

Biometric based Door Lock System with Buzzer

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Abstract

Security has always been an issue of concern in every family and also in workplaces, shops, etc. Everyone is concerned about strangers walking into their house or workplace without their knowledge. The issue with the usual door lock is that it might potentially be opened by someone using a duplicate key. An alternative to this strategy is to employ a lock's password or pattern, which runs the risk of being discovered and allowing the lock to be opened. Therefore, integrating a door lock with biometrics can be a solution to these problems. In this project, we create a fingerprint-based door lock system that unlocks doors. This study focuses on creating a buzzer-based biometric door lock system that eliminates the need for carrying around keys, preventing problems like key loss. When an unauthorized person tries to enter, the buzzer helps the owner be informed.

Keywords: Fingerprint, Biometrics, Buzzer.

INTRODUCTION

This project is about solving a problem related to the safety of unauthorized persons entering our homes, shops, or offices. Security issues can be fixed using traditional locks but there is always the opportunity for someone to unlock the lock even without breaking it using a duplicate key. Using these types of locks creates problems when we lose keys and we have to carry the keys with us regularly. Metal Keys are a natural way to lock or unlock a door, and everyone knows it. Although the physical key is a well-proven and well-known technology, it has no flaws. For keys, there can be only one unique key. Different keys are required for different locks. Managing a large number of keys is also very difficult. Therefore, to exclude all problems in this project we implement a system that uses the fingerprints of an individual to unlock the door.

Biometric verification is a technique by which an individual can be interestingly perceived by no less than one unmistakable natural quality. One-of-a-kind identifiers integrate fingerprints, hand and ear geometry, retina and iris patterns, voice recognition, DNA prints, and signatures. The biometric identifier in which we are involved in this project is finger impression as it is unique to every individual and the use of finger impression as the way to unlock entryway locks can overcome the security issue of unapproved people entering our homes, shops, work environments, etc. In simple words, we can say that we are implementing a door lock system using an Arduino which makes use of fingerprints to identify whom to allow and who not to allow inside our homes, offices, shops, etc. This system also helps to alert the owner in case an unauthorized individual tries to enter through the door.

LITERATURE SURVEY

A few notable reviews of various works on biometric security systems are included below. In his study on personal authentication using biometric technology, Fernando.L.Podio firmly asserts that fingerprints are one

of the best home security options among bio-examining frameworks. Because tokens like access cards, magnetic cards, photo id cards, body keys, and so forth, may be lost, stolen, copied, or left at home, the designer has hailed the biometric security framework as an intriguing benefit. Passwords may also be forgotten, exchanged, or seen in any event. Biometrics help to provide quick, simple, and economical aspects for a wider range of implementations.

The purpose of M I Efunbote's work, "Development and Experimentation of a Security Door Lock System Using Biometric Fingerprint Architecture," is to use the biometric fingerprint sensor to develop a secure door lock for the door. The microcontroller unit's response time was quick, dependable, secure, and accurate. The system checks to see if the scanned fingerprints were registered or not then adds and deletes registered fingerprints. Its success was as expected.

BACKGROUND

EXISTING METHOD

This is the time when everything is connected to the network and when anyone can access information from anywhere in the world among the most common methods of personal recognition we often see passwords or patterns and access card methods set a unique unlock process. Password and access cards are used but the passwords or patterns in locks can be stolen easily as they are easily guessed by others if they are not strong enough without a portable key it is possible for someone to guess one's password on the other hand access cards can be duplicated. Unfortunately, some cases are committed by those who know us best criminals do not always come as criminals uninvited guests can be in-laws or local children.



Figure 1: Password-based door lock



Figure 2: Access card-based

PROPOSED SYSTEM

Our Proposed System offers great safety and efficiency while resolving all security issues with the current system this is the best way to avoid the trouble of a lost or stolen key or an unwanted entry the solution to these issues offers a high level of accuracy rate is the fingerprint each finger has a distinct unchanging pattern of friction ridges due to this everyone can identify themselves by their fingerprint the biometric-based door lock system uses tried-and-true technology users fingerprints are scanned by fingerprint scanners which are subsequently used to verify authentication more accurate and economical than other methods fingerprint scanning essentially eliminates duplication.

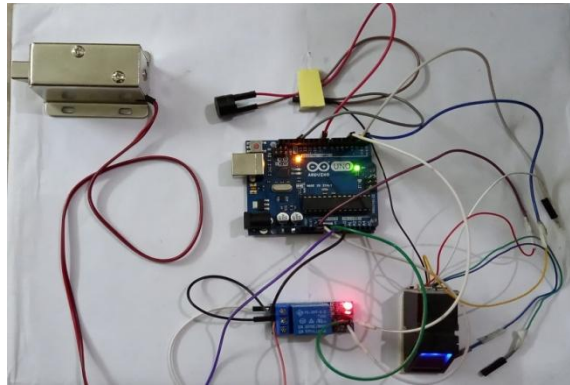


Figure 3: Proposed system

HARDWARE COMPONENTS

These are the hardware components of the biometric-based door lock system.

1. Fingerprint sensor
2. 5v Relay
3. Solenoid lock
4. Buzzer
5. Jumper wires
6. Arduino Uno
7. Adapter

BLOCK DIAGRAM

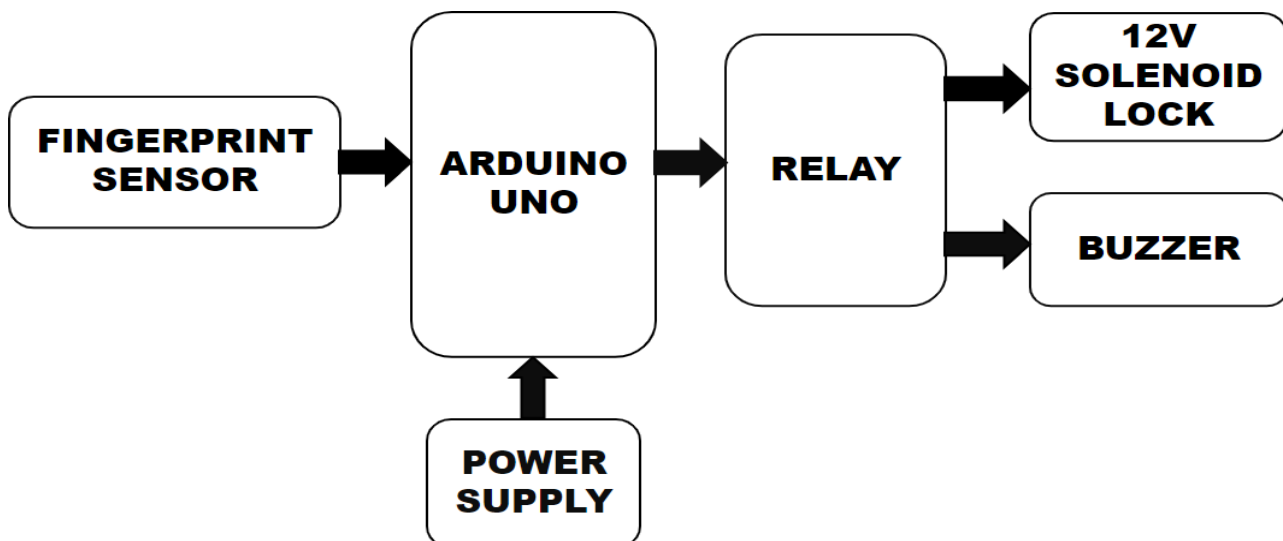


Figure 4: Block Diagram

CIRCUITDIAGRAM

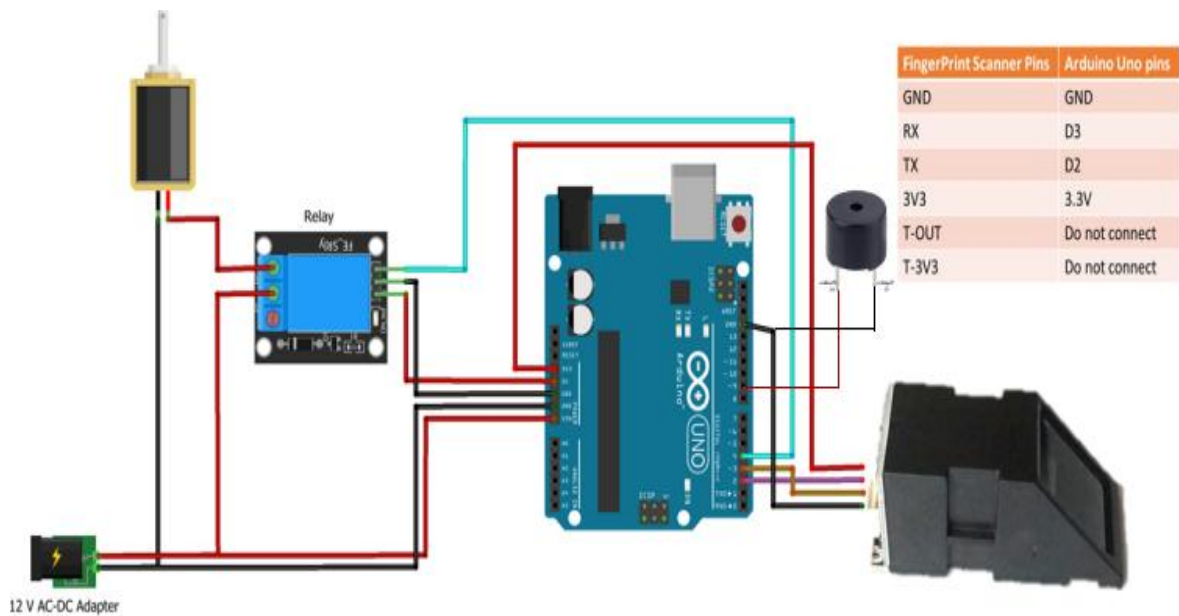


Figure 5: CircuitDiagram

ALGORITHM

Step 1: Start.

Step 2: Collect all the required components (Fingerprint sensor,5v relay,12v solenoid lock, ArduinoUno,and Buzzer) as mentioned in the circuit diagram.

Step 3: Connect the fingerprint sensor and Arduino according to the circuit diagram by using the jumper wires.

Step 4: Dump the fingerprint enroll code in the Arduino Uno and store the fingerprints by scanning them with the fingerprint sensor.

Step 5: Connect the remaining components according to the circuit diagram.

Step 6: Again, dump the biometric-based door lock system code in the Arduino Uno.

Step 7: The fingerprint is scanned with the fingerprint sensor and initially, the door lock will be in the locked state.

Step 8: The fingerprint is put in a condition where it scans for the match of the fingerprint.

Step 9: If a match is found, it moves to step 10 or it moves to step 12.

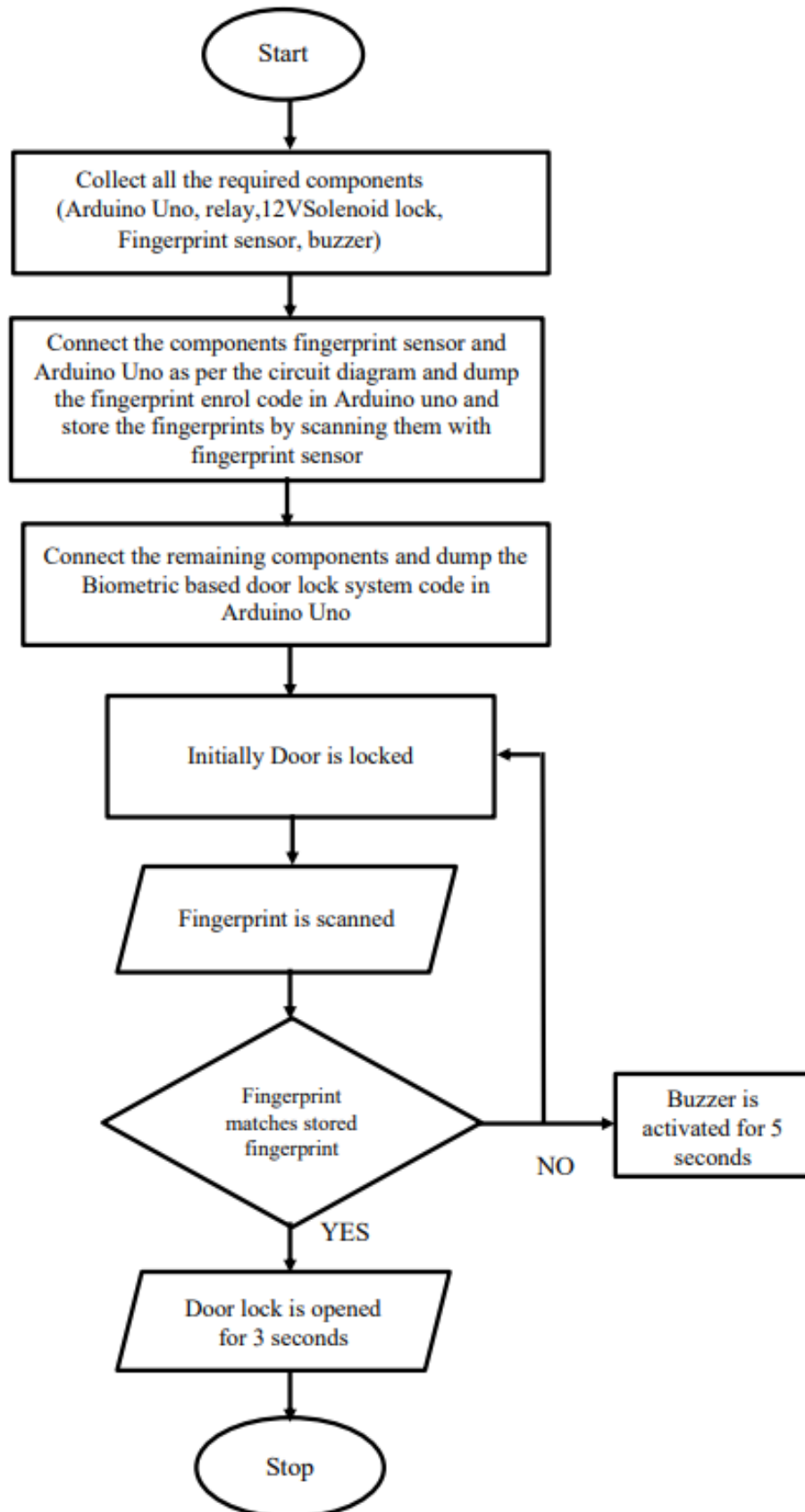
Step 10: If the match is found the relay which controls the lock gives the signal to the lock and the door is unlocked for 3 seconds.

Step 11: If the match is not found the door remains locked.

Step 12: The lock remains closed, and the buzzer gets activated for five seconds. Step 13: Stop.

FLOWCHART

This is the flowchart of a biometric-based door lock system with a buzzer.



RESULTS

The following figures show the prototype working scenario and outcomes of this system.

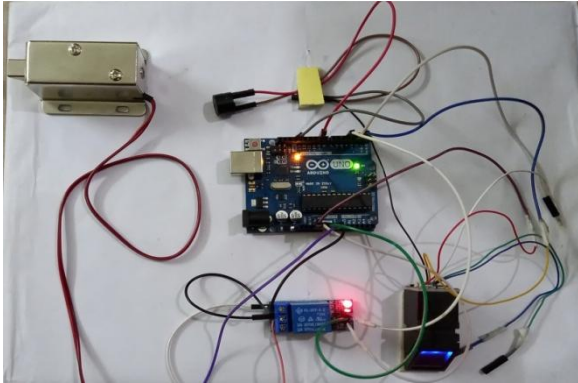


Figure 4: Project prototype identified

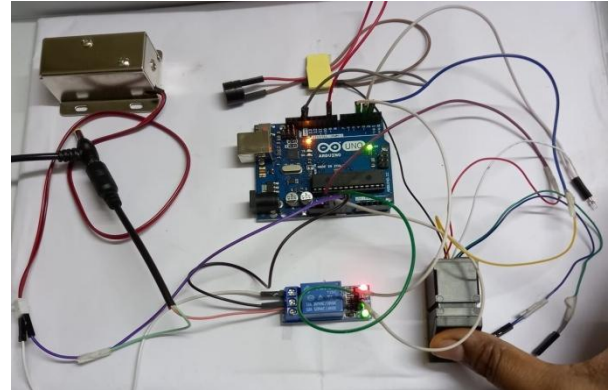


Figure 5: Door lock when the authorized user is identified

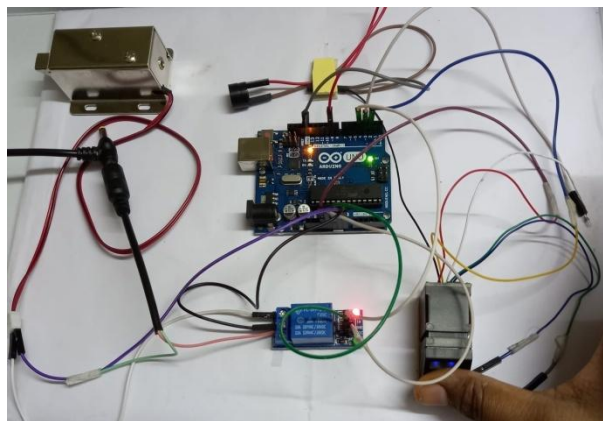


Figure 6: Door lock when the authorized user is not identified

CONCLUSION

we conclude that systems for fingerprint-based door locks can be created to fit a specific need compared to lock systems on the regular market this door locking mechanism is more affordable our fingerprint-based lock system quickly and accurately recognizes fingerprints making it possible to integrate with users and offer stronger security. it is convenient to consider a fingerprint mismatch as an attempt at unauthorized access for systems requiring greater protection such as pricey jewelry items or museum artifacts scanning of several fingerprints may be used to alert people to potential theft in the wake of such an unconfirmed event.

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