BIOMETRIC BASE SMART DOOR ACCESS SYSTEM USING ARDUINO UNO

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Abstract: For any organization, banks, office, etc. the security is the first priority to keep their document secure. There are different types of security system like: lock and key system, password lock system, etc. but those systems are not so secure and hence consume more time and can be break easily using duplicate key. The best security system is fingerprint door lock and unlocks system. This system can't be hacked and neither consumes much time and hence our security system will be stronger. This system has been designed in such a way that only authorized person can only access the system. Operation of this system is much easier than the previous system and can be installed easily. In future this system can be upgraded or we can add latest technology like voice recognition system, retina recognition system and automatic fire alarm system. Here we have used the biometric as a security system using the Arduino as a controller. For locking and unlocking the door we have used solenoid lock which operates on the +12V. In this thesis, we have added automatic fan on system to keep the Arduino board working smoothly. For alternative we have used keypad for unlocking the door in emergency situation like incase concerned person is not available due to ill health problem.

IndexTerms **- Bio Metric, Relay, LCD display, Buzzer, Arduino Uno, key pad.**

I. INTRODUCTION

Recently, there has been recorded that the rate of crime has been increased rapidly in all over the world. We all know that "Prevention is better than cure" rather than to face the loss it is much better to take necessary actions to eradicate that issue before it occurs [1].Due to its simplicity and attractive features the project has successfully gained the popularity in a short interval of time. Today, fingerprint project is mainly linked with security problems later it may be developed or implemented as fingerprint-based driving license, bank accounts operation and so on [2]. Algorithm matching plays a vital role in this project because specified templates of fingerprint of the persons are registered initially then the fingerprint templates of persons is compared with the initially stored templates of fingerprints [3]. The password system is not more secure system and it can be easily hacked and it is also a time consuming. With this project now our houses, offices, banks, etc are safer [4]. In previous project they have used biometric for attendance system but we have used biometric for unlocking the door and we have added the automatic fan on system in this project. In this we have used the keypad for alternative input to unlock the door in any emergency situation [5].

II. PROPOSED BLOCK DIAGRAM

For designing and constructing any work, one of the major requirements of understanding the flow of works and showing the each and every parts is, how going to interact to each is to explain with the help of block diagram. With the help of block diagram, one can easily understand functionality of components. So, in order to explain our work we have shown block diagram in Fig.1 as shown below.

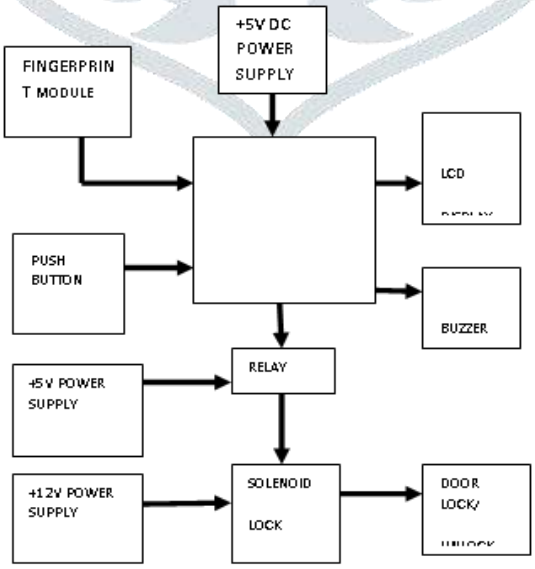

Fig.1. Block Diagram

Our block diagram is divided into input, power section, processing and output section. This division has been done so to isolate the problem easily and troubleshoot the system. In input section we have following components-Finger print module , Push button. In power section we have used two types of volts - +5V and +12V Power supply, processing section contains process module-relay, solenoid lock and out contains- LCD, Buzzer and door lock. All blocks work on +5-volt dc supply. Solenoid lock used for locking the door that works on 12volt. We have already saved the 5 fingerprints on the system. Whenever an authorized person places

his/her finger in the fingerprint module, the controller will compare the fingerprint with the data (fingerprint) which is stored in the memory. If the fingerprint matches with the data, the door will unlock automatically and the LCD will display "allowed- door opened, if the fingerprint does not match with the data then the buzzer will be activated.

III. DESCRIPTION OF CIRCUIT DIAGRAM.

Circuit diagram shows the connection of all the components with their names. Circuit has been designed using Proteus to check the working of components under simulation environment. As shown in Fig.2, the circuit is draw using the simulator software. Where we have tried to run with hardware module connected. In this circuit we have used Arduino UNO as a controller. Here push button and fingerprint module are input to the system and solenoid lock, LCD display and buzzer is an output. This system works in +5v were as solenoid lock works in +12v. Here we have used a relay for triggering the solenoid lock.

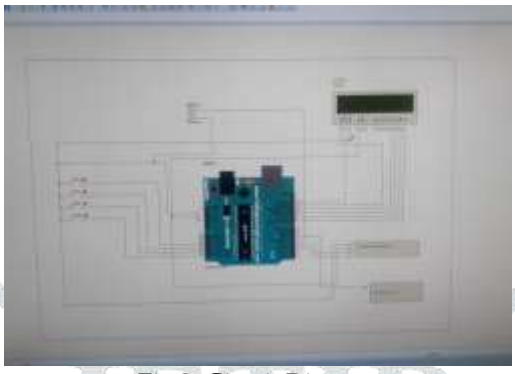

Fig.2. Circuit Diagram

IV. COMPONENTS USED IN CIRCUIT

A. *16*2 LCD display:* LCD display is an important component for any digital display or an output. LCD display can be different types and used in different displays like computer, calculators, television mobile phones, digitals watches, etc. Here we have used an 16*2 LCD display [6]. 16*2 LCD has two registers, namely, common and data. The command register stores the command instructions given to the LCD. The data register stores the data to be displayed on the LCD[7]. 16*2 is named so because it has 16 columns and two rows. There are a lot of combinations available like 8*1, 8*2, 10*2, 16*1, etc. The most commonly used LCD display is 16*2 LCD display [8].

B. *Fingerprint Module:* Fingerprint refers to automated method of identifying or confirming the identity of an individual based on the comparison of the two fingerprints. Fingerprint recognition is the one of the well known as biometrics. Here we have used R305 fingerprint module. R305 fingerprint module is a serial fingerprint scanner which can be directly connected to the PC's com port. The system will process the two time finger images generate a template of the finger based on processing result and store the template [9].

C. *12v Solenoid Lock:* 12 v solenoid lock has a slug with a slanted cut and a good mounting bracket. It is basically an electronic lock, designed for a basics cabinet, safe or door [10].

D. *5v Relay:* The relay module is an electrically operated switch that allows you to turn ON or OFF a circuit using voltage or current [11].

E. *Arduino IDE:* Arduino IDE is a PC software used in our project. Arduino IDE consist of varieties of libraries which makes programming easier and simpler [12]. Our project uses the AtMega853 controller that is programmed in the Arduino. It is a very convenient tool which performs various functions by loading a set of instructions in an appropriate format to the board. Either analog or digital values can be monitored by the moisture sensor in Arduino [13].

V. ALGORITHM

a. Start.
b. Add fingerprint.
c. Store the fingerprint.
d. Press the start button.
e. Place the finger.
f. If fingerprint matches unlock if not matches activate the buzzer.
g. Stop.

VI. BENEFITS OF THE SYSTEM

a. It is more secure then password and lock and key system.
b. It consumes less time than lock and key system.
c. Operation is quick and easy.
d. Installation is easy

VII. RESULTS AND DISCUSSION

We have designed this system in simple way. Firstly we have to on the system and we have to store the data/fingerprints. This system can store 25 fingerprint. This is has been designed for a particular room so we haven't used database for this system. After adding the fingerprint to start the system we have to press up/down button and LCD will display "place the finger" after placing the finger if the fingerprint matches with the fingerprint which is already stored in the system then door will be unlocked and LCD will display "allowed – door opened", if fingerprint does not matches then LCD will display "fingerprint is not matched" and the buzzer will be activate.

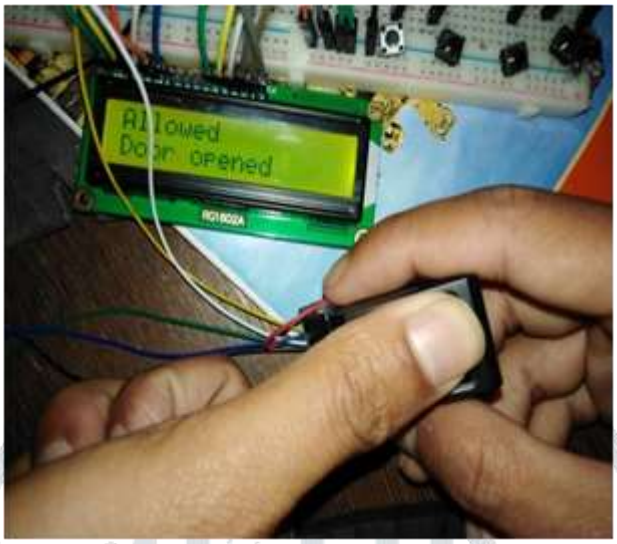

Fig.3. Model

Table 1 ANALYSIS TABLE

SL.NO	PROPOSED WORK	[1]
1	In this system we have security system as well as automatic fan on system also.	In this system there is only attendance system
2	Our system does not need database management system to store the data because in this system controller itself can store 25 persons ID.	Here database management system is important
3	Adding and deleting fingerprint is easy.	To add fingerprint, changes in program has to be done.

VIII. FUTURE SCOPE AND CONCLUSION

The future scope of our proposed project biometric smart door access system is that in future it can be easily upgradable to be use as multifunctional automatic security system such as in future we can add automatic fire alarm system, face recognition system, voice recognition system and many more related with biometric. Now a day's crime like bank robbery, house robbery, robbery of main documents from office, etc are increasing due improper security system to overcome with those problem we came up with this projects "biometric smart door access system " which is more secure and less time consuming. Which does not manual error, does not gives false instruction and has a high accuracy.

IX. ACKNOWLEDGMENT

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