International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 07 Issue: 07 | July - 2023 SJIF Rating: 8.176 ISSN: 2582-3930

Automated Door Locking System using IOT

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Abstract - As technology advances and expands on a daily basis, safety becomes increasingly essential in all disciplines. Everyone desires a private place where no one can enter without their permission, thus we need to secure our room, office, locker, etc. that preserve our valuable accessories, documents, data, and jewelry, and for that purpose, the proposed work has developed a "Password based door lock system by using Arduino.". This device is a digital door lock with a password or pin code. Which prevents the user from opening the door unless they input the correct password or pin code.

Key Words: Arduino Uno, Keypad Lock, Security, Servomotor.

1.INTRODUCTION

The term "door lock" refers to a device that prohibits a door from being opened and that can only be opened with a key, fingerprint, retina scanner, smartcard, or other similar device. Door locks have played a vital role in human life for a long time. As the rate of theft rises, security has become a top priority in recent years. Door locks are intended to keep us and our belongings safe and secure from thieves. People used to lock home doors with physical keys, and they required the key to unlock doors. If they lost the key, it was unlikely to repair, and it was expensive. Now, those door lock systems may be replaced with new locking technologies. The Arduino Uno, Servo motor, 4*4 keypad module, and jumper wires comprise the password-based door lock system. In this project, we will use the keypad to enter a password and then use the servo motor to open the door lock. The Arduino is the program's brain, controlling the entire system. The password or pin code is entered using the 4*4 keypad module. The servo motor pushes (locks) or pulls (unlocks) the door's latch.

2. Body of Paper

a. Microcontroller

A microcontroller is a compact integrated circuit designed to govern a specific operation in an embedded system. A typical microcontroller includes a processor, memory and input/output (I/O) peripherals on a single chip.

b. Radio Frequency Identification (RFID)

It refers to a wireless system comprised of two components: tags and readers. The reader is a device that has one or more antennas that emit radio waves and receive signals back from the RFID tag.

c. Fingerprint Scanner

A scanner used to identify a person's fingerprint for security purposes. After a sample is taken, access to a computer or other system is granted if the fingerprint matches the stored sample. Laptops increasingly have built-in readers.

d. 4×4 Keypad Module

The polymer material used in these Keypad Modules is thin and flexible. The 16 keys in the 4×4 Keypad module are grouped in a matrix of rows and columns. An electrical wire connects all of these switches together. In most cases, there is no link between rows and columns. When we push the key, a row and a column fall into touch.

e. LCD Display

A liquid crystal display (LCD) has liquid crystal material sandwiched between two sheets of glass. Without any voltage applied between transparent electrodes, liquid crystal molecules are aligned in parallel with the glass surface.

f. Real Time Clock

An RTC module keeps track of time once an initial time input is provided to it. This input can come from several sources (NTP, GPS, etc.). The RTC module usually comes with its own crystal oscillator, and even its own battery, so that the timekeeping continues, even if there is a power disturbance on the Arduino.

g. Jumper Wires

Simple terms, jumper wires are wires with connection pins on both ends. A jumper wire is sometimes referred to as a jumper, a jumper cable, a DuPont, or a cable. Without soldering, jumper wires are used to connect electronic components or a test circuit. Jumper wires come in a variety of colours, and the fact that they all work the same colors doesn't mean anything.

h. SERVO MOTOR

A servo motor is a simple electric motor which is controlled by servomechanism. When a DC motor is used as a controlled device in conjunction with a servo mechanism, it is referred to as a DC Servo Motor. AC Servo-Motor refers to a controlled motor that is powered by AC.

i. HC-05 Bluetooth Series Module

HC 05 Bluetooth is a wireless communication protocol; it is used in two devices as a sending and receiving the information. The Bluetooth is free to use in the wireless communication protocol as the range of the Bluetooth is less than the other wireless communication protocols like WiFi and Zigbee. The Bluetooth operates at the frequency of the 2.41 GHz and also used in many small ranges of applications.

j. QuadBand GPRS-GSM SIM800L

A customised Global System for Mobile communication (GSM) module is designed for wireless radiation monitoring through Short Messaging Service (SMS). This module is able to receive serial data from radiation monitoring devices such as survey meter or area monitor and transmit the data as text SMS to a host server.

k. Buzzer

If Door not unlocks successfully in three attempts then the buzzer makes a noise.

l. LED

- Green Light - If Door unlocks successfully.
- Red Light - If Door not unlocks successfully.

1. CIRCUITS

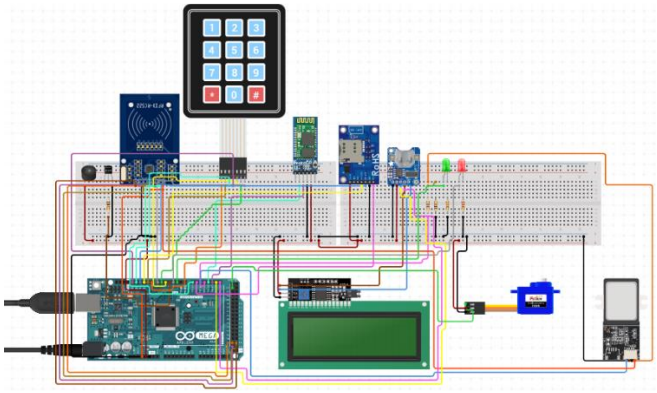

Fig -1: Figure

2. FLOW CHART

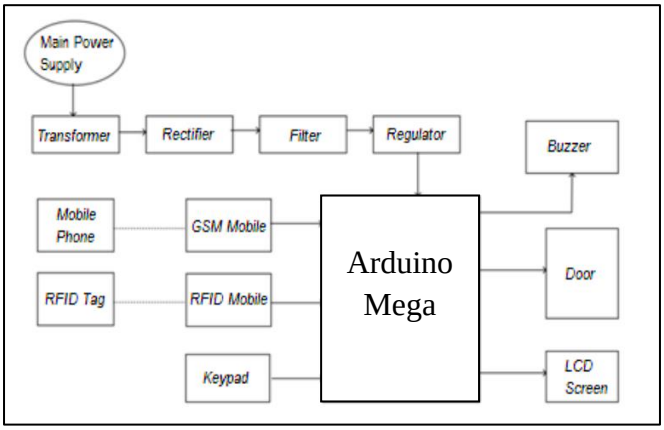

Fig -2: Flow Chart

3. CONCLUSIONS

The main purpose of this experiment was to design a security which is beneficial to each and every individual. The use of the Arduino Mega microcontroller in this project allows for design simplicity and cheap hence, the project can be achieved in lesser time compared to other techniques previously employed. Since there are many other security systems available, such as fingerprint, retina scanner, RFID card, pattern, and so on. However, the "Password based door lock system using Arduino Mega" is very inexpensive. It is cost effective because we are using affordable component costs. Also, with the help of the library, it is extremely simple to develop code, and anyone may use this model for security purposes. Because the existing door lock system has an issue with expensive and irreplaceable components, one may use an Arduino-based door lock system to solve this problem because it is simple to install and remove. Therefore, the "Password-based door lock system using Arduino Mega" is a time-saving programmable module that will assist us in providing excellent security.

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