs. Fingerprints are unique for each and every one, so any kind of malpractice is not possible.

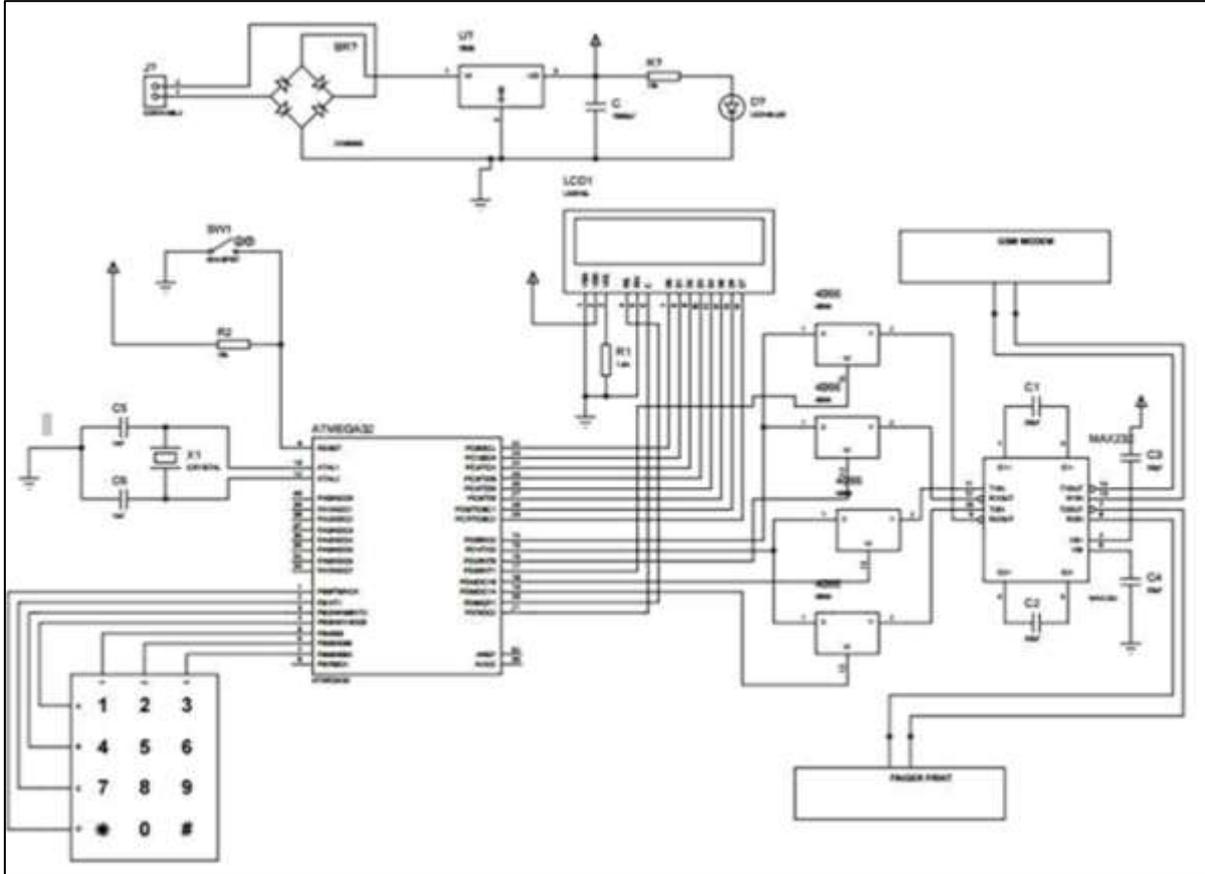


Fig. 3: Circuit Diagram

## VI. EXPERIMENTAL RESULT



Fig. 4: Proposed hardware



Fig. 5: Verification of fingerprint

Fig 4 shows the completed design of Client Fingerprint Activated ATM with OTP. When the fingerprint is verified by the fingerprint module the motor will ON and the automatically opens, an OTP is send to the registered mobile number. Fig 5 shows the verification of fingerprint. In that, the fingerprint is verified and can make further transaction.

## **VII. CONCLUSION**

Thus ATM which is a convenient and easy method in our day today life. If the technology is improved in the system, it will have great importance in our future. In every technology introduced it ends up with some disadvantages in some way or the other. But in this paper we try to overcome it by trapping the person inside the ATM so when we compare it with the current system it is always better and easy for each and every people as it require only fingerprint.

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