# Door Opening System based on Fingerprint Scanning

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**ABSTRACT-**
In the today's world, safety and security are the   major issues faced by every individual. Though there is lot of solutions available for these issues yet complete solution is not. Our project "Intelligent door locking system"  is a step towards providing solution to these issues provides by restricting entries of unauthorized users.  Unauthorized access is not allowed by designing a lock that stores the fingerprints of one or more authorized users.  If the user wants an entry need to scan his/her fingerprint, Fingerprint is scanned and is validated for authentication. If the fingerprint matches, the door will be opened automatically otherwise the system will remain in locked position until not get authenticated at that point of time itself. This features improves the efficiency of the system
Keywords: Fingerprint, PIC, Authorization

## 1. INTRODUCTION
Security is the major issue in today's time. Earlier security was provided manually which can easily by intruders. Later, Password is mainly used for authentication but this method forces user to remember username/password combinations to access accounts and  also requires strong server security otherwise anyone can break into the database and read the passwords thus this system is also not a successful method. Fingerprint is basic method for authentication and it proves to be a unique identification for every individual as it identifies individuals and verify their identity. For their permanence and unique nature, they have been used for not only for identification but also forensic investigation, criminal cases for a long time.

### 1.1 Existing Systems
 Various attempts are made for providing security for all domiciles. Up to date, complete security is not discovered.

### 1.1.1 Lock and Key System:
First step towards security was Lock and key system. Security protocol followed in this system was "Single key for a single lock". Initially, the system was successful and provided at most security. But soon proved wrong by the fact that multiple keys can be easily made for a single lock. Hence this system is an outdated system to provide security.

**1.1.2 Password Authentication:**
Next level of Security used password as an authenticating tool. This system stores password of authenticated users for the purpose of validation. But in this system first need to remember passwords and secondly that password can be acquired by unauthorized user by continuously trying all the possible combinations.
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**1.1.3 Authentication by RFID card:**
Next level of technological development for providing security was authentication by RFID card. In this the access is granted only for the user whose RFID code matches with the authorized code. But this system also have pitfall - duplication of RFID card and anyone who possess this card can unlock the door.

In our proposed system tried to overcome this security issues and provide a highly efficient and reliable security system using **"FINGERPRINT RECOGNISATON TECHNOLOGY"**. Fingerprint provides a high level of recognition accuracy by providing a unique identification for everyone. . Fingerprint scanning is more accurate and cost effective method and duplication is virtually impossible.

**1.2 Fingerprint Technology**

**1.2.1 Fingerprint?**
A fingerprint is a pattern on finger (Figure 1.1). All parts of fingers are impressions of furrows and friction ridges. These ridges and furrows present good similarities like parallelism and average width. Every individual has unique pattern on finger which is virtually impossible to copy.



**Fig 1-Fingerprint image from the sensor**

**1.2 Fingerprint recognition system?**
Fingerprint recognition (sometimes referred to as dactyloscopy) is the process of comparing questioned and known fingerprint against another fingerprint to determine if the impressions are from the same finger or palm. A Fingerprint recognition system can easily perform verification. In verification, the system compares an input fingerprint to the enrolled fingerprint of a specific user to determine if they are from the same finger.
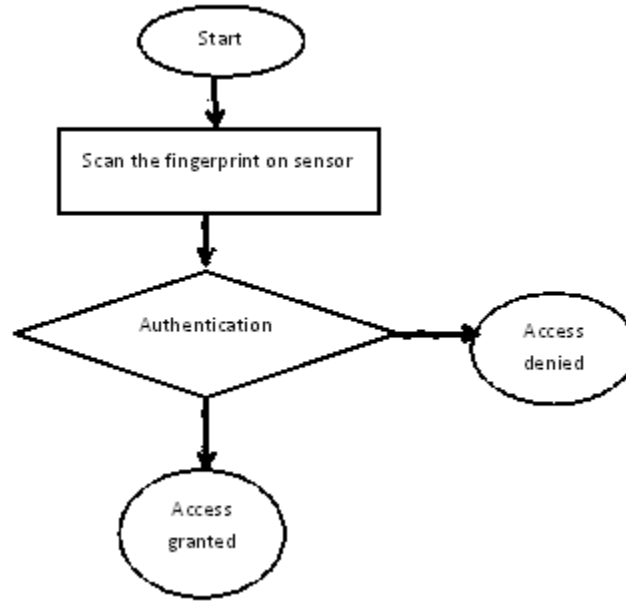
**Fig 2-Flow chart representing verification process**

### 1.2. Fingerprint matching techniques?
The large number of approaches for fingerprint matching

**1.2.3.1 Minutiae-based matching**: This is the most popular and widely used technique Minutiae are extracted from the two fingerprints and stored as sets of points in the 2D plane. This technique essentially consists of finding the alignment between the template and the input minutiae sets  resulting  in the maximum number of minutiae pairings

**1.2.3.2 Pattern-based (or image-based) matching**:  In Pattern based  compare the basic fingerprint patterns (arch, whorl, and loop) between a previously stored template and a candidate fingerprint. This requires  the images alignment  in the same orientation.

### 2. System model-our design
In the proposed system does user want the access to the office need to authenticate itself through fingerprint verification? Once the user scans fingerprint it's checked from the stored records whether it's an authorized user or unauthorized. If the user is authorized the door of the system will automatically get opened and user is allowed, in any case if the user is unauthorized the system is alarmed and user is allowed only after user enrolls itself and completes the requirements.
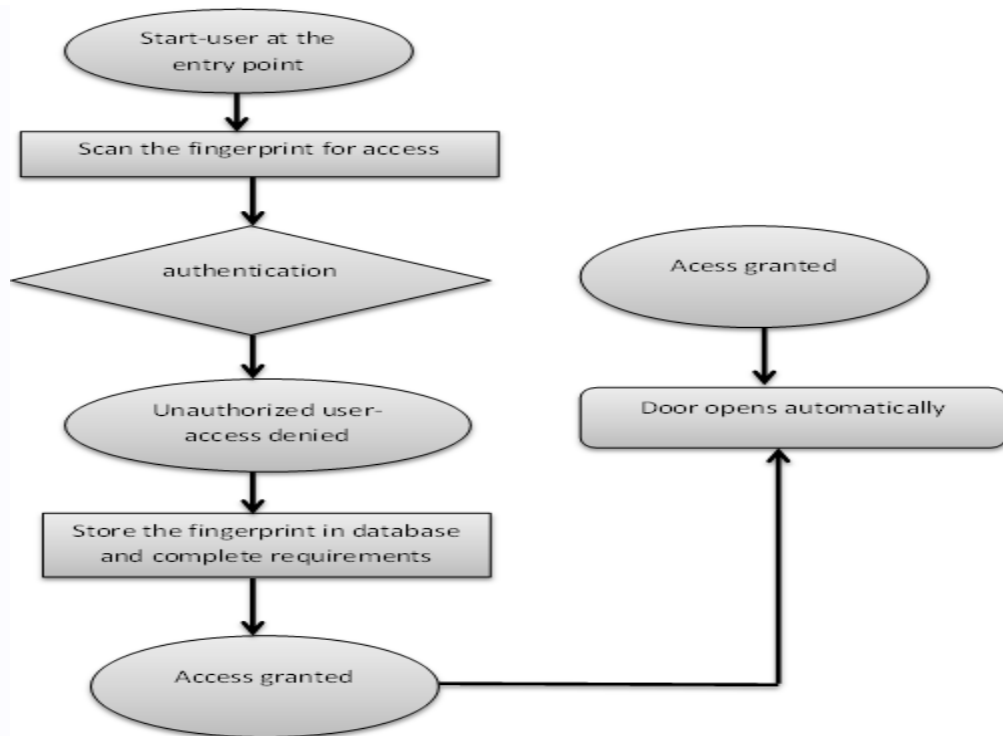In our system it works as:

Fig 5-Flow chart representing working of the system.
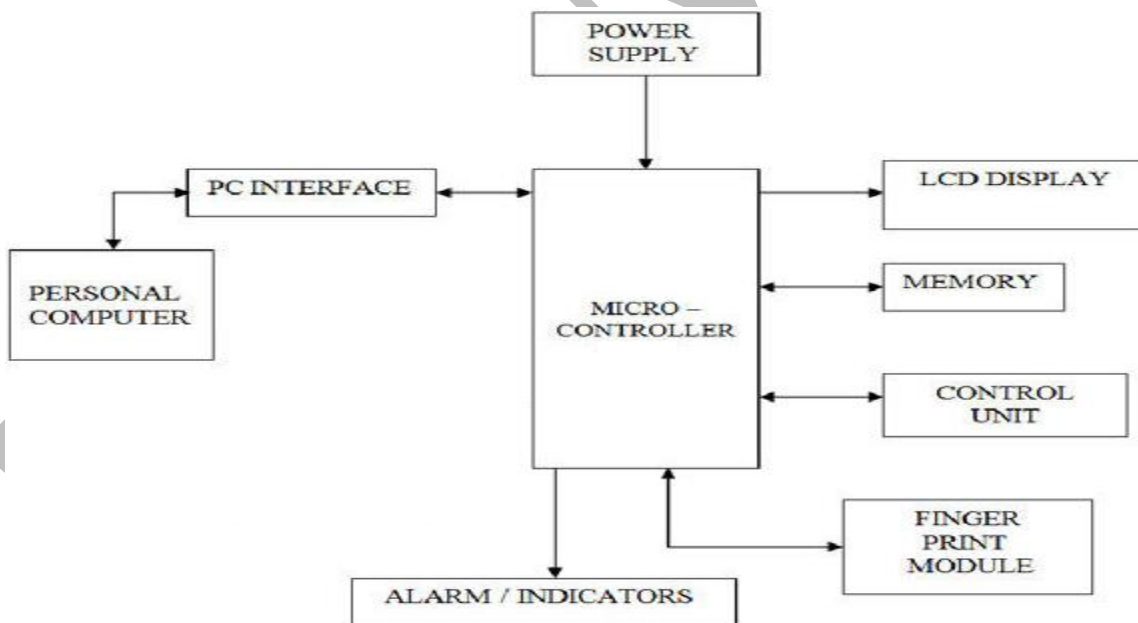
## 2.1Block diagram of the system

**Fig 6-Schematic Block Diagram**

## 2.2 Components in our system:
## 2.2.1 Fingerprint module:
In this system used r305 fingerprint module-r305 is an optical sensor with following features:

- Power DC 4.5V-6.0V
- Interface UART(TTL logical level)/ USB 1.1
- Working current Typical: 100mA Peak: 150mA
- Matching Mode 1:1 and 1:N
- Image acquiring time <0.5s
- Storage capacity 256
- Security level 5 (1, 2, 3, 4, 5(highest))



**Fig 7-Fingerprint Scanner**

## 2.2.2 Microcontroller:
A microcontroller is a single chip that contains the processor, non-volatile memory for the program, volatile memory for input and output, a clock and an I/O control unit also called a computer on a chip, billions of microcontroller units are embedded each year in a myriad of products from toys to appliances to automobiles. In this system we use PIC microcontroller.

- PIC refers to peripheral interface controller has either ROM or EPROM or Flash memory for storage.
- The storage is separated in program memory and data memory and data memory is either 8, 16 0r 32 bit and program memory-12, 14 or 24 bits.
- This microcontroller is available at low cost, re-programmable and supports serial programming.
- It supports RISC architecture and has built in oscillators with selective speed.
- Pic microcontroller has 256 bytes EEPROM memory, 356 bytes RAM and 8K ROM memory.

## 3. Future scope and Conclusion:
In future to this system can either introduce face recognition techniques or iris recognition? Even can connect the system with the GSM module to alarm about the unauthorized users.
Hence the biometric finger print system provides good solution to the home safety problem. Our proposed system is designed in such a way that it overcomes the defects of previously available systems. User friendliness is given much importance in our system which makes it more comfortable to use than any other existing systems. Also it is built with open source hardware which makes it cheaper

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