

# Fingerprint Door Lock

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**Abstract** - Since ancient times, security has been and remains a problem for homes, offices and stores. Everyone is afraid of a stranger breaking into their home or office without their knowledge. Normal doors can be equipped with locks that can be selected with an alternate key. You can find alternatives to this system, such as password or the pattern system of locks. This system can be exposed and opened again. Therefore, a solution to this problem ( ) may be to combine the door lock with biometrics. Biometric verification is any means by which a person can be uniquely identified by evaluating one or more distinguishing biological traits. Unique identifiers include fingerprints, hand geometry, earlobe geometry, retina and iris patterns, voice waves, DNA, and signatures. Here we will use fingerprint for biometric verification as it is one such thing which is unique to every individual and the use of fingerprint as the key to door locks can overcome the security problem of unauthorized people trespassing to our homes, shops, offices, etc to a great extent as duplicacy in such key is not possible. Also, this system will not lead to problems like losing keys because we do not require carrying keys if this system is used instead of traditional locks. So, using arduino we will try to implement the system with features which will increase the security level

**Key Words:** Home/office security system, Fingerprint door lock, Arduino based project

## 1.INTRODUCTION

Nowadays the security of the office / business environment is a major threat that everyone faces when they are not at home or at home. When it comes to security systems, it is one of the

main concerns in a busy competitive world, where one cannot find ways to provide security for one's privacy by hand. Instead, you find another solution that provides better, more reliable and atomic protection. This is the age when everything is connected to the network, where anyone can find information anywhere in the world. The potential for identity theft is therefore a serious problem. Because of these risks it is very important to have some form of diagnostic system in order to access personal information. Nowadays, identification of a person becomes an important issue around. Among the common identification methods we often see are passwords and card identification strategies. But it is easy to steal passwords now and identification cards may be lost, thus making these methods completely unreliable.

There are some very annoying situations like locking yourself in a house or office or leaving your key inside or sometimes when a thief breaks the lock and steals everything. These kinds of situations always bother people who use a door lock with a key. Although in some places people use smart cards, a situation may arise when someone loses a card or keeps a card inside. Then in some cases there will be security guards to lock the houses or offices and keep the keys safe. But there are also times when the person holding the keys may not be available or go to an emergency, which can cause unnecessary delays for people who need the key immediately. These are some of the problems that people may face when using smart keys or cards. This is where our system, door-based locking system based on fingerprints begins to take effect. Our design is used to provide better security as users do not need to remember passwords and do not need any kind of keys or cards that are often lost. If someone's fingerprints are approved in the system they will not face any kind of delay in

getting into the room. Fingerprint recognition is one of the most secure programs because one person's fingerprint is unique. Unauthorized access can therefore be prevented by designing a lock that holds the fingerprints of one or more authorized users and opens the system when the same is detected. Bio-metrics certification proves to be one of the best features because the skin on our palms and soles shows a ridge-like flow on each unique and unchanging finger. This makes fingerprints a unique identification for everyone. The popularity and reliability of fingerprint scanners can be easily predicted from its use on the latest handheld devices such as mobile phones and laptops.

## 2. LITRATURE REVIEW

### 1.1.RELATED WORKS

In todays world homes offices shops banks need too many security measures for security reasons to ensure security for these areas the smart lock system was born there many innovative smart door locks that are designed to lock and unlock the system this kind of lock with fingerprint rfid card pin code password or iot by unlock the system by mobile phone users using these types of locking systems use a pin fingerprint or a rfid card to unlock system these systems do not have security pecking command for added security to increase security user must unlock the system with minimum of two security commands in the home lock system there must be unlocking options for customers sometimes a thief can miss the option and enter the house so we can also provide two levels of security for guests this procedure must be completed with the exclusive use of for security reasons in the current situation there is a probability of hacking and opening smart locks the proposed system can overcome the security problems encountered in the current situation the systems 3-level security can help users with accurate security the main reason the system provides is to protect the 4044 users living space or workplace or to keep valuables and important papers 4044 safe therefore this project can be understood by 4244 public and will be useful for future work many mechanization and modernization can be done in this project this project can be rebuilt using different microcontrollers and various methods.

In an excellent paper personal authentication through biometric technology fernando l podio 2002 points out that the fingerprints are one of the many forms of biometrics used to identify individuals and establish their identity fingerprint analysis for matching often requires comparing several characteristics of a display pattern these include patterns which are built-in elements of the symbol and dots which are distinctive features found in patterns according to him in order to successfully use other photographic technologies it is also necessary to know the structure and properties of human skin details and patterns are important in fingerprint analysis because no two fingers are alike he also adds the three basic patterns of fingerprints are arcs loops and swirls by its definition arch is the poles that enter from one end of the finger rise in the middle and form an arc and then exit from the another end of the finger loops are poles entering from one side of the finger forming an arc turn around and walk out that way finally he says that the zigzags are layers that are formed around the center of the finger in a swirl pattern the ridges form a circle around the finger.

### 1.2. PROPOSED SYSTEM

In our design we used Arduino uno as the microcontroller which is the heart of the system. Since Arduino uno has only 14 pins we had to use oneArduino uno microcontrollers. Our system design consists of the following components:

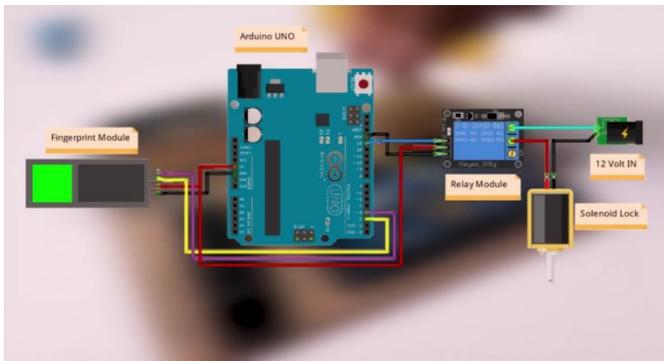
1. Fingerprint reader module
2. Solenoid lock
3. Relay module
4. Arduino uno
5. Jumper cables
6. Plywood
7. Some screws
8. Battery (12 v)

## 2. HOW THE SYSTEM WORKS

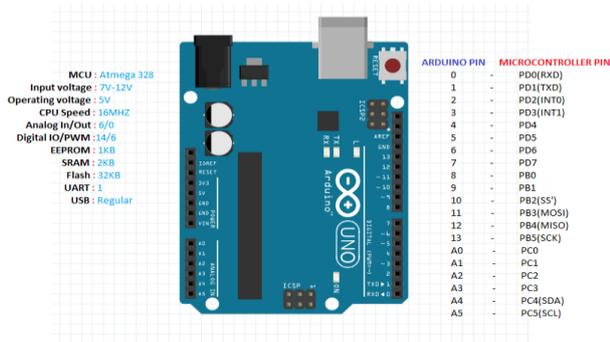
In this system, user will enter fingerprint in the fingerprint scanner which is connected to the door latch through the microcontroller. After scanning the print, the system runs its database and looks for a match. If any match is found, the latch opens and thus the door gets unlocked. Same thing happens when user wants to lock

the door. Correct fingerprint makes the latch to close, locking the door behind the user.

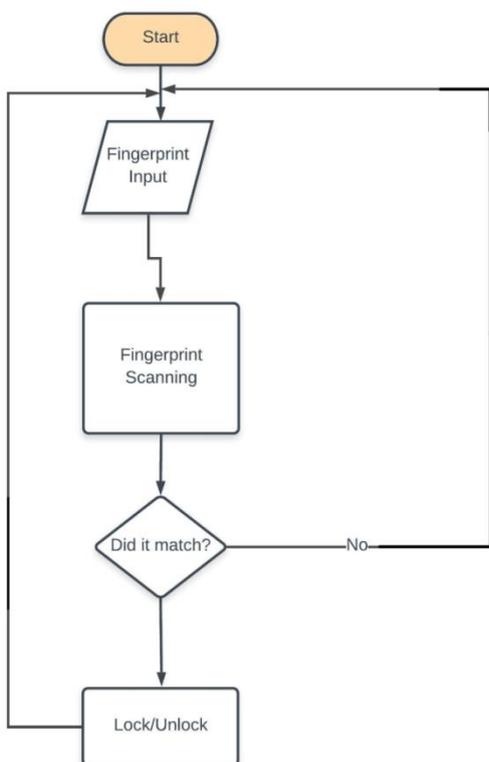
### 3. CIRCUIT DIAGRAM



### 4. ARDUINO UNO PIN LAYOUT



### 5. FLOWCHART



### 6. PERFORMANCE EVALUATION

Compared to the standard secure system, our fingerprint door lock system is advanced, efficient and highly secure. The standard security system consists of locks, which, when in contact with the appropriate keys, are unlocked. In our system, authorized and correct fingerprints are the only key to unlocking a secure lock system.

Lock systems are very much needed in our daily lives. To protect important and personal matters and personal privacy, there is no other way to lock and lock. But the type of system launched, tells a lot about the level at which an object can be and how secure it can be.

The fingerprint lock system is a biometric key where the visible fingerprint connector is used as the unlock key. It is more secure and more secure as fingerprints are different and cannot be copied. There are fundamental differences between lock systems of many types. Traditional lock and lock system, fingerprint lock system, password / PIN code system, biometric lock system are some of the security systems one can use for security purposes. The pros and cons of each system make them efficient, secure, fragile and difficult to break.

### 7. CONCLUSION

in this article we tried to solve the security problem in the door by combining the biometric concept with the door lock so for this purpose we use fingerprint as unique key to deploy device to lock or unlock door we discussed different components using arduino which we will need to make our project ie we have giving hardware and software requirements of project we went through different research papers and then gave a brief overview of the articles and after studying the papers we came up with an algorithm on how our system works we will operate we also have which gives a schematic that describes the project and also has a cost structure to have it priced if it were to be sold as product we have shown a schematic diagram and a possible related diagram of the components and are also looking at future possibilities of our project.

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