

Security Door Lock for Mains Supply and Safety of Electrical Engineer

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Abstract: *The main motive of this work is to provide safety to the electrical field engineer who works on the site of main distribution line feeder box. To provide safety to the engineer, the feeder box is equipped with RFID sensor and RFID readers which plays an important role. The engineer will be provided authorized glows and shoes with RFID tags. The reader mounted on the box will check whether the glows are authorized or not. If it gets authorized, then only the main door of the box will open and engineer will do his work. When the door gets opened it will share the details to the main server of the electrical distribution office in the form of message "The door is open". We have made the provision that it will help engineer to solve the issue after door opens. There will be one-way communication from distribution office to electrical field engineer regarding guidelines for the issues. We have also made an application to record the history of the problems in the data base which would help to identify problems in the future.*

Objective: *The objective of this project is to take safety precautions deeply, as well as access to registered authorised users by only allowing them to access and control the electricity box with proper safety equipment. The electrical engineer's convenience is also taken into account through a mobile application and with real-time one-way communication.*

Keywords: Security Door

I. INTRODUCTION

The problem of electric shocks for the technicians while working on the field is an alarming issue worldwide. Lack of technology and compromise in safety equipment's while on the field is a major reason for electric shock causing severe injury and most of the time leading to death. So, implementing modern method involves at most efforts taken in technology which is established using Radio Frequency Identification. This technology is considered as one of the most secure way in various applications which gives access for registered identification in contactless way. Our goal is to create a contactless working with minimal cost which will be affordable for each technician in country along with zero compromises in safety as the output. The security system is basically divided into two types: using normal lock key or electronic automatic identification system. In general, locks are very simplistic device that are employed to address straightforward problem. This technology has not been very often used in industry due to lack of standardization among the manufacturing companies earlier. An authorized glove's will be provided to the workers or engineers which will be containing predefined RFID tags present in them and will open the door of the feeder box once it will be sensed by the RFID readers. Node MCU control all the devices in this system, also a platform is being used widely from the past few years as it provides easy use support and documentation. It can be readily available to all concerned users.

II. LITERATURE SURVEY

In [1], Smart Door Lock System by Nayana R and Shashidhar R. gives an overall idea about how we use fingerprints of an authorized person to enter in the room. The finger prints of the authorized person are stored previously in the microcontroller, and a matching algorithm is used to check whether the person is authorized or not. If the person is authorized, OTP (One Time Password) has been sent to that person's mobile number using GSM. If an unauthorized person tries to enter the room, the buzzer will turn on indicating that someone is trying to access door. This system can be implemented to

places where security place major role that is in banks, offices, etc. The main aim of this research is to provide high security with low cost, because security plays major role in our society in almost every sector.

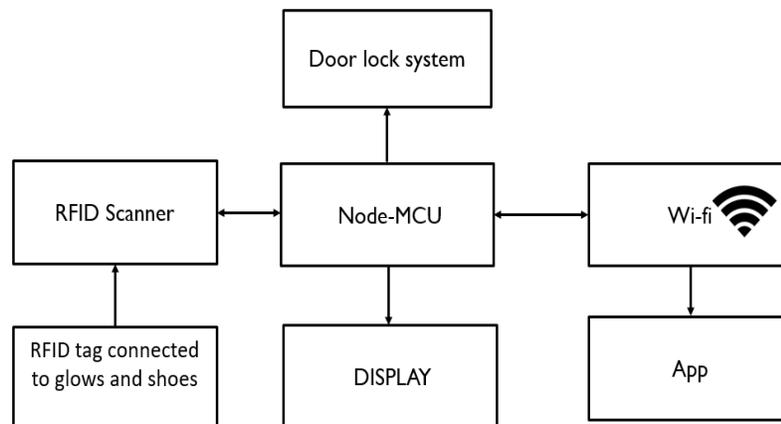
In [2], Smart Door Lock And Lighting System by Rahul Satoskar and Akarsh Mishra a smart door lock and lighting system using IoT for smart home is proposed. A smart door lock system is a system which uses digital password for opening and closing the door. The door lock is the foremost and endmost thing people come across in entering and leaving the home respectively, the home automation function in digital door lock system allows users to comfortably control and monitor home environment and situation all at once. It also allows users to remotely overlook the situation inside the house through World wide web or any other public network. A smart lighting is proposed which can be remotely controlled using Internet.

In [3], Android Based Smart Door Locking System By, Manish Kumar, M Hanumanthappa, T V Suresh Kumar and Amit Kumar Ojha. This paper gives detailed information about system in which we can unlock the door by using predecided password. It increases the security level to prevent an unauthorized unlocking done by attacker. In case the user forgets the both passwords, this system gives the flexibility to the user to change or reset the password. This automatic password based lock system will give user more secure way of locking unlocking system. First the user combination will be compared with pre-recorded password which are stored in the system memory. User can go for certain number of wrong combinations before the system will be temporarily disabled. The door will be unlocked if user combination matches with the password. The same password can be used to lock the door as well. This system will give the user an opportunity to reset his own password if he wants.

While referring the paper we get to know there are some drawbacks in their project, so we tried to analyze them and implemented in our project and make it user friendly, cost effective, safety and security based.

III. METHODOLOGY

3.1 Block Diagram



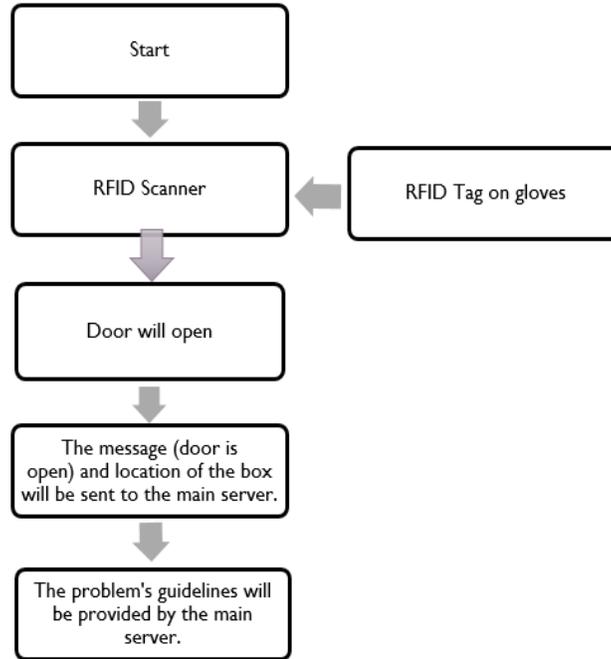
The following figure depicts the block diagram of the system. The actual working of the system starts when a user holds an RFID tag glows over the RFID reader. The reader scan's the RFID tag. There is a possibility that the glows help by the user is not an RFID tag glows but something else. In that case the RFID reader is not able to recognize the tag. If the glows is to be an RFID tag, the scanner receives the 8 digit unique id from the tag and then passes on to the microcontroller i.e. Node MCU. Once it transmits a unique ID to the controller, it will check to see whether it's available in the data base (Firebase). When the ID has been verified, the controller is the only one who can open the door. Since unlocking the solenoid lock for a predetermined amount of time as per the code. The door will not open till it is verified. When the door opens, the controller sends a message to the server room stating "the door is open" and the location of the box on GoogleMaps so that the location of the box may be determined using an Android app.

3.2 Flow Chart

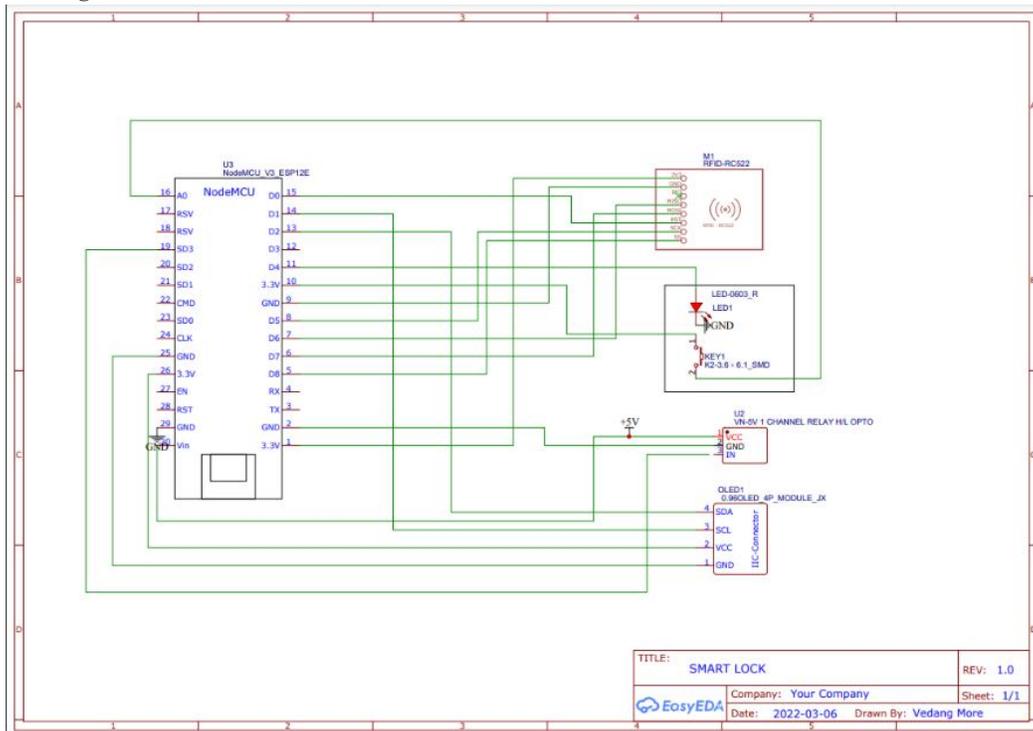
The Node MCU is a key component in the circuit since it is coupled to other components such as the RFID sensor. Authorized glows and shoes with RFID tags will be supplied to the electrical engineer. The RFID reader will check to see



if the gloves and shoes tags are present. Only if certified safety is present will the box door open, and then only the electrical engineer may perform his duties. While the door is open, it will send information to the electricity distribution office's main server's, including the fact that the door is open and the location of the box. The main servers will also provide the specifics of the problem on LCD to assist the engineer.



3.3 Circuit Diagram



IV. RESULTS

NODEMCU based electronic door lock system is very smart and secure device for real world problems. RFID receiver is receiving data from RFID tags and NODE MCU determined that data true or false. The power supply given for this system is 220V down converted to 12V and 12V to solenoid and 5V for NODE MCU.

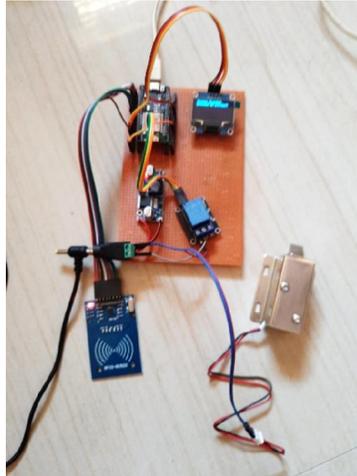


Figure: Hardware Output

The application displays the location of the box to the main distribution office and maintains one-way communication with the field engineer. as well as the history of the issue in the box for future assistance.

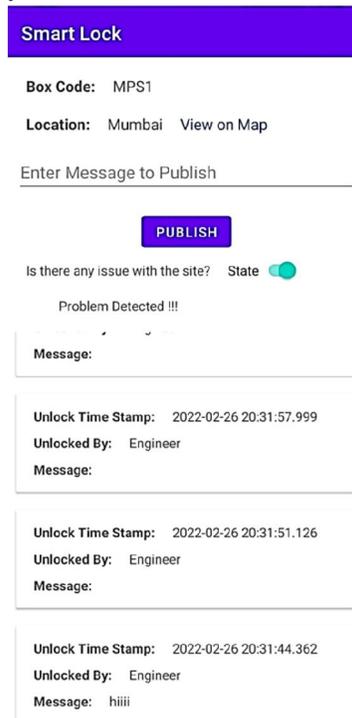


Figure: Application Output

The realtime database is being used to store RFID tag data as well as box latitude and longitude location details. It is simple to re-edit the details according to the requirements. It also keeps track of problems inside the feeder box.

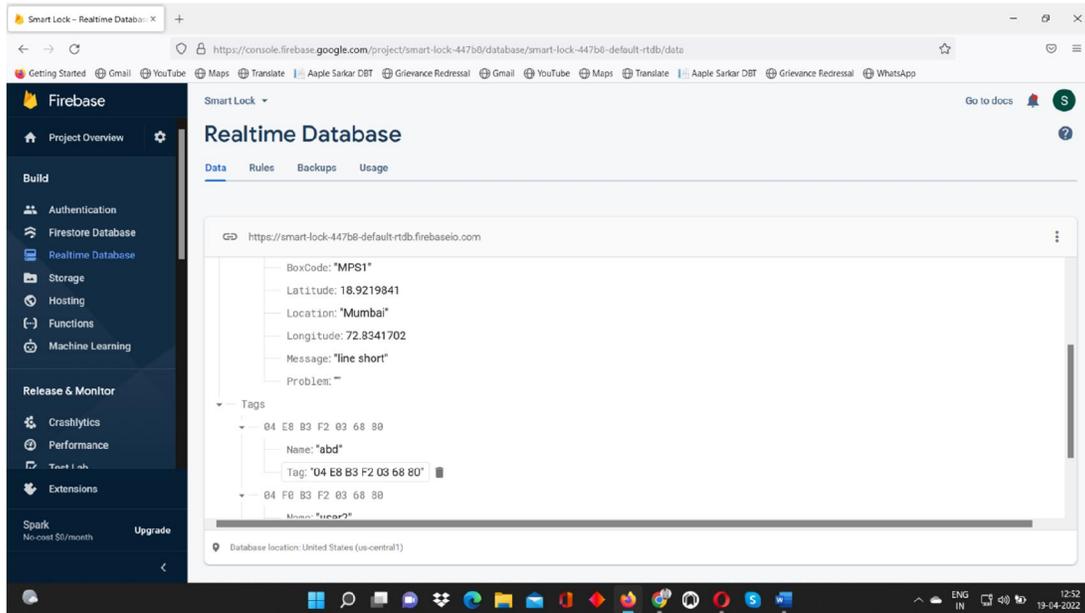


Figure: FireBase Output

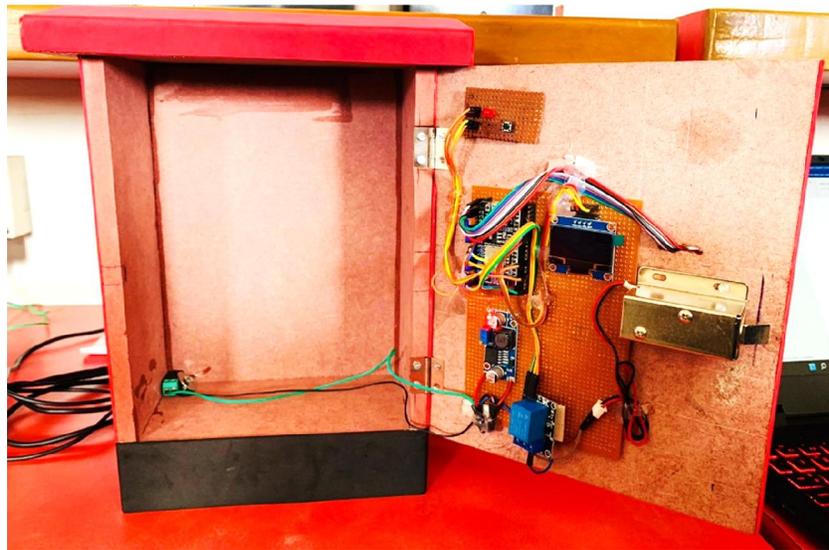


Figure: Final Output 1



Figure: Final Output 2

V. CONCLUSION

According to the literature survey it is observed that lack of safety equipment's provoke issues of electrical shock . So to overcome this problem we have proposed safety gloves and shoes which authorize the safety wear . In this system is designed with the electronic door lock using RFID on NODE MCU. Electronic lock systems are preferable over mechanical locks, to resolve the security problems that are associated with the mechanical locks. An electronic door lock system for feeder Box was developed in this report. NODE MCU microcontroller is used as a main controller. NODE MCU is amazingly useful device. They are used for a wide range of application. NODE MCU needs other components for receiving and sending data must be added to it. NODE MCU is designed to be all of that on it and it is used for the more cost effective in education and industrial applications.

VI. ADVANTAGES AND FUTURE SCOPE

6.1 Advantages

- **Cost efficient:** The component's used in this project are based on general purpose applications, thus reducing the cost of system and readily available in the market.
- **Keyless Entry:** Keys might often be misplaced or lost by individuals. Keycards are less likely to of getting lost, damaged, or stolen. Even if a person loses a keycard, it is much easier, cheaper, and faster to create a new one than replacing a lost key.
- **Weatherproof:** RFID locks and keycards are weatherproof, as there is no exposed part for a card slot. As stated before, these locks use wireless technology and do not require physical contact with the card to trigger the system. Hence, there is no need to design an exposed card slot or key slot in RFID locks, which might be damaged upon contact with water or humidity

6.2 Future Scope

This system can be utilized for major data storage labs, power distribution plants, Solar distribution boxes, Electrical rooms in residential society, as well as a variety of other locations where high voltage distribution boxes are used.

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REFERENCES

- [1]. Nayana R, Shashidhar R, "Smart Door Lock System", International Journal for Modern Trends in Science and Technology, ISSN: 2455-3778: Volume: 05, Issue No: 02, February 2019.
- [2]. Rahul Satoskar, Akarsh Mishra, "Smart Door Lock and Lighting System Using Internet of Things", International Journal of Computer Science and Information Technologies, Vol. 9 (5) , 2018, 132-135, ISSN: 0975-9646.
- [3]. Dr. Manish Kumar, Dr. M Hanumanthappa, Dr. T V Suresh Kumar, Mr. Amit Kumar Ojha, "Android Based smart Door Locking System with Multi User and Multi Level Functionalities", International Journal of Advanced Research in Computer and Communication Engineering, Vol. 5, Special Issue 2, October 2016, ISSN (online): 2278-
- [4]. <https://nodemcu.readthedocs.io/en/release/>
- [5]. <https://www.takigen.com/products/list/L002#:~:text=The%20solenoid%20lock/>
- [6]. <https://randomnerdtutorials.com/security-access-using-mfrc522-rfid-reader-with-arduino/>
- [7]. <https://randomnerdtutorials.com/guide-for-oled-display-with-arduino/>
- [8]. <https://developer.android.com/studio/>
- [9]. <https://firebase.google.com/firebase/mobile-platform/>