

Smart Door Locking System Using IOT

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Abstract

Physical keys are the most natural way to lock or open a door, and everyone is familiar with it. Although the physical key is a well-proven and well-known technology, it is not without faults. For a lock, there can only be one unique key. Different keys are required for various locks. Carrying a big number of keys is also inconvenient. Smart locks are key-less door locks that let you unlock your door without having to use areal key. A smart lock is an electromagnetically lock that is meant to lock and unlock a door when it receives instructions from an authorized device and executes the authorization procedure using a cryptography key. Keywords—door lock, Arduino, Smart home, Home automation, Security.

Conceptual Security has consistently been a significant worry to the general public either in the family units or the workplace condition. There are different methodologies set up to address these issues. This venture is proposed to build up a savvy locking framework utilizing the Internet of Things. Utilizing conventional keyed locks is basic since the start of humankind, anyway there is a high risk of keys being lost or getting into inappropriate hands. Subsequently, many individuals prefer biometric locks over traditional keyed locks to improve the security of their homes or workplaces. In contrast to the conventional lock, a cutting-edge biometric lock requires no key to bolt or open the door and instead uses a biometric sensor. Our project is an Arduinonano based adaptable working device that provides

physical security utilizing the biometric sensor which is available in a smartphone.

Keywords: *internet of things (IOT), sensors, microcontroller, ESP8266, cloud computing with thing Speak, Arduino.*

INTRODUCTION

Bio metric systems have overtime served as robust security mechanisms in various domains. Fingerprints are the oldest and most widely used form of bio metric identification. The use of fingerprint for identification has been employed in law enforcement for about a century. A much broader application of fingerprint is for personal authentication, for instance to access a computer, a network, an ATM machine, a car or a home. In this article we will be discussing about fingerprint based door lock system. Electronic lock using fingerprint recognition system is a process of verifying the fingerprint image to open the electronic lock. This project highlights the development of fingerprint verification. Verification is completed by comparing the data of authorized fingerprint image with incoming fingerprint image. Then the information of incoming fingerprint image will undergo the comparison process to compare with authorized fingerprint image.

Fingerprint door lock incorporates the proven technology. Fingerprint reader

scanning is the most mature and tested type of bio metric technology. Recent studies on bio metrics have shown that compared to the hand method, fingerprint is more accurate and cost-effective. The duplication of bio metric fingerprint technology is virtually impossible, only one in one billionth of a chance. Bio metric security guarantees a positive method of user identification with something that cannot be lost, replicated or stolen. Fingerprint based door lock system can achieve all these features.

Objectives of System-

1. In this project the user can lock or unlock the door with the password and Fingerprint using mobile application.
2. Our project helps in building an economical and a low budget biometric lock using the fingerprint sensor available in a smart phone.
3. Implement a mobile application is used to inspect and double – check the impression and send the confirmation to Arduino through Bluetooth.

Components-

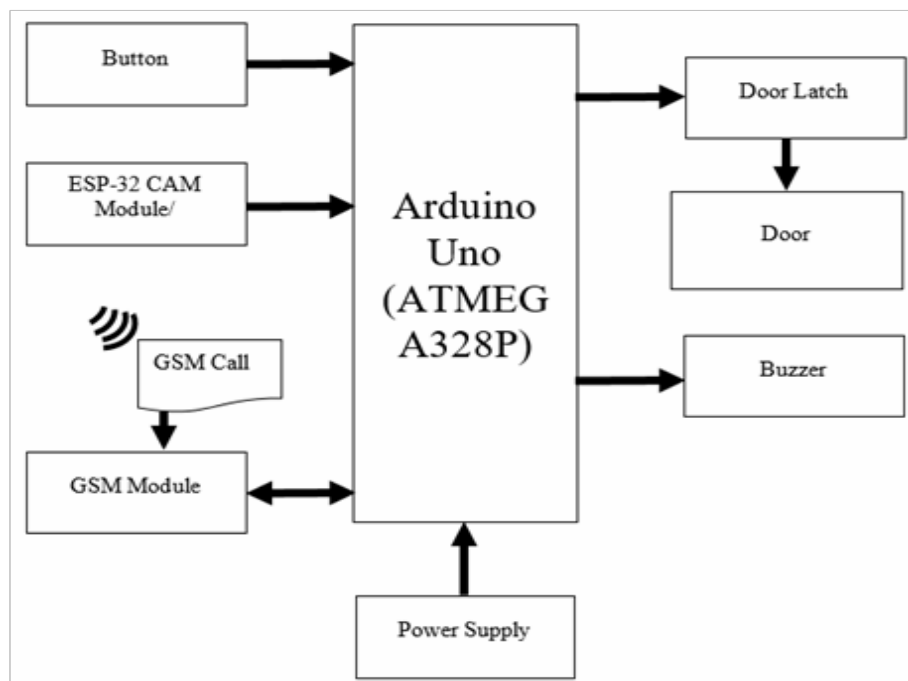
- Ardunio Nano
- HC-05 Bluetooth Module
- Solenoid Lock
- Single Channel Relay Module
- 3*18650 battery holder
- 6.3.7V 18650 Rechargeable Battery
- Buzzer
- Jumper Wires.

Modeling and analysis

Block Diagram

Our project helps in building an economical and a low-budget biometric lock using the fingerprint sensor available in a smartphone. The first step is to create a program using Arduino IDE and uploading it into a microcontroller, in this case it is

Arduino Nano. This program sets up a communication link between the nano board and a smartphone via Bluetooth. This communication link helps the microcontroller in executing the commands sent by the smart phone. The first step in developing the program is to create a string variable which stores the unique device ID for lock, and then the servo library is added. The basic idea behind the working of door lock lies in the ID sent by the Android phone by means of the developed app. To receive the data sent by the phone we use Bluetooth module HC-05 with a default baud rate of 9600. It is connected to the Arduino nano board (Microcontroller) at the same baud rate.



Actual Working of Block Diagram-

Process of Work

The purpose of this experiment is to implement a door-locking mechanism that opens or closes the lock on the door automatically with a fingerprint. There are two work processes for this experiment which are

Case 1: The lock will open

A Fingerprint will input values allowing us to compare the values with the string of Fingerprint values that are set in the code. When inputting a code comprising of integer values with the help of the fingerprint, if the string of integer values matches the string of integer values already fixed in the code, the fingerprint module will send a signal to the display and the “Code Accepted” message will be shown. If the code is accepted, the Arduino will send a signal to Servo Motor. The Motor will then rotate 90° and open the lock, allowing door to be unlocked.

Case 2:-

The lock will not open:

If the Fingerprint does not match the fixed string in the code, the Keypad will send a signal to the Display to show the “Wrong Code” message. Wrong fingerprint in the will automatically instruct the user to start again from the beginning. If “Wrong Code” message is shown, the Servo Motor

will not rotate and the lock will not open allowing the door to remain locked.

CONCLUSION

In this project the user can lock or unlock the door with the password and Fingerprint using mobile application. Our project helps in building an economical and a low budget biometric lock using the fingerprint sensor available in a smart phone.

In this paper , we have tried to solve the security matter in door by bringing the concept of biometrics along with the door lock. So, for that purpose we are using finger prints as unique key to implement a device so as to lock or unlock a door. We have discussed about the different components using arduino we would require to implement our project i.e we have given the hardware and software requirements in the project. We have gone through different research papers and then given a brief about the papers and after studying the papers we have come with an algorithm as to how our system will work. We have also given a project description diagram and also a cost structure so as to get to a price if it is sold as a product. We have shown a block diagram and a probable connected

diagram of the components and also given the future possibilities in our projec

Applications-

1. Can be used for doors at Home and Offices
2. Can be used for Industrial doors
3. Can be used for high security Bank vault doors
4. And practically any place where remote controlling is required.

USES

Security

The conventional lock and key based framework have a lot of vulnerabilities. The significant one among them is the way that the key can be effortlessly duplicated. This might result in an unwanted intrusion by a stranger at any point of time. Fingerprint of each person is unique; with the usage of a biometric lock it is nearly impossible for someone to break into your private property.

No risk of misplacing

Whilst using traditional locks there is always a moment of time where we might have misplaced our keys or we might not have enough time to search for them, in such situations there is no other solution than breaking the lock or getting a new pair of keys. This can be

avoided using our biometric lock which is hassle free and very handy.

Cost-Effective

The cost estimation for our proposed project is very economical and in fact very negligible. No sophisticated instruments are being used in here, all the components required are easily available in the market.

Usability

In this biometric locking system, all we need to do is to scan our fingerprint using the fingerprint sensor readily available in a smartphone, with no added tools. This makes the process quite hassle free and quick.

In-accessible

A conventional lock can be picked or broken into. A card-based entry system can be hacked into or the card can be misplaced. These are not entirely fool-proof. Since fingerprint of each person is unique, which is the only criteria required to get access, the security provided here is quite reassuring.

Future scope

Biometric security guarantees a positive method of user identification with something that cannot be lost, replicated or

stolen. This system is very cost-effective and easy to install and is designed under different modes which makes it useful. The Smart locking system has great potential. It will allow users to forget about their traditional key and to use only their mobile device to get access to the needed area. The system will be developed in the future to provide more extensions and to be as mobile as possible.

Advantages

1. Lock and unlock your door from your phone
2. Assign individual pass codes.
3. Know who's coming in and out.
4. No more hideaway keys
5. Enhanced security
6. Easy to use.
7. See who's at your door before unlocking it

Disadvantages

1. Smart door locks are vulnerable to hackers.
2. If there is something wrong with the app or the technology the smart door lock can cause inconvenience.
3. Installation charges of smart locks are higher than normal locks.

4. If your phone is stolen, you lose it or it dies, you could get locked out if you don't have a backup plan

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