



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

# IJIRSET

International Journal of Innovative Research in  
**SCIENCE | ENGINEERING | TECHNOLOGY**



# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 11, Issue 4, April 2022

**ISSN** INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA

Impact Factor: 8.118



9940 572 462



6381 907 438



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# Arduino UNO Atmega328 Based Fingerprint Doorlock System for Bank Locker Applications

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**ABSTRACT:** The paper presents the idea of a smart and modest door lock enhanced with a fingerprint interface. For implementing this project Arduino Uno is used. This paper uses a biometric-based locker technique for the locking system. This article's aim is to make a Bank locker, therefore a biometric locker system is used to make the bank locker secure. Therefore, the fingerprint technique is used to make a security system. A fingerprint sensor will be integrated into the locker and placed on the outer side of the door, preventing access to the controlling systems from the outside. As thefts are increasing day by day it is our responsibility to make them secure. The fingerprint sensor will take the user's fingerprint and send it to the microcontroller, which will compare it to its records. If the print matches one of the microcontroller memory's prior fingerprints, the microcontroller will lock or unlock the latch according to its true state. In today's world, common locks are not very secure, thus in order to make our locks more efficient and secure, a security system is invented that may help us in gaining more security. As a result, utilization of a fingerprint door lock system is implemented.

**KEYWORDS:** Biometric Fingerprint Sensor, Arduino Uno, LCD Display, Security System.

## I. INTRODUCTION

Theft is one of the major problems in today's world places like in offices and other public places should not be secured so that issues to make secure our documents and precious things so we have decided to make this type of security system that will be more useful to all the people. This mechanism ensures that fingerprints are used correctly for door opening and closing [1]. The fingerprint most of the banks have a locker system such that one key is with the user and the bank has a master key. They also have a password which the user has to tell the bank before going in the locker room, now if the user loses the key then, it is a big security risk. There are many thieves around us that can easily or forcefully break our lockers so we can be lost our property so to overcome this problem we are creating this type of security system. Many of the bank lockers do not guarantee the full safety of the user. In the fingerprint bank locker system, this is a very unique idea instead of keeping keys or protecting those keys [2]. Biometric devices are highly secured security identification and authentication device. Such devices use automated methods of verifying and recognizing the identity of a living person based on a physiological behavioral characteristic. These characteristics include fingerprints, facial images, iris, and voice recognition. Biometrics is the process of automatically identifying a living individual based on physiological or behavioral features for the purpose of authentication [4].

## II. RELATED WORK

A number of works have been done on minutiae-based fingerprint matching. Some of them use the local structure of the minutiae to describe the characteristics of the minutiae set. This approach has high processing speed and robustness to rotation and partial prints. However, the local structure usually has less distinct features because it only represents some parts of the whole minutiae set. Prints from different fingers may have quite a few similar local structures by coincidence while prints from the same finger may only have very few similar structures due to the presence of false minutiae and the absence of genuine minutiae. As used in, Alignment-based matching algorithms take use of the shape of the ridge connected to minutiae. This might improve system accuracy. However, this approach results in a larger template size because the associated ridges for each minutia must be saved. Research in, combines the local and global structures.

The local structure is used to find the correspondence of two minutiae sets and increase the reliability of the global matching. The global structure of minutiae reliably determines the uniqueness of a fingerprint miniature. In a locker system based on biometric and short message service technologies was developed. This study made use of biometric technology for data enrolment, and short message service for passcode generation and authentication. In an office automation system using RFID and GSM technology was developed. This study made use of both RFID and GSM technology to electronically control the opening and closing of door. Also in , a biometrically-controlled door system using iris recognition with power backup to gain access to a place or resource developed. All these works were used as a theoretical tool in the development of our system.

Fingerprint matching techniques are of two types: graph based and minutiae based. The template size of the biometric information based on minutiae is much smaller and the processing speed is higher than that of graph-based fingerprint matching. Modern vehicles uses computer controlled battery ignition system; no matter the type of mechanism used, all ignition systems use battery, switch, coil, switching device and spark plug . However, in this modern technology dispensation, biometrics has been employed for the ignition and security process.

This paper presents the various outcomes and results of the study containing visions into the scheme. Electric bikes, of much sort have been surveyed by and by in a semi-open contract conspire on the Nanyang Technological University campus in Singapore. According to this campus, it is a famous and helpful administration, with a few models of electric bike being exceptionally very much utilized. Riders contemplate the premier of the electric bikes to be both agreeable and engaging while at the same time utilizing it, and extremely suitable for campus travel. Understudies and general society alike view the plan unhesitatingly, and creators have seen a lessening in the quantity of miles driven via auto inside the grounds for the dominant part of clients who are additionally drivers.

### III. METHODOLOGY

The above is the flow chart of methodology adopted by us:

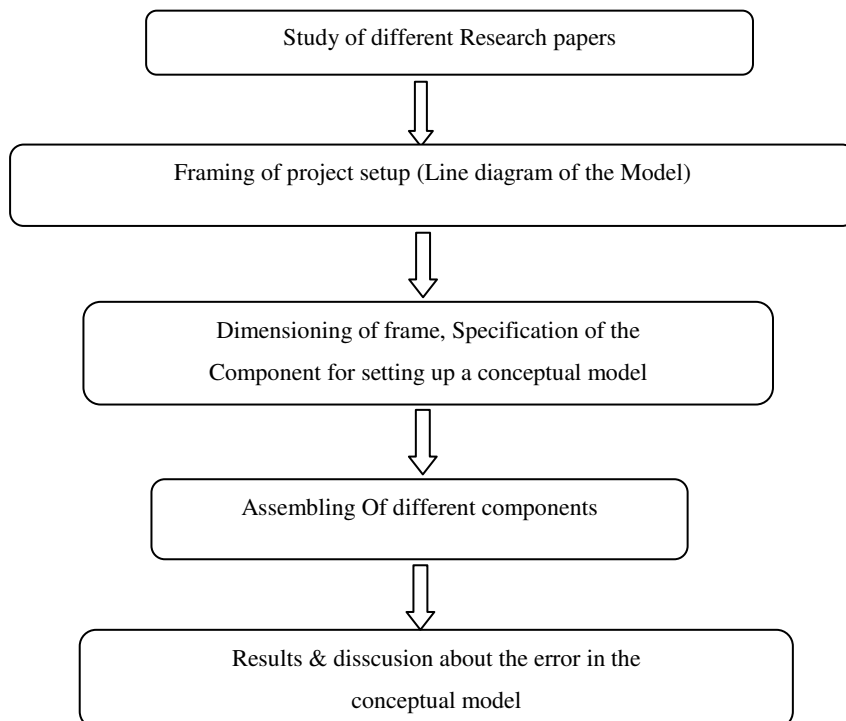


Fig .1Flow Chart For Working Process

The developed fingerprint-based Bank doorcontrol system consists of a number of subsystems, namely, a door with a lock, an interfacing control system, a thumbprint reader and a control program written in C#. The developed control program application which operation depends on sensing of the matched fingerprint with the database template controls the operation of the interfacing control circuit, while the interfacing control circuit controls the operation of the door lock for opening and closing operations. The framework for the developed system is shown in Figure 3. The stepwise procedures followed in for the system development are:

**Fingerprint acquisition:** The acquisition of fingerprint was obtained from the fingerprint sensor hardware and few information about authorized person were also collected through the software interface, **Feature extraction:** Features were extracted from each of the individual fingerprint by using a feature extraction algorithm, **Template generator:** A template was generated for each of the features extracted and finally stored, **Stored templates:** The extracted features were stored as a template in the system database, **Matching:** A matching algorithm was applied by the control program **Evaluation:** The performance of the system was evaluated based on time of recognition.

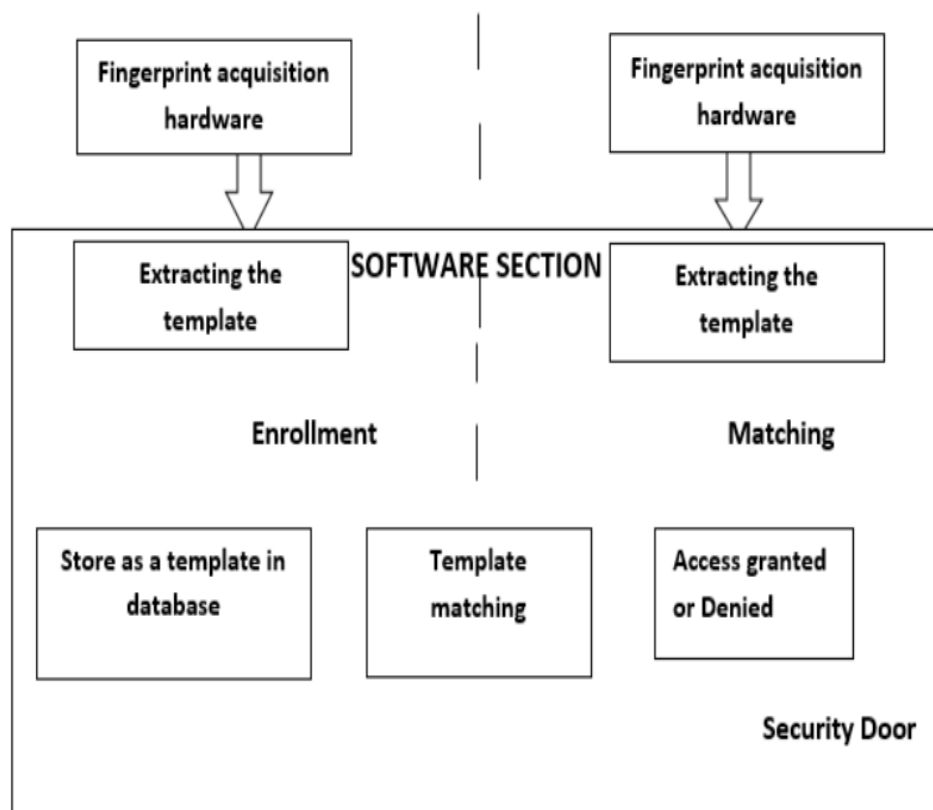


Fig.2 The System Development framework

#### IV. PROPOSED MODEL

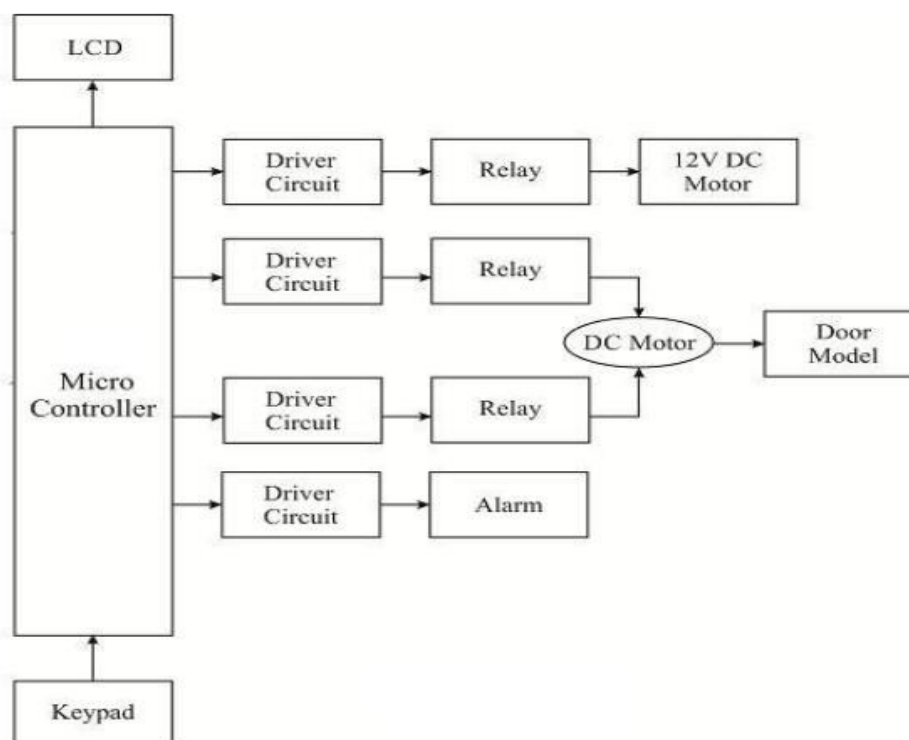


Fig.3 Block schematic

An interfacing technique was used to integrate the two important parts of this study, namely the hardware part and the software part. The fingerprint acquisition device used is a fingerprint sensor that detects the patterns on the finger of each person to be saved in the database for verification purpose. The fingerprint sensor used fingerprint sensor. Once the individual places his or her finger on the sensor, the acquired fingerprint is converted into electric signals which are analog in nature. These analog signals are then converted into digital signals via an analog to digital converter.

#### V. RESULTS

In this paper fingerprint, doorlock system prototype is designed and tested. The Arduino UNO board is used to power the system. The program is executed using the Arduino IDE software, which is free software, making the system simpler and more cost-effective. In this system, the circuit complexity is reduced, and the system's cost is reduced. This Project is low-cost and extremely dependable in the event of a security breach. This biometric bank locker system has a number of advantages over traditional locking systems making it extremely valuable. This biometric bank locker system has many merits over the conventional locking system which makes it very important. This locker system is very to use.



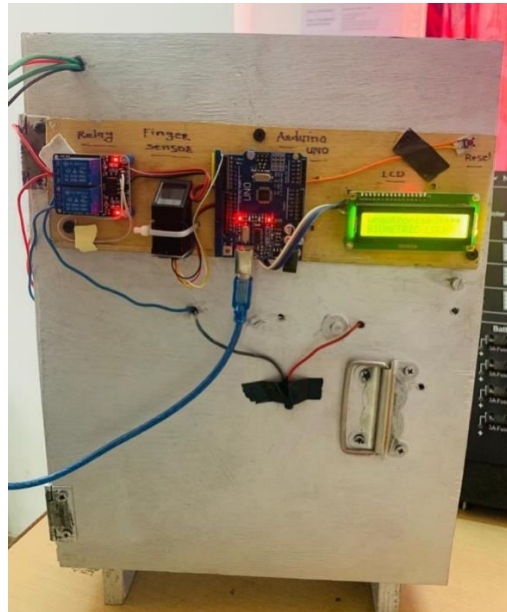


Fig.4 Final Circuit

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