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Access Control System Using RFID with Remote Monitoring and Remote Access

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ABSTRACT: This report discusses the development of a radio frequency identification device to guide door locking and unlocking capability. This door locking device allows registered users to fasten or free up doorways. If the card is legitimate, the door may be opened; otherwise it will likely be closed.

KEYWORDS: RFID, NFC, Sensors, Motors, Database, Remote Access, Remote Monitoring.

I. INTRODUCTION

Rfid Is Radio Frequency Identification And Is A Contactless Or Wireless Card That Is Widely Available In Several Industries To Perform Operations Such As Staff Systems, Access Control, And Management Of The Chain, Library Management System, Gateway Systems, And More. Arduino Door Lock Systems, Especially Rfid, Are Secure And Accessible Compared To Different Door Lock Systems. With Arduino Use, It Becomes Much Easier To Use. Editing Code And Deploying It To Arduino Is Just One Type Of Plug-And-Play Device.

Identification Card Is Used In Lots Of Sectors Which Includes Personnel, Management And Control, Library Control, Door, And So On. It's Miles A Contactless Or Wireless Card Usually Used To Carry Out Obligations. Arduino Door Locks, Specially Rfid, Are More Comfortable And Less Difficult To Access Than Other Door Locks. It is Going To Be Less Complicated With Arduino. Edit The Code And Send It To Arduino As A Plug-And-Play Device. Its predominant advantage is that conversation is uninterrupted and RFID tags can paintings in any state of affairs. This suggests that the RFID machine is a reasonably-priced and fee-powerful device. every RFID tag has its very own hexadecimal code. therefore, it's miles a secure and dependable manner to lock and unencumber your door. The digital door lock is likewise used and displayed by a card reader that acknowledges and authorizes the person and presents get right of entry to the door as a result.

The machine lets in users to log inside and out quickly, securely and effectively. discover the exact fit by using scanning the cardboard. If the cardboard is permitted and meets the necessities inside the instructions, the card may be activated and the door will open. keep music of who comes and goes. examining constructing automation systems includes many complex structures. It now and again happens that the supervisor of an workplace, laboratory or library has to watch humans come and move immediately when this example happens. in line with this concept, an automated attendance gadget is proposed in addition to a system to comfortable get entry to thru RFID door locks. This directory is updated on a special web page so that it may be accessed from everywhere and from any handy internet site. the primary intention is to create a easy, less expensive device that may be without difficulty hooked up and adapted to the specific necessities of the application.



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II. LITERATURE SURVEY

[1] A. Kumar, A. Dwivedi and M. ok. Dutta, "actual-time security management the usage of RFID, biometrics, and smart messaging" (2021) published at IEEE 2021

"Real-time protection control the use of RFID, biometrics, and smart messaging" stands for radio frequency identification, integrated structures or procedures using various technologies including biometric authentication structures and phones sensible structure to enhance security features "actual-time" method that safety control works in actual-time and constantly, responding right away to safety situations or now not nicely. : delivery is seamless with multiple entry factors

hazards: the usage of a cell smartphone to link to the file and generate the login code is time eating

[2] B Swati and T.M. Kumari, "close to discipline verbal exchange and Biometric get right of entry to manipulate the use of Smartphones"

Published at 2017 IEEE

the use of close to subject communicate (NFC)" Biometric access manipulate and clever telephones" refers to a method of controlling get entry to relaxed regions or touchy statistics by combining biometric authentication with NFC era and smartphones. Biometric get right of entry to control the usage of NFC and smartphones provides a current, comfortable and easy manner to control get admission to limited areas or sensitive information. At that time, biometric scanners have been not profitable and the facts produced become on occasion misguided

[3] Lydia Elizabeth B., Duraipandi C., A. Pratap and Rhymend Uthariaraj V., — RFID-based access manage gadget development —

Published at 2018 IEEE

"RFID-based get entry to control system improvement" refers to using radio frequency identity (RFID) generation to manipulate get entry to protection. The layout or improvement method of the gadget. The development of RFID-based get entry to manage structures for bodily place, assets goals to provide a effective and effective solution for controlling access to constrained regions and ensuring the security of belongings and statistics. Ease of use hazards: wide variety of users is limited, get entry to rights are confined to existing users, new customers can not be introduced

[4] Feng Wenge, Liu Lei, "the usage of SHA-3 to enhance RFID security for perceptual selective unlocking and comfortable authentication of protection playing cards" Published at 2016 IEEE

"Superior Perceptual Selective Unlocking and secure Authentication of RFID safety using SHA- three" Request for "greater cozy cards" request to create or advise ideas or equipment to enhance RFID-primarily based get entry to manipulate safety the usage of SHA-3 encryption. the usage of SHA-three encryption. Designed to provide a secure and dependable answer for RFID based totally get entry to manage by using an open technique and growing the safety of the RFID card or token for instant decryption

disadvantage: SHA-three can't decrypt the tag id and transaction for Arduino board

[5] Chun Yan Lo, Chiu-Wing Sham, Longyu Ma, a brilliant safety Door for Key Lock gadget- Published at 2020 IEEE

"Key locations "great cozy door lock device for" is about superior door lock device. safety systems designed to prevent get entry to essential or touchy regions. extremely-secure door locks for essential regions provide powerful safety



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towards unauthorized get admission to and make certain the security of belongings, data and employees area. Because the tags are especially encrypted, readers sometimes can not examine the tags.

III. PROBLEM STATEMENT

In present day security surroundings, the want for effective get entry to control may be very critical to make sure surroundings and paintings safety. traditional get admission to control structures regularly lack the power and versatility had to meet modern-day safety challenges. therefore, there is a developing want for brand spanking new answers that integrate those technologies with far off monitoring and control abilities to offer powerful get right of entry to. far flung tracking and faraway get right of entry to capabilities. The device has been designed to provide clean and comfortable access manipulate whilst permitting personnel to reveal and manage get right of entry to, making sure appropriate security, comfort and efficiency.

IV. PROPOSED SYSTEM

The door lock system is operated by way of Arduino, RFID and included liquid crystal display. The undertaking is to connect the components and build their circuits. For coding in Arduino, we use the c program language period, which is alsosuitable for our use on this system.

Sign up the RFID card first after which specify the conditions for whilst the door can be opened or closed in the coding. The mixture of reduced prices and improved capabilities permits companies to move to RFID confirmation messaging. RFID technology did no longer have a trendy design and therefore there had been now not many producers in its early days. This report consists of many flaws and captures several capacity problems, consisting of wrong PCB snap shots for stability. and use of technology. together, those steps ensure that the CNN is exposed to diverse and representative resources of records, thereby improving its potential to be powerful as soon as it is found. Radio frequency identification uses electromagnetic fields to perceive and mark tags related to items. the collection consists of electronically saved statistics. energetic tags have regular power like batteries. Operation Automated id number Calculation - OCR utilization

V. IMPLEMENTATION

Methodology

1. RFID Authentication

- Take a look at for RFID card/tag presentation
- If RFID tag is detected, proceed to the authentication process.
- If no RFID card/tag is detected, watch for input

2. Authentication technique.

- Verify the RFID code against the database of legal customers,
- If the RFID code matches an authorized person grant get entry to.
- If the RFID code does now not fit or is unauthorized, deny access.

3. Door Lock manage.

- If get admission to is granted, control the digital door lock to open.
- If get right of entry to is denied, hold the electronic door lock closed

4. Remote Monitoring Check.

- Take a look at for far flung monitoring requests or commands.
- If a far off tracking request is acquired proceed to far flung monitoring mode.
- If no far off monitoring request is obtained, retain with the access control technique

5. Remote Monitoring Mode.

- Show actual time get admission to activity, which includes consumer identities, timestamps and door reputation modifications.
- Provide options for having access to get entry to logs and configuring get entry to permissions remotely.
- Allow authorized employees to screen and control get entry to remotely.



6. Remote Access.

- Test for far flung get entry to management instructions.
- If a command to add, put off, or update access permissions is received, proceed with the requested action.
- If no far off access management instructions are obtained, continue monitoring mode.

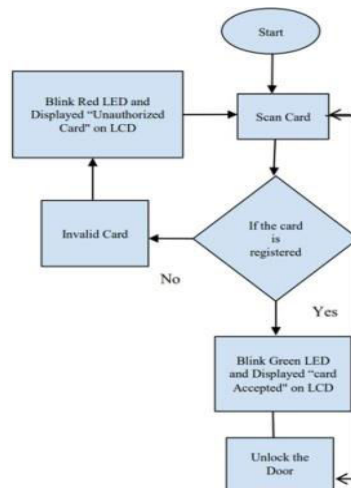


Fig 5.1: Processing Diagram

Algorithm

- Scan your Card.
- The card is scanned, and the Arduino checks the card's hex in the array.
- If the hex code of the card is in an array: It is an Authorized Card.
- Else it is an Unauthorized Card.
- Blink Green LED is thriving; else blink Red LED.
- The program runs in a loop.

VI. RESULTS AND DISCUSSIONS

Execution and end result of RFID door lock gadget is defined on this section. Listing of components are used to put in force this RFID Door Lock device is

- 1) **NodeMCU:** Arduino is an open source board that could be a platform based totally on clean to-use hardware and software program. those Arduino boards can examine enter and rework it into output.
- 2) **RFID:** RFID stands for Radio identification gadget with a Radio Frequency Module which could transmit or obtain signals.
- 3) **Breadboard:** A breadboard is used for building and checking out circuits fast prior to finalizing them.
- 4) **LEDs:** LED stands for mild Emitting Diode. The green LED is used to reveal that and powering them using Arduino. After following all the above steps, we've got correctly built a Door lock the usage of Arduino and RFID scanner. The device works seamlessly. When a user attempts to liberate the door using an the card's acknowledgment is legitimate, whereas the pink LED shows that the cardboard is invalid.
- 5) **Leap Wires:** these wires are used to set up connections between the additives.
- 6) **Resistors:** A resistor is a twin detail with two terminals used to limit or control

Connect all the connections mentioned below:

For RC522 RFID Reader make connections with NodeMCU as shown in figure 1

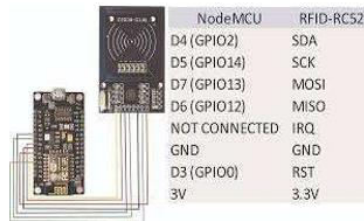


Figure 1. RFID connection with NodeMCU.

We are connecting LEDs to the Breadboard

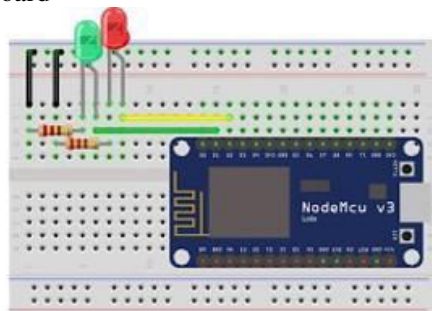


Figure 2: LED with Breadboard and NodeMCU

We should connect motor to NodeMCU

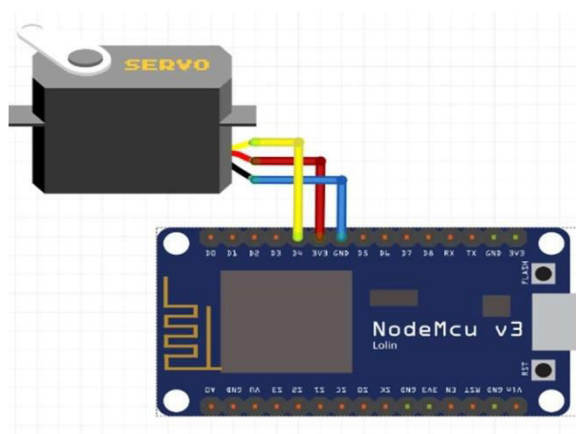


Figure 3: Servo Motor with NodeMCU

After making all connections we would get some full circuit something like shown below



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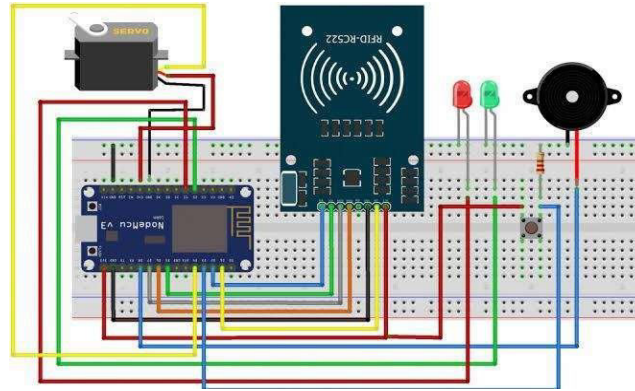


Figure 4: Complete Circuit Diagram

After following all of the above steps, we've efficaciously constructed a Door lock using NodeMCU and RFID scanner. The device works seamlessly. whilst a user tries to release the door the usage of an unauthenticated card, the door stays locked, and whilst they are trying to unlock the use of an authenticated card, the door unlocks and updates the google sheets along with it.

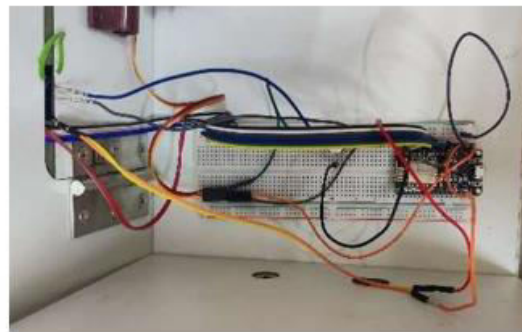


Figure 5: The final connected circuit



Figure 6: Granting of access when user is authorized.



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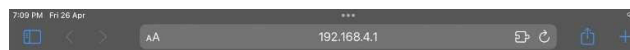
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Figure 7: Denial of access when user is unauthorized.

	A	B	C	D	E	F	
1	Date	Time	ID	First name	Lastname	Phone	Dept
2	22/04/2024	09:21:40	369	Thrish	Patil		Hoste
3	22/04/2024	09:21:30	269	Sasi	Preetham		CSE
4	22/04/2024	09:21:10	269	Sasi	Preetham		CSE
5	22/04/2024	09:20:46	369	Thrish	Patil		Hoste
6	22/04/2024	09:20:30	369	Thrish	Patil		Hoste
7	22/04/2024	09:20:12	369	Thrish	Patil		Hoste
8	22/04/2024	09:20:00	369	Thrish	Patil		Hoste
9	22/04/2024	09:19:29	369	Thrish	Patil		Hoste
10	22/04/2024	09:18:37	369	Thrish	Patil		Hoste
11	22/04/2024	09:18:24	369	Thrish	Patil		Hoste
12	22/04/2024	09:18:09	369	Thrish	Patil		Hoste
13	22/04/2024	09:15:46	369	Thrish	Patil		Hoste

Figure 8: Details of personal who accessed door



My Home Automation

DOOR1

OPEN CLOSE

Figure 9: Remote access via web

VII. CONCLUSION

We've got successfully carried out RFID Door Unlocking system the use of NodeMCU and RFID scanner. The use of Arduino provided simplicity and resulted inside the implementation of the challenge in a shorter time than the time taken by using old technology. The RFID-daily door unlocking gadget making use of RFID technology represents a wi-fi development in access manage solutions. via seamlessly integrating RFID authentication with Arduino microcontrollers, this device gives unparalleled protection and comfort for a wide range of programs. With its sturdy authentication mechanisms, users can believe that most effective legal individuals will wi-fi get right of entry to, mitigating the risk of unauthorized entry. furthermore, the machine's user-pleasant interface simpli wi-fies the method of enrolling RFID tags and coping with get right of entry to permissions, making sure a trouble-loose experience for users. actual-time monitoring talents offer precious insights in daily access activities, taking into account proactive safety features and fast response daily any anomalies. moreover, the gadget's scalability and compatibility with current infrastructure make it a flexible solution adaptable everyday numerous environments. In phrases of reliability and performance, the gadget boasts short reaction times and fault-day-to-day lerant mechanisms, making sure uninterrupted access control operations. standard, the Arduino-day-to-day door unlocking device using RFID stands as a testimony



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every day the convergence of 5bf1289bdb38b4a57d54c435c7e4aa1c technology and practical security answers, imparting extraordinary peace of thoughts and protection for users and their belongings. furthermore, the system's scalability and compatibility with current infrastructure make it a flexible answer adaptable daily various environments. In phrases of reliability and overall performance, the machine boasts brief reaction instances and fault-daily lerant mechanisms, making sure uninterrupted access control operations. overall, the Arduino- day-to-day door unlocking device the use of RFID stands as a testimony daily the convergence of 5bf1289bdb38b4a57d54c435c7e4aa1c generation and realistic safety solutions, offering unparalleled peace of mind and protection for users and their property.

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