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IOT Based Home Automation Using Esp32 and Blynk Application

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Abstract: The Internet of Things (IoT) refers to a system of interrelated, internet-connected objects that are able to collect and transfer data over a wireless network .It used to be controlled by websites and smart phone applications remotely, also, to control tools and instruments by codes and algorithms structures for artificial intelligence issues. In case we want to create advanced systems using different algorithms, Wi-Fi connection is connected to our tools, equipment, and devices controlling them by smart phone applications or internet websites. A smart home to operate lamps or other home-use devices, it can be used as a security system or an industrial-use system, for example, to open or close the main building gate, to operate full automatic industrial machine, or even to control internet and communication ports using IoT technology. A huge industrial facilities or governmental institutions have much of lamps. Employees sometimes forget to turn them off in the end of the day. This research suggests a solution that can save energy by letting the security to control lighting of the building with his smart home by Blynk application. The lamps can be controlled by switches distributed in the building and Blynk application at the same time with a certain electrical installation. This research presents a simple prototype of smart home, or the easy way and low cost to control loads by Wi-Fi connection generally.

Keywords: Blynk,, IOT, Wi-Fi

INTRODUCTION

Home automation is become more beneficial because of its safety and security. Nowadays, home automation become more advance and precise to monitor all the home appliances. Home automation system become energy efficient and highly approachable smart home technique. It involves basic feature to maintain the user satisfaction and comfort. Home automation is a unique system that can control and communication between nearly all aspects of your house. Home automation is a term used to describe the working together of all household amenities and appliances. for example, a centrally microcontroller panel can have the capability to control everything from heating and overall electrical appliances. Home automation can include controlling aspects of our home remotely through a computer or any mobile equipment, programming electronics devices to conditions or scenario or centralizing the control of a variety of appliances in our in to a single control center. It is essential that the different controllable appliances be interconnected and communication with each other. The main purpose of home automation is to control or monitor signals from different appliances or basic services. A smart phone can be used to control or monitor the home automation system

Proposed system : This is IoT project, It's to make a simple ESP32 IoT smart home automation using Blynk & to control 2 relays with and without the internet. We can take access of our appliances through blynk app. Useful in many ways like security, ease of leaving, fully accesses, save energy.
Proposed system functions : In this project required following component for this ESP32 home automation system and smart relay module.

ESP32
2-channel 5v SPDT relay module
Sensor
Jumper wires

IMPLEMENTATION

Working process in project :
This is IoT project, It's make a ESP32 IoT smart home automation using Blynk & IR remote to control 8 relays with and without internet. With this ESP32 project, It can control 8 home appliances from the smartphone, IR remote, and manual switches. If there is no internet available still it can control the relay module from the IR remote and manual switches.

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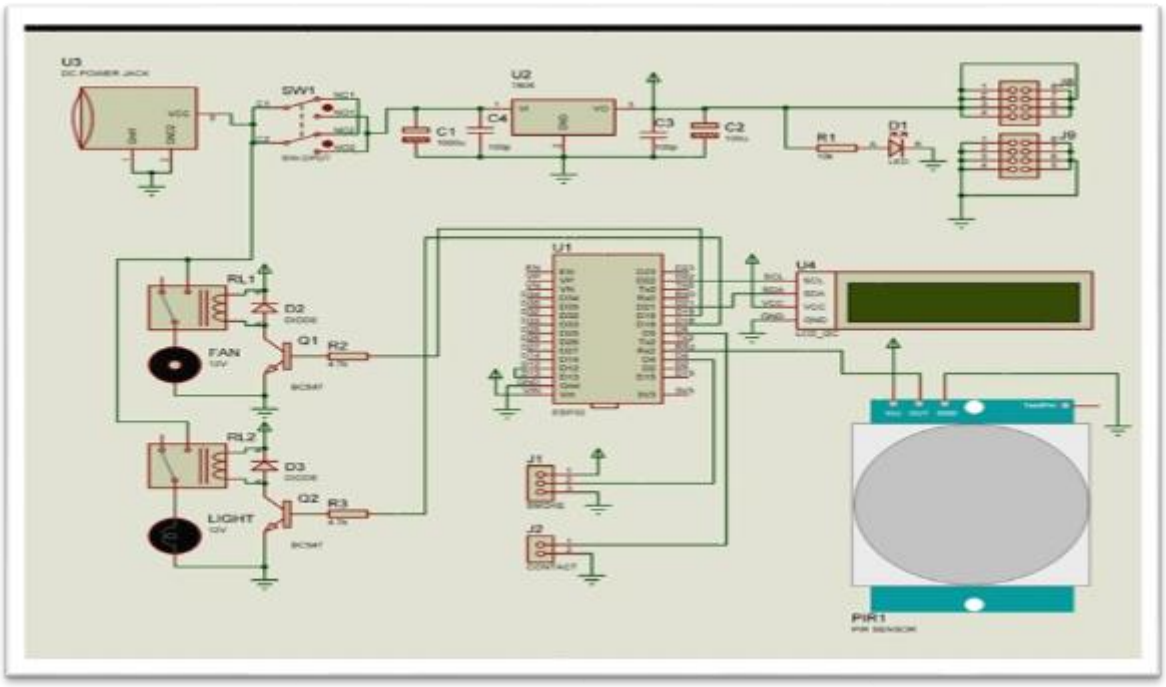
With this Iot-based smart home system, If the ESP32 connected with Each other Wi-Fi then it can also monitor the realtime feedback of the relays in the Blynk app. If the Wi-Fi is available the ESP32 with automatically connect with the WiFi.



The circuit is very effortless, It's applied D23, D22, D21, D21, D19, D18, D5, D25 & D26 GPIO to control the 8-channel relays module. And the GPIO D13, D14, D27, D33, D32, D15, D4 connected with switches to control the relay module manually. The output pin of the IR receiver is connected with D35. It is used the INPUT PULLP function in Arduino IDE instead of using the pull up resistors with each switch. As per the source code, when the control pins of the relays module receive LOW signal the relay will turn on and the relay with turn off for the HIGH signal in the control pin. It's used a 5v amp mobile charge to supply the circuit. If want to use push buttons instead of switches, then we have to connected the push buttons across the GPIO pins and GND pin as shown in the above circuit.
ESP32 home automation using Blynk app. the set up the Blynk app ESP32 Iot projects in create a new project Blynk app. Enter the project name and choose the device as "ESP32 DEV Board". The connection type will be Wi-Fi then tap on create. The adding Button widgets in Blynk app Now to control the 8-channel relay module we have to add 9 button widgets in the Blynk app.

Steps to add buttons in the Blynk App :

Open the project in the Blynk app.

The tap on that button and output pin – V1 & mode - switch. It can also give any name to that button. We have used an active low relay module, so to turn ON the relay it has to send 0 and 1 to turn OFF the relay.
In a same way create buttons with V2, V3, V3, V4, V5, V6, V7, V8 pins to control the relays.
For the last button select in the pin v9 & mode-PUSH. It will this button to turn off all the relays.

Program ESP32 with Arduino IDE :

```
#include "DHT.h"
#define DHTPIN 15
#define DHTTYPE DHT11
DHT dht(DHTPIN, DHTTYPE);
#include <Blynk,h>
#define BLYNK_PRINT Serial
```

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```
#include <WiFi.h>
#include <WiFiClient.h>
#include <BlynkSimpleEsp32.h>
//#include <ESP8266WiFi.h>
//#include <BlynkSimpleEsp8266.h>
#include <LiquidCrystal_I2C.h>
LiquidCrystal_I2C lcd(0x27. 16, 2);  // pos, line
char auth[] ="KRUZEX5acrNEI7NxqHN0pYuowDBYZo0";// iot project
char ssid[] = "project";
char pass[] = "1234567890";

#define PIR_SENSOR       2
#define SMOKE_SENSOR     4
#define Relay_FAN        18
#define Relay_LIGHT      19
#define CONTACT_SENSOR   5
#define SYS_ACTIVE       13
//--------------------------------------------------------------------------------
void setup()
{
lcd.init();
lcd.backlight(); // turn on LCD backlight
lcd.setCursor(0, 0);
lcd.print("Starting....      ");
lcd.setCursor(0, 1);
lcd.print("HOME AUTOMATION   ");
Serial.begin(115200);
dht.begin();
Blynk.begin(auth, ssid, pass);
//--------------------------------------------------------------------------------
pinMode(SYS_ACTIVE,     INPUT);
pinMode(PIR_SENSOR,     INPUT);
pinMode(SMOKE_SENSOR,   INPUT);
pinMode(CONTACT_SENSOR, INPUT_PULLUP);
pinMode(Relay_FAN,  OUTPUT);
pinMode(Relay_LIGHT,  OUTPUT);

digitalWrite(Relay_FAN, HIGH);
digitalWrite(Relay_LIGHT, HIGH);
delay(3000);
lcd.clear();
}
//================================================================================
void loop()
{
if(digitalRead(SYS_ACTIVE) == LOW){
Blynk.virtualWrite(V0, "System Activate");
DHT11_sensor();
Smoke_data();
pir_data();
contact_data();
}
else{
Blynk.virtualWrite(V0, "System Deactivate");
delay(100);
}
Blynk.run();
}
```

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```
//-------------------------------------------------------------------------------
void DHT11_sensor(){
float h = dht.readHumidity();
float t = dht.readTemperature();
lcd.setCursor(0, 0);
lcd.print("T:"+String(t)+String("C"));
lcd.setCursor(10, 0);
lcd.print("H:"+String(h));
Blynk.virtualWrite(V1, t+String("C::"), h+String("H"));
//Blynk.virtualWrite(V0, t);
Serial.print(F("Humidity: "));
Serial.print(h);
Serial.print(F("%  Temperature: "));
Serial.print(t);
Serial.print(F("°C "));
}
//-------------------------------------------
void Smoke_data()
{
if(digitalRead(SMOKE_SENSOR) == LOW){
lcd.setCursor(0, 1);
lcd.print("S:D");
Blynk.virtualWrite(V2,"SMOKE DETECTED ");
Blynk.notify("SMOKE DETECTED");
delay(100);
}
else{
lcd.setCursor(0, 1);
lcd.print("S: ");
Blynk.virtualWrite(V2,"     ");
delay(100);
}
}
//-------------------------------------------
void pir_data(){
if(digitalRead(PIR_SENSOR) == HIGH){
lcd.setCursor(4, 1);
lcd.print("T:D");
Blynk.virtualWrite(V3,"THEFT DETECTED ");
Blynk.notify("THEFT DETECTED");
delay(100);
}
else{
lcd.setCursor(4, 1);
lcd.print("T: ");
Blynk.virtualWrite(V3,"     ");
delay(100);
}
}
//-------------------------------------------
void contact_data(){
if(digitalRead(CONTACT_SENSOR) == HIGH){
lcd.setCursor(7, 1);
lcd.print("C:BRACK");
Blynk.virtualWrite(V4,"CONTACT BRACK ");
Blynk.notify("CONTACT BRACK");
delay(100);
}
```

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```
else{
lcd.setCursor(8, 1);
lcd.print("C: ");
Blynk.virtualWrite(V4,"    ");
delay(100);
}
}
//-------------------------------------------
```

CONCLUSION

In a this paper, an internet based smart home system that can be controlled upon user authentication. is proposed and implemented. The home automation using iot has experimentally proven to work by connecting effortless appliances to it. The designed system instigates a process according to the user's. requirements. The android based smart home app communicates with ESP32 with Blynk app, IR remote and manual control relays.

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