iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 11 **Issue:** III **Month of publication:** March 2023

DOI: https://doi.org/10.22214/ijraset.2023.49470

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 11 Issue III Mar 2023- Available at www.ijraset.com

IOT based Smart Door Lock System

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Abstract: ***Security describes protection of life and property. The safety in the house is very important. Besides the traditional method door that used a key can be easily open by not authorized person or burglar if they have the right key. This will allow them to steal the entire valuable thing in the house. Nowadays the telecommunication technologies become wider and more new features exist to make human life better This project will use a Bluetooth feature in mobile phone to automatically open the door so that Bluetooth technology syncs your phone directly with the lock. It wills automatic open if authorized person is detected. The door will open for a certain delay and the door automatically closes within this time. IOT based smart door lock using 4x4 MATRIX MEMBRANE TYPE KEYPAD-16 KEYS, ARDUINO UNO, RELAY MODULE.***
Keywords: 4x4 Matrix Membrane Type Keypad-16 Keys, Arduino UNO, Relay Module.

I. INTRODUCTION

A. *Problem and Weakness of Current System*

1) *Obsolete Components:* The existence of new technologies comes from the creation of new components. This fact shows that once the old devices are obsolete, there are no spare component should replace it. Therefore, new system with new components has to be created.
2) *Up Grading Issues:* Most of control access system now a days uses PIC [11][12]. It would be difficult with PIC because every time upgrading needs to be done, the stand-alone PIC needs to be pulled out from the circuit and burned again.
3) *Complicated Programming:* Since most of control access system nowadays uses PIC, many engineers will face difficulties if problem occur on the device. There a son being is because PIC is not an open- source IDE compared to Arduino. Therefore, if problem occur, more time is needed for the engineers to create new coding for the device.

B. *Requirement of New System*

This project is an IOT based Door lock system which consists of a Node MCU board which has an inbuilt ESP8266 WIFI chip. It is interfaced to a Sg90 (9g micro servo motor) which is used for simulating the lock in grand unlocking mechanism of the door Lock.

1) *Need for Feasibility Study*

The feasibility study is needed to Answer the question whether a new system is to be installed or not?
Determine the potential of the existing system.
Improve the existing system.
Know what should be embedded in the new system.
Define the problems and objective involved in a project.
Avoid costly repairs a later stage when the system is implemented. Avoid crash implementation of a new system.
Avoid the 'Hardware Approach' i.e., getting a computer first and then deciding how to use it.

There are three aspects infeasibility study portion of the preliminary investigation.

a) Technical feasibility
b) Economic feasibility
c) Operational feasibility

II. PLATEFORM DETAILS

A. *Arduino UNO*

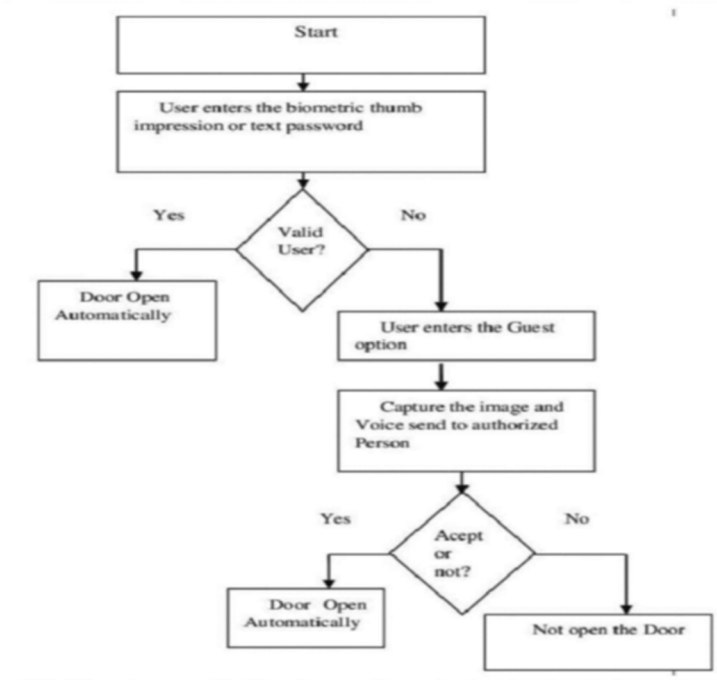
Arduino UNO is a low-cost, flexible, and easy-to-use programmable open-source microcontroller board that can be integrated into a variety of electronic projects. This board can be interfaced with other Arduino boards, Arduino shields, Raspberry Pi boards and can control relays, LEDs, servos, and motors as an output.

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1) *Advantages:* Using a smart door lock system has many of its own advantages: It's secure. simple and easy to access. It's pick - proof. Entire lock and electronics housing is well constructed. We can use multiple smart locks.
2) *Disadvantages:* Code Hacking unfortunately, some crimes are committed by the ones that know us best. Without a physical key, it is possible that someone could guess your password. Intruders do not always come in the form of robbers. Uninvited guests can also be over-bearing in-laws or neighborhood kids. Forgetting Your Password choosing a random password is suggested to maximize your security as it is easier to guess repetitive numbers or important dates. However, if your code is too complicated or is changed often, it can be easy to forget. Writing down your codes or sharing them with others can also pose an unnecessary threat to your home's security. Electric Problems Due to the system's reliance on electricity, electrical issues can make your home vulnerable to attacks. In the event of an electrical failure, your home can be left completely unlocked, or the lock could function improperly. Though most systems have a backup battery, you don't want to risk your valuables to the chance of failure.

III. DESIGN SPRCIFICATION DIAGRAM

In software engineering, an entity-relationship model (ER model for short) is an abstract and conceptual representation of data. Entity-relationship modeling is a data base modeling method, used to produce a type of conceptual schema or semantic data model of a system, often a relational database, and its requirements in a top-down fashion. Diagrams created by this process are called entity-relationship diagrams or ER diagrams.



IV. CODING

```
#include <Keypad.h>

char * password = "3690"; // To increase the passcode length change the numerical
to the size after position

int position = 0;

const byte ROWS = 4; // 4 rows
const byte COLS = 4; // 4 columns
```

```
char keys[ROWS][COLS] =
{
{'1','2','3','A'},
{'4','5','6','B'},
{'7','8','9','C'},
{'*','0','#','D'}
}; //mapping of the keys done w.r.t to the grid keypad

byte rowPins[ROWS] = { 13, 12, 11, 10 }; //connection of rows pins to the arduino
byte colPins[COLS] = { 9, 8, 7, 6 }; // connection of the columns pins to the
arduino

Keypad keypad = Keypad( makeKeymap(keys), rowPins, colPins, ROWS, COLS
);

int Lock = 5; // Connecting the relay to the 5th pin

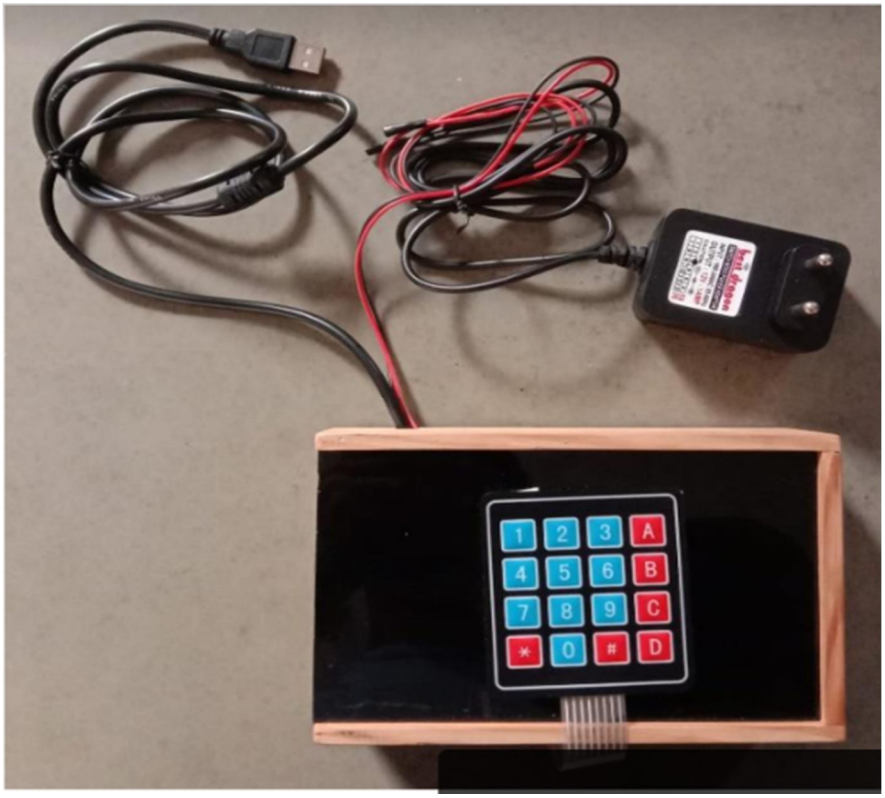
void setup()
{

pinMode(Lock, OUTPUT);
LockedPosition(true);
}

void loop()
{
char key = keypad.getKey();
if (key == '*' || key == 'A') //OR operator used to lock the device back again
{
position = 0;
LockedPosition(true);
}
if (key == password[position])
{
position ++;
}
if (position == 4) // change this if you want to increase the password length
{
LockedPosition(false);
}
delay(100);
}
void LockedPosition(int locked)
{
if (locked)
{
digitalWrite(Lock, LOW);
}
else
{
```

```
digitalWrite(Lock, HIGH);
}
}
```

V. IMPLEMENTATION



VI. CONCLUSION

The main aim of this paper is to design a smart door security system using Arduino application, so that people can feel safe about their home whether they are away from home or are in the house. This project is based on Arduino, and the coding is done on Arduino ide platform using the Arduino application. At the end of this research the aim and objectives of the project was achieved. People can now feel more secure about their doors all the time. Doors can be controlled conveniently to those with access. Physically challenged people can open or lock doors from their fingertips without asking help of any body. It is safe to say that the main objectives and the aim of the project were achieved at the end of the project. In this project, smart door lock system based on Bluetooth which integrates the home security with home automation. Home security system for automatic doors provides advance security of today's standard for home owners. Since our proposed system is built over wireless sensor network, it is a cheap, flexible, and easily installable system without any overhead such as careful planning, cabling, and construction works.

VII. LIMITATION AND FUTURE ENHANCEMENT

A. Limitation

With the vast and different form so keeping doors locked from unauthorized persons many people tend to use low means of protection. The latching of the door is solely controlled by Smartphone established between the device and them controller.

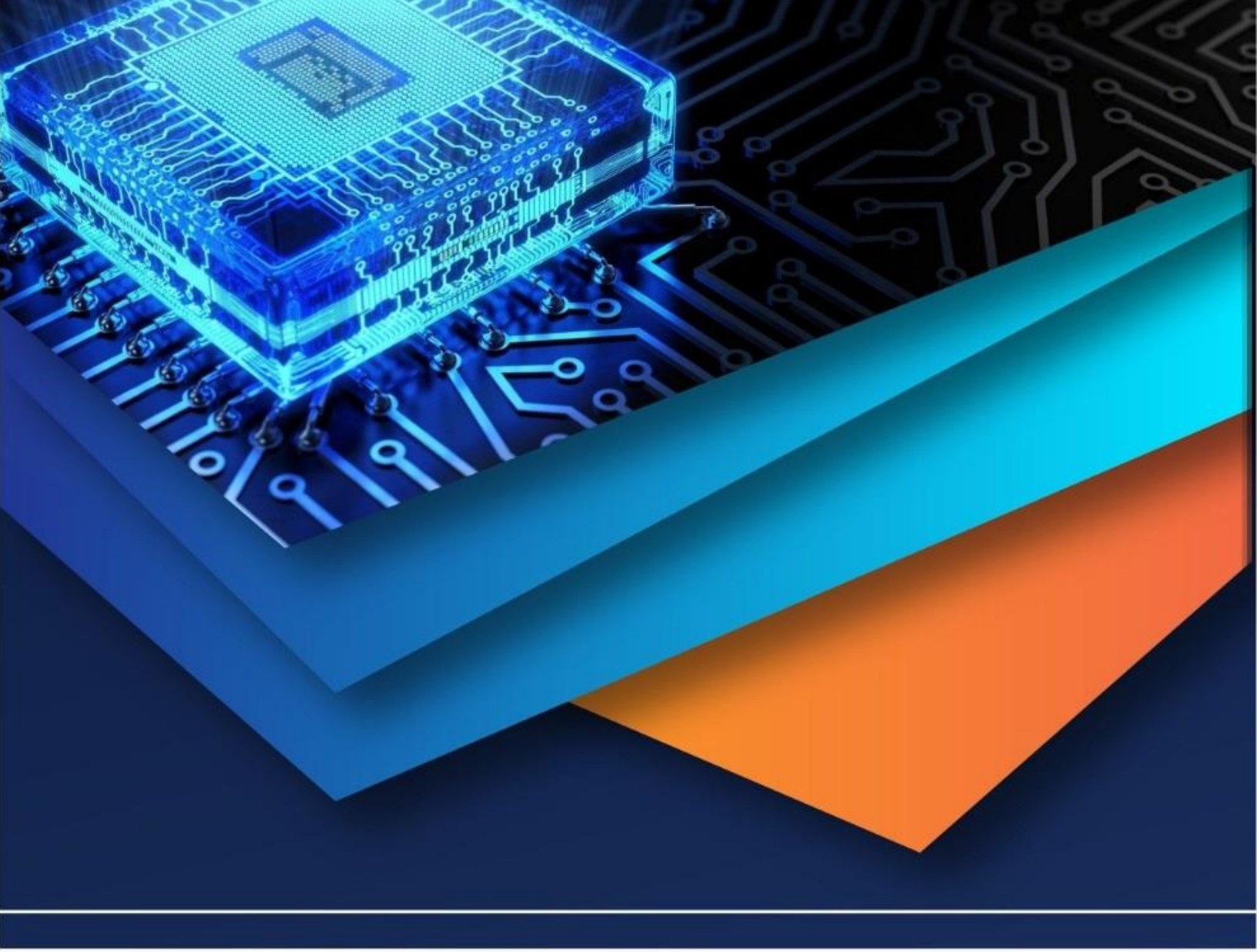
B. Future Enhancement

The project is limited to performing the task of opening and closing of doors precisely main entrance doors of a building. It is not designed for the purpose of surveillance in a home or any building nor is it a burg alarm that alarms you in any case of perimeter bridging it’s only limited to performing the task of opening and closing.

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