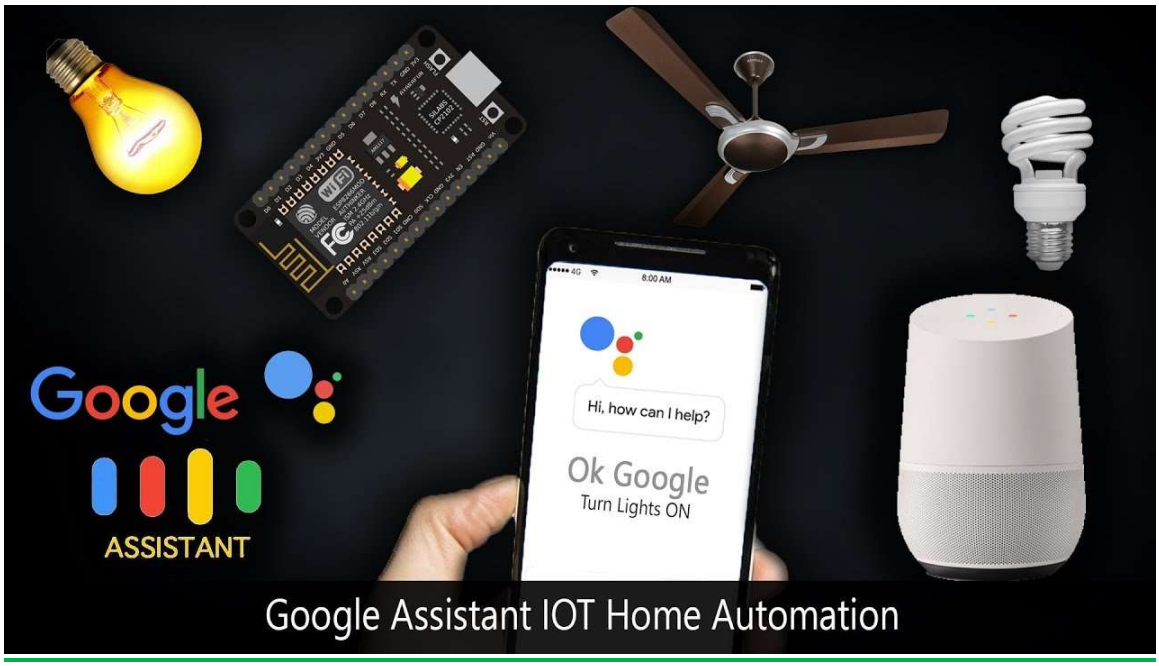

Google Assistant IoT Home Automation

VERZEO

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Abstract

World's demand for electricity had grown 85% between 2010 and 2017 this increase is more than today's total use of electricity in India, USA, Japan, Australia combined. We can't decrease the electricity growth rate but we can lessen the amount of electricity wasted each year by turning off our home appliances when not in use. This project presents a design and prototype of Home Automation system that will use ESP8266 Wi-Fi module as a network provider in connecting with other appliances. The proposed system has two main components. The first main part is Arduino, which controls and manages input of Wi-Fi module. The other main component is Wi-Fi module through Wi-Fi module a web server can be added to the module which will help in controlling of devices over Internet. One server can manage many hardware interface modules as long as it exists on Wi-Fi network coverage. It supports a wide range of home automation devices like power management components, and security components. We want to make this automation system centralized and artificially intelligent. Further we will connect the specific home to our database and it can be accessed from anywhere through a specific IP address or website. Also, an app would be developed which will allow the user to control their devices using the Google Assistant.

Contents:

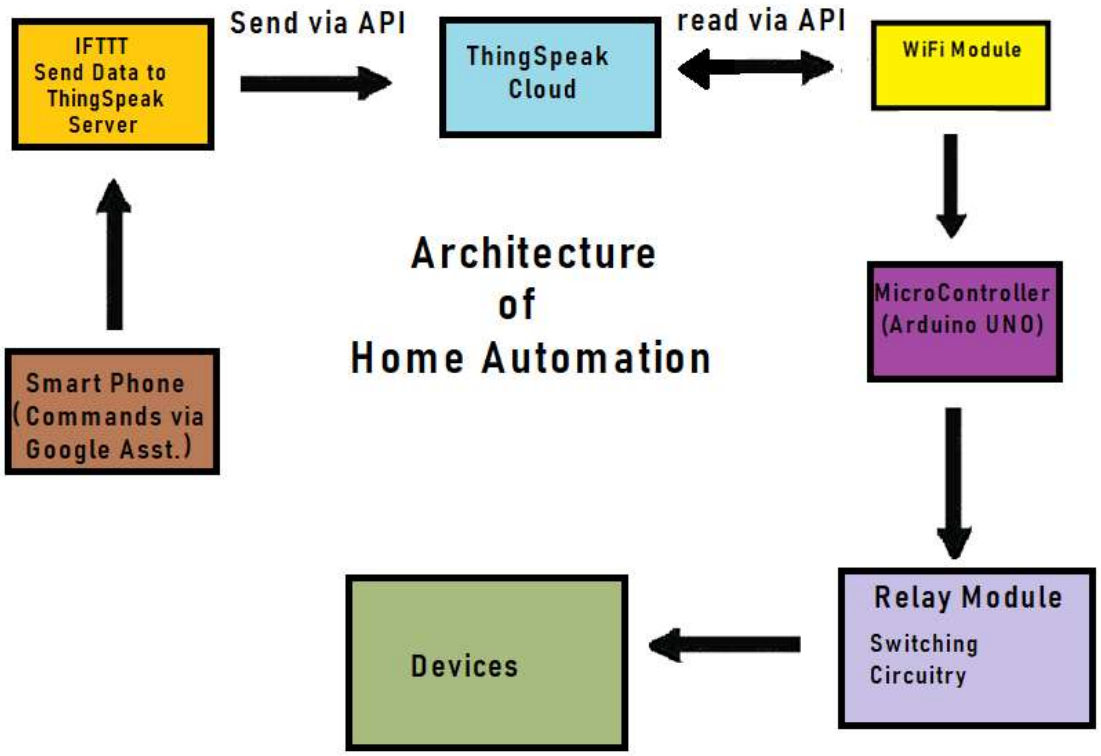
Introduction:

Home automation is also named as domestics or Smart home .It involves the control and automation of lighting, heating, ventilation, air conditioning and security, as well as home appliances. Wi-Fi is often used for remote monitoring and control. Home devices, when remotely monitored and controlled via Internet is a part of Internet of things. Modern systems generally consists of switches and sensors connected to a central hub called a gateway from which the system is controlled with a user interface that is interacted either with a mobile phone software ,tablet, computers or a web interface ,often but not always via internet cloud services. World's demand for electricity had grown 85% between 2010 and 2017.

This increase is more than today's total use of electricity in India, USA, Japan , Australia combined. We can't decrease the electricity gross electricity wasted each year by turning off our home appliances when not in use. World's demand for electricity had grown 85% between 2010 and 2017 this increase is more than today's total use of electricity in India, USA, Japan, Australia combined. We can't decrease the electricity growth rate but we can lessen the amount of electricity wasted each year by turning off our home appliances when not in use. Unlike most of available home automation system in the market the proposed system is scalable that one server can manage many hardware interface modules as long as it exists on Wi-Fi network coverage. System supports a wide range of home automation devices like power management components, and security components.

SYSTEM ARCHITETURE:

The flowchart explains the home automation system. The controlling device will be connected with same google account as of ThingSpeak account. The module will be connected with the micro controller . The micro controller fetches data from ThingSpeak cloud via read API. The controller will give the required command to the relay board and the relay board acts as switch between the circuit. The appliances will be connected with the relay board. Now, the appliances can be controlled using internet of things.



Literature Review:

When people think about home automation, most of them may imagine living in a smart home: One remote controller for every household appliance, cooking the rice automatically, starting air conditioner automatically, heating water for bath automatically and shading the window automatically during night. To some extent home automation equals to smart home. They both bring out smart living condition and make our life more convenient and fast. Early home automation began with labour-saving machines. Self-contained electric or gas powered home appliance became viable in the 1900s with the introduction of electric power distribution led to the introduction of washing machine ,water heater, refrigerator, sewing machines, dishwashers and clothes dryers. As per our survey currently there exists system neither at cheaper rates nor easy to handle. Various systems are hard to install, difficult to use and maintain. Current systems are generally proprietary, closed and not very user friendly Based on Arduino or GSM or low cost home security system and home automation system.

• Requirements:

Hardware Components:

- Arduino UNO R3 with Cable.
- ESP8266 Wi-Fi Module.
- Bulb and Holder.
- 2 Channel 12v relay module.
- Power Supply.
- Connecting Cables.
- Resistors(10kΩ) .

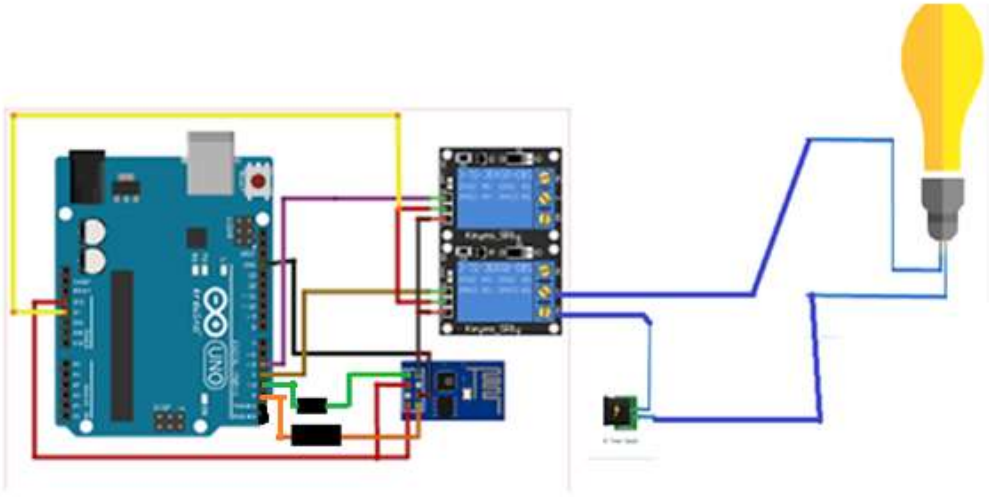
Software requirements:

- Arduino IDE.

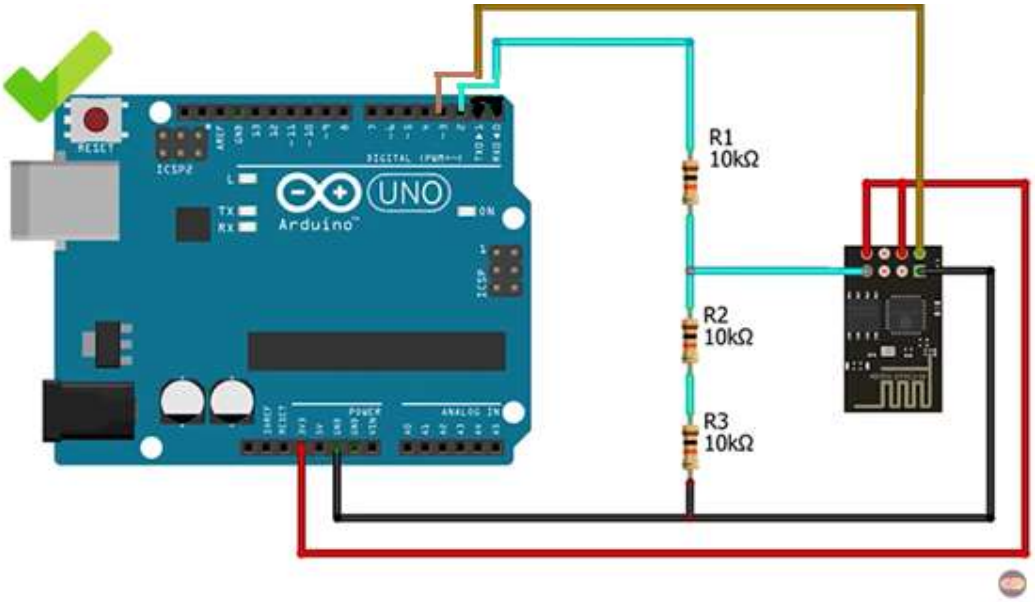
Control Auxiliaries:

- Google Assistant.
- ThingSpeak cloud.
- Smart Phone or Mic Connected to Google Assistant.

Circuit Diagram:



Don't directly connect the Tx, Rx of arduino with Rx, Tx of ESP8266, because the ESP8266 Wi-Fi module works at 3.3v whereas Arduino works at 5v which may cause damage to the circuit.



Procedure and Setup:

Make all the connections of the circuit as shown above.
Now create a ThingSpeak Cloud account and create a channel for the controlling the home appliances. Add as many fields as required for appliances and generate API key.

API(Application Programming Interface) is used to communicate with the ThingSpeak cloud for uploading and receiving the data. This is a unique used for controlling and don't reveal this key to others.

Create an account in IFTTT.com with same email ID that google Assistant is depend upon. Make all webhooks by adding phrases to it for controlling the appliances.

Such as,
For turning the <Device> on,
"Turn ON the <Device>"
For turning off the <Device>,
"Turn OFF the <Device>"

Similarly, create as many as you can for automation.(Note for using more than 8 fields, you need to upgrade the ThingSpeak cloud to premium).

Dump the Following code into the micro controller.

Code:

```
#include <SoftwareSerial.h>
#include <stdlib.h>
int ledPin = 13;
String apiKey = "U78K3PYRY3EZUFZR";
String ssid="Sss";
String pswd="12345678";
String wifi;

SoftwareSerial espSerial(3, 2); // RX, TX using software serial for esp8266
void setup() {
  // initialize the digital pin as an output.
  pinMode(ledPin, OUTPUT);

  // enable debug serial
  Serial.begin(115200);
  // enable software serial
  espSerial.begin(57600);

  wifi="AT+CWJAP_DEF=";
  wifi+="";
  wifi+=ssid;
  wifi+="";
  wifi+=',';
  wifi+="";
  wifi+=pswd;
  wifi+="";
  wifi+="\r\n";
  espSerial.println(wifi);
  delay(2000);
  // reset ESP8266
  espSerial.println("AT+RST\r\n");
  delay(5000);
}

void loop() {
    int i=0;
    char c[100]; // returned data storage

   // TCP connection to thingspeak.com api server;
  String cmd = "AT+CIPSTART=\"TCP\",\"";
```

```
cmd += "api.thingspeak.com";
cmd += "\",80";
espSerial.println(cmd);
if(espSerial.find("ERROR")){
  Serial.println("AT+CIPSTART error");
  espSerial.println("AT+CIPCLOSE\r\n");
  espSerial.println(cmd);
  return;
}
else if(espSerial.find("OK"))
{
  Serial.println("connected to Thing speak API");
}
else if(espSerial.find("ALREA"))
{
  Serial.println("Already connected");
}

// prepare GET string
String getStr = "GET /channels/1120116/fields/1.json?results=1";
getStr += "\r\n";


// send data length
cmd = "AT+CIPSEND=";
cmd += String(getStr.length());
espSerial.println(cmd);

if(espSerial.find(">")){
  espSerial.print(getStr);
  delay(1000);
  if(espSerial.find("+IPD"))
  {
    Serial.println("+IPD found");
    while(espSerial.available())
    {
      if(espSerial.find("feeds"))
      { Serial.println("found feeds:");
        while(espSerial.available())
       {
    c[i]=espSerial.read();
    i++;
       }
```

```
      }
     }
     if(c[i-13]=='1')
     {
     digitalWrite(ledPin,HIGH);
     }

     else if(c[i-13]=='0')
     {
      digitalWrite(ledPin,LOW);
     }
     Serial.println(i);
     Serial.println(c);
     c[i-13]='/0';
     espSerial.flush();
    }
    else
    {
     Serial.println("+IPD not found");
     espSerial.flush();
    }
  }
  else{
    espSerial.println("AT+CIPCLOSE\r\n");
    // alert user
    Serial.println("AT+CIPCLOSE");
    espSerial.flush();
  }
  delay(2000);
}
```

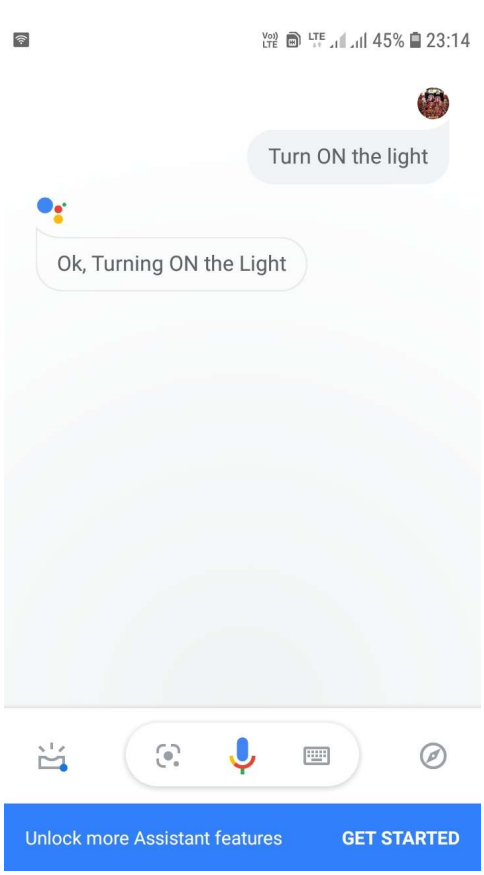
Results:

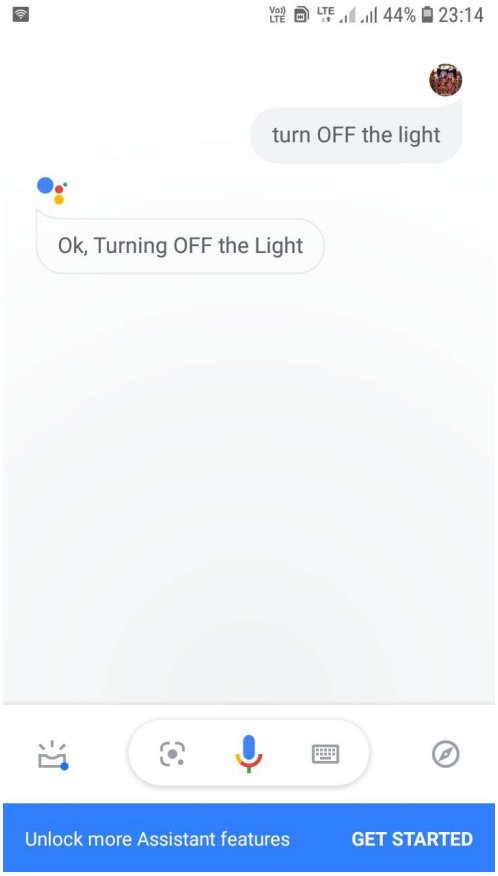
When you say “ok google” on your smart phone or tablet, assistant will pop up .

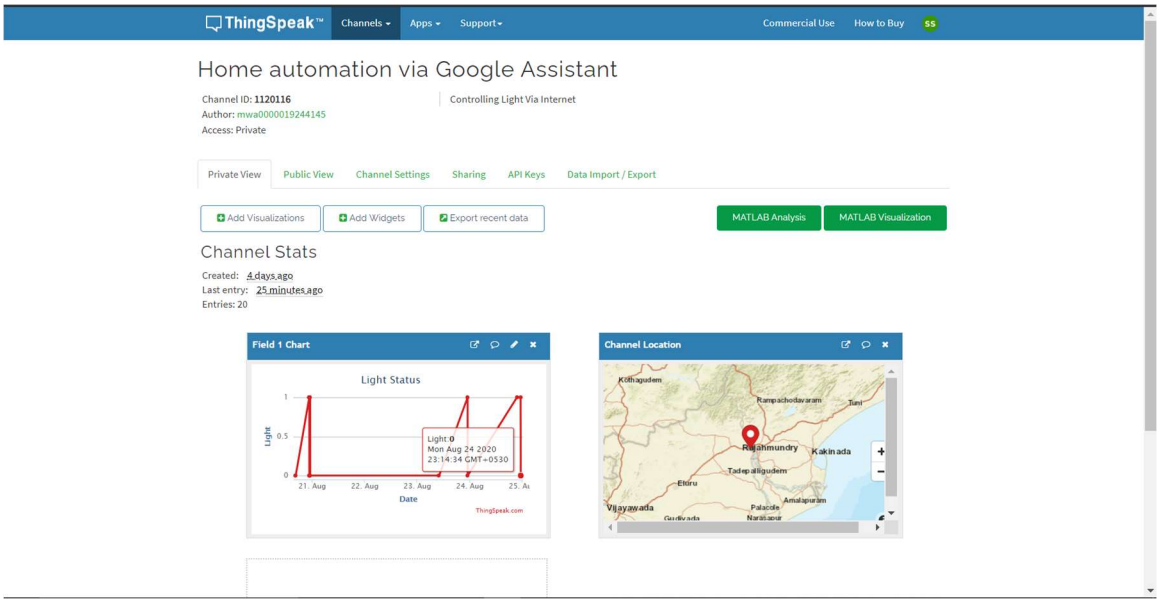
When I said “Turn ON the light “, it replied “ok, Turning ON the light” and relay is activated and light is turned ON.

When I said “Turn OFF the light”, it replied “ok, Turning OFF the light” and relay is deactivated and light is turned OFF.

Accordingly, data was uploaded in ThingSpeak cloud.







Data is being updated according with respect to command.

Conclusion:

Google Assistant IoT Home Automation is successfully implemented and designed system worked with full efficiency.