Abstract. This paper describes an advanced security system designed for the purpose of door locking. Keys can be stolen but not our identity. Also, overriding a fingerprint sensor door lock is really tough so the system guarantees high security. Technology is getting upgraded day by day and is accessible by any educated and technical person with minimum of computing skills. Now technology is nothing but advancement of the particular field of science irrespective of the fact whether it is related to computer or not. With the advancement of technology, our security is at constant threat to get away with this problem, we developed this security system completely based on biometric authentication. For implementing this project, we will be using the Arduino UNO, a fingerprint sensor, a servo motor, and some other hardware devices. Alongside the working of this fingerprint-based system, we shall also discuss about how our project can be helpful to the society during this epidemic.

Keywords— Fingerprint sensor, Authentication, Security, Arduino, Quick Access, Body Temperature, Lock

1. Introduction

According to a report by National Crime Records Bureau, a burglary or an unwanted break-in takes place every 3 minutes in India.[1] This issue is getting severe in each and every city of India, so to minimize this problem we came up with the idea of Fingerprint Door Lock System. We have made a door lock equipped with fingerprint module which will scan our fingers, it can be one or multiple fingers. Our project is solely based upon Arduino programming (a type of coding language used to run certain electronic modules. When a person whose fingerprint is earlier recorded in the module touches other person tries to enter the house or any other area where it is installed the LED screen will show “ACCESS GRANTED” and the door will open and if any other person tries to enter the house or any other area where it is installed the LED screen will show “ACCESS DENIED” and thus will not be able to enter.

Window Snyder, Chief Security Officer of Firstly once said “One single vulnerability is all an attacker needs.” In this world where our information and property is always under the risk of getting stolen, it is our duty to keep our resources safe and secure from evil hands. As security is the biggest concern in the current era, we planned this project which will not only provide high security but also detect issues in temperature of the person willing to take entry into the property.

Considering the rapid spread of coronavirus throughout the world, we’ve tried to add a cost-effective LM-35 Temperature Sensor which would instantly check the body temperature while granting access. If the temperature is higher than the normal range then the person will not be able to enter but if it is alright then the person can enter. This door lock has dual purpose use. It can work for both security and as well as for social use.

2. Proposed Model

In our design, Arduino Uno MCU board acts as the heart of our system. Our system design consists of the following components:

a. Arduino UNO board
b. R305 Fingerprint Sensor
c. 6x2 LCD Display Screen

d. Relay module

e. Electronic Door Lock Solenoid

f. Power source

g. Jumper cables

h. LM35 Body Temperature Sensor

i. Battery Holder

*System Diagram*

*Circuit Diagram*
2.1 LM-35 Temperature Sensor

No. of terminal: 3
Sensitivity: 10 mV per degree Celsius
Temperature Range: -55°C to 150°C
Scale Factor: 0.01 V/°C

2.2 How the system works

When a person places his/her finger on the scanner during the security setup it is saved and recorded. From next time onwards used for granting access. This process is nothing but conversion of numerical values and creation of a finger template which is used here, his process is then repeated every time you want to grant someone access.

The specialty of our project is that when a person sticks or places his/her finger on the scanner it also checks the temperature of that particular person and if any anomaly is seen or noticed it will be displayed and the person who is monitoring it so that he can take the necessary action. This feature is added to the setup on the view of the coronavirus situation because home is somewhere everyone ones to stay safe and healthy and also keep other near ones protected from this deadly virus.

3. Impact on COVID-19

According to a study, published in the Journal Frontiers in Public Health, the likely order of symptoms in patients with COVID-19 is fever, followed by cough, muscle pain, and then nausea, and/or vomiting, and diarrhoea.[2] Since fever is the most common symptom of COVID-19, our LM-35 Temperature Sensor will help us detect symptomatic patients affected by the Coronavirus. This sensor can sense up to 150°C temperature. The body temperature measured using the sensor is instantly displayed in another LCD and if the displayed temperature is above the normal range, the user can be immediately taken to the hospital. Even if it isn’t a case of COVID-19, all necessary steps should be taken from our side when it comes to the security and health of our closed ones. The only problem with LM-35
temperature sensor is that to get accurate body temperature we need to put the sensor around our body cavity, like mouth, ears or armpit, but that won’t be possible if it is placed next to the fingerprint door lock system.

4. Discussion

Though this security system is much costlier than a traditional door lock but there is no tension of rusting or misplacing of keys when it comes to fingerprint sensor door lock system. Though such a system provides efficient performance and high security, there are certain things we need to keep in mind while installing it in our property. As a backup during power cuts or emergency, we need to have a mechanical key slot in it too.

The advantages of a fingerprint door lock system over a traditional key lock are as follows: i. Difficulty in over-riding or hacking ii. User-friendly to all age groups iii. No manual errors iv. No false intrusions

5. Conclusion

Since there is no risk of forgetting passwords or losing keys, hence fingerprint sensor door lock is surely the most convenient option in the current scenario. This security system has a wide scope in future as artificial intelligence techniques like face recognition can also be added to ease the process of identification. Other than the temperature sensor, fire sensors and iris scanners can also be installed along with the system to increase the security.

Acknowledgement

We sincerely express our gratitude to Prof. (Dr.) B.C. Mal, Vice Chancellor, JIS University for giving us this opportunity and we are deeply thankful to our guide Dr. Saikat Maity, Head of the Department, Dept. of Computer Science and Engineering, JIS University for his constant support and suggestions.

References

[1] www.indiatoday.in
[2] www.circuit-digest.com
[3] www.electronicsforu.com
[4] www.mid-day.com