CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION:

The internet of things, or IoT, is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers (UIDs) and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction. Internet of Things (IoT) is an ecosystem of connected physical objects that are accessible through the internet. The 'thing' in IoT could be a person with a heart monitor or an automobile with built-in-sensors, i.e. objects that have been assigned an IP address and have the ability to collect and transfer data over a network without manual assistance or intervention. The embedded technology in the objects helps them to interact with internal states or the external environment, which in turn affects the decisions taken.

1.2 IMPORTANCE OF IoT:

The "Internet of Things" (IoT) has the power to change our world. IoT will play an important role in the future and there is expected to be a significant amount of cash flowing through the market in the up-coming years. Over half of major new business processes and systems will incorporate IoT elements by 2020. The impact on consumers' lives and corporate business models is rapidly increasing as the cost of instrumenting physical things with sensors and connecting them to other things devices, systems and people continues to drop.

Rapid changes in IoT technology makes it a challenging task for the most experienced experts to anticipate the future of standardization in the field. For humanity, which is moderately muddled by nature, the Internet of Things is an extraordinary advancement. On the other hand, for individuals who esteem their security, the M2M helps in interconnecting different electronic gadgets. Basically, IOT means having each electronic gadget and numerous different things associated and associating progressively with the Internet by controlling via applications. It can be followed and observed in queries why do we need internet

of thing. The thinking goes you'll have the capacity to sort out your life better by not expecting to pay tedious regard for your life.

1.3 ADVANTAGES OF IoT:

1.3.1 ENHANCE DATA COLLECTION:

The more the information, the easier it is to make the right decision. Knowing what to get from the grocery while you are out, without having to check on your own, not only saves time but is convenient as well.

1.3.2 EFFICIENT RESOURCE UTILIZATION:

If the functionality and the way that how each device works are known, it definitely increases the efficient resource utilization as well as monitor natural resources.

1.3.3 MINIMIZE HUMAN EFFORT:

As the devices of IoT interact and communicate with each other and do lot of task for human, then they minimize the human effort.

1.3.4 SAVE TIME:

As it reduces the human effort then it definitely saves out time. Time is the primary factor which can save through IoT platform.

1.4 MOTIVATION:

Internet of Things can connect devices embedded in various systems to the internet. When devices/objects can represent themselves digitally, they can be controlled from anywhere. The connectivity then helps us capture more data from more places, ensuring more ways of increasing efficiency and improving safety and IoT security.

IoT is a transformational force that can help companies improve performance through IoT analytics and IoT Security to deliver better results. Businesses in the utilities, oil & gas, insurance, manufacturing, transportation, infrastructure and retail sectors can reap the benefits of IoT by making more

informed decisions, aided by the torrent of interactional and transactional data at their disposal.

1.5 PROBLEM DOMAIN AND SOLUTION:

In an normal wooden door, there is a no security aspect for our smart home.

But implementing this project in a door user can able monitor the door status by use of reed switch which sense the door moment and node mcu to pass the information to user about the door status.

LITERATURE SURVEY:

2.1 BLUETOOTH BASED HOME AUTOMATION USING ARM9 :

D.Naresh proposed the "Bluetooth Based Home Automation Using ARM9 in 2013. The paper proposed that home need electrical parameters are interfaced to the general purpose input / output ports of the microcontroller in an embedded system board and their status is passed to the ARM7 with Bluetooth device.

MERITS:

- Low cost.
- Line of sight.

DEMERITS:

- It controls only certain ranges of 10-30metres.

2.2 ZIGBEE BASED HOME AUTOMATION SYSTEM

Jitendra Rana proposed Zigbee Based Home Automation in 2010 embedded system with the ZigBee wireless network and indicated how to overcome by eliminating the complication of wiring in case of inter connected wired automation.

MERITS:

- Set up-simple and easy.
- Easy to monitor and control home appliances from remote.

DEMERITS:

- Requires knowledge of system for the owner to operate zigbee compliant device.
- Coverage is limited and cannot be used as outdoor wireless communication system.

CHAPTER 3

PROJECT DESIGN

3.1 INTRODUCTION:

The Internet of things (IoT) is the extension of Internet connectivity into physical devices and everyday objects. Embedded with electronics, Internet connectivity, and other forms of hardware (such as sensors), these devices can communicate and interact with others over the Internet, and they can be remotely monitored and controlled.

The definition of the Internet of things has evolved due to convergence of multiple technologies, real-time analytics, machine learning, commodity sensors, and embedded systems. Traditional fields of embedded systems, wireless sensor networks, control systems, automation (including home and building automation), and others all contribute to enabling the Internet of things. In the consumer market, IoT technology is most synonymous with products pertaining to the concept of the "smart home", covering devices and appliances (such as lighting fixtures, thermostats, home security systems and cameras, and other home appliances) that support one or more common ecosystems, and can be controlled via devices associated with that ecosystem, such as smartphones and smart speakers.

3.2 REQUIREMENTS:

For this project, the requirements will fall under two categories,

● Hardware requirements

● Software requirements

3.2.1 HARDWARE REQUIREMENTS:

The hardware components required for the implementation of door monitoring system at door.

3.2.1.1 NODE MCU:

Node MCU is an open source IoT platform. It includes firmware which runs on the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware which is based on the ESP-12 module. ... It uses many open source projects, such as lua-cjson and SPIFFS. GPIO pin designated as an input pin can be read as high (3.3v or 5v) or low (0V). A GPIO pin designated as an output pin can be set to high (3.3v or 5v) or low (0V).Fig 3.3.1 shows Node mcu (ESP8266).
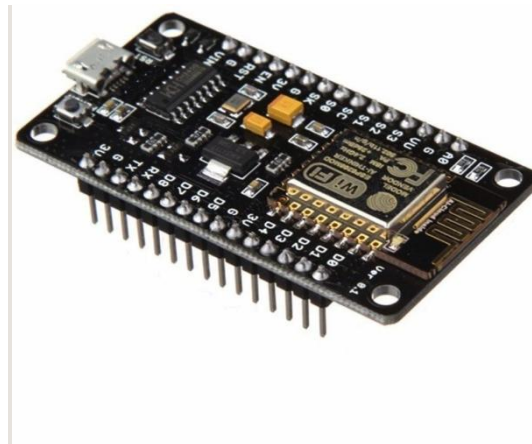
Figure: 3.2.1.1 NODE MCU (ESP 8266)

NODE MCU GPIO:

The GPIO(General Purpose Input/Output) allows us to access to pins of ESP8266 , all the pins of ESP8266 accessed using the command GPIO, all the access is based on the I/O index number on the NoddMCU dev kits, not the internal GPIO pin, for example, the pin 'D7' on the NodeMCU dev kit is mapped to the internal GPIO pin 13, if you want to turn 'High' or 'Low' that particular pin you need to called the pin number '7', not the internal GPIO of the pin. When you are programming with generic ESP8266 this confusion will arise which pin needs to be called during programming, if you are using NodeMCU devkit, it has come prepared for working with Lua interpreter which can easily program by looking the pin names associated on the Lua board. If you are using generic ESP8266 device or any other vendor boards please refer to the table below to know which IO index is associated to the internal GPIO of ESP8266.

Nodemcu dev kit	ESP8266 Pin	Nodemcu dev kit	ESP8266 Pin
D0	GPIO 16	D7	GPIO 13
D1	GPIO 5	D8	GPIO 15
D2	GPIO 4	D9	GPIO 3
D3	GPIO 0	D10	GPIO 1
D4	GPIO 2	D11	GPIO 9
D5	GPIO 14	D12	GPIO 10
D6	GPIO 12		

3.2.1.2 REED SWITCH:

A reed switch is an electromagnetic switch used to control the flow of electricity in a circuit. They are made from two or more ferrous reeds encased within a small glass tube-like envelope, which become magnetised and move together or separate when a magnetic field is moved towards the switch. There are two types are

- ✓ Normally opened
- ✓ Normally closed

Range : 0.15mm -0.25mm
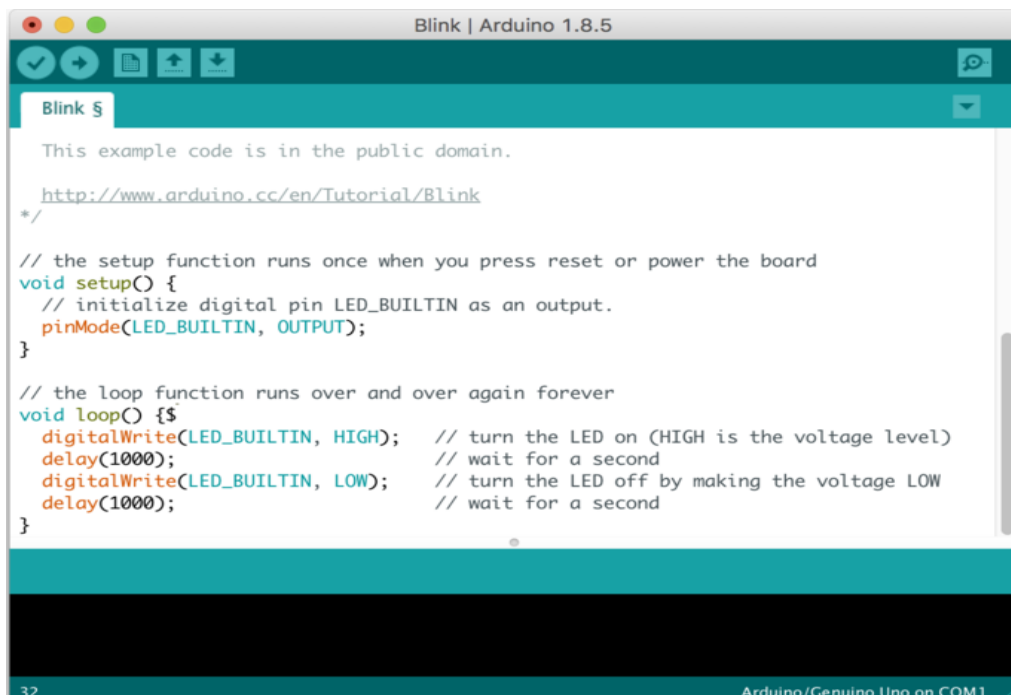

Figure: 3.2.1.2 REED SWITCH

3.2.2 SOFTWARE REQUIREMENTS:

3.2.2.1 ARDUINO IDE

The Arduino **integrated development environment (IDE)** is a cross-platform application (for Windows, macOS, Linux) that is written in the programming language Java. It is used to write and upload programs to Arduino compatible boards, but also, with the help of 3rd party cores, other vendor development boards.

The source code for the IDE is released under the GNU General Public License, version 2.The Arduino IDE supports the languages C and C++ using special rules of code structuring. The Arduino IDE supplies a software library from the Wiring project, which provides many common input and output procedures.


```
●  ●  ●                    Blink | Arduino 1.8.5

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   Blink §                                               ▼

     This example code is in the public domain.

     http://www.arduino.cc/en/Tutorial/Blink
   */

   // the setup function runs once when you press reset or power the board
   void setup() {
     // initialize digital pin LED_BUILTIN as an output.
     pinMode(LED_BUILTIN, OUTPUT);
   }

   // the loop function runs over and over again forever
   void loop() {$
     digitalWrite(LED_BUILTIN, HIGH);    // turn the LED on (HIGH is the voltage level)
     delay(1000);                        // wait for a second
     digitalWrite(LED_BUILTIN, LOW);     // turn the LED off by making the voltage LOW
     delay(1000);                        // wait for a second
   }



 32                                            Arduino/Genuino Uno on COM1
```

Figure: 3.2.2.1 ARDUINO IDE

3.2.2.2 BLYNK:

Blynk is a new platform that allows you to quickly build interfaces for controlling and monitoring your hardware projects from your iOS and Android device. After downloading the Blynk app, you can create a project dashboard and arrange buttons, sliders, graphs, and other widgets onto the screen. In this sense it makes the programming and the hardware much easier. User can create a account and use blynk application in mobile.
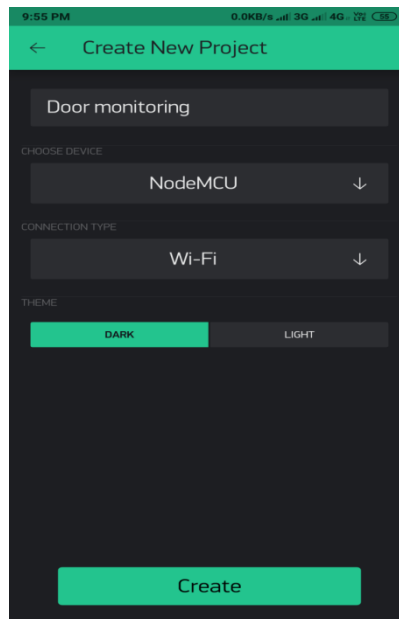
Figure: 3.4.1 shows the Blynk mobile application.

Figure: 3.2.2.2 BLYNK

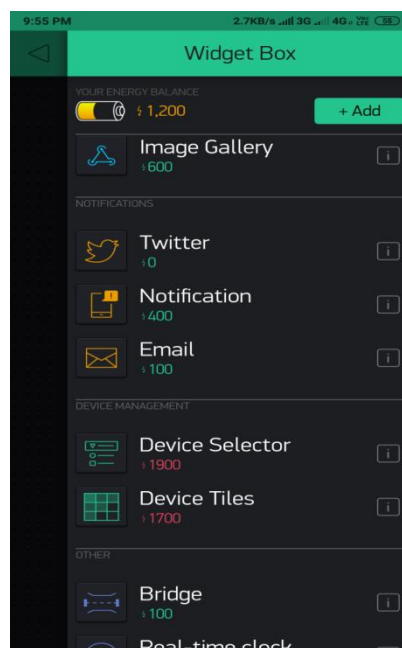### 3.2.3 REGISTER IN BLYNK :.

Steps involved in register in blynk:

- Open an application blynk.
- Select the create new project and choose device and connection type.

Figure: 3.2.2.1 SELECTING DEVICE

- Select the notification from widget box.

Figure: 3.2.3.2 WIDGET BOX

CHAPTER 4

IMPLEMENTATION AND EXPERIMENTAL RESULTS

4.1 DESCRIPTION OF MODULES:

In door monitoring system, three modules are implemented. They are,

- Monitoring the door status.

- Alert the owner.

4.2 IMPLEMENTATION:

4.2.1 MONITORING THE DOOR STATUS:

In smart home door status is monitored and alert to owner when it opened. It can be implemented with the help of hardware devices such as Node MCU and reed switch.

The reed switch is fit at both end of door in opposite direction. Reed switch is operated by magnetic signal get released. The reed switch is connected to NodeMCU (ESP8266) it is a micro controller which receive the signal from the reed switch and the micro controller is programmed with use of arduino ide. In that include the authentication code and wifi user name and password. When the unauthorized person open the door when the owner not in home the reed switch send the signal to NodeMCU. NodeMCU procees based on the code and send the value to blink application.
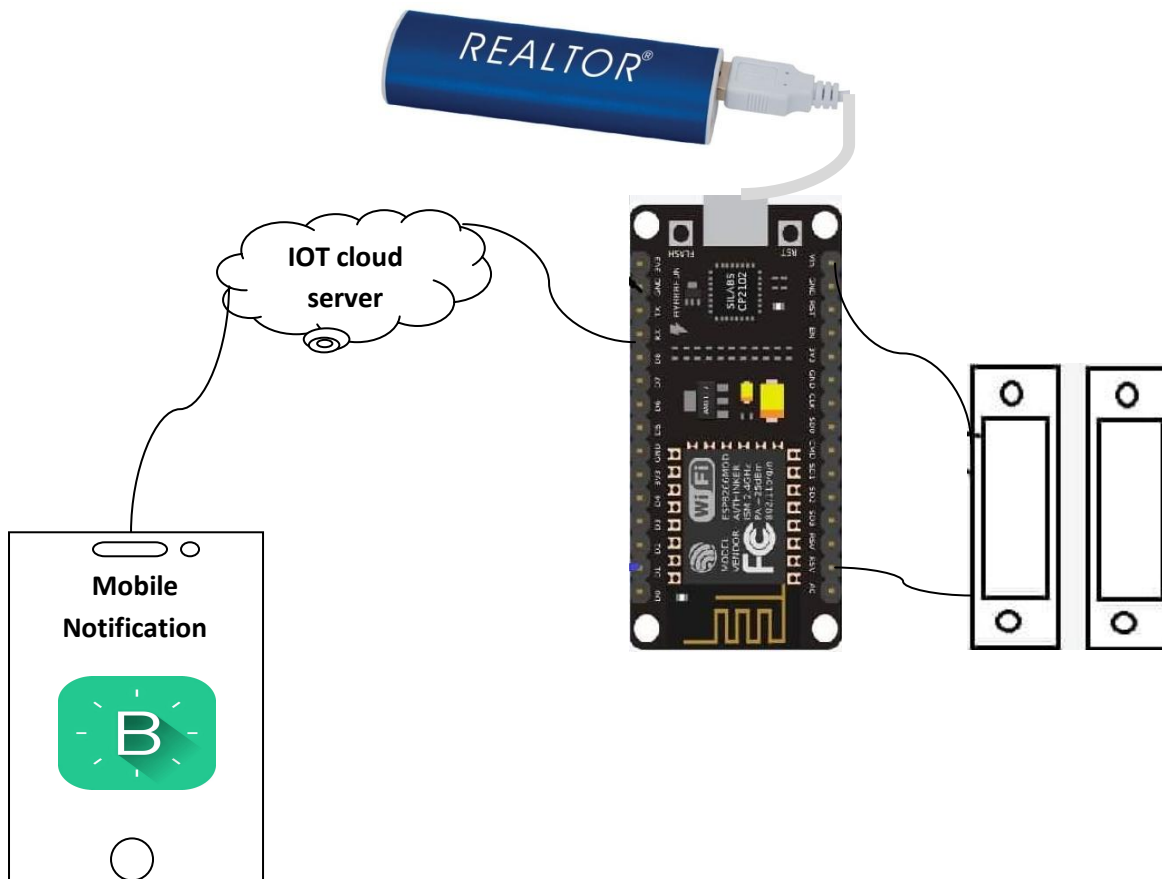
FIGURE 4.2.1.1: BLOCK DIAGRAM

4.2.2 ALERT THE OWNER:

The owner receive alert message in their mobile by,

The blynk application is used to send the notification to the user. The node mcu send the message to the blynk server. Blynk server process the data and send the message to the blynk application. By using the blynk application the user will get the message in their mobile as someone open the door. By this the user get knowledge about the door status in their smart home.

4.3 OUTPUT
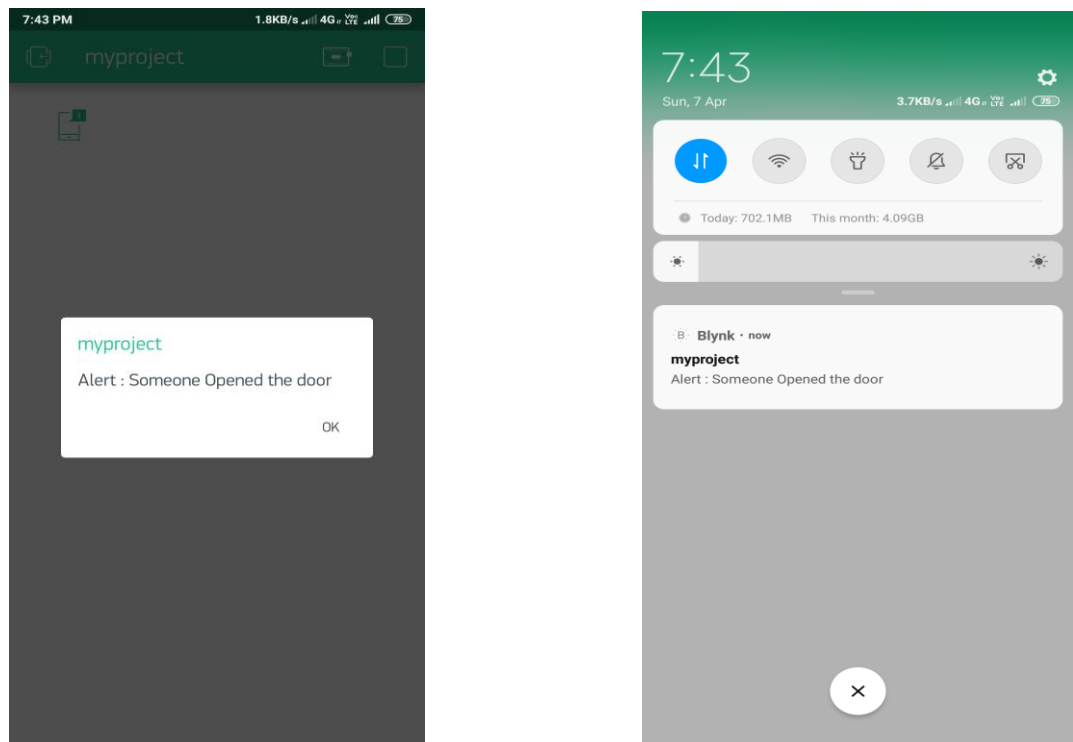
FIGURE 4.3.1 : When door is opened.

4.5 CODING

```
#define BLYNK_PRINT Serial
#include <ESP8266WiFi.h>
#include <BlynkSimpleEsp8266.h>
BlynkTimer timer;
char auth[] = "f016e1d31abf4b95a28b6466c10348f1";
char ssid[] = "CPH1613";
char pass[] = "alok123456";
int flag=0;

void notifyOnButtonPress()
{
int isButtonPressed = digitalRead(D1);
if (isButtonPressed==1 && flag==0)
 {
Serial.println("Someone Opened the door");
Blynk.notify("Alert : Someone Opened the door");
flag=1;
}
else if (isButtonPressed==0)
{
flag=0;
}
}

void setup()
{
Serial.begin(9600);
Blynk.begin(auth, ssid, pass);
pinMode(D1,INPUT_PULLUP);
timer.setInterval(16000L,notifyOnButtonPress);
}
void loop()
```

```
{
Blynk.run();
timer.run();
}
```

CHAPTER 5

CONCLUSION

5.1 CONCLUSION:

Thus the status of the door is monitored using the person entry and keep track everytime when the door is opened and the signal is sent as a mobile notification. Now owner of the house feel secure by knowing about their home is secured. It is successfully finished by using NodeMCU and reed switch.

5.2 FUTURE WORK:

IoT plays an vital role in automations which involves with the use of network sensors in physical devices to allow for remote monitoring and control. IoT will gain a massive traction in various spheres like healthcare, banking, retail, manufacturing, consumer goods etc. The number of IoT devices that are active is expected to grow to 10 billion by 2020. This project is expanded without fitting the sensor at door and also using some face recognization the face of third party trying to open the door is captured and send along with message.

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