

## E-Securing Home System

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**Abstract:** E-SECURING HOME SYSTEM is based on door locking system, in this system the biometric authentication plays an important role to provide high security. Now a days security is very important in order to keep our data safe from outsiders. The main purpose of this paper is to protect the home from unauthorized people by using the unique id that is finger print authentication. At the place of door locking system, the finger print scanner is placed to lock and unlock the doors in place of the conventional door locking system. Which gives more protection to the house owner. The other indication system is also developed by using GSM module to send the message to the house owner mobile. The entire system is controlled by the arduino mega microcontroller.

**Keywords:** Finger print module, Arduino mega microcontroller, Solenoid lock, Esp8266 module, GSM sim900 module.

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### I. Introduction

In olden days most of the people are illiterate. So in many documents their finger prints are taken as a signature. But now a days many people used their signatures instead of thumb impression, because of the illiteracy. There is a probability to do forgery instead of others. To avoid forgery, the government has been implemented finger print system.

In this busy competitive world security takes a primary concern to protect our belongings like bank accounts, vehicles, house property etc. Most of us were using a id numbers and passwords as a security, but there is a some software techniques to open the accounts, for example when door is locked by the owner and left for other cities, the unauthorised persons or thieves may come and open the door with duplicate keys. Even though the number of locking systems were developed, the number of hackers also improved parallel to open the door locks with duplicate keys. There is a different types of locking systems developed there are some traditional

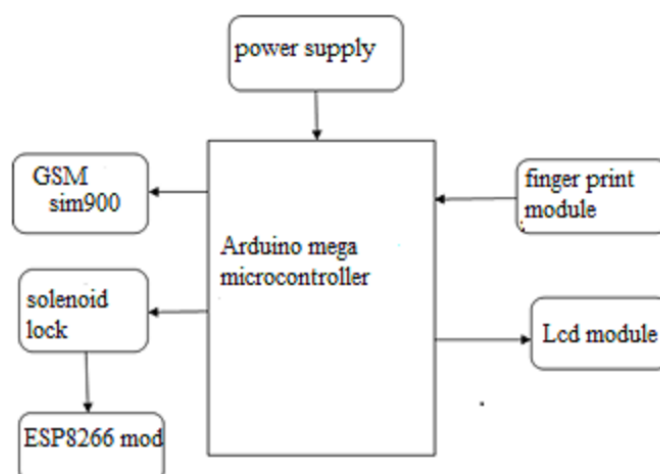
home locking methods and remote locking systems etc, there is a drawback in traditional methods such as in lock and key security, if the key is lost then you cannot open the door or might need to break the lock and also thieves can make duplicate keys to open the door without our knowledge and remote locking systems such as anyone can unlock the door. The only way to protect our homes is to use a unique id, which gives the highly protection. That highly protection is possible only by using the finger print authentication. Now a days all fields, the finger print authentication occupies the main role for unique identification. The finger ridges of individual does not match with any other finger ridges. So there is no possibility to open the lock of door. And also no possible to lock or unlock the systems.

Finally finger prints are most useful and security compare with signatures of the human beings.

### II. Hardware

The block diagram of Arduino mega microcontroller and E-securing home system is shown in Figure-1, have following units, which includes

- 1). Finger print Module
- 2). Arduino mega
- 3). Solenoid lock 12v
- 4). Power supply
- 5). Esp8266 module
- 6). GSM sim900 module.
- 7). LCD module.



Fig

-1: The block diagram of arduino and E-securing home system

#### A. Finger print module

The fingerprints for matching purposes generally requires the comparison of several features of the print pattern. These include patterns, which are aggregate characteristics of ridges, and minutia points, which are unique features found within the patterns.<sup>+</sup>

It is also necessary to know the structure and properties of human skin in order to successfully employ some of the imaging technologies.

This is a finger print sensor module with TTL UART interface. 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 finger print module can directly interface with 3v3 or 5v Microcontroller.[1]



#### B. Arduino mega microcontroller

The circuit shown in Fig.operates using a 12V power supply.An Arduino microcontroller (MCU) requires only 5V but the solenoid electric lock requires 12V.As Arduino Uno has an inbuilt 5V voltage regulator, a common 12V supply can be used for the whole system. The brain of the circuit is Arduino Uno MCU board (BOARD1). It is based on ATmega328/ATmega328P and has 14 digital input/output (I/O) pins, six analogue inputs, 32k flash memory, 16MHz crystal oscillator, a USB connection, power jack, ICSP header and reset button, among others. It can be programmed using arduino IDE software.

#### C. Solenoid lock 12v

12V Solenoid lock has a slug with a slanted cut and a good mounting bracket. It's basically an electronic lock, designed for a basic cabinet, safe or door. When 9-12VDC is applied, the slug pulls in so it

doesn't stick out and the door can be opened. It does not use any power in this state.

Specifications of 12V solenoid lock:

- Operating voltage : 12VDC
- Draws 650mA at 12V, 500 mA at 9V when activated
- Designed for 1-10 seconds long activation time
- Wire length: 222.25mm

#### D. LCD module

A liquid crystal display or LCD draws its definition from its name itself. It is combination of two states of matter, the solid and the liquid. LCD uses a liquid crystal to produce a visible image. Liquid crystal displays are super-thin technology display screen that are generally used in laptop computer screen, TVs, cell phones and portable video games. LCD's technologies allow displays to be much thinner when compared to cathode ray tube (CRT) technology. We use lcd module in our system to show message when the door is opened for authorized person.

#### E. GSM sim900 module

We use sim900 here to deliver msg to owner/authorized when the unauthorized person is trying to access in home as warning to the owner.

The SIM900 is a complete Quad-band GSM/GPRS solution in a SMT module which can be embedded in the customer applications. Featuring an industry-standard interface, the SIM900 delivers GSM/GPRS 850/900/1800/1900MHz performance for voice, SMS, Data, and Fax in a small form factor and with low power consumption. With a tiny configuration of 24mm x 24mm x 3 mm, SIM900 can fit almost all the space requirements in your M2M application, especially for slim and compact demand of design.

### III. Software Description

Arduino IDE To upload the library and drawings to the Arduino mega , also to compile written code for this project.

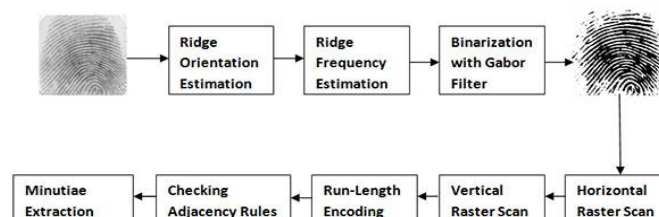
The Arduino IDE supports the languages C and C++ using special rules of code structuring. The Arduino IDE supplies a software library from the Wiring project, which provides many common input and output procedures. We will be using c++ programming language in our system.

#### Algorithm

##### Minutiae Based Extraction in Fingerprint Recognition

In this system, the captured fingerprint image needs to be matched against the stored fingerprint templates of every user in the database. This involves a lot of computation and search overhead and thus we need a fingerprint classification system that will help us to severely restrict the size of the templates database. To accomplish this, we extract the minutiae features and match against the incoming fingerprint.

Figure-2: Minutiae based fingerprint extraction[7]



### IV. Eplanation Of Experimental Setup

In this experimental setup Arduino mega microcontroller is used to process all the devices which are finger print module, GSM sim900, solenoid lok 12v and lcd module.

In this system firstly the owner or whoever owner's interested persons must enrol with their finger prints or any thumb who already enrolled by the finger print scanner. when the thumb of the owner is placed on the finger print scanner, the sensor verifies with the already enrolled data. When thumb (finger) is placed on the finger print scanner, the scanner checks whether the connect finger is placed or not, if matches perfectly with finger print data which is already stored, the door is open and then it will show message on lcd module as successfully door opened and it will also send message to the owner same as shown. If not matched perfectly, then the door will not open and the message will be shown as unauthorized access to the owner and on lcd module which is placed at door

And hence door will not open and also owner will get warned if anyone trying to open the door. For every process the message is send to the owner by the GSM module and correspondingly message is shown on lcd module.[1]

## V. Results And Discussion

E-seuring home system using finger print sensor is a powerful system with high security. This high security system is designed own hardware which can't be crack by unauthorised persons. Door locking procedure is only done by authorised finger print which is unique for each user. The hardware design is very easy because of open source hardware. Software code is open source and have so many API for controlling purpose and it helps to develop our source code without difficulty.[1]

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