
IoT and Fingerprint Based Door Locking System

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Abstract— This project presents a door locking system which suggests two ways for unlocking a door using Internet of Things (IoT) and Fingerprint. Most of the major door lock security systems have several loopholes which could be broken down to gain access to the desired places, and it creates a concern for a secure lifestyle and proper working environment. People can access Internet services by using their cell phone, laptop and various gadgets. Fingerprint is a reliable biometric feature having a wide range of applications that require authentication. Biometric systems such as fingerprint provide tools to enforce reliable logs of system transactions and protect an individual's right to privacy. In the proposed system, fingerprints of the authorized users are enrolled and verified to provide access to a facility that is used by multiple users. A user can also be removed and a new user can be enrolled in the system. We have implemented a centralized control system from where we can control who can enter in which rooms and who cannot. This is an Arduino Mega device based. Fingerprints are stored dynamically in a database for computing the different statistics.

Keywords-Internet of Things; fingerprint; security; Arduino; GSM;

I. INTRODUCTION

An proficient, low power consumption and low cost embedded admittance control system for Smart locker security and remote monitoring[3] based on finger print detection is very important for wide range of commercial and security application. Many countries are steadily adopting smart home security control system. Today most of the home and office applications that we interact with contain microprocessors. All of these appliances have some user interface, but many users become irritated with the difficulty of using the complex functions of their appliances. In this project a framework and appliance is developed for the security application allows users to interact with appliances through a separate user Interface device that they are already carrying. Smart phones and biometric devices are culpable for given that interfaces are common, and have communication capabilities to allow connection to appliances, and are already being used for a wide

range of different applications. This project framework indulges in an abstract specification and a common protocol for describing appliances, a two-way communication protocol, and automatic interface generation software that allows user interfaces to be personalized to users and the devices they are using [2]. The most prominent part of any enterprise security system is precisely sensing visitor who arrive and leave through the door. An entry guard can be managed remotely, identifying visitors at Door and notifying to user via mobile phone is the most accepted way to undertake security. The proposed system has added arrangements like view webpage through mobile phone [3]. Furthermore, voice alert or siren activated to vigilant authorities when impostor detected. The system identifies the visitor's presence, captures fingerprints and transfers to lockers owner to recognize the visitors. The system also generates database output whenever a person tries to open the locker. The user can directly login and interact with the embedded device in real time without the need to maintain an additional server. It

has a variety of features such as energy efficient, intelligence, low cost, portability and high performance.

II. LITERATURE SURVEY

Research on IoT and biometric methods has gained renewed attention in recent years brought on by an increase in security concerns. The recent world attitude towards terrorism has influenced people and their governments to take action and be more proactive in security issues. This need for security also extends to the need for individuals to protect, among other things, their working environments, homes, personal possessions and assets. Many biometric techniques have been developed and are being improved with the most successful being applied in everyday law enforcement and security applications. Among them, fingerprint recognition is considered to be the most powerful technique for utmost security authentication. Advances in sensor technology and an increasing demand for biometrics are driving a burgeoning biometric industry to develop new technologies. As commercial incentives increase, many new technologies for person identification are being developed, each with its own strengths and weaknesses and a potential niche market. This section reviews some well-known biometrics with special emphasis to fingerprint.

Enhanced Fingerprinting and Trajectory prediction for IoT Localization in Smart buildings we came to know LNM, which uses NR signal Fingerprint Markov Chain for Localizing in smart building environment and Matching Algorithm. Fingerprint based Door Locking System we came to know Result obtained in providing the security is quite reliable, the aspects existing with the present technologies by the use of finger print Biometric as authentication technology.

III. PROPOSED SYETEM

A. Power Supply

A power supply is an electronic device that supplies electric energy to an electrical load. The primary function of a power supply is to convert one form of electrical energy to another and, as a result, power supplies are sometimes referred to as electric power converters.

B. Fingerprint

A fingerprint is a biometric device that is used to authenticate the user based on the user fingerprint stored in the software.

C. Aurdino MEGA

Arduino is an open-source prototyping platform based on easy-to-use hardware and software. Arduino consists of both a physical programmable circuit board and a piece of software, or IDE runs on your computer, used to write and upload computer code to the physical board.

D. LCD Display

The LCD display is used to see whether the entered password is correct or not. It is also used to interface with the project to output lock status.

E. GSM Module

GSM (Global System for Mobile communications) is an open, digital cellular technology used for transmitting mobile voice and data services. GSM differs from first generation wireless systems in that it uses digital technology and Time Division Multiple Access (TDMA) transmission methods. GSM is a circuit-switched system that divides each 200 kHz channel into eight 25 kHz time-slots. GSM operates in the 900MHz and 1.8GHz bands in Europe and the 1.9GHz and 850MHz bands in the US. The 850MHz band is also used for GSM and 3GSM in Australia, Canada and many South American countries.

F. Motor Driver IC298

Most of the microcontrollers operate on very low voltage (5v) and current while the motors require higher voltages and current So, the microcontrollers cannot provide them such higher current. For this purpose we use motor driver ICs. Motor driver is a little current amplifier. It takes a low current signal and gives out a high current signal which can drive a motor. It can also control the direction of motor.

IV. PROJECT DESCRIPTION

IoT and Fingerprint Based Door Locking System is based on the principle when the fingerprint matches with the saved authorized fingerprints door will unlock, and when SMS send by authorized person & it will received by GSM module then door will unlock, otherwise it will remain locked.

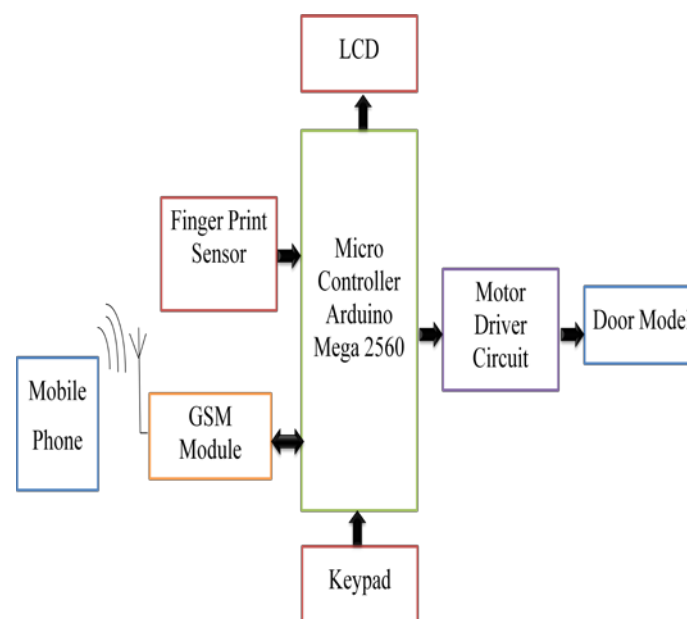


Figure 1. Block Diagram of IoT And Fingerprint Based Door Locking System

In this project there are two ways to open a door by using mobile phone and fingerprint sensor. For first unlock method if the fingerprint matches with the saved authorized fingerprints door will unlock, otherwise it will remain locked. For second unlock method if the SMS send by authorized person will received by GSM module then door will unlock, otherwise it will remain locked.

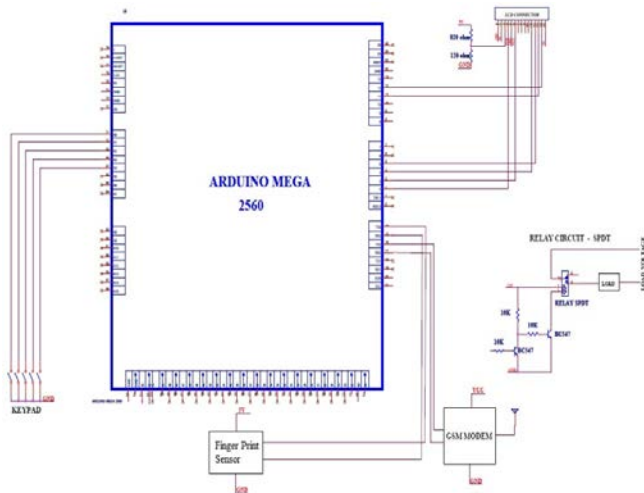


Figure 2. Circuit Diagram of the project

The project communicates over SMS (Short Message Service) using GSM module. Combining both methods the door will unlocks, when an authorized person will place a finger on the fingerprint sensor, or if SMS is received by the GSM module door unlocks and the LCD displays a message.

Fingerprint module is connected with Arduino, Arduino is used to rotate motor which is connected with the latch of door and it will display status on LCD. When user places his/her finger on fingerprint sensor, if the fingerprints matches with stored fingerprints the Arduino runs the program accordingly which gives output to motor driver circuit which is responsible for rotation of motor i.e. clockwise or anticlockwise.

On other hand when a SMS is sent by mobile phone to the SIM inserted in the GSM Module, if the message is received the Arduino runs the program accordingly which gives output to motor driver circuit which is responsible for rotation of motor i.e. clockwise or anticlockwise. Mobile phone communicates with GSM module wirelessly, Arduino is used to rotate motor which is connected with the latch of door and it will display status on LCD.

V. CONCLUSION

The project is being tested in protous and is working properly. It is also tested in bread board and is properly working. It has lots of application like we can use this project in door for home and office security, lockers, ATM, and anywhere where security is needed. Here we can easily change the password and it has features like if wrong password is

entered more than three times it would be locked until and unless reset button is pressed. In this project we have used very less component so it is cost effective and it is less complicated than a simple micro controller based code lock system. Digital code lock is totally based on Arduino. Arduino has been the brain of thousands of projects. As compare to other microcontroller.

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