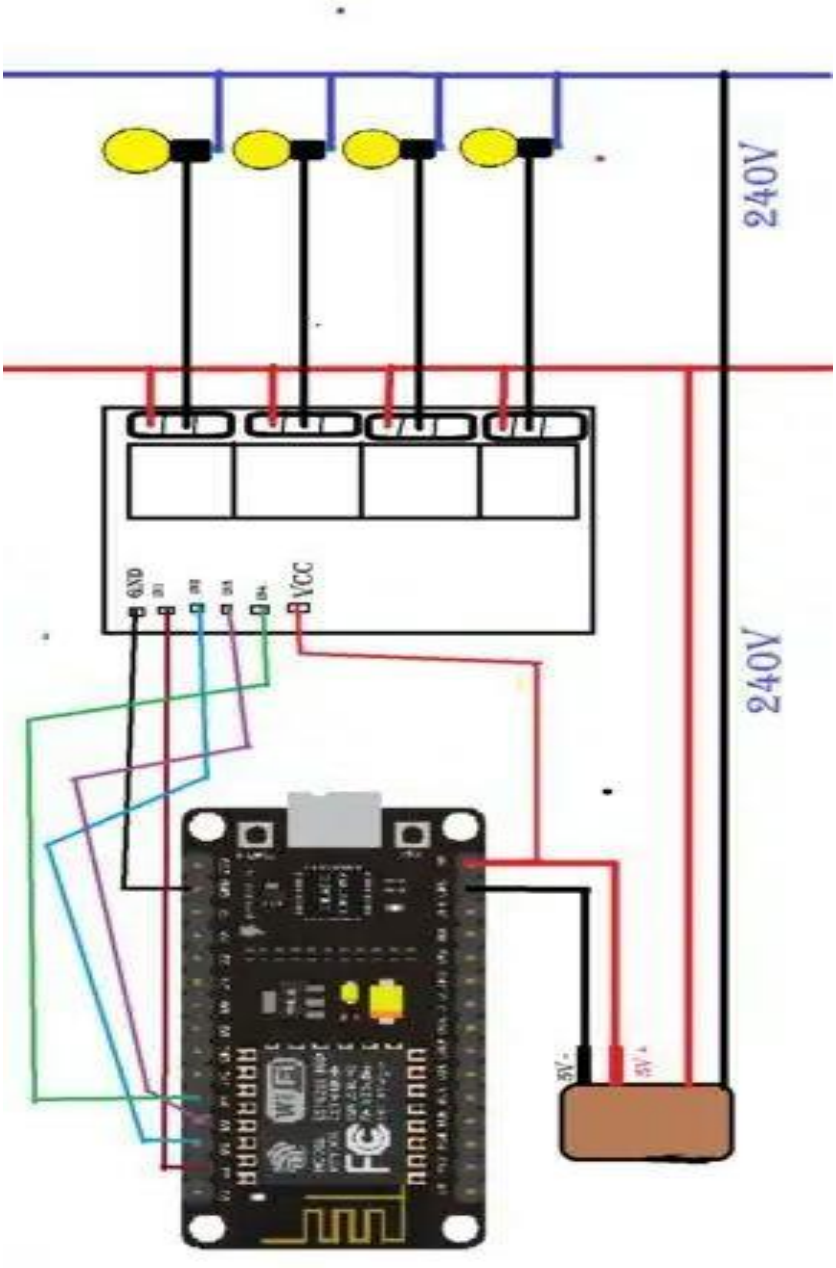
1.INTRODUCTION

1.INTRODUCTION

The Internet of Things (IoT) is a novel paradigm that is becoming popular with research and industries. The basic idea is that IoT will connect objects around us (electronic and electrical) to provide seamless communication and contextual services provided by them. The objective of this paper is to build an IoT enabled wall outlet using Arduino Mega and ESP Wi-Fi module and control it wirelessly using the smart phone app Blynk. The Internet of Things (IoT) is huge in several ways. The forces that are driving it and the benefits that are motivating it are increasingly numerous, as more and more organizations, industries, and technologists catch the IoT bug. The number of connected devices on the IoT network will be huge. One estimate says that the number will be nearly 40 billion, which is approximately 30 devices for each and every active social network user in the world. The economic impact and benefits of the IoT will be huge. Analysts define the IoT in terms of connected everyday objects; the nature of the connection remains to be determined. A two-way connection by means of the Internet Protocol constitutes the ideal case, but the originators of the IoT concept appear to have emphasized a simpler model of RFID query and response. The IoT will be inextricable from sensor networks that monitor things but do not control things. Both connected everyday objects and sensor Networks leverage a common set of technological advances toward miniature, power-efficient sensing, processing, and wireless communication.

2.CIRCUIT DIAGRAM


240V
240V
GND
Vcc

3.COMPONENTS

4.1HARDWARE COMPONENTS :

1 .ESP8266 node MCU

2. 4 channel relay module

3. LCD display

4. Arduino UNO

5. IR sensor

6. PiezoBuzzer

4.2 SOFTWARE COMPONENTS :

1.Blynk app

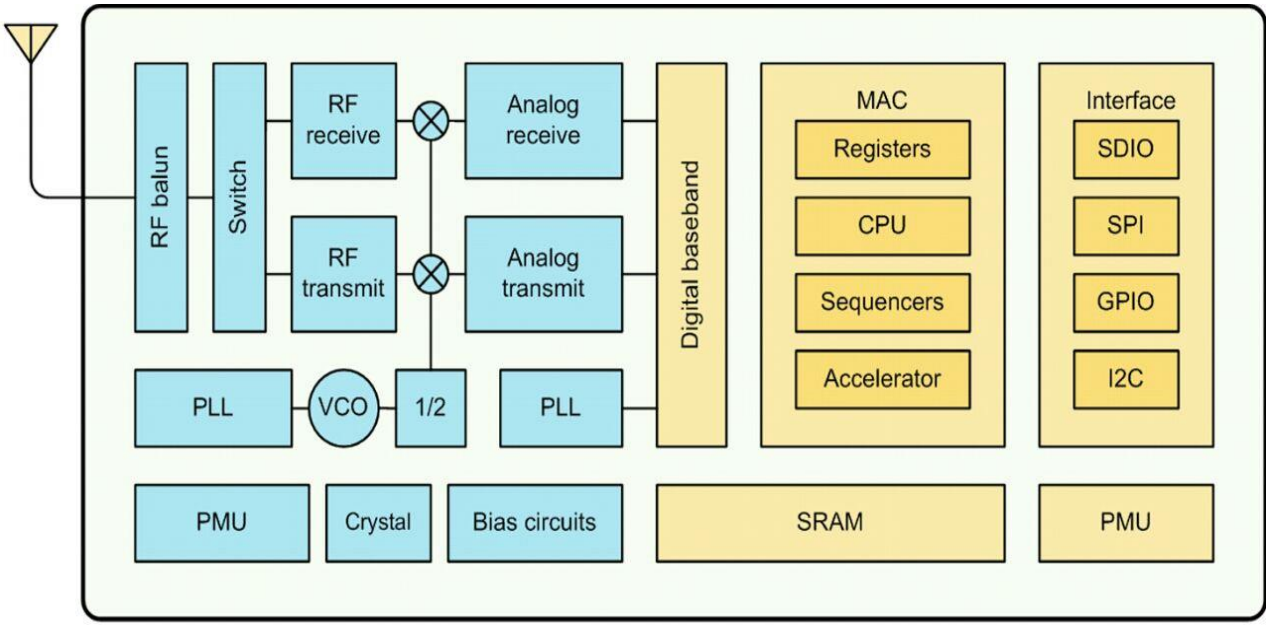
2.Blynk server

4.1HARDWARE COMPONENTS

1.Node MCU

IoT platform node MCU is open source . Language used in it is lua scripting language. It is based on the eLua project, and built on the ESP8266 SDK 0.9.5. It uses many open source projects, such as lua-cjson, and spiffs. It includes firmware which runs on the ESP8266 Wi-Fi SoC, and hardware which is based on the ESP-12 module. NodeMCU was created shortly after the ESP8266 came out. In December 30, 2013, Espressif systems began production of the ESP8266.The ESP8266 is a Wi-Fi SoC integrated with a Tensilica Xtensa LX106 core, widely used in IoT applications. NodeMCU started in 13 Oct 2014, when Hong committed the first file of NodeMCU - firmware to GitHub. Two months later, the project expanded to include an open-hardware platform when developer Huang R committed the gerber file of an ESP8266 board, named devkit 1.0. Later that month, Tuan PM ported MQTT client library from Contiki to theESP8266 SoC platform, and committed to Node MCU project, then Node MCU was able to support the MQTT IoT protocol, using Lua to access the MQTT IoT protocol, using Lua to access the MQTT broker. Another important update was made on 30 Jan 2015, when Devsaurus ported the u8glib to NodeMCU project, enabling NodeMCU to easily drive LCD, Screen, OLED, even VGA displays.

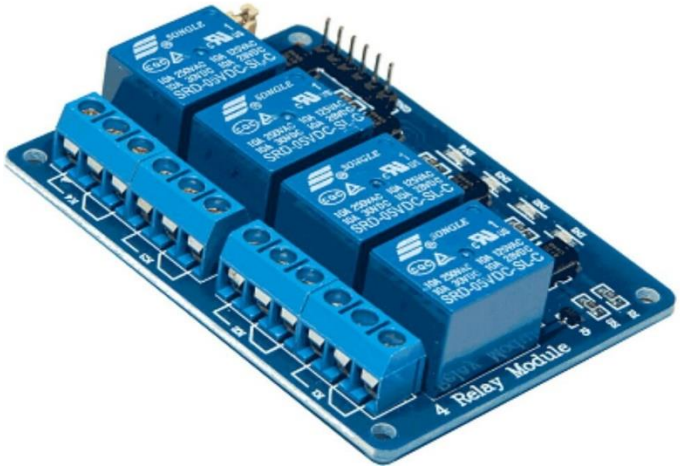
BLOCK DIAGRAM:



FEATURES:

- 802.11 b/g/n
- Integrated low power 32-bit MCU
- Integrated 10-bit ADC
- Integrated TCP/IP protocol stack
- Integrated TR switch, balun, LNA, power amplifier and matching network
- Integrated PLL, regulators, and power management units
- Supports antenna diversity
- WiFi 2.4 GHz, support WPA/WPA2
- Support STA/AP/STA+AP operation modes
- Support Smart Link Function for both Android and iOS devices
- SDIO 2.0, (H) SPI, UART, I2C, I2S, IR Remote Control, PWM, GPIO
- A-MPDU & A-MSDU aggregation & 0.4s guard interval
- Standby power consumption of < 1.0mW (DTIM3)
- +20 dBm output power in 802.11b mode
- Operating temperature range -40C ~ 125C

2. 4 CHANNEL RELAY MODULE



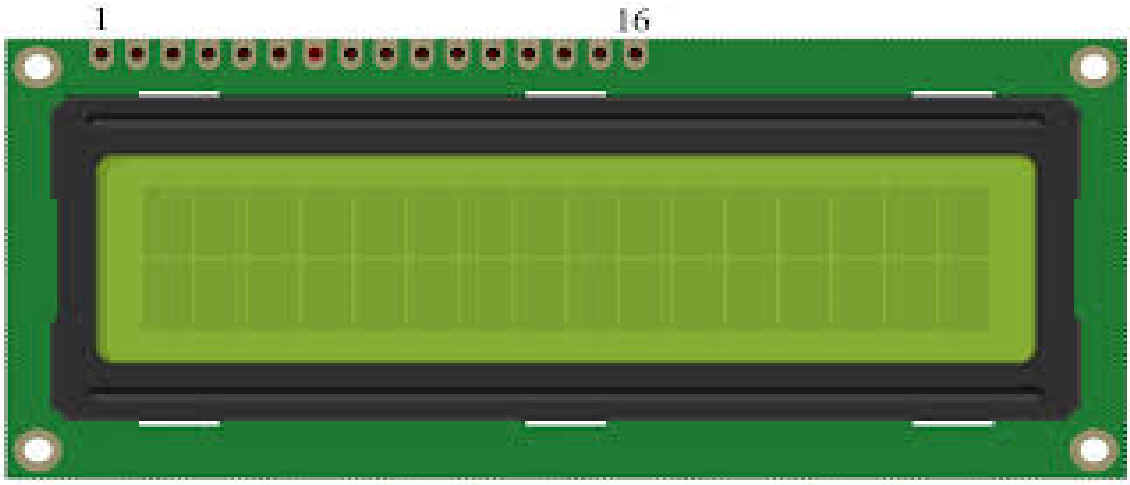
The Arduino Relay module allows a wide range of microcontroller such as Arduino, AVR ,PIC, ARM with digital outputs to control larger loads and devices like AC or DC Motors, electromagnets, solenoids, and incandescent light bulbs. This module is designed to be integrated with 4 relays that it is capable of control 4 relays.The relay shield use one QIANJI JQC-3F high-quality relay with rated load 7A/240VAC,10A/125VAC,10A/28VDC.The relay output state is individually indicated by a light-emitting diode.

Details: Each 5V Relay need 20mA driving current 5V TTL control input which can be directly controlled by Arduino, AVR, PIC, ARM and others Indication LED for each Relay's Status.

Specification: 10A @ 250VAC

10A @ 30VDC

3. LCD DISPLAY



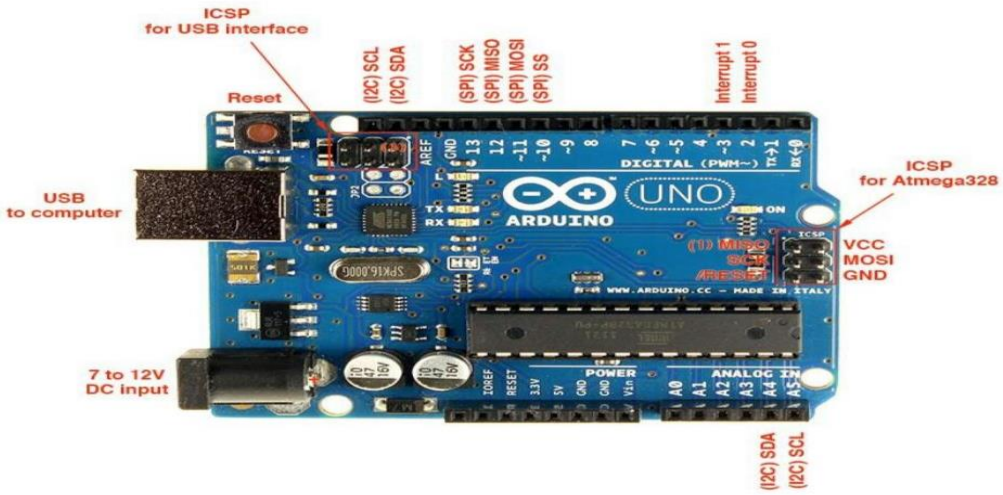
Liquid Crystal display which is commonly known as Alphanumeric Display it means that it can display Alphabets , Numbers as well as used for displaying various messages unlike seven segment display which can only display only numbers and some alphabets ,The only disadvantages of LCD over screen segment is that seven segment is robust display and be visualized from a longer distance as compared to LCD.

16x2 LCD SPECIFICATIONS

Model No. WH1602T

- ►Character LCD 16x2
- ►5x8 dots includes cursor
- ►Bulit-in controller (ST7066 or Equivalent)
- ►+5V power supply only
- ►Negative voltage optional for +3V power supply
- ►1/16 duty cycle
- ►White LED backlight not available
- ►Interface : 6800, option SPI/I2C (RW1063 IC)

4. ARDUINO UNO



Arduino uno is an open Source ,Computer hardware and software company project, and user community that designs and manufactures microcontroller kits for building digital device and object in the physical world.

Arduino is used for controlling whole the process GPS receiver and GSM module GPS receiver is used for detecting coordinates of the vehicle .

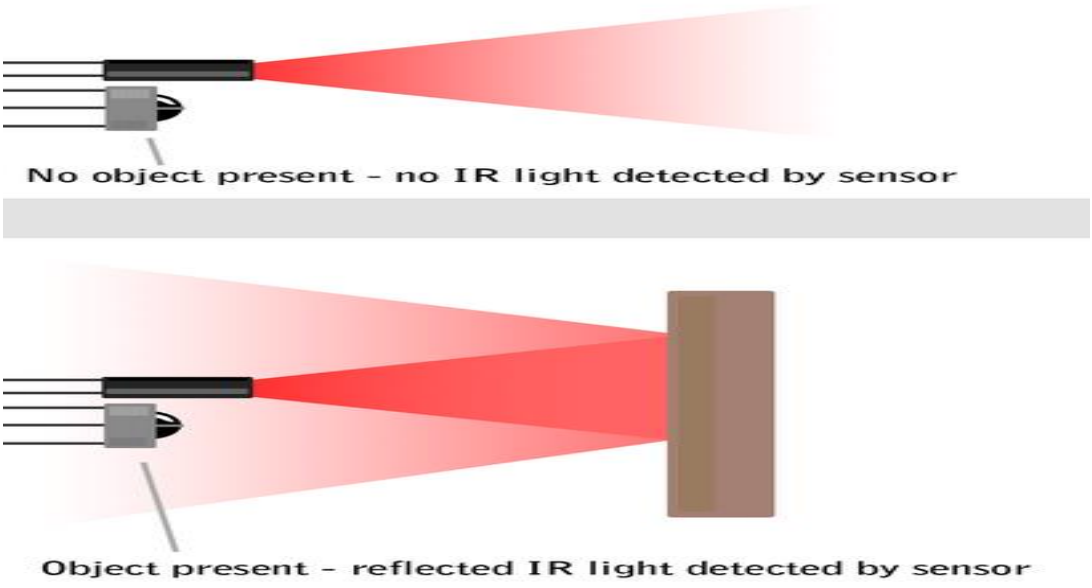
Arduino based designs used a variety of microprocessor and controller. The boards are equipped with sets of digital and analog input /output pinsthat may be interfaced to various expansion boards and other circuits .

SPECIFICATIONS

Microcontroller :	ATmega328
Operating Voltage :	5V
Input Voltage (recommended) :	7-12V
Input Voltage (limits) :	6-20V
Digital I/O Pins :	14 (of which 6 provide PWM output)
Analog Input Pins :	6
DC Current per I/O Pin :	40 mA
DC Current for 3.3V Pin :	50 mA
Flash Memory :	32 KB (ATmega328) of which 0.5 KB used by bootloader
SRAM :	2 KB (ATmega328)
EEPROM :	1 KB (ATmega328)
Clock Speed :	16 MHz

5. IR SENSOR

An infrared sensor is an electronic device, that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion.These types of sensors measures only infrared radiation, rather than emitting it that is called as a passive IR sensor. Usually in the infrared spectrum, all the objects radiate some form of thermal radiations. These types of radiations are invisible to our eyes, that can be detected by an infrared sensor.The emitter is simply an IR LED (Light Emitting Diode) and the detector is simply an IR photodiode which is sensitive to IR light of the same wavelength as that emitted by the IR LED. When IR light falls on the photodiode, The resistances and these output voltages, change in proportion to the magnitude of the IR light received.



6. PIEZO BUZZER

Piezo buzzer is an electronic device commonly used to produce sound. Light weight, simple construction and low price make it usable in various applications like car/truck reversing indicator, computers, call bells etc. Piezo buzzer is based on the inverse principle of piezo electricity discovered in 1880 by Jacques and Pierre Curie. It is the phenomena of generating electricity when mechanical pressure is applied to certain materials and the vice versa is also true. Such materials are called piezo electric materials. Piezo electric materials are either naturally available or manmade. Piezoceramic is class of manmade material, which poses piezo electric effect and is widely used to make disc, the heart of piezo buzzer. When subjected to an alternating electric field they stretch or compress, in accordance with the frequency of the signal thereby producing sound.

4.2SOFTWARE COMPONENTS

1. BLYNK APP

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. It's really simple to set everything up and you'll start tinkering in less than 5 mints. Blynk is not tied to some specific board or shield. Instead, it's supporting hardware of your choice. Whether your Arduino or Raspberry Pi is linked to the Internet over Wi-Fi, Ethernet or this new ESP8266 chip, Blynk will get you online and ready for the Internet of Your Thin

2. BLYNK SERVER

Blynk Server is an Open-Source Netty based Java server, responsible for forwarding messages between Blynk mobile application and various microcontroller boards (i.e. Arduino, Raspberry Pi. Etc).Blynk Cloud is software written on Java using plain TCP/IP sockets and running on our server. Blynk iOS and Android apps connect to Blynk Cloud by default. Access is free for every Blynk user. To run Blynk Server, all we need is Java Runtime Environment

4.CIRCUIT EXPLANATION

CIRCUIT EXPLANATION

The main objective of this project is to develop a home automation system using an Node MCU board with Internet being remotely controlled by any Android OS smart phone. As technology is advancing so houses are also getting smarter. Modern houses are gradually shifting from conventional switches to centralized control system, involving remote controlled switches. Presently, conventional wall switches located in different parts of the house makes it difficult for the user to go near them to operate. Even more it becomes more difficult for the elderly or physically handicapped people to do so. Remote controlled home automation system provides a most modern solution with smart phones.

In order to achieve this, a relay module is interfaced to the Node MCU board at the receiver end while on the transmitter end, a GUI application on the cell phone sends ON/OFF commands to the receiver where loads are connected. By touching the specified location on the GUI, the loads can be turned ON/OFF remotely through this technology. The loads are operated by IOT board through Relay Module.

For Security purpose:

An infrared sensor is an electronic device, that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion.These types of sensors measures only infrared radiation, rather than emitting it that is called as a passive IR sensor. Usually in the infrared spectrum, all the objects radiate some form of thermal radiations. These types of radiations are invisible to our eyes, that can be detected by an infrared sensor.The emitter is simply an IR LED (Light Emitting Diode) and the detector is simply an IR photodiode which is sensitive to IR light of the same wavelength as that emitted by the IR LED. When IR light falls on the photodiode, The resistances and these output voltages, change in proportion to the magnitude of the IR light received

5.RESULT

It has been observed that smooth output has been seen.As per the given commands from Blynk app,the lights will be turned on/off . Below shown figure seems that how application works on screen and gives us proposed results.

6.ADVANTAGES

- **Home security:** With IoT home automation you are less worried about home security. You can control the security of your home with your phone. If anything goes wrong, you may receive notifications on your phone and you may probably operate you lights or locks through your phone.

- **Energy efficiency and savings:** You can increase the energy efficiency by controlling your electrical fixtures through IoT. If you are unsure whether your child has left lights on before leaving, you can check and control it through your phone.

- **Convenience:** This can be considered as one of the main advantages of home automation using IoT. You have the control of all your devices connected through IoT. It makes it very convenient for you to have all the devices adjusted just through your phone. For example, if you forgot to adjust your thermostat in the morning before you left your house, you can adjust it from your office.

ADVANTAGES OF IOT FOR BUSINESS

IoT is not only for home automation but you can use it for your advantage at work. Following are the benefits of IoT for businesses:

- Convenience in managing connected business
- Easy management of larger data
- Manage user identity easily
- Enhances security and monitoring

With so many benefits, IoT is something that everyone is looking forward to. If you are looking for IoT services for home automation, there are many IoT solution providers that can help you automate your home based on Internet of Things.

7.DISADVANTAGES

System crashes due to any damage in the interconnection: If there is any damage due to rupturing of cables or the fibers the entire system gets crashed. This will not be the case of radio signals or the other signals. Here there will be a problem of signal receiving. The wiring of the system results in crash in most of the systems.

Human errors: If the human does not handle the kit safely or if he/she does not use the correct keys to perform the operations, human errors may occur. Human errors also lead to destructions of the machine. Then there will be a huge system crash.

8.APPLICATIONS

IoT based home automation can revive the way people use technology. There is a considerable range of possibilities when we speak about applications of home automation.

- Controlled electrical fixtures such as lights and air conditioners
- Simplified garden or lawn management
- HVAC
- Controlled smart home appliances
- Enhanced safety and security at home
- Water and air quality control and monitoring
- Voice based home assistant supporting natural language
- Smart locks and switches

9.COST OF PROJECT

COST OF PROJECT

1. nodeMCU =450 RS

2. Breadboard=100 RS

3. Display =150 RS

4. Conneting wires=100 RS

5.Arduino=560 RS

TOTAL PROJECT COST=Hardware cost + software cost +Human cost

= 3000 RS

10.FUTURE SCOPE

FUTURE SCOPE

Using this paper as a framework, it will give immediate access to information about the physical world and the objects, leading to innovative services and solutions and leading to an increase in efficiency and productivity. In the near future the Internet and wireless technologies will connect different sources of information such as sensors, mobile phones and cars in an ever tighter manner. The number of devices which connect to the Internet is – seemingly exponentially – increasing. These billions of components produce consume and process information in different environments such as logistic applications, factories and airports as well as in the work and everyday lives of people.

11.CONCLUSION

The paper has been experimentally proven to work successfully. We can control the parameters of the AC components using the Blynk app or manually using the touch screen. The designed system not only monitors the sensor data, like temperature, light, mood lighting but also actuates a process according to the requirement. It also stores the sensor parameters in the cloud in a timely manner. This will help the user to analyze the condition of various parameters in home anytime anywhere.

12.REFERENCES

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3.www.arduino.cc

4.www.wikipedia.org/wiki/Internet_of_Things

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