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IoT Based Home Door Security System

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Abstract: *Nowadays home security has become one of the most important concerns in our society. Most of the security mishaps such as theft, robbery and other attacks occur mainly by breaking through the door. These issues mainly occur due to negligence of the individual, lack of proper features and maintenance of the door. Our project mainly deals with increasing the security of doors through an advanced door locking mechanism using Iot. We use the NodeMCU, which is an IOT device acting as the Microcontroller built around the ESP8266SoC for the entire system. For the locking mechanism we use a solenoid lock, which can be electronically controlled with a relay depending upon various situations. Non-sensitive real time information about the lock is displayed through an LCD module placed outside of the door. Sensors such as Infrared sensor, passive buzzer, vibration sensor etc are used for additional security so that it can raise an alarm in case of an emergency. Using the Blynk application the real time data generated by all the sensors in the system such as locked/unlocked etc can be sent to the user's device as notifications. This also allows for remote monitoring as well as detection of issues within the system using software programs rather than the user manually troubleshooting. All these methods provide an extra layer of protection, control, and ease of use compared to traditional locking security systems.*

Keywords: Home Security, IoT, NodeMCU, Blynk Application, Remote Monitoring

I. Introduction

IoT refers to a virtual internet connection from things, processes, people, animals and almost everything that we see around. It describes a situation where everything in our surrounding environment is made capable of automatically communicating with each other without any inter-human or human-to-machine interaction. Smart home based security systems have become indispensable in daily life, due to the ability to monitor data, automation and control, ease of access, better time management. The project describes about the implementation and deployment of an IoT based home security door system, which can be remotely managed and monitored through a smartphone. With this the user can have the convenience and the safety of technology at their hands.

II. Existing System and its Limitations

Arguably the most commonly used security system in homes is the traditional key and lock mechanism. In case of simplicity it is one of the easiest to use, at the same time the technology is quite old and insecure in terms of security compared to modern picking techniques. These flaws in security can be contributed to many factors such as

- Cylinder locks in doors can be fairly easy to pick, which means that anyone with even the slightest knowledge can enter the house very easily.
- Key designs can be easily copied.
- Keys must be guarded securely since they are very easy to lose and forget.
- Having to carry multiple keys for multiple doors.
- Real time status could not be measured, such as if the door is locked or unlocked.
- Changing access rights would require the need of physically transferring the keys.

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In case of institutions, offices and large companies these issues get intensified, since there are multiple employees and multiple access points, which can lead to major mishaps.

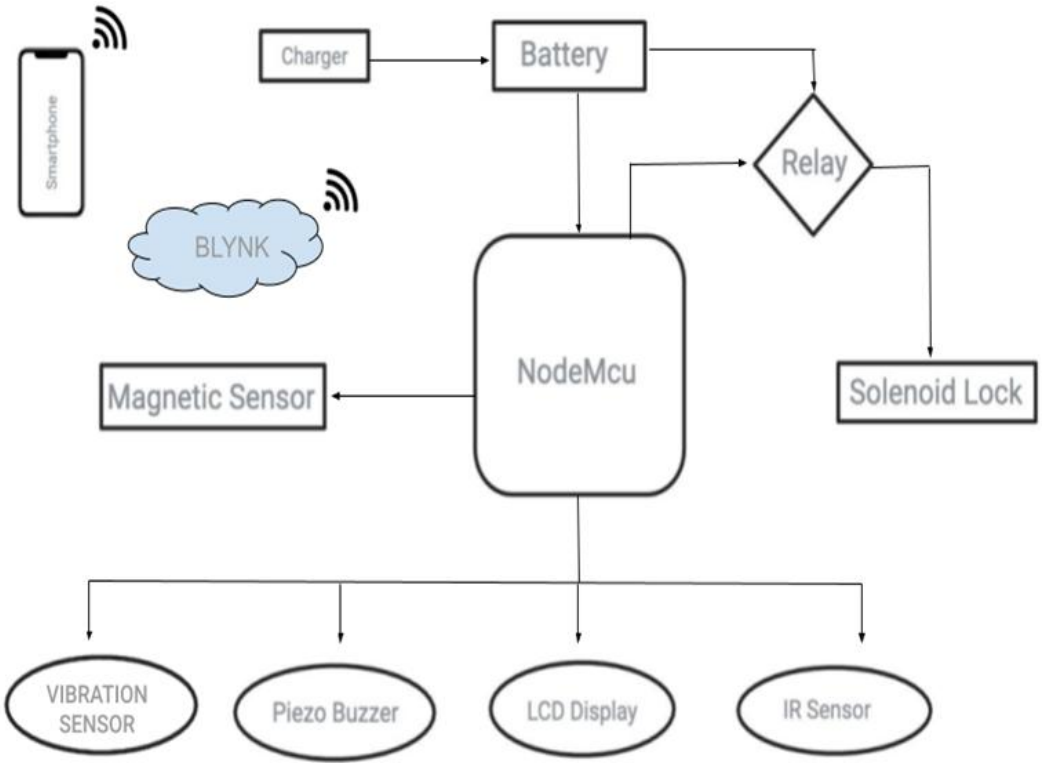
A much secure, practical and seamless solution is to use a door lock based upon Iot. This type of door lock ensures that there is only a single virtual key which can't be stolen or copied. These keys can be safely guarded as they don't exist in the real world and at the same time need for carrying around multiple keys can be easily eliminated. Door access can be securely transferred to other people without the need for physically transferring the keys.

Using the leverage of Iot all the above mentioned real time factors of the door can be easily monitored through the user's personal device without the need of physically checking each door. Considering the multiple advantages of security, practicality, and ease of use, we propose a solution using Iot as a replacement for the existing system.

III. Proposed System

In our system a successful entry through the door is only possible through the user's personal device such as a smartphone. For the identification of authorized/unauthorized entry we use a combination of mechanical detection using magnetic sensor and software detection using blynk app.If door is unlocked without The vibration sensor can detect any unwanted tampering with the door, at the same time, the built-in buzzer can raise an alarm in case of an emergency. Real time data generated by all the sensors in the system is transmitted to the user via the blynk application so that the user can monitor and control the system remotely. For added convenience, an IR sensor is placed inside the door from which the user can just wave his hand close to the sensor to unlock the door rather than using a smartphone to unlock the door. This is secure as only a user having access to the door can get in and leave through the door. Also an LCD screen is placed outside the door from which non sensitive information such as can be easily displayed. Compared to traditional locking methods our system provides an extra layer of security as only the user can unlock the door at the same time, the user is aware of all actions performed on the door.

V. System Architecture



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VI. Components Required

6.1 NodeMCU

NodeMCU is an open source platform based on ESP8266 which can connect objects and let data transfer using the Wi-Fi protocol. In addition, by providing some of the most important features of microcontrollers such as GPIO, PWM, ADC, and etc, it can solve many of the project's needs alone.

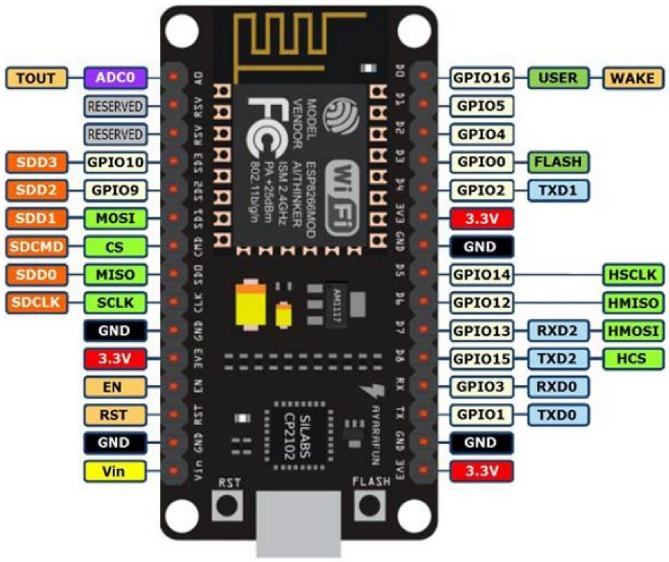
Since NodeMCU is an open-source platform, its hardware design is open for edit/modify/build.NodeMCU Dev Kit/board consist of ESP8266 wifi enabled chip. The ESP8266 is a low-cost Wi-Fi chip developed by Espressif Systems with TCP/IP protocol. For more information about ESP8266, you can refer to the ESP8266 WiFi Module.

There is Version2 (V2) available for NodeMCU Dev Kit i.e. NodeMCU Development Board v1.0 (Version2), which usually comes in black colored PCB.

A. Features

- Easy to use
- Programmability with Arduino IDE or IUA languages
- Available as an access point or station
- practicable in Event-driven API applications
- Having an internal antenna
- Containing 13 GPIO pins, 10 PWM channels, I2C, SPI, ADC, UART, and 1-Wire

B. Diagram



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6.2 Magnetic Contact Switch Sensor

Magnetic Contact Switch Sensor (MC-38) Wired Door Window Sensor Magnetic Switch Home Alarm System can be used as a door or window security system. It produces the signal when moved away from each other which can be fed to the microcontroller to perform the desired action as per requirement.

This sensor is suitable to use for trigger alarm or ON/OFF light inside a cupboard sliding door. This wired sensor is triggered by the magnet. When the magnet is closed by, the circuit is closed or open if the magnet is far from the sensor.

A. Working

In the left half of the image, the magnet is at a distance to the switch, which prevents the metal reeds from going closer and completing the circuit. Whereas, on the other half of the image, it can be seen that when the magnet is closer to the switch, the metal reeds get connected to one another and the circuit is completed and we observe an output through the sensor module.

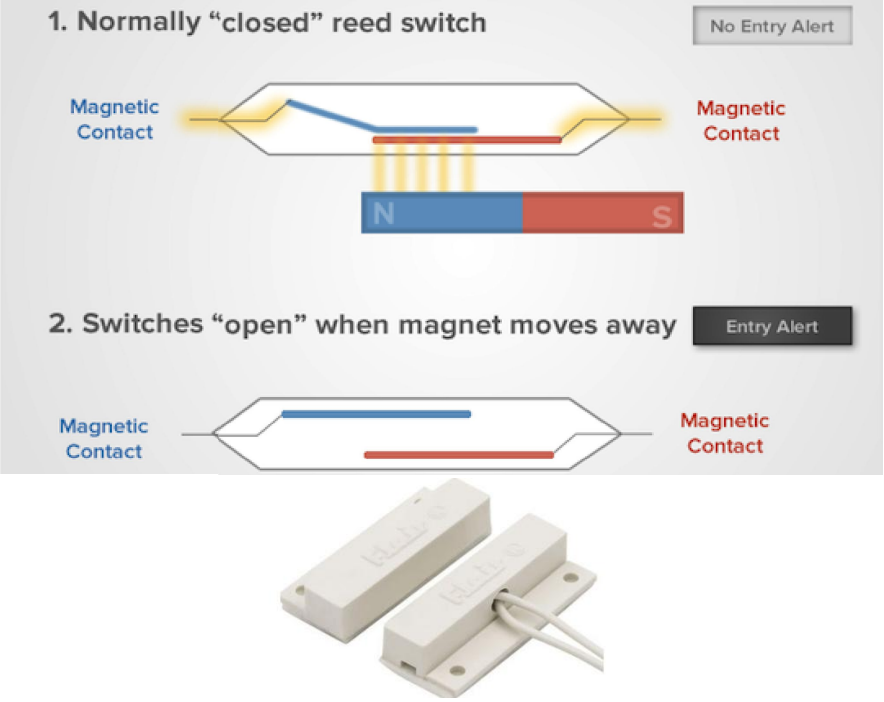
To summarise, when the magnet is close by, the circuit is closed and we obtain an output, and when the magnet is far from the reed switch, the circuit is open and we do not get an output

B. Specifications

Below are some features and specifications of the MC-38 magnetic switch.

1. Rated current: 100mA
2. Power rating: 3W
3. Operating distance: 15 - 25mm
4. Cable Length: 30.5cm ± 12mm
5. Sensor Output: Normally Closed(NC) (Switch is closed when the switch and magnet are together)

C. Diagram



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6.3 Solenoid Lock

A solenoid door lock is a remote door locking mechanism that latches or opens by means of an electromagnetic solenoid. In most cases, the actual locking mechanism of a solenoid door lock will be identical to a conventional key-operated example. The only difference between the two is the inclusion of a low-voltage solenoid in the mechanism, which pulls the latch back into the door when a push button or other controller is activated. The latch will then be retained in the door for as long as the button is pushed, or, in the case of a latching solenoid, indefinitely until the button or controller is activated again. These types of door locks are used extensively in remote security access and automotive doors.

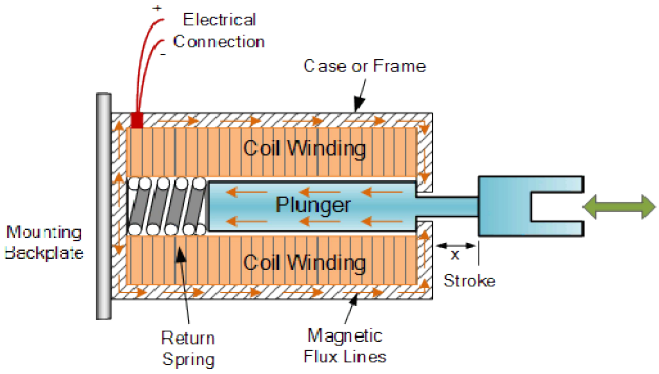
A. Working

The principle behind an electromagnetic lock is the use of electromagnetism to lock a door when energized. The holding force should be collinear with the load, and the lock and armature plate should be face-to-face to achieve optimal operation. The magnetic lock relies upon some of the basic concepts of electromagnetism. Essentially it consists of an electromagnet attracting a conductor with a force large enough to prevent the door from being opened. In a more detailed examination, the device makes use of the fact that a current through one or more loops of wire (known as a solenoid) produces a magnetic field. This works in free space, but if the solenoid is wrapped around a ferromagnetic core such as soft iron the effect of the field is greatly amplified. This is because the internal magnetic domains of the material align with each other to greatly enhance the magnetic flux density.

B. Specifications of 12v Solenoid Lock:

- Operating voltage : 12VDC
- Draws 650mA at 12V, 500 mA at 9V when activated
- Designed for 1-10 seconds long activation time
- Standard Size: 1,200 lbf (5,300 N) holding force.

C. Diagram



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6.4 LCD Display

The term LCD stands for liquid crystal display.. These displays are mainly preferred for multi-segment light-emitting diodes and seven segments. The main benefits of using this module are inexpensive; simply programmable, animations, and there are no limitations for displaying custom characters, special and even animations, etc.

B. Pin Diagram

The 16×2 LCD pinout is shown below.

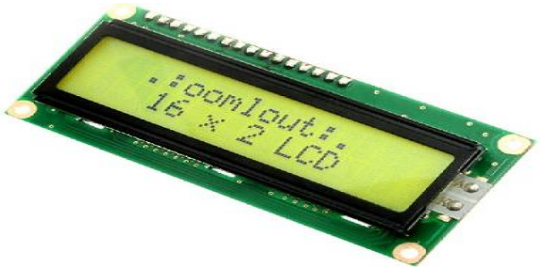
- Pin1 (Ground/Source Pin): This is a GND pin of display, used to connect the GND terminal of the microcontroller unit or power source.
- Pin2 (VCC/Source Pin): This is the voltage supply pin of the display, used to connect the supply pin of the power source.
- Pin3 (V0/VEE/Control Pin): This pin regulates the difference of the display, used to connect a changeable POT that can supply 0 to 5V.
- Pin4 (Register Select/Control Pin): This pin toggles among the command or data register, used to connect a microcontroller unit pin and obtains either 0 or 1(0 = data mode, and 1 = command mode).
- Pin5 (Read/Write/Control Pin): This pin toggles the display among the read or writes operation, and it is connected to a microcontroller unit pin to get either 0 or 1 (0 = Write Operation, and 1 = Read Operation).
- Pin 6 (Enable/Control Pin): This pin should be held high to execute Read/Write process, and it is connected to the microcontroller unit & constantly held high.
- Pins 7-14 (Data Pins): These pins are used to send data to the display. These pins are connected in two-wire modes like 4-wire mode and 8-wire mode. In 4-wire mode, only four pins are connected to the microcontroller unit like 0 to 3, whereas in 8-wire mode, 8-pins are connected to microcontroller units like 0 to 7.
- Pin15 (+ve pin of the LED): This pin is connected to +5V
- Pin 16 (-ve pin of the LED): This pin is connected to GND.

B. Specifications

The features of this LCD mainly include the following.

- The operating voltage of this LCD is 4.7V-5.3V
- It includes two rows where each row can produce 16-characters.
- The utilization of current is 1mA with no backlight
- Every character can be built with a 5×8 pixel box
- The alphanumeric LCDs alphabets & numbers
- Is display can work on two modes like 4-bit & 8-bit
- These are obtainable in Blue & Green Backlight
- It displays a few custom generated characters

C. Diagram



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6.5 IR Sensor

IR sensor is an electronic device that emits light in order to sense some object of the surroundings. An IR sensor can measure the heat of an object as well as detect the motion. Usually, in the infrared spectrum, all the objects radiate some form of thermal radiation. These types of radiation are invisible to our eyes, but infrared sensors can detect these radiations.

The emitter is simply an IR LED (Light Emitting Diode) and the detector is simply an IR photodiode . Photodiodes are sensitive to IR light of the same wavelength which is emitted by the IR LED. When IR light falls on the photodiode, the resistances and the output voltages will change in proportion to the magnitude of the IR light received.

A. Working Principle

Infrared receivers or infrared sensors detect the radiation from an IR transmitter. IR receivers come in the form of photodiodes and phototransistors. Infrared Photodiodes are different from normal photo diodes as they detect only infrared radiation.

Different types of IR receivers exist based on the wavelength, voltage, package, etc. When used in an infrared transmitter – receiver combination, the wavelength of the receiver should match with that of the transmitter.

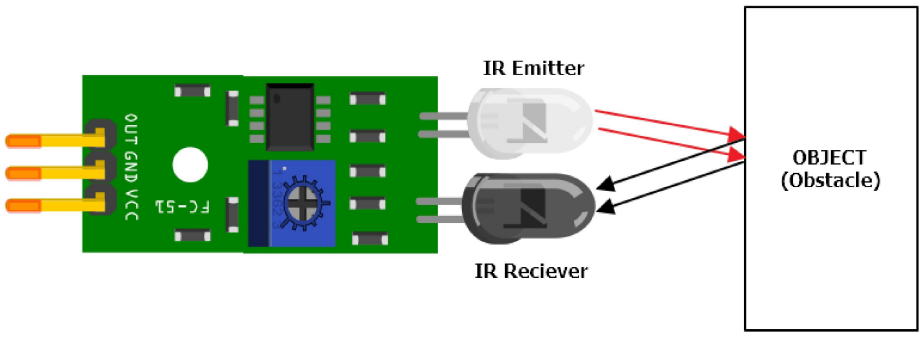
The emitter is an IR LED and the detector is an IR photodiode. The IR photodiode is sensitive to the IR light emitted by an IR LED. The photo-diode's resistance and output voltage change in proportion to the IR light received. This is the underlying working principle of the IR sensor.

When the IR transmitter emits radiation, it reaches the object and some of the radiation reflects back to the IR receiver. Based on the intensity of the reception by the IR receiver, the output of the sensor is defined.

B. Application

- Climatology
- Meteorology
- Photobiomodulation
- Flame Monitors
- Gas detectors
- Water analysis
- Moisture Analyzers
- Anesthesiology testing
- Petroleum exploration

C. Diagram



Note: Black surfaces absorbs light naturally. So it will not reflects much light on IR Reciever.
This concept is used in Line follower robot.

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6.6 Piezo Buzzer

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric (piezo for short). Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.

Piezo buzzers are used for making beeps, tones and alerts. This one is petite but loud! Drive it with 3-30V peak-to-peak square wave. To use, connect one pin to ground (either one) and the other pin to a square wave out from a timer or microcontroller. For the loudest tones, stay around 4 KHz, but work quite well from 2KHz to 10KHz. For extra loudness, you can connect both pins to a microcontroller and swap which pin is high or low for double the volume.

A. Specifications

The specifications of the buzzer include the following.

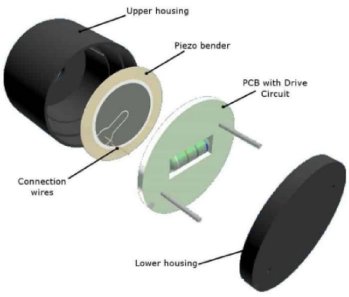
- Color is black
- The frequency range is 3,300Hz
- Operating Temperature ranges from – 20° C to +60°C
- Operating voltage ranges from 3V to 24V DC
- The sound pressure level is 85dBA or 10cm
- The supply current is below 15mA

B. Applications

The applications of the buzzer include the following.

- Communication Devices
- Electronics used in Automobiles
- Alarm Circuits
- Portable Devices
- Security Systems

C. Diagram



Piezo Buzzer Construction

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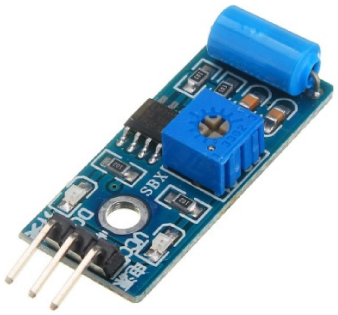
6.7 Vibration Sensor

The vibration sensor is also called a piezoelectric sensor. These sensors are flexible devices which are used for measuring various processes. This sensor uses the piezoelectric effects while measuring the changes within acceleration, pressure, temperature, force otherwise strain by changing to an electrical charge. This sensor is also used for deciding fragrances within the air by immediately measuring capacitance as well as quality.

A. Working Principle

The working principle of vibration sensor is a sensor which operates based on different optical otherwise mechanical principles for detecting observed system vibrations. The sensitivity of these sensors normally ranges from 10 mV/g to 100 mV/g, and lower and higher sensitivities are also accessible. The sensitivity of the sensor can be selected based on the application. So it is essential to know the levels of vibration amplitude range to which the sensor will be exposed throughout measurements.

B. Diagram



6.8 Relay

Relays are switches that open and close circuits electro mechanically or electronically. Relays control one electrical circuit by opening and closing contacts in another circuit. Relays are generally used to switch smaller currents in a control circuit and do not usually control power consuming devices except for small motors and Solenoids that draw low amps. Nonetheless, relays can "control" larger voltages and amperes by having an amplifying effect because a small voltage applied to a relay's coil can result in a large voltage being switched by the contacts. As relay diagrams show, when a relay contact is normally open (NO), there is an open contact when the relay is not energized. When a relay contact is Normally Closed (NC), there is a closed contact when the relay is not energized. In either case, applying electrical current to the contacts will change their state.

A. Working Principle

It works on the principle of an electromagnetic attraction. When the circuit of the relay senses the fault current, it energises the electromagnetic field which produces the temporary magnetic field. This magnetic field moves the relay armature for opening or closing the connections. The small power relay has only one contact, and the high power relay

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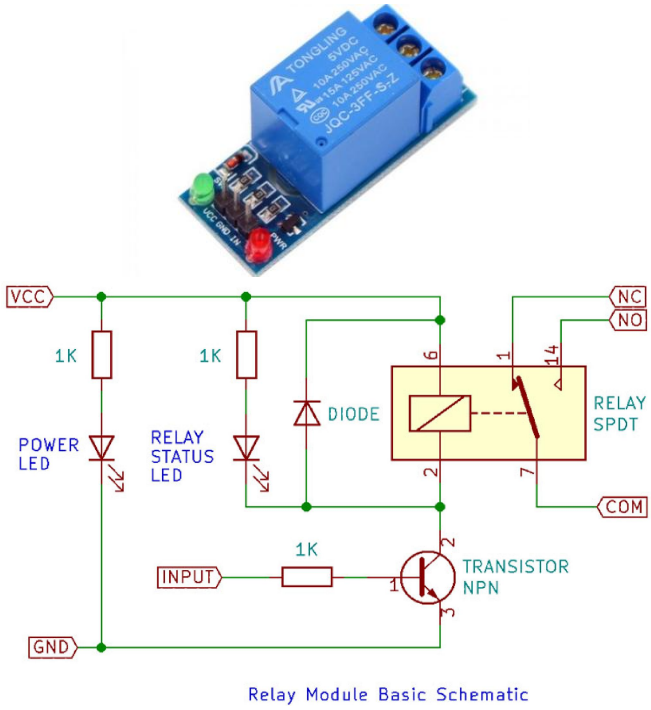
has two contacts for opening the switch. The inner section of the relay is shown in the figure below. It has an iron core which is wound by a control coil. The power supply is given to the coil through the contacts of the load and the control switch. The current flowing through the coil produces the magnetic field around it. Due to this magnetic field, the upper arm of the magnet attracts the lower arm. Hence close the circuit, which makes the current flow through the load. If the contact is already closed, then it moves oppositely and hence opens the contacts.

B. Specifications

- Supply voltage – 3.75V to 6V
- Quiescent current: 2mA
- Current when the relay is active: ~70mA
- Relay maximum contact voltage – 250VAC or 30VDC
- Relay maximum current – 10A

C. Diagram



Relay Module Basic Schematic

6.9 Battery

A battery is a device that converts chemical energy into electrical energy in the form of voltage, which in turn can cause current to flow. A battery works by immersing two plates made of different metals into a special chemical solution called an electrolyte. The metals react with the electrolyte to produce a flow of charges that accumulate on the negative plate, called the anode. The positive plate, called the cathode, is sucked dry of charges. As a result, a voltage is formed between the two plates.

Cylindrical batteries come in four standard sizes: AAA, AA, C, and D. Regardless of the size, these batteries provide 1.5 V each; the only difference between the smaller and larger sizes is that the larger batteries can provide more current. The cathode, or positive terminal, in a cylindrical battery is the end with the metal bump. The flat metal end is the anode, or negative terminal.

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A. Working

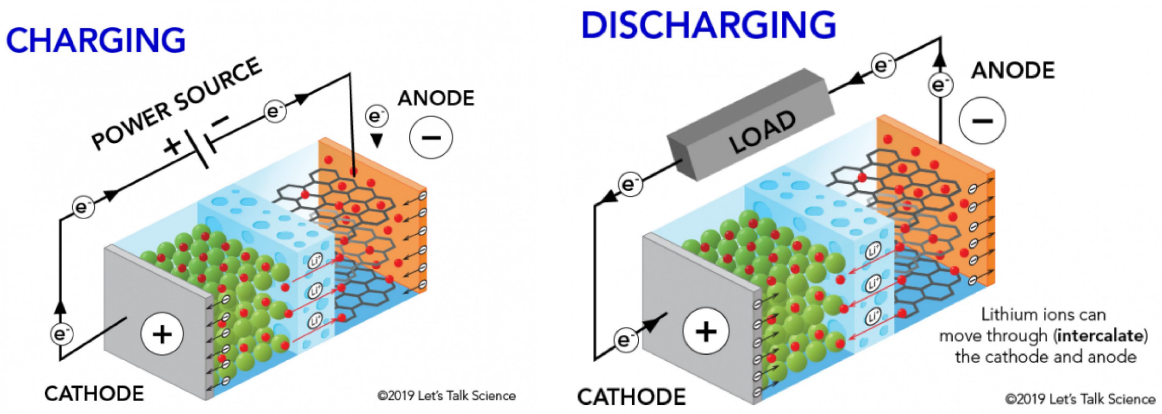
Lithium-ion batteries are classified into liquid lithium ion batteries and polymer lithium ion batteries or plastic lithium ion batteries according to the electrolyte materials used in lithium ion batteries. The positive and negative materials used in the polymer lithium ion battery are the same as the liquid lithium ions. The positive electrode material is divided into lithium cobaltate, lithium manganate, ternary material and lithium iron phosphate material, and the negative electrode is graphite. The working principle of the battery is also basically Consistent.

The lithium polymer battery electrolyte is a flexible solid polymer, and the metal ruthenium foil is sealed in the battery, and can still operate normally at a high temperature of 180 °C.Since the polymer replaces the liquid electrolyte with a solid electrolyte, the polymer lithium ion battery has the advantages of being thinner, arbitrarily area, and arbitrarily shaped compared with the liquid lithium ion battery, so that the battery can be made of the aluminum-plastic composite film. Therefore, the specific capacity of the entire battery can be improved; the polymer lithium ion battery can also use a polymer as a positive electrode material, and its mass specific energy will be increased by more than 20% compared with the current liquid lithium ion battery. The polymer lithium battery is characterized by being compact, thin, and lightweight.

B. Specification and Features

- 11.1V 3300mAH Lipo Battery
- Charge Capacity(C) : 3300mAh.
- Rated Voltage: 11.1V
- High energy density - potential for yet higher capacities.
- Does not need prolonged priming when new. One regular charge is all that's needed.
- Relatively low self-discharge - self-discharge is less than half that of nickel-based batteries.
- Low Maintenance - no periodic discharge is needed; there is no memory.
- Specialty cells can provide very high current to applications such as power tools.

C. Diagram



6.10 Charger

A charger, or AC/DC converter is a type of external power supply, often enclosed in a case similar to an AC plug. Use of an external power supply allows portability of equipment powered either by mains or battery without the added bulk of internal power components, and makes it unnecessary to produce equipment for use only with a specified power source.

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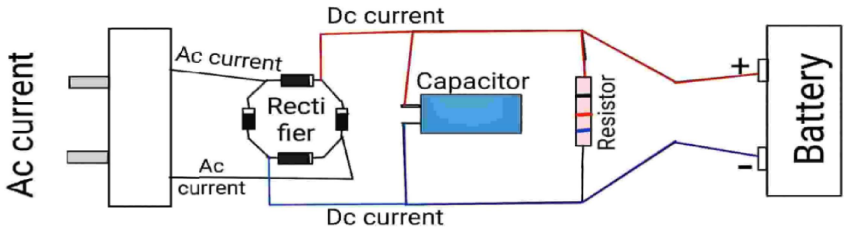
A. Working Principle

The basic components of a mobile charger are step down transformer, rectifier and voltage regulator. The supply that comes in our home is 230V A.C. but the battery needs DC power. The battery needs 5V dc. So first of all there is a need to step down the ac voltage. This is done by a step down transformer. Now we get the lower AC. This AC now needs to be converted to dc , this is done by the rectifier. Now a voltage regulator is used to regulate the voltage. The supply is now given to the battery of the mobile phone

B. Specification

- Input - 100-240 VAC 50/60Hz
- Category - Switch Mode Power Adaptor (SMPS)
- Output Type - DC
- Output - 12Volts 2A

C. Diagram



6.11 Blynk Application

Blynk is a Platform with IOS and Android apps to control Arduino, Raspberry Pi and the likes over the Internet. It's a digital dashboard where you can build a graphic interface for your project by simply dragging and dropping widgets. There are three major components in the platform:

- Blynk App - allows you to create amazing interfaces for your projects using various widgets we provide.
- Blynk Server - responsible for all the communications between the smartphone and hardware. You can use our Blynk Cloud or run your private Blynk server locally. It's open-source, could easily handle thousands of devices and can even be launched on a Raspberry Pi.
- Blynk Libraries - for all the popular hardware platforms - enable communication with the server and process all the incoming and outcoming commands.

A. Diagram

VII. WORKING

Since our project is based on the Intelligence of IOT, it depends upon the interconnection of devices where the master controller controls and monitors other devices connected to it. Therefore we conclude certain prerequisites before enabling the perfect functioning of the project.

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- For the proper communication between the devices the user must have a **Personal Home Network**.
- A **Backup Power System** is required for the uninterrupted functioning of the system.
- The device used for controlling the system(Ideally a smartphone) must be registered with the **Blynk Application**.
- The **Authentication Token** generated by Blynk will be sent to the user's Email Id and it must be added to the program.
- The **Nodemcu** must be connected to the user's personal home network with its **SSID** and **Password**.

7.1. Personal Home Network

A personal home network or home area network is a type of network that facilitates communication among devices within the close vicinity of a home. One of the most common ways of connecting the devices to the internet is through Wi-Fi, which is a local area wireless technology that allows an electronic device to exchange data or connect to the internet using 2.4 GHz UHF. Since nodemcu sends and receives data wirelessly we recommend the use of a wireless access point. For a home network having a 2.4Ghz wifi band, the range can extend upto 150 feet indoors, which would be sufficient for the proper working of the system. To have a seamless connection and working the wifi access point must have a stable data connection and transfer speeds must be at least a minimum of 300kb/s. The nodemcu must be connected to the home network, with its login credentials such as the network's SSID and Password.

7. Backup Power

For the proper connectivity and transmission of data between the nodemcu and blynk server internet connection is required. This is very important since loss of power to the system can result in failure of many crucial operations such as data transmission, communication between devices and to the blynk server. Inorder to combat this issue we consider the use of a backpower system such as an inverter to ensure proper functioning and communication of various devices in our system. A backpower system also ensures that any unwanted tampering or malware injection can be prevented. A backpower system capable of providing at least 150AH ~ 220V AC is recommended (Inverter capacity can vary depending upon the user's preference and home requirements).

7.3 Blynk App

Our project allows for a convenient and a safe way for controlling the door lock system, instead of the user manually using the keys. This creates the need for an interface from which the user can remotely control and access the system from a distance. For this reason we chose a free application called Blynk, which is a platform that allows both IOS and Android devices to connect and control their system over the Internet. It's a digital dashboard where you can build a graphic user interface for your project by simply dragging and dropping widgets. Every Blynk project is assigned a unique 32-byte string called the "auth token", which allows the hardware to communicate with a specific project in the app. When a new program is uploaded to the blynk the authentication token must be included in the program, so that the application can uniquely identify and control the devices through the blynk closed server.

A. Case 1: Authorized Entry

In case of an authorized entry, i.e with the use of the blynk application, the user is able to unlock the door successfully. When the user approaches the door, using the blynk application the user connects to the locking system through the Authentication Token generated at the time of registering the device with the blynk app.

Blynk will first verify if the authentication token included in the application as well as in the program hosted by the Nodemcu is similar. If the authentication token matches, Blynk will initiate the commands programmed in the Nodemcu.In this case when the user toggles the virtual button (lock/unlock) on the blynk application, it sends the request to the Nodemcu to provide signals for action specified by the user

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The Nodemcu generates a signal to the solenoid lock which inturn unlocks the door. Considering an ideal condition, implying the door is in the locked state (solenoid lock and magnetic contact sensors are engaged) upon authorized entry the solenoid lock will be disengaged, the magnetic contact sensors will be disengaged and the magnets will be separated from each other. This will lead to the system concluding that the door is unlocked through an authorised way.

B. Case 2: Unauthorized Entry

In case of an unauthorized entry (without the use of the blynk application). There are two scenarios to consider, intruder trying to break the door and intruder is successful in breaking the door.

In the first scenario,

When an intruder i.e a person who doesn't have the access to the system, tries to unlock the door with some picking techniques such as drilling, cutting etc can be easily detected. This is because the vibration sensor installed on the door lock system is tuned in such a way that any unwanted long exposure vibrations are inspected through the programmed module. If the resulting vibrations pass a certain threshold, the vibration sensor gets activated which immediately transmits a signal to the nodemcu, programmed in such a way that the buzzer is triggered making a high frequency sound which can alert neighbours and nearby people followed by an immediate threat notification to the user's smartphone. This way we can ensure that any unauthorized entry to the door can be stopped, before the intruder breaks the door.

In the second scenario,

Considering an ideal condition, implying the door is in the locked state (solenoid lock and magnetic contact sensors are engaged) upon unauthorized entry the magnetic contact sensors will be disengaged and the magnets will be separated from each other. But at the same time the solenoid lock will still be engaged.

This will lead to a condition in which the system recognizes the solenoid lock as locked (as an entry can be only authorised only if the door is unlocked through the blynk application). At the same time the magnetic sensors are disengaged concluding that the door is burglarized. This situation will be detected as a threat and therefore the security has been compromised. As a result the buzzer is triggered making high frequency sounds, alerting the neighbours and nearby people, also the user gets an immediate notification on their smartphone alerting that a threat has been detected.

VIII. Technology And Programming Languages

The various Technologies and Programming languages that are going to be used in the above proposed system are:

- C Language.
- Arduino.
- Blender.
- Circuito.io.
- Blynk Application.
- Fritzing.

IX. Applications and Further Improvements

The above proposed system has multiple applications due to its intuitive, practicable and hassle free interactions with the enhancement of security.

- Ideally useful in situations where continuous monitoring of an access point is required.
- Ideal for homes and offices.

9.1 Further Improvements

- Real Time Camera Feed.
- Motion Detection.

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- Face Recognition.
- Multi User Access.
- Doorbell Notification.
- Guest Unlock.
- Upgraded Locking Mechanism.
- Upgraded Security Features.
- Nodemcu As A Server.
- Power Saving Mode.

X. CONCLUSION

This project represents the design and the implementation of an interactive Iot enabled home door security system with an app interface. The user can monitor and control the access to the home door remotely. The system can detect any unauthorised attempts and raise an alarm from both the administrator's device and also from the security system itself. This method provides an extra layer of protection and control compared to traditional locking security systems.

In conclusion, the Internet of things is going to be the future of connectivity. With this, multiple devices that we interact with on a daily basis can be easily connected to the internet, this allows the user to remotely control their devices without the need of physical presence. Iot also allows remote detection of issues with the help of inbuilt software and sensor based fault detection systems, rather than the user troubleshooting the issue. This has a high potential for improving businesses, fine tune services, products, better utilisation of assets.

As we're heading to a future with all devices interconnected to the cloud and with each other, we firmly believe that our project is secure, hassle free and convenient to the end user and thus the system proposed is feasible

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