ATM FOR VISUALLY CHALLENGED PEOPLE

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Abstract - *"ATM" stands for Automated Teller Machine. ATM machine was invented by John Shep- phardbaren on June 1967 at Barclays bank in Enfield, United Kingdom. ATM, also called the cash machine is an electronic telecommunication device that enables the customers of financial institutions to perform financial transactions, without the need for a human cashier. An automatic teller machine requires a user to pass an identity test before any transactions. The current method available for access control in ATM is based on smartcard. It is difficult to prevent another person from attaining and using a legitimate person's card, also conventional smartcard can be lost, duplicated, stolen or impersonated with accuracy[1].The aim of our project is to implement an ATM for visually challenged people. Here we implement automatic ATM processing using voice command and finger print. In this, only a single person is strictly permitted at a time. Door will be locked when the sensors detect human presence inside the cabin. There will be two modes - Normal mode and Blind mode. Customer can select their respective modes through voice command. After inserting the smart card, which already has the fingerprint template number of the visually challenged person encrypted on it, user can use the fingerprint scanner which compares the one in the smart card with the fresh one for authentication. In Blind mode, there is a provision using which the blind people can even choose whether to check balance or to withdraw cash by voice command. Normal mode processing is same as that of existing ATM.*

Key Words: **Easy VR, Automated Teller Machine, Fingerprint, RSA, Voice recognition**

1. INTRODUCTION

About 285 million people around the world are visually impaired and about 35 million people are blind. So there should be a system to help the differently abled ones to access ATM. ATM stands for Automated Teller Machine. It was invented by John Shepphardbaren on June 1967 at Barclays bank in Enfield, United Kingdom. In India, Hong Kong and Shanghai banking corporation (HSBC) installed first ATM in 1987[7]. ATM, also called the cash machine is an electronic telecommunication device that enables the customers of financial institutions to perform financial transactions, without the need for a human cashier. According to ATM industry association (ATMIA) there are now close to 3 million cash machines installed world-wide. Usually, the customer is identified by inserting an ATM card with a magnetic stripe that contains a unique card number and some security information. Security is of paramount importance during ATM transactions. People choose passwords which are easy to remember, and easily predicted, or they change all PINs to be the same. Another concern is the accessibility of ATM machines to differently abled people.

ATM requires a user to pass an identity test before any transaction can be granted. The current method available for access control in ATM is based on smartcard. Efforts were made to conduct an interview with required questions among the ATM users and the result proofed that a lot of problems was associated with ATM smartcard for access control. Among the problems are; it is very difficult to prevent another person from attaining and using a legitimate persons card, also conventional smartcard can be lost, duplicated, stolen or impersonated with accuracy. The financial crime case rises repeatedly in recent years; a lot of criminals tamper with the ATM terminal and steal user's credit card and password by illegal means. Once user's bank card is lost and the password is stolen, the criminal will draw all cash from their account, which will bring enormous financial losses to the customer. To carry on the valid identity to the customer becomes the focus in current financial circle.

Traditional ATM systems authenticate generally by using the credit card and the password, the method has some defects. Using credit card and password cannot verify the client's identity exactly. Therefore Biometric authentication is used in this system

2. WORKING

The system is developed for assisting blind people for accessing the ATM. ATM is a place where people can easily handle the banking transactions without much time delay. The current feature of ATM doesn't support much security for the persons who are visually impaired. Hence, the project focuses on developing the ATM system for the visually impaired people. The system consists of ATM card reader section, fingerprint section and various indication alarms.

On detecting human presence in the ATM room, the system will produce voice output in order to select either normal mode or blind mode. The voice input of the person will be recognized using a voice recognition module. On selecting the blind mode, the sequence of voice information will be provided in the ATM through the PC. On the other hand, if the selected mode is normal, the information will be displayed on the LCD screen. Both two modes include ATM card verifying process as well as fingerprint matching.

The ATM card data consists of the encrypted fingerprint data of the card holder. RSA algorithm is used for the encryption process. On inserting the card, the encrypted fingerprint data will be sending to the PC. The on time fingerprint data will be compared with the decrypted fingerprint data. The successful matching of the data will lead the person to access the ATM service. If the details mismatched, the system will not allow the person to access the ATM.

There are 4 modules in the system

1. ENTRY MODULE

2. LOGIN MODULE

3. NORMAL MODE

4. SPECIAL MODE

In **Entry module**, with the help of sensors; the system ensures that only one person is inside the ATM cabin. Once the user has entered the cabin, the solenoid lock will lock the door after the PIR sensor ensuring that only a single user has entered into the cabin.

In **Login module**, the user authenticates by inserting the smartcard which has the fingerprint template encrypted in it. This encrypted template is cross checked with that stored in the memory.

In **Normal mode**, the functioning is as same as the existing one but fingerprint template is used instead of PIN number. Here keypad is used as the input method i.e either to withdraw cash or to check the balance.

In **Special mode**, fingerprint template is used as PIN and voice commanding is used to select the operation to be performed i.e either to withdraw money or to check the balance[5].

3. RSA ALGORITHM

RSA algorithm is to encrypt and decrypt messages. The key used for encryption is different from the key used for decryption. It is asymmetric cryptographic algorithm. Asymmetric means that it contains two different keys. This is also called public key cryptography, because one of them can be given to everyone, the other key must be kept private[3].

In case of public cryptography, we use one public key and one private key to send our message. But in this case we may have a chance to loss our content, to avoid that we are providing more secure and authentication by using two set of keys, one use as the sender's private key by using this we can encrypt the image and another key as the receiver's Public key by using this we provide the authentication. Then the receiver decrypts the encrypted image

The steps involved in RSA double key image encryption algorithm is described below:

1. Choose two prime numbers p and q.
2. Set n equal to p * q.
3. Calculate f(n) = (p 1)*(q 1)
4. Select e such that e is relatively prime to f(n) and less than f(n)
5. Determine d such that de mod f(n) = 1 and d < f(n)[4].

3.1 Encryption process

Encryption is the process of transforming plaintext into a cipher text by using an encryption algorithm combined with a parameter c= m^e mod n. Where "c" represents a cipher text, "m" represents a message to be encrypted, n=pq.

3.2 Decryption process

Decryption is the process of converting the cipher (hidden) form into an original image, to know the actual content by the receiver.

m= c^d mod n

4. SYSTEM ARCHITECTURE

A system architecture is a conceptual model that defines the structure, behaviour, and more views of a system[7]. An architecture description is a formal description and representation of a system, organized in a such way that describes the structures and behaviours of the system. System architecture gives an idea about the content of the elements comprising a system, the relationships among those elements, and the rules governing those relationships. The architectural components and set of relationships between these components that an architecture description may consist of hardware, software, documentation, facilities, manual procedures, or roles played by organizations or people. A system architecture can comprise system components and the expand system. So that will work together to implement the overall system. There have been efforts to formalize languages to describe system architecture, collectively these are called architecture description languages Normal or Body Text

4.1 Easy V R

Easy V R 3 is a multi-purpose speech recognition module designed to easily add versatile, robust and cost effective speech recognition capabilities to almost any application[6]. The Easy V R 3 module can be used with any host with an UART interface powered at 3.3V , 5V, such as PIC and Arduino boards. Some application examples include home automation, such as voice controlled light switches,

locks, curtains or kitchen appliances, to the most popular robots on the market. It can be easily plugged into a solder-less breadboard or standard prototyping board, and it is compatible with the microbus specifications.

The Easy V R 3 communicates via an asynchronous serial interface (commonly known as UART interface), with the following features:

Baud Rate: 9600 (default), 19200, 38700, 57600, 115200
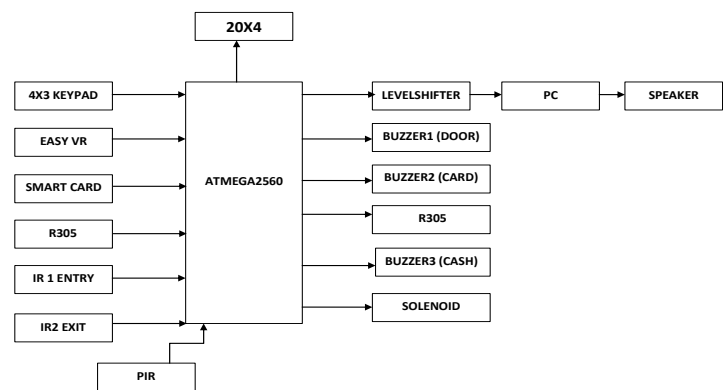
Frame: 8 Data bits, No parity, 1 Stop bit

Fig -1: Architecture diagram

4.2 R305

This is a finger print sensor module with TTL UART interface for direct connections to microcontroller UART or to PC through MAX232 / USB-Serial adapter. The user can store the finger print data in the module and can configure it in 1:1 or 1: N mode for identifying the person. The FP module can directly interface with 3v or 5v Microcontroller. A level converter is required for interfacing with PC serial port.

Optical biometric fingerprint reader with great features and can be embedded into a variety of end products, such as: access control, safety deposit box, car door locks.

4.3 Level Shifter

MAX232 IC is used to convert the TTL/CMOS logic levels to RS232 logic levels during serial communication of microcontrollers with PC. The controller operates at TTL logic level (0-5V) and the serial communication in PC works on RS232 standards (-25 V to + 25V). This makes it difficult to establish a direct link between them to communicate with each other.

4.4 IR Sensor

IR Sensors work by using a specific light sensor to detect a select light wavelength in the Infra-Red spectrum. By using an LED which produces light at the same wavelength as what the sensor is looking for. By keeping an object close to the sensor, the light from the LED bounces off the object and into the light sensor

4.5 Buzzer

A buzzer or beeper is an audio signaling device; it may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers and confirmation of user input such as a mouse click or keystroke.

4.6 Keypad

The 12 keys keypad is widely used in many applications, some of those are telephones and ATM machines. There are many different types of keypads and the keypad which would be explained here would a matrix method in order to find which key is pushed.

4.7 LCD

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. These modules are preferred over seven segments and other multi segment LEDs. economical; easily programmable. The reasons being: LCDs are economical; easily programmable.

5. FEATURES OF THE SYSTEM

- More economical as finger print scanner is much easier to set up.
- Fingerprint biometric scheme is much user friendly as it is unique and cannot be copied

- Finger-print authentication is accurate
- Emphasis the idea of self-dependence to blind as well as poorly educated people.
- Much safer scheme, as there is no fear of losing the secret PIN by any means
- Confusions regarding memorizing and maintaining PINs can be avoided

6. FLOW CHART
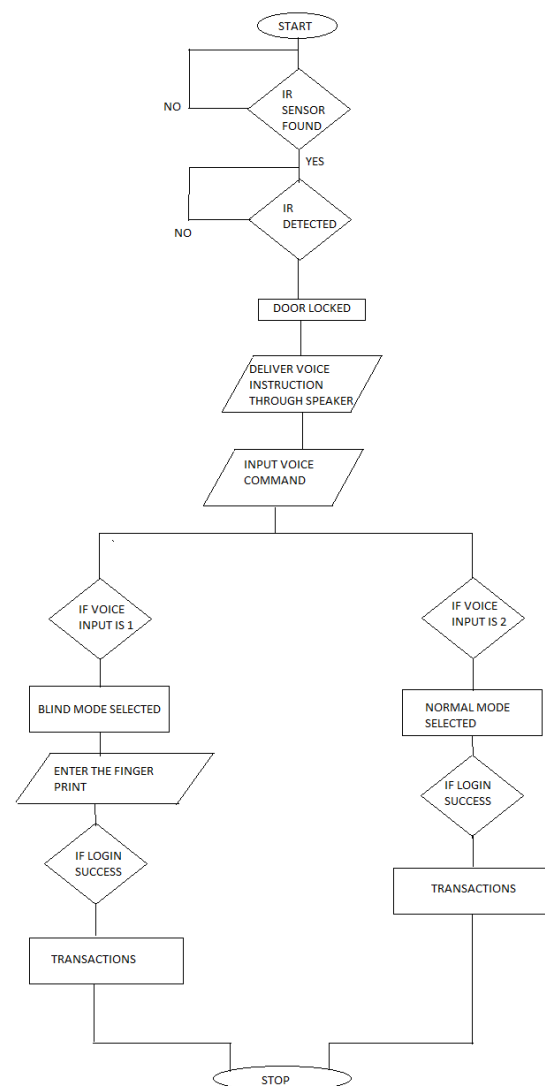
7. ADVANTAGES OF THE SYSTEM

- Blind and partially sighted people can check on their accounts on their own.
- As the transactions is through voice commands, it is very helpful to the uneducated people as well as aged ones

8. SYSTEM REQUIREMENTS & SPECIFICATION

Here we are including the softwares and hardwares used for developing the project and implementing the project

8.1 SOFTWARE REQUIREMENTS

1. Operating system : windows 7/8.1
2. Coding language : Embedded C
3. Visual studio (2008 version)
4. Proteus (simulation software)
5. Circuit wizard
6. Easy V R Commander

8.2 HARDWARE REQUIREMENTS

1. AT Mega 2560[6]
2. I R Sensor
3. P I R Sensor
4. R305 Fingerprint module
5. Easy V R voice module
6. Buzzers
7. Keypad
8. LCD

9. TECHNOLOGIES USED

- In this section we are including the technologies used for our project developement phase.
- RSA algorithm[3][4][5]
- Fingerprint Encryption technology (R305)
- Buzzer usage
- voice commanding technology (Easy V R)[5][6]

10. CONCLUSIONS

We have selected the topic for the project "ATM FOR VISUALLY CHALLENGED PEOPLE" and got accepted .The base papers and related papers are selected and studied and presented in the literature survey. After the literature survey we selected the RSA algorithm to implement in our project. This algorithm includes methods for fingerprint encryption.

Our proposed system enables the visually challenged people to access the ATM and perform transactions through voice commands. Safe and economical fingerprint authentication is used instead of PIN for their account It not only helps the blinds but

also emphasis self- dependence to uneducated and aged people We provides two levels of security. It not only allows a single user at a time but also provides Fingerprint Authentication. Our system is more user friendly and is also open to future advancements

11. FUTURE WORKS

- Implementation of ATM for differently abled ones
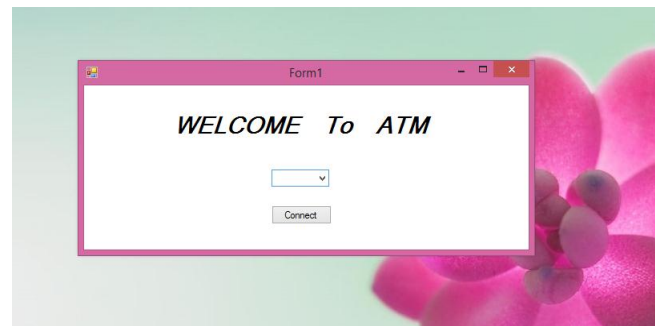- Can be expanded to multiple user environment

12. SCREEN SHOTS

Fig -2: Screenshot

Fig -3: System Design

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