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# **Finger Print Recognition Based Smart Lock**

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**Abstract:** *This paper is presented to design and implement the fingerprint based lock system using microcontroller. Biometrics are studies which commonly include fingerprint, hand geometry recognition and verification. Among the available biometric traits, finger print proves to be one of the most secured traits providing good mismatch ratio and also reliable. The present scenario to operate a lock is with lock which are having keys. Which sometimes fail to provide good security to the lock. To provide perfect security to the lock and to make the work easier, this project is taking help of two different technologies viz. Embedded systems and biometrics.*

**Keywords:** *fingerprint, locking system, microcontroller, biometrics, authentication, buzzer, security.*

## **I. INTRODUCTION**

Biometric systems have overtime served as robust security mechanisms in various domains. Fingerprints are said to be the oldest and most widely used form of biometric identification. The use of fingerprint for biometric identification has been employed in law enforcement for about a century now. A much broader application of fingerprint is for personal security authentication, for instance to access a computer, a network, an ATM machine, a car or a home. Electro-mechanical lock using fingerprint recognition system is a process of verifying the fingerprint image to open the electron- IC lock. This project highlights the development of fingerprint detection and verification. It is completed by comparing the data of authorized fingerprint image with incoming fingerprint image. Then the information of incoming fingerprint image will be compared with authorized fingerprint image. In this project, digital image processing algorithms is employed to identify whether the incoming fingerprint image is genuine or forgery.

## **II. STATEMENT**

The aim of this project is develop a secure locking system based on fingerprint scanner. In this project, microcontroller accompanied with an interface circuit has been used for opening and closing lock based on finger print which is stored in microcontroller itself so that only authorized person will access the security lock.

## **III. DEFINATION OF TERMS USED**

### **A. Fingerprints**

fingerprints are the patterns of valleys and ridges on the surface of the finger. Like everything in the human body, these ridges form through a combination of genetic and environmental factors. The genetic code in the dna that gives general orders on the way skin should form, but the specific way it forms is a result of random events.

### **B. Fingerprint Technology**

in the late 1800s, an anthropologist named alphonse bertillon sought to fix the problem of identifying convicted criminals and turned biometrics into a distinct field of study. He developed 'bertillon age', a method of bodily measurement which got a named after him. Bertillon realized that even if names changed, even if a person cut his hair or put on weight, certain elements of the body remained fixed, such as the size of the skull or the length of their fingers. His system was used by police authorities throughout the world, until it quickly faded when it was discovered that some people shared the same measurements and based on the measurements alone, two people could get treated as one.



Fig. 1 Finger Print.

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After this, the police used finger printing, which was developed by Dr. Richard Edward Henry of Scotland Yard, instead. In addition, the same methods used by the Chinese for years. There are many steps in the history of fingerprinting as a way to identify criminals in the world. The Argentine police was the first person to keep fingerprint files. He classified fingerprints according to a system established by Prof. Francis Galton, an anthropologist related to Charles Darwin. Galton later published one book that is, Fingerprints that contained a classification system. In this technology one's finger is the key i.e., one's fingerprints are used as the "PASSWORD" for identification. Finger print technology introduced by Fujitsu to help combat the increasing incidence of financial fraud and forgery. Among these available biometric traits, fingerprint proves to be one of the best traits providing good mismatch ratio, high accurate in terms of security and also reliable. To provide perfect security and to make the work easier we are taking the help of two different technologies viz. embedded systems and fingerprint biometrics in our project.

### C. Block Diagram

The block diagram mainly consists of 89c52 MCU, Finger Print Module, Keypad, 16x2LCD, Buzzer, Relays, and Switch 9v battery, locking mechanism. Fingerprint Based Locks System Using Microcontroller Proceedings of IRF International Conference, 05th April-2014, Pondicherry, India.

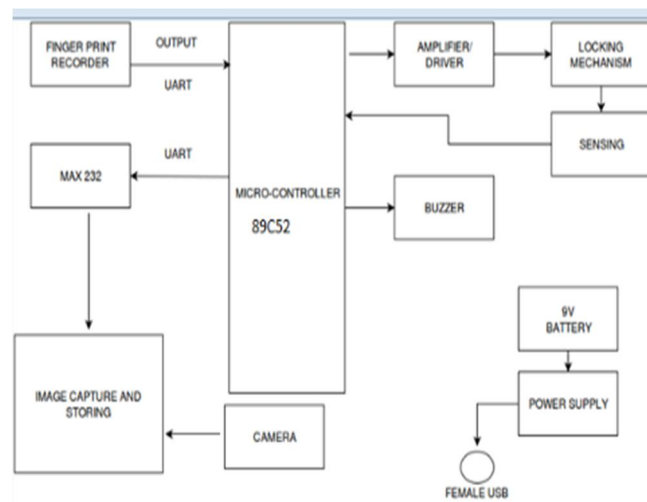


Fig.3 Block Diagram.

The block diagram consists of various blocks as shown in Figure 3. The fingerprint module is interfaced to the microcontroller, it will be in user mode. In this mode, stored images will be verified with the scanned images. When coming to our application the images of the person's fingerprint that are authorized to open the locks will be stored in the module with a unique id. To prove that the persons are authorized to open the locks they need to scan their fingerprint images. The Finger Print scanner is interfaced to 89c52 microcontrollers; this controller will be controlling the Finger Print scanning process. Immediately the locker will be opened. After the work has been completed if lock handle is pressed locks will be closed again. If an unauthorized person tries to scan his fingerprint image, then an indication will be given by a buzzer which is interfaced to the controller and also if wrong password is entered by the user again indication will be given by the buzzer. The current user instead of him/her can add a new person as the user of the same locker by new registration process and the old user's fingerprint image will be deleted. Option for changing the password is also available. Fingerprint Based Locks System Using Microcontroller Proceedings of IRF International Conference, 05th April-2014, Pondicherry, India, ISBN: 978-93-82702-71-9 158 Working The block diagram consists of various blocks as shown in Figure 3. When fingerprint module is interfaced to the microcontroller, it will be work in the user mode. In this mode, stored images will be verified with the scanned images. When coming to our application the images of the person's fingerprint that are authorized to open the locks will be stored in the module with a unique id. To prove that the persons are authorized to open the locks they need to scan their fingerprint images. The Fingerprint scanner is interfaced to 89c52 microcontrollers; this controller will be controlling the scanning process. Immediately the locker will be opened. After the work has been completed if lock handle is pressed locks will be closed again. If an unauthorized person tries to scan his fingerprint image, then an indication will be given by a buzzer which is interfaced to the controller and also if wrong password is entered by the user again indication will be given by the buzzer. Option for changing the password is also available.





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## IV. FUTURE SCOPE

Fingerprint based locks are revolutionary locking systems that open with just the touch of authorised user's finger; their increased use in various locking applications can actuate what would be known as 'Keyless World'.

- A. A fingerprint mismatch can be conveniently regarded as an attempt of illegal access in the wake of such unratified event, an adjunct siren alarm may be initiated to reveal possible theft.
- B. For systems demanding more security, such as expensive jewellery items or museum articles, scanning of multiple fingerprints may be employed.

## V. CONCLUSION

A. *The Main Advantages of using this Lock are:*

- 1) It is a simple lock which can be easily used and handled without any special training.
- 2) For every human being finger print is a unique trait and it cannot be imitated or fabricated
- 3) High accuracy in terms of security.
- 4) No false intrusions.
- 5) Hassle free access without keys or combination codes.

A methodical approach in designing the microcontroller based system for biometric smart security locks and even more for user verification using a finger print scanner has been followed. The result obtained in providing the security is quite reliable and accurate in all the circumstances. The system has successfully overcome some of the aspects existing with the present technologies, by the use of finger print Biometric as the authentication Technology.

## VI. ACKNOWLEDGMENT

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