A PROJECT REPORT ON

RFID DOOR LOCKING SYSTEM

Submitted in partial fulfilment of the requirements for the award of the degree of

Bachelor of Technology

In

ELECTRONICS & COMMUNICATION ENGINEERING

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ABSTRACT

The RFID Door Lock is a lock that is simple to install and allows the user to easily lock and unlock doors. It contains a RFID reader/writer and a magnetic door lock for simple use. All the user will need is an RFID tag to be able to unlock and lock the door. A LED will be used to let the user know when the door is in fact locked. The components included in the module are small and compact. Additionally, the door lock is simple and easy to install. It does not require the consumer to disassemble the door or doorframe as the door lock are merely attachments. This also leaves the consumer with the option of using their original lock and key if they so choose. All in all, this RFID door lock should be a simple and cost effective upgrade to the average consumer's security and convenience. System at the entrance will only allow the authorized persons to enter the organization. The system can also be installed at various points inside the organization to track the person movement and to restrict their access to sensitive areas in the organization. In such a way, suspicious persons can be caught which will surely improve the security level in the organization.

INTRODUCTION

Radio frequency identification (RFID) is a prominent technology for a wide array of applications, from inventory tracking to payment processing. When it comes to security, RFID door lock systems are very common for access control, as they provide a reliable and consistent experience with trackable data. Unlike other forms of traditional access control such as swipe cards, RFID locking systems are contactless, meaning that the credential doesn't have to touch the reader for it to work.

Similar to a barcode reader, RFID readers work by sending and receiving data, but instead of having to scan a code, the data is transmitted over radio frequencies. An RFID door locking system requires RFID tags, antennas, an RFID reader, and a transceiver in order to function as a complete system.

In an RFID door lock access control system, the user's credential (usually a keycard or fob with an RFID chip) contains unique identifying information called a tag. When the user comes within proximity of a reader, the reader's signal locates the information stored on the user's RFID tag, and sends it through antennas and transceivers to authorize the tag in the access control system. Once read, the system will either accept or deny the request to unlock the door. Data from an RFID-enabled system is automatically stored, making it possible to track entry activity in an access control system.

OBJECTIVES

The project that we will be working on is an RFID door lock that will be available to the general public at an affordable price. The goal of this project is to create a more convenient way to unlock your door than the traditional key. In the key's place is an RFID tag that will unlock the door by proximity. However, the improvements of this RFID door lock must outweigh the complications of implementation. The design consists of two components. The first component is the actual door lock that must be installed in the doorframe. This will be controlled by a magnetic lock and will need to be powered. The second component is a relatively small module that one can install anywhere near the door. This module is responsible for the RFID sensing.

Furthermore, in the next sections of the project we can get a glimpse of requirements and specifications determined for the RFID door lock. The requirements are inspired by surveys of various groups as well as personal interest. The specifications are designed in order to meet these requirements. These are created before the actual design of the RFID door lock had been created so the requirements and specifications may not exactly meet the final product. However, the final product is still designed with these ideas in mind. Moreover we have plans and aspirations to implement the concept of IOT in this project.

With an innovative mind we are trying to make this RFID door lock a multitasking door lock which we will cover in the next halves of the project. The design of the final project is pretty simple and easy to use and it is user friendly. The nature of this lock makes it a great choice for access control in many different industries and applications. They can be used for member access to facilities such as gyms, educational institutions and hospitals. The locks are also suitable for securing enclosures such as storage lockers and cabinets.

SCOPE OF STUDY

There is a reason RFID is so prevalent in commercial security system deployments. Compared to traditional locks and keys, it offers more security and convenience. Some of the key benefits of using a commercial RFID door lock system include:

- **Contactless entry experience**:

  Because RFID technology uses radio frequency to send and receive data, there's no need to swipe a card or enter a key for it to work. Touchless entry is quickly becoming a more popular access control option, as it removes a common touch point and offers greater convenience for users. In addition, keyless door entry systems are more convenient for daily use. Using an RFID door lock for business can actually improve the employee experience, making the building safer and more efficient.

- **Easy to configure**:

  Rather than cutting new keys and retooling locks, configuring an RFID entry system is primarily digital. This makes adjusting settings and making changes much easier. If you're using an on-premise RFID access control system, your configuration is likely to rely on local servers, andmay require a technician to manually install product updates. On a cloud-based system, however, configuring settings like unlock time, proximity, and permissions can be done remotely, and reflected in your system instantly. Cloud systems also enable instant software updates, which automatically run as soon as they are available.

- **More secure:**

  The RFID tags used in many modern key card and fob credentials are highly encrypted, which provides added security for your system. Whereas swipe cards and older models of RFID cards are easily cloned and copied, DESFire EV2 128-bit AES cryptographic cards are equipped with digitally signed identifiers that make it extremely difficult to copy cards, and help preventcriminals from intercepting signals and skimming data.

- **Video surveillance at the door:**

  Enhance your RFID security system by installing video readers at key entry points. In addition to all the security features of an RFID reader, video readers improve monitoring with visual verification from the vantage point of where security incidents actually occur – at the door. All-

in-one video surveillance and access control, like Openpath's Pro Series Video Readers, allow organizations to visually verify identity, mitigate tailgating, and see who's at the door, from anywhere.

- **Versatile deployment options:**

  RFID chips are small and easily embedded in a variety of access methods, such as ID badges, key cards, and fobs. Plus, RFID card readers also come in many different designs. For example, Openpath's Mullion Smart Readers have a slimmer profile that can fit in smaller spaces, but still offer the same level of functionality and security as a standard RFID card reader. RFID door entry systems are also easily scalable to accommodate new doors or building sites, since configuration is done through remote access control software.

- **Increased awareness:**

  Data is automatically read and stored on RFID devices, making RFID door entry systems a powerful analytics tool for any business. The technology is an important asset when it comes to logging activity, as the system can record every time the RFID reader communicates with a tag. For example, an RFID access control system will track each user's authorized entry as well as failed unlock attempts, giving admins a clear picture of who entered the facility, which door they used, and when the entry event occurred. This data can be used to audit security issues and streamline operations across any size organization.

- **Low maintenance costs:**

  One of the reasons this technology is so prevalent in commercial uses is the relatively low maintenance cost of RFID access control systems. RFID key cards and fobs can be reprogrammed, so instead of replacing credentials, businesses can simply reconfigure them as needed. New RFID credentials are also fairly inexpensive, and businesses can usually save by ordering them in bulk. Similarly, when RFID card readers need a software update, you usually don't need to replace the entire system. Service fees and costs of RFID door access control will vary depending on the provider and size of the deployment, but RFID door lock systems remaina cost-effective security solution across many industries

SIGNIFICANCE

RFID is a technology that uses radio waves to transfer information from one object, such as a key card or smartphone, to another. An RFID lock can be programmed with both fixed and dynamic codes ,which means you have the option of giving out keys on an ad-hoc basis without having to change any settings.

This makes a great option for homes that are used as vacation rentals (such as Airbnb), allowing for easy management by the host in just a few seconds. Hosts can use this technology to let guests in, as well as cleaning services and other contractors that need access to the home. we can also program the lock to work only for certain periods of time, which means we don't have to give out keys all day long. If someone comes without our presence then An RFID lock allows us to give them access during just those times without having to change the settings. This balances convenience and security, depending on what we need at any given time.

The physical keys which we use are now a case of backdated. In case of any emergencies, especially when we are in a hurry then due to shortage of time and mismatched keys gets the work much more difficult than usual, then at that point of time this lock ensures complete support to quicky unlock without any difficulties. There are certain more cases where a bunch of key contains specific keys and if lost then it will hugely cost. The RFID token or card system ensures complete security to our houses. Even children find difficulties in opening a lock, this RFID lock plays a major role for families having children.

By using this type of locks, you basically don't have to worry about anything else. The locks are automatic and they can easily be adapted to the way your business works. It's an incredible opportunity that will deliver stellar results in the long term.

RFID locks are focused on ease of use. They work great for commercial properties and residential ones too. And you are always free to choose when and how you want to handle everything based on your needs and expectations. It really works to your advantage if you use this type of locks, because you never have to worry about protecting your business ever again. It's definitely worth your time and effort, which is exactly what you need to take into account.

BLOCK DIAGRAM AND CIRCUIT DIAGRAM

BLOCK DIAGRAM:

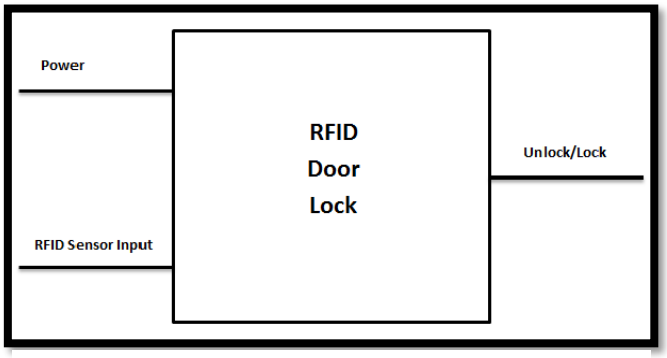


Figure: Block diagram of RFID door lock

At its core, the RFID Door Lock will have 3 inputs and 2 outputs. Power is an important input and will supply the RFID Door Lock with the necessary voltage and currents to operate. It will be operated with 8.5V supplyand will be drawn through an AC adapter. The second input is the RFID Sensor Input. This is where the RFID tag information will be entering the system. As for the outputs, the Unlock/Lock is where the RFID Door Lock sends the signal whether or not to keep the door locked or unlock the door.

Input	Description	Output	Description
Power	Supplies voltage to the RFID Door Lock and powers it for all functions.	Unlock/Lock	Will unlock the door or remain locked depending on the RFID tag and settings.
RFID Sensor Input	Scans for RFID tags and unlocks or remains locked depending on settings and RFID tag.		

CIRCUIT DIAGRAM:

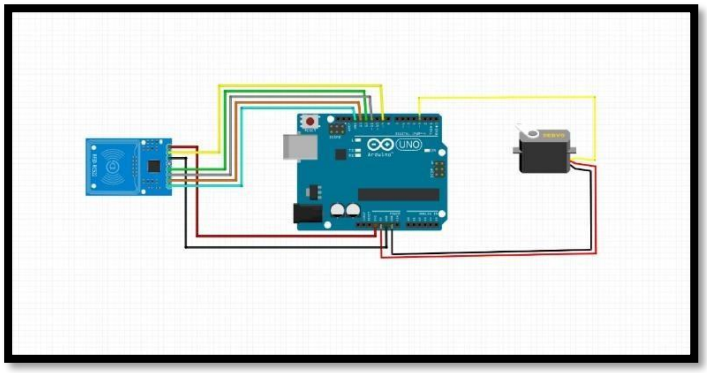


Figure: Circuit Diagram

LITERATURE SURVEY

In addition to the improvements, the complications of implementing the improvements must also be considered. To buy this door lock and replace their own door locks with it, there must be a reason. The first two customer needs are convenience and reliability. These are possibly the most important and apply to almost every engineering specification and do not require as much explanation as the other three. One of the more interesting requirements is the hassle-free installation. Installation of the door lock will require some assembly, but it shouldn't be too difficult. The device should be a complex system simplified for the common consumer. Another important feature is the need for failsafe, and overrides. If the owner of a door lock loses their keys, access to the door should not be denied to them at any time. It should always be possible for only the customer to access the system.

2.1 Arduino IDE

The Arduino IDE is incredibly minimalistic, yet it provides anear-complete environment for most Arduino-based projects. The top menu bar has the standard options, including “File”(new, load save, etc.), “Edit”(font, copy, paste, etc.), “Sketch” (for compiling and programming), “Tools” (useful options for testing projects), and “Help”. The middle section of the IDE is a simple text editor that where you can enter the program code. The bottom section of the IDE is dedicated to an output window that is used to see the status of the compilation, how much memory has been used, any errors that were found in the program, and various other useful messages.

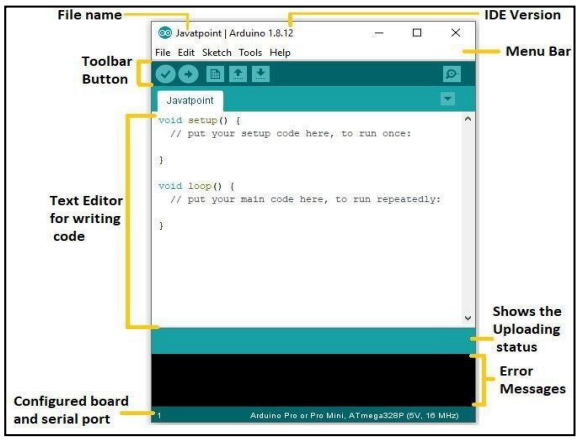


Figure: Basic Arduino Sketch Structure

Projects made using the Arduino are called sketches, and such sketches are usually written in a cut-down version of C++. Because programming a microcontroller is somewhat different from programming a computer, there are a number of device specific libraries (e.g., changing pin modes, output data on pins, reading analog values, and timers). In fact, the Arduino is, in fact, programmed in C++, Java. It just uses unique libraries for the device.

2.2 RFID Reader

The RFID reader is really a cellular gadget accustomed to move information with regard to realizing as well as monitoring labels attached to items. The label consists of in electronic format saved info. Some type of labels is actually operated through electromagnetic induction through permanent magnetic areas created close to the reader. RFID reader consists of a good RF component also it functions like each TEXAS as well as RX associated with stereo frequency indicators. The transmitter of the component consists of a good oscillator to create the actual company frequency. The recipient of the component features a demodulator in order to draw out the actual reverted info as well as retains a good amplifier to aid the actual transmission with regard to digesting. The microprocessor can be used to create the actual manage device, that utilizes a good Operating System as well as storage of the component filtration systemas well as shops the info.

RFID, Radio Frequency Identification is a fundamental and inexpensive technology that enables wireless data transmission. This technology has not been very often used in industry due to lack of standardization among the manufacturing companies earlier. RFID technologies are efficient and secure compare to other network. With RFID, wireless automatic identification takes a very specific form: the object, location, or individual is marked with a unique identifier code contained with an RFID tag, which is in some way attached to or embedded in the target. RFID is not a single product but a comprehensive system, a typical RFID system include three basic elements: RFID tag (transponder), reader (transceiver) and back-end application system (or database), which demands the support of the computer network. The software is used for management, controlling, transaction, operation and maintaining record of the various users.

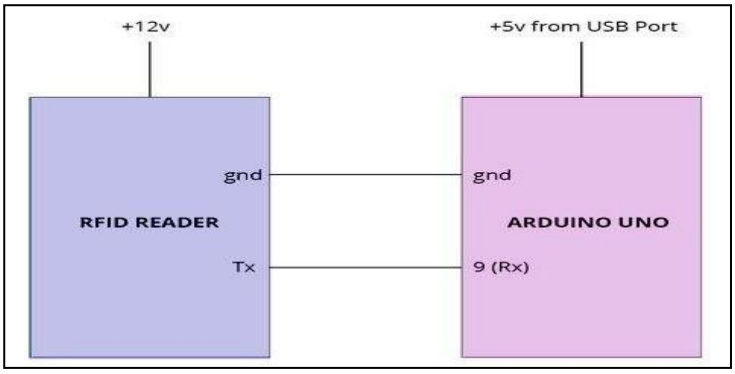


Figure: Interfacing of RFID with ESP8266

RFID provides primarily 2 feasible results, the first is TTL suitable o/p as well as a different one is actually o/p. The TTL suitable o/p pin number could be attached to a good Arduino panel straight. As the result pin number of the RS232 suitable should be transformed in order to TTL utilizing an RS232 in order to TTL converter. The automated doorway locking mechanism program signal diagram utilizing an Arduino is actually proven beneath. This particular signal is principally employed for a good interfacing associated with RFID reader by having an Arduino. This particular task could be improved through hooking up a good to show the actual results. The signal of the task utilizes 3 individual components, specifically the reader, the controller as well as doorway locking mechanism. The place where a reader scans the actual RFID labels, the controller can be used to simply accept the information in the RFID reader as well as manage the actual o/p from the doorway locking mechanism.

2.3 Servo Motors

A servo motor is a type of electromechanical device that generates torque and velocity in response to the current and voltage supplied. They come in various types, shapes, and sizes. Joseph Facort used the term "servo" for the first time in 1859 when he used steam to control the rudders on a ship. A servo has three parts: a motor and feedback device and control electronics. A servo motor is one of these three parts. If you need feedback, you can use a potentiometer, Hall-effect device, a tachometer, a resolver, an encoder, a linear transducer, or any other sensor that fits your needs. The control electronics that power the motor and compare the feedback data and the command reference to make sure the servo motor is working as it should are the last parts of the servo system.

They come in mainly two types: AC and DC. AC servos can handle more current surges and are usually used in industrial machines, so they are more likely to be found there. DC servos aren't built to take a lot of power surges and are usually better for smaller applications. In general, DC motors are cheaper than their AC counterparts. Some of these, too, have been built for continuous rotation, making it easy to get your robot moving. They have two ball bearings on the output shaft to reduce friction and make it easier to get to the potentiometer that changes the rest point.

Servos are controlled by sending an electrical pulse of variable width, or pulse width modulation (PWM), through the control wire. There is a minimum pulse, a maximum pulse, and a repetition rate. A servo motor can usually only turn 90° in either direction for a total of 180° movement. The motor's neutral position is defined as the position where the servo has the same amount of potential rotation in the both the clockwise or counter-clockwise direction. The PWM sent to the motor determines position of the shaft, and based on the duration of the pulse sent via the control wire; the rotor will turn to the desired position. The servo motor expects to see a pulse every 20 milliseconds (ms) and the length of the pulse will determine how far the motor turns. For example, a 1.5ms pulse will make the motor turn to the 90° position. Shorter than

1.5ms moves it in the counter clockwise direction toward the 0° position, and any longer than 1.5ms will turn the servo in a clockwise direction toward the 180° position.

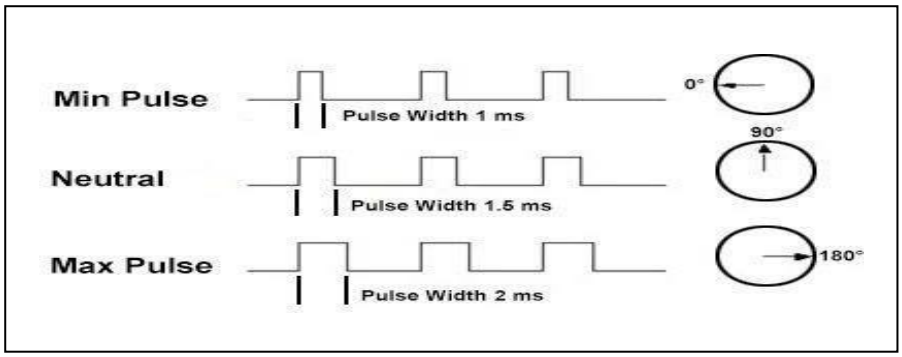


Figure: Variable Pulse width control servo position

When these servos are commanded to move, they will move to the position and hold that position. If an external force pushes against the servo while the servo is holding a position, the servo will resist from moving out of that position. The maximum amount of force the servo can exert is called the torque rating of the servo. Servos will not hold their position forever though; the position pulse must be repeated to instruct the servo to stay in position.

2.5 Amica Node MCU ESP8266

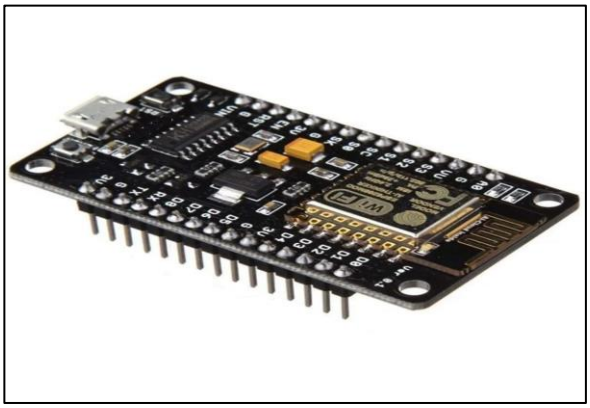


Figure: Amica Node MCU ESP8266

The Amica Node MCU ESP8266 Development Board is a popular microcontroller board based on the ESP8266 chipset, which features built-in Wi-Fi capabilities and is widely used in the Internet of Things (IoT) space. In this literature survey, we will explore some of the key features, applications, and use cases of the Amica Node MCU ESP8266 Development Board.

The ESP8266 chipset was first introduced in 2014 by the Chinese company Espresso Systems. The chipset was designed to provide a low-cost, low-power solution for connecting devices to the internet. The first version of the chipset, the ESP8266EX, was released in 2014 and featured an 80MHz 32-bit microcontroller with 64KB of instruction RAM and 96KB of data RAM. The Amica Node MCU ESP8266 Development Board was first introduced in 2015 by the Chinese company Amica. The board was designed to provide an easy-to-use development platform for the ESP8266 chipset, featuring a USB-to-serial converter and a range

of development tools and libraries.

The first version of the Amica Node MCU ESP8266 Development Board, known as the Node MCU v0.9, featured an ESP-12 module with 4MB of flash memory and 802.11 b/g/n Wi-Fi support. The board also featured a micro-USB port for power and programming, as well as a range of GPIO pins for connecting sensors, actuators, and other devices. Over the years, the Amica Node MCU ESP8266 Development Board has gone through several iterations, with each new version adding new features and improvements. In 2016, the Node MCU v1.0 was released, featuring an improved ESP-12E module with 4MB of flash memory and improved support for the Arduino IDE. In 2017, the Node MCU v2 was released, featuring an ESP-12F module with 4MB of flash memory and support for the Lua scripting language. The board also featured improved power management and a more compact design.

The latest version of the Amica Node MCU ESP8266 Development Board, the Node MCU v3, was released in 2018. This version features an improved ESP-12S module with 4MB of flash memory and support for the Python programming language. The board also features improved power management and a range of new development tools and libraries.

The Amica Node MCU ESP8266 Development Board has undergone several iterations over the years, with each new version adding new features and improvements. The board has become a popular option for developers who are building connected devices, thanks to its low cost, ease of use, and built-in Wi-Fi capabilities.

One of the key features of the Amica Node MCU ESP8266 Development Board is its low cost, which makes it an attractive option for hobbyists and makers who are interested in building IoT projects. The board is also easy to use, with a range of development tools and libraries available that can help users get started quickly.

The Amica Node MCU ESP8266 Development Board is compatible with the Arduino IDE, which is a popular development environment used by many makers and developers. This compatibility means that users can leverage the existing Arduino ecosystem to build their projects, including a wide range of sensors, actuators, and other hardware components. One popular application of the Amica Node MCU ESP8266 Development Board is in home automation projects, where the board can be used to control lights, appliances, and other devices. The built-in Wi-Fi capabilities of the board make it easy to connect to a local network and control devices remotely using a smartphone or other web-enabled device. Another popular use case for the Amica Node MCU ESP8266 Development Board is in the development of IoT sensors and devices. The board can be used to collect data from a wide range of sensors, including temperature sensors, humidity sensors, and motion sensors, and transmit that data to a central server for analysis.

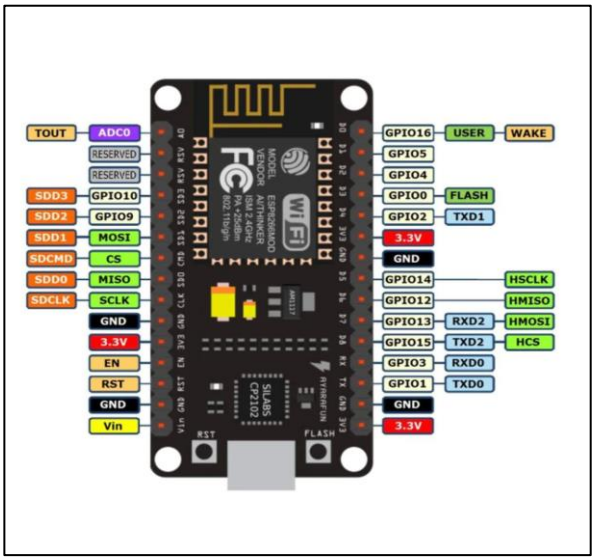


Figure: Pin configuration of Node MCU ESP8266

The pinout of the Amica Node MCU ESP8266 Development Board typically includes a micro-USB port for power and programming, a reset button, and a range of GPIO pins for connecting sensors, actuators, and other devices. The GPIO pins are typically arranged in two rows, with each row consisting of 8 pins.

The block diagram of the Amica Node MCU ESP8266 Development Board typically includes an ESP8266 chipset, which features an 80MHz 32-bit microcontroller with 64KB of instruction RAM and 96KB of data RAM. The chipset also includes 802.11 b/g/n Wi-Fi support and a range of other communication interfaces, such as SPI, I2C, and UART.

In addition to the ESP8266 chipset, the board typically includes a USB-to-serial converter, which allows the board to be programmed using the Arduino IDE or other development environments. The board also typically includes a voltage regulator, which provides a stable 3.3V power supply for the ESP8266 chipset and other components on the board.

Overall, the Amica Node MCU ESP8266 Development Board is a versatile and cost-effective option for makers and developers who are interested in building IoT projects. With its built-in Wi-Fi capabilities, compatibility with the Arduino ecosystem, and wide range of development tools and libraries, the board is a great choice for a wide range of applications.

PREVIOUS WORK DONE

As compared with a mechanical lock, the electronic lock is always better as it resolves the security problem arises by using the mechanical lock. Nowadays, digital technology is widely being used for locking purposes. Many smart locking systems such as automatic door opening and closing system, wireless door locking system, Biometrics, and Password based system are being used for controlling the movement of a door without the utilization of key, which is even used for maintaining the overall security of the house. The implementation of such smart lock helps to overcome various security problems as they alert the user and have built-in various features. Thus, RFID based Smart Door Lock is also one of the types of smart lock. It is a reasonable technology that can be applied for various applications such as assets safe, jewellery safe, access tracking, access control, etc. It is a very cheap and affordable design of smart lock that allows convenience and security for users. This smart lock can be controlled through application so that users should not carry bunch of keys and have the
fear of losing or misplacing keys

With this area, the actual strategy utilized in this particular investigation procedure with regard to resolving the issue is mentioned beneath. In the beginning the actual card is actually studied through the readers. The study info is actually encrypted through the encrypted software program which info helps you to save towards the impair storage. As an effect, the info from the card can't be taken with an unauthenticated individual. Next to no-one can duplicate the actual card and also the authenticated card owner continues to be within security. Additionally, it assists the actual manager how the info helps you to save within the impair storage along with correct period. Therefore, manager computes the amount of the actual utilizes from the card along with correct period. The actions associated with strategy tend to be portrayed the following:

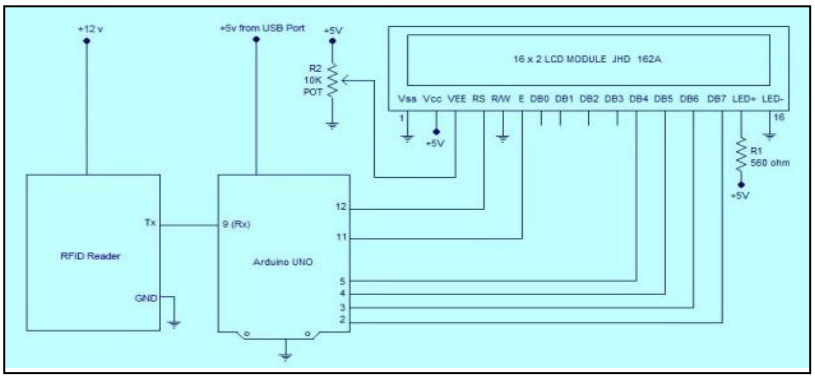


Figure: RFID card door lock circuit system

In this study, we proposed a security system contains door locking system using passive type of RFID. The system is implemented in three spaces using central database system. The secure space located on same or different part of buildings as illustrate in figure1. The system used hardware as well as software. The hardware components are RFID reader, tags, USB connections and connecting cables etc. In addition, we have used servo motor (stepper motor for this purpose). The proposed scheme is showing below

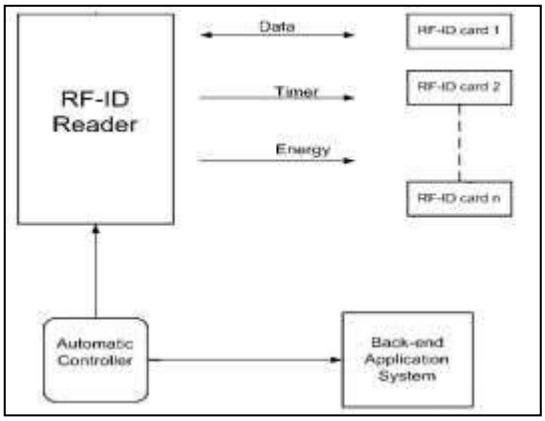


Figure: RFID reader implementation

Step 1: The RFID reader retrieve the information contains by tag as it come in the range of few millimeters from reader.

Step 2: after receiving the tag information, reader send this information to database for conformation. If it holds, the information stored for further operation.

Step 3: The central server queries to database and retrieve corresponding information after receiving the query from the reader.

Step 4: The reader computes timestamp (date, time) after receiving the reply form server and create a log.

Step 5: Once the tag information verified, the system generates a control signal through parallel port which controls the opening and closing of door by means of steeper motor.

The basic principle of RFID technology: the RF signal to be transmitted by the reader and writer is coded and loaded onto the high frequency carrier signal, and then sent out through the antenna. The electronic label entering the working area of reader and writer receives the signal. The relevant circuits of the chip in the card perform voltage doubling rectifying, modulating, decoding, deciphering, and then judging the command request, password, authority, etc. Finally, signal processed by tag according to the command.

The objective of this work is to provide remote access to door lock system. The obvious motivation for providing such a kind of remote access to door lock is to make properties much more secure and enable it

to automatically distinguish between a valid user and an intruder. This work also ensures that the owner need not worry about whether the door is left unlocked or not and hence ensures peace of mind for the owner. The proposed system aims to achieve Access control mechanism in a smart way. By using RFID, the system will distinguish a valid user with an invalid one.

The current function suggested the conceptual construction which may be built-into the actual RFID Card in order to offset the actual unauthorized utilization of Card. The investigation goal had been in order to incorporate biometric authentication process right into a cut capable RFID 4 Card. The procedures tend to be split in to 3 phases. Phase 1: Style as well as Manufacturing associated with Label. This particular phase includes the look, calibration, simulation as well as manufacturing from the label antenna, along with a controlled combined attached to the controller. phase2: Fingerprint Coordinating as well as Storage space. This particular phase entails the actual process associated with obtaining, authenticating, Acquiring as well as storage space from the biometric authentication process, frustration printing in this instance. Phase 3: Program Creating as well as Screening. This particular phase involves the actual integration from the numerous stages inside a guaranteed manage device as well as screening from the prototype. However, the entire system is actually completely unguaranteed in the management aspect. Therefore, current techniques offer held a significant. Weak point for all of us, examining this particular system; we now haveadditionally observed which improving runtime could be feasible with increased security.

The following picture depicts the work done by us in this semester:

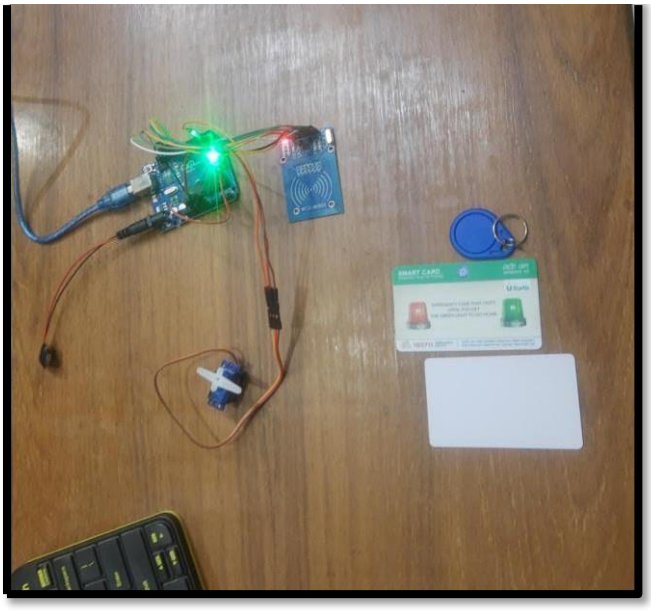


Figure: RFID door lock model

PRESENT STATUS OF WORK

Gathered materials: a NodeMCU board, RFID module, servo motor, jumper wires

Step 1: Connected hardware:-

We have connected the RFID module and servo motor to the NodeMCU board using jumper wires . The RFID module is be used to read the RFID tags and the servo motor would be used to unlock the door.

Step 2: Programmed the NodeMCU board:-

We have written code to program the NodeMCU board. The code includes instructions for reading RFID tags, controlling the servo motor, and communicating with the Blynk platform.

Step 3: Created a Blynk account:-

We have created a Blynk account and downloaded the Blynk app onto your mobile device & web platform

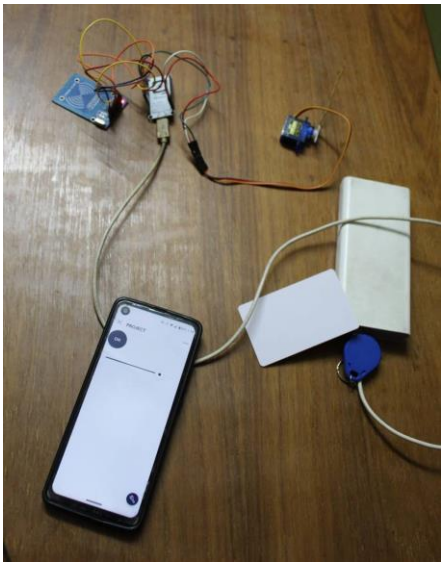
Step 4: Connected NodeMCU board to Blynk:-

We have connected the NodeMCU board to the Blynk platform using the Blynk API key and a Wi-Fi connection. This allows you to control the RFID door lock system from the Blynk app on our mobile device.

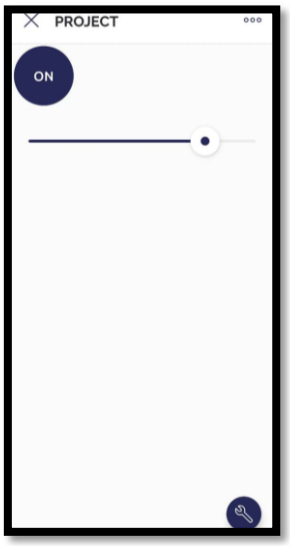
Step 5: Tested system:-

Once everything was connected and programmed, we have tested the system to ensure that it worked properly. We have tested the system by holding an RFID tag up to the reader, which should have triggered the servo motor to unlock the door & also the door opening task is done using Blynk mobile & web platform

Hence in this semester, we have coonected out project module with the latest technology i.e-Internet of Things(IOT) using an app which will definitely enable us to open or close the door lock with a single touch.



Entire project



Screenshot of the App

PENDING WORK AND FUTURE SCOPE

The RFID Door Lock is a very cheap and affordable design that allows convenience and security for users. The design is relatively small and easy enough to install with just a couple of screws. Of course, there are additional features that can be added in order to improve the system as a whole. However, it is important to note the cost of the improvement should be taken into consideration. The following are a few ideas that can be implemented without adding much cost to the design as a whole. These are just a few of the ideas for the RFID Door Lock in which improvements can be made to further improve both the security and convenience of the product.

The first addition is strictly a change in the code. As of now, the RFID reader used is linked to the tag and card reader. However, either by adjusting the code or using a different RFID reader, one should be able to read the RFID code of the individual tags and cards. This will allow for more options in terms of how the user wants the security to be set up. By reading the specific RFID codes, you can change the accepted keys and also deny access for certain keys. Another additional addition code is responses to potential brute force. A common technique in which people use to hack digital door locks is using a variable RFID card that changes its pattern rapidly until it finds the correct pattern. To counter this, you can implement a response from the Arduino if the wrong RFID pattern is read more than X number of times. For example, you can stop accepting any patterns after X number of times or require a reset in order to unlock the door.

An example of a physical improvement is adding the ability to run on 9V batteries. This gives albeit a limited amount of security in case of a power outage. Because of the inverting amplifier design, even when disconnected with the Arduino, the door lock has the ability stays locked. But in order for the door to stay locked, it still needs a power supply. If the door is powered by a 9V power supply when disconnected from the power supply, you can keep the door locked and that'll give the owners time to respond before they're house is left unprotected. With 9V batteries, Arduino should be capable of being powered as well allowing the correct RFID card to still unlock the door.

We are also looking forward to making the following additions to the system

Biometric scanner: The next-generation biometric-based technology offers a dependable, helpful, and authentic way of verifying/identifying an individual's identity utilizing latest Biometric fingerprint scanner. Fingerprint scanners are being used broadly for enrollment, identification & verification in varied projects where the identity of people is required. But here in out project we shall implement the biometric scanner in the doorlock itself which will allow the door lock to become more user-friendly.

Solar Power: Using a DC source in this project module seems to be quite tedious. Therefore a solar panel can be used in order to save the power and making the project as innovative as possible.

CONCLUSION

Numerous safety systems have been suggested in order to protect RFID buildings towards feasibleattacks particularly all of us outlined the various software field from the RFID technologies in addition to a few achievable sections of its software. We now have set uppowerful protection depending onencryption technique. Apart from all of us attempted tomaintain much better procedure runtime. Evaluating the suggested program along with current program, we now have satisfied along with each Guideline for example program authentication protection as well as functional runtime. Regarding protection, the machine is actually fairly guaranteed with regard to eliminating the actual biometric program as well as forerunning the actual procedure at the rear of the actual home windows. Regarding runtime, the actual system's needed period is more preferable compared to the current runtime.

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