VOICE CONTROL HOME AUTOMATION

ABSTRACT

- The idea behind Voice-controlled Home automation is to control home devices with voice.
- On the market there are many devices available to do that, but making our own is awesome.
- In this project, the Google assistant requires voice commands.
- Adafruit account which is a cloud based free IoT web server used to create virtual switches, is linking to IFTTT website abbreviated as “If This Than That” which is used to create if else conditional statements.
- The voice commands for Google assistant have been added through IFTTT website.
- In this home automation, as the user gives commands to the Google assistant, Home appliances like Bulb, Fan and Motor etc., can be controlled accordingly.
- The commands given through the Google assistant are decoded and then sent to the microcontroller, the microcontroller in turn control the relays connected to it.
- The device connected to the respective relay can be turned On or OFF as per the users request to the Google Assistant.
- The microcontroller used is NodeMCU (ESP8266) and the communication between the microcontroller and the application is established via Wi-Fi (Internet)

- Automation plays an important role in a person’s life.
- Home automation allows us to control household appliances such as lamps, doors, fans, AC, etc.
- It also provides home security and an emergency plan to be unlocked.
- Home automation is not only about reducing people’s efforts but also about efficient use of energy and saving time.
- The main goal of home automation and safety systems is to help people with disabilities and the elderly to help them control household appliances and alert them to emergencies.
- In this project, Google Assistant is an AI (Artificial Intelligence) voice command service is used.
- Using voice, we can interact with the Google assistant and it can search the Internet, schedule events, set alarms, control electronic devices, etc.
- This service is available on Google Home smart phones and devices.
- We can control smart devices including lights, switches, fans, and thermostats using our Google Assistant.
- We will build an app that can control household appliances. Here, we will control 60W light using Google Assistant service.
- This application includes Google Assistant and Adafruit server and IFTTT service.

OBJECTIVE:

The main object of our project is to develop a google assistant controlled home automation is to control home appliances with voice. A cloud based free IOT web server called Adafruit account which is used to create virtual switches. The home appliances which is connected to the relay can be turned ON or OFF as per the user given voice commands to the google assistant

INTRODUCTION

- Google Assistant is an AI (Artificial Intelligence) voice command service. Using voice, we can interact with the Google assistant and it can search the Internet, schedule events, set alarms, control electronic devices, etc. This service is available on Google Home smart phones and devices.
- We can control smart devices including lights, switches, fans, and thermostats using our Google Assistant. We will build an app that can control household appliances.
- Here, we will control 60W light using Google Assistant service. This application includes Google Assistant and Adafruit server and IFTTT service.
- The project prioritized the implementation of automated home automation and protection system using Arduino microprocessor and Android smartphone.
- Home appliances are connected to a microprocessor and a connection is established between Arduino and an Android mobile device or tablet via a Bluetooth module.
- We will improve system authentication so that an authorized person can access household appliances.
- A low-cost and measurable device with minimal modification is very important.
- Introduce the design and implementation of flexible systems that can monitor and control household appliances on your android phone or tablet.

- A smart home-controlled home program has been introduced for the elderly and the disabled. The idea of controlling household appliances using a human voice is intriguing.
- The proposed system has two main components, namely:
- (a) voice recognition system, and (b) wireless system. This home appliances control app uses a voicecontrolled android app. Increasing use of PC (personal computers), the Internet, mobile phones, and wireless technology, makes it easier for the user to remotely control and manage electronic devices.
- A lot of research has been done and many solutions have been proposed to achieve remote access to household appliances. Some of them have used the Internet, as well as wireless technology to communicate and control household appliances, while others are using Bluetooth and GSM technology to control household appliances. The ultimate goal of our system is to create the perfect companion for someone to be at home.
- In general, automated home research has targeted many needs such as applications that provide comfort and smart requirements while others highlight the special needs of the elderly and disabled, etc. Our system is a computer-based system that can receive voice to direct commands and process them. . The program allows us to switch any device ON / ON.

- Home automation” refers to the automatic and electronic control of household features, activities, and appliances. The utilities and features of our home can be easily controlled via Internet.
- There are three main elements of a home automation system: sensors, controllers, and actuators. Having day to day developing technology is a proud moment to the whole world.
- The foremost aim of the technology is to increase the efficiency and to decrease the effort. In this trending world, Internet of Things is being given extreme importance.
- In that, Automation, leads to have less effort and much efficiency. By using IoT, we are successful in controlling the appliances in various areas, in which one of them is to control the home automation by using Node Microcontroller. We can also use other boards like raspberry pi, beagle bone etc., Even though the technology is developing in our day today life, there is no help coming into existence for the people who are physically not good on the basis of technology.
- As the speech enabled, home automation system deploys the use of voice to control the devices. It mainly targets the physically disabled and elderly persons. Similarly, the line following robot functions with respect to the speech commands given to it. The line following robot moves forward and backward with the help of sensors and a motor driver board.
- Home is the place where one desires to be rest after a long tiring day. People come home exhausted after a long hard-working day. Some are way too tired that they find it hard to move once they land on their couch, sofa or bed. So, any small device/technology that would help them switch theirs lights on or off, or play their favorite music etc. on a go with their voice with the aid of their smart phones would make their home more comfortable.
- Moreover, it would be better if everything such as warming bath water and adjusting the room temperature were already done before they reach their home just by giving a voice command. So, when people would arrive home, they would find the room temperature, the bath water adjusted to their suitable preferences, and they could relax right away and feel cozier and rather, feel more homely. Human assistants like housekeepers were a way for millionaires to keep up their homes in the past

METHODOLOGY

- **Arduino** : Arduino Uno is a microcontroller board based on ATmega328P. It has 14 digital input / output pins (6 of which can be used as PWM effects), 6 analog input, 16 MHz quartz crystal, USB connection, power jug, ICSP header, and set button re. Just connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started.
- **Bluetooth** : A connection between the cell phone and the microcontroller Bluetooth module (HC-05) is used.HC-05 has low power 1.8V operation and is easy to use via Bluetooth SPP (serial port protocol). The serial port Bluetooth module has Bluetooth 2.0 + EDR (advanced data rate), 3Mbps modulation with a complete 2.4GHZ radio transceiver, and baseband. Using a Bluetooth profile and an android platform architecture various types of Bluetooth applications can be upgraded.
- **Relay:** A relay is an electromagnetic switch that can be turned on and off by applying the voltage across its contacts.
- In this project used a 5V 2-channel relay.
- **Android:** Android is an open source operating system which means that any manufacturer can use it on their phones for free.
- Built to really open.
- Android is built on the open Linux Kernel. In addition, it uses a JAVA custom machine designed to improve memory and hardware resources in the mobile space

- By using the above components we use our system. The main part of this program is Arduino Uno with microcontroller namely Atmega 328. Atmega 328 has a32KB flash, it is necessary to burn boot loader and download Arduino drawings. The boot loader is configured under the control of the ISP system.

- The 12V output power adapter is used as an input to the Arduino voice-controlled system. Relays connected to Arduino Uno output pins, these are used as load switches.

- Android is a mobile application based on the Linux kernel and is currently developed by Google. We choose android platform because of its huge market worldwide and easy to use user interface. The voice sensor which is a built-in feature for android phones is used to create a program that the user can use to make the appliances in his home automatically. For wireless communication applications, the Bluetooth HC-05 module is used as a remote control connected to the control unit to hear the signals sent by the android voice system.

- The app starts searching for a Bluetooth device. When detected and introduce the voice sensor. Reads the word and converts the audio signal into a character unit. Provides the value of each device that will be supplied with the microcontroller device. The microcontroller uses a hole in serial mode. After reading the data determines the input value and sends the signal to the corresponding port where the transfer circuit will operate

Online Service Account Creation:

- 1) First, create an account at www.Adafruit.io
- 2) Now, create a dashboard. This dashboard is the user interface for remote control.
- 3) After following the steps above, give the name to the dashboard and save it.
- 4) Now, create a feed (usage detection) to control the Turn Off light. To create it, simply click the „+“ icon and select the feed conversion modified.
- 5) After selecting the feed switch, a pop-up window appears as displayed.
- 6) Enter the name of our feed (shown in the red box) and create it. After creating, select the created feed (heremineis LED) and click on Next Step. In the next step prepare the feed shown below.
- 7) Here, I have used the 0 (OFF) and 1 (ON) buttons and click on Create. This will create a switch button on your dashboard that can be used to remotely control items.

Now, the dashboard is ready for IoT applications such as home automation

IFTTT (If This Then That):

- If This Then That, also known as IFTTT is a free web-based service for creating a series of simple conditional statements, called applets. The applet is subject to changes that take place on other web services such as Gmail, Facebook, Telegram, Instagram, or Pinterest.
- For example, an applet might send an email message when a user in tweets uses a hashtag or copy an image from Facebook into a user archive if someone tags a user in an image. Here, I used IFTTT to use Google assistant service and Adafruit service in the series. So, if I use Google assistant to control the brightness of my home by saying Ok Google, CRY or turn off the light. IFTTT then translates the message and can send it to the Adafruit dashboard as an understandable command for the created feed.
- Preparing for IFTTT: Now, the dashboard is ready for IoT applications such as home automation.

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- So, if I use Google assistant to control the brightness of my home by saying Ok Google, CRY or turn off the light. IFTTT then translates the message and can send it to the Adafruit dashboard as an understandable command for the created feed.

Preparing for IFTTT:

- The first step is to create an account on IFTTT.
- Note: Create an account on IFTTT using the same email id you used for Adafruit.
- 1) After creating an account, click My Apples and select New Applet.
- 2) After selecting a new applet, we get a new page to click on. This is shown in the picture.
- 3) Then search for Google Assistant and select it.
- 4) Now, enter the voice phrases we will use as the Google assistant command. We may include any phrase as per our request. As you can see, the phrases included in the above areas are for making the LIGHT ON. To make the Light CLOSE, we have to build another applet with different phrases. Now, we find another page to click on in the option used to connect Google Assistant with Adafruit.
- 5) Then search for Adafruit and select it.
- 6) After selecting Adafruit, select the action. Now enter what data we need to send to the feed in the Adafruit dashboard. 7) Click Create Action

- So, when I use Google Assistant on my mobile phone and give a voice command such as “Ok Google, Turn on LED”, the applet created by IFTTT receives this command and will send „1“ data to the Adafruit feed. This will launch the event on the Adafruit dashboard by a continuously monitored microcontroller (here NodeMCU). This little controller will take action according to the data change in the Adafruit dashboard.

CODE:

```
#include <ESP8266WiFi.h>
#include "Adafruit_MQTT.h"
#include "Adafruit_MQTT_Client.h"
#define Relay1            D1
#define WIFI_SSID       "SSID NAME"
#define WIFI_PASS       "SSID Password"
/************************* Adafruit.io Setup *********************************/
#define AIO_SERVER      "io.adafruit.com"
#define AIO_SERVERPORT  1883
#define AIO_USERNAME    "Enter your UserName"
#define AIO_KEY         "Enter you AIO_KEY"
 /************ Global State (you don't need to change this!) ******************/
// Create an ESP8266 WiFiClient class to connect to the MQTT server.
  WiFiClient client;
// or... use WiFiFlientSecure for SSL
//WiFiClientSecure client;
// Setup the MQTT client class by passing in the WiFi client and MQTT server and login details.
  Adafruit_MQTT_Client mqtt(&client, AIO_SERVER, AIO_SERVERPORT, AIO_USERNAME, AIO_KEY);
```

```
/************************** Feeds ***************************************/
// Setup a feed called 'onoff' for subscribing to changes.
• Adafruit_MQTT_Subscribe Light1 = Adafruit_MQTT_Subscribe(&mqtt, AIO_USERNAME"/feeds/Enter your
  Feed Name");
• void MQTT_connect();
• void setup() {
• Serial.begin(115200);
• pinMode(Relay1, OUTPUT);
  // Connect to WiFi access point.
• Serial.println(); Serial.println();
• Serial.print("Connecting to ");
• Serial.println(WLAN_SSID);
• WiFi.begin(WLAN_SSID, WLAN_PASS);
• while (WiFi.status() != WL_CONNECTED) {
• delay(500);
• Serial.print(".");
  }
```

```
    Serial.println();
    Serial.println("WiFi connected");
    Serial.println("IP address: ");
    Serial.println(WiFi.localIP());
 // Setup MQTT subscription for onoff feed.
    mqtt.subscribe(&Light1);
}
void loop() {
    MQTT_connect();
    Adafruit_MQTT_Subscribe *subscription;
    while ((subscription = mqtt.readSubscription(5000))) {
    if (subscription == &Light1) {
    Serial.print(F("Got: "));
    Serial.println((char *)Light1.lastread);
    int Light1_State = atoi((char *)Light1.lastread);
    digitalWrite(Relay1, !(Light1_State));
      }
  }
}
```

```
void MQTT_connect() {
int8_t ret;
  // Stop if already connected.
if (mqtt.connected()) {
return;
  }
Serial.print("Connecting to MQTT... ");
uint8_t retries = 3;

while ((ret = mqtt.connect()) != 0) { // connect will return 0 for connected
Serial.println(mqtt.connectErrorString(ret));
Serial.println("Retrying MQTT connection in 5 seconds...");
mqtt.disconnect();
delay(5000);  // wait 5 seconds
retries--;
f (retries == 0) {
if (retries == 0) {
  // basically die and wait for WDT to reset me
    while (1);
   }
```

CONCLUSION:

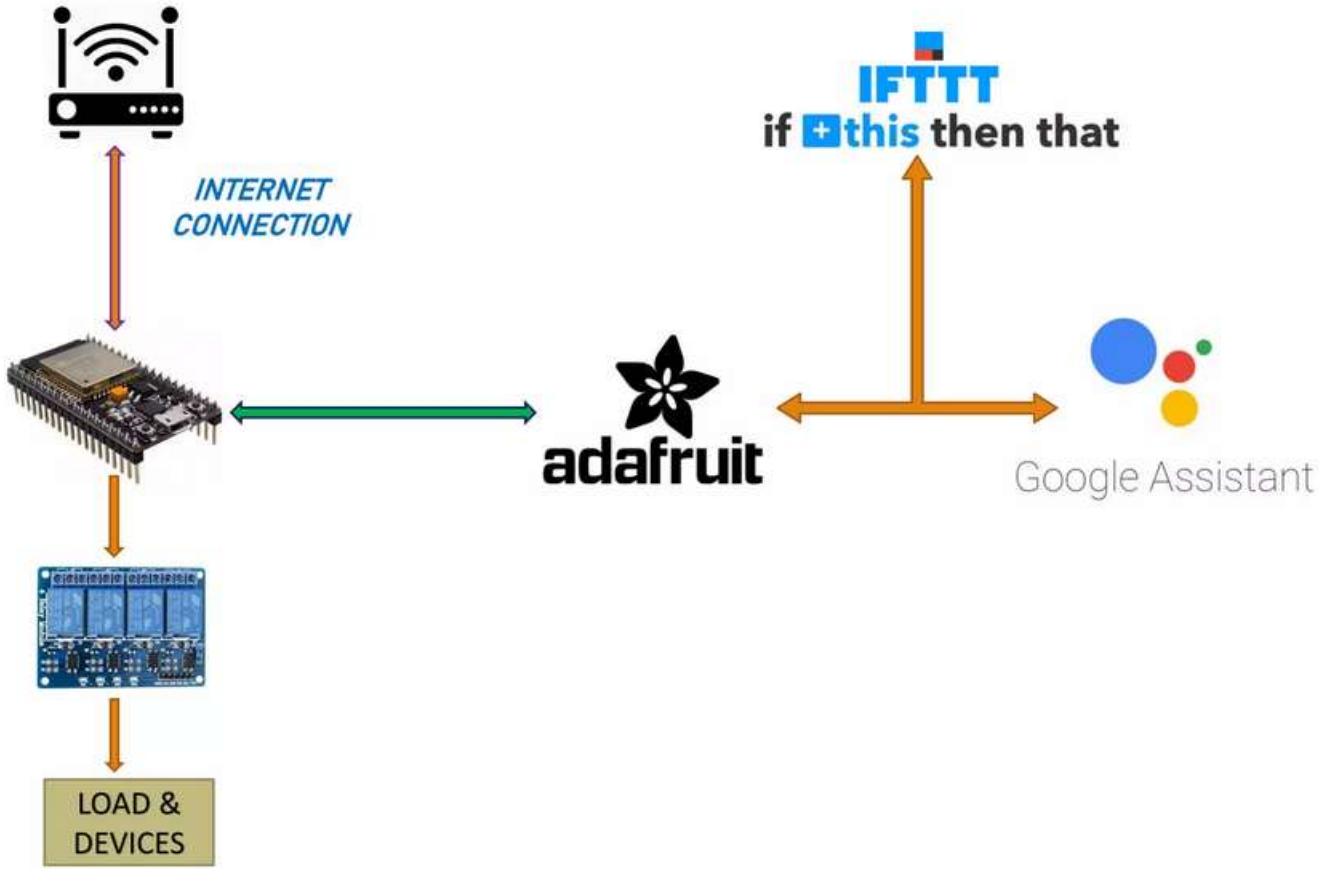
For this project, we have successfully implemented a home automated voice-controlled automation system using Arduino with a Bluetooth HC-05 module. This project can be used to control the „n‟ number of input controls i.e., by increasing a few transmissions.

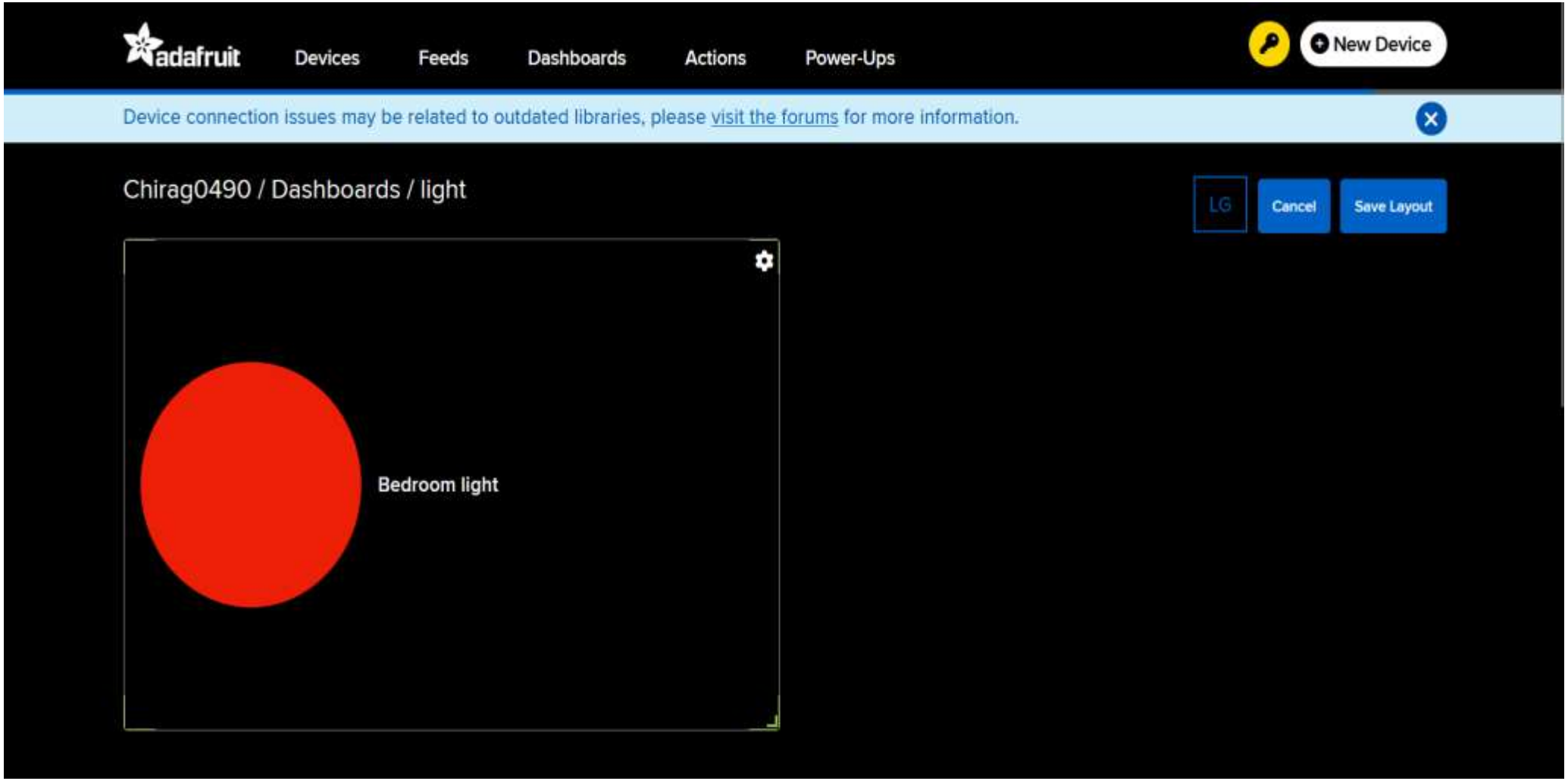
Our used module is reliable and flexible to control any loads and the total area of wireless control is 10 meters. So this project can be helpful in real-time home voice control.

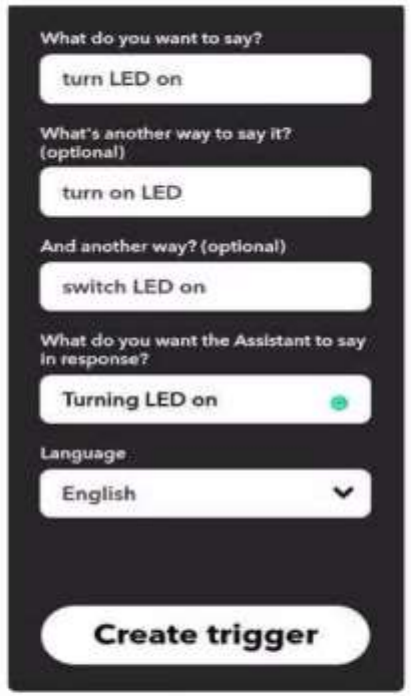
Therefore, Arduino voicebased home appliances are proven to be the best remotecontrolled function in household appliances using the Bluetooth module HC-05.

The project can be extended to more automated applications such as industrial automotive, automotive, military, health care, transportation, and so on. In addition, the installation area can be expanded using GSM modules.

BLOCK DIAGRAM:




adafruit
Devices
Feeds
Dashboards
Actions
Power-Ups
New Device
Device connection issues may be related to outdated libraries, please visit the forums for more information.
Chirag0490 / Dashboards / light
LG
Cancel
Save Layout
Bedroom light



My Applets

Filter

All (2 of 2) Published Archive

Get Pro to get 20 Applets

If you say "Okay Google, activate light", then Send data to Lightstatus feed

by chiragvinchurkar73

Connected

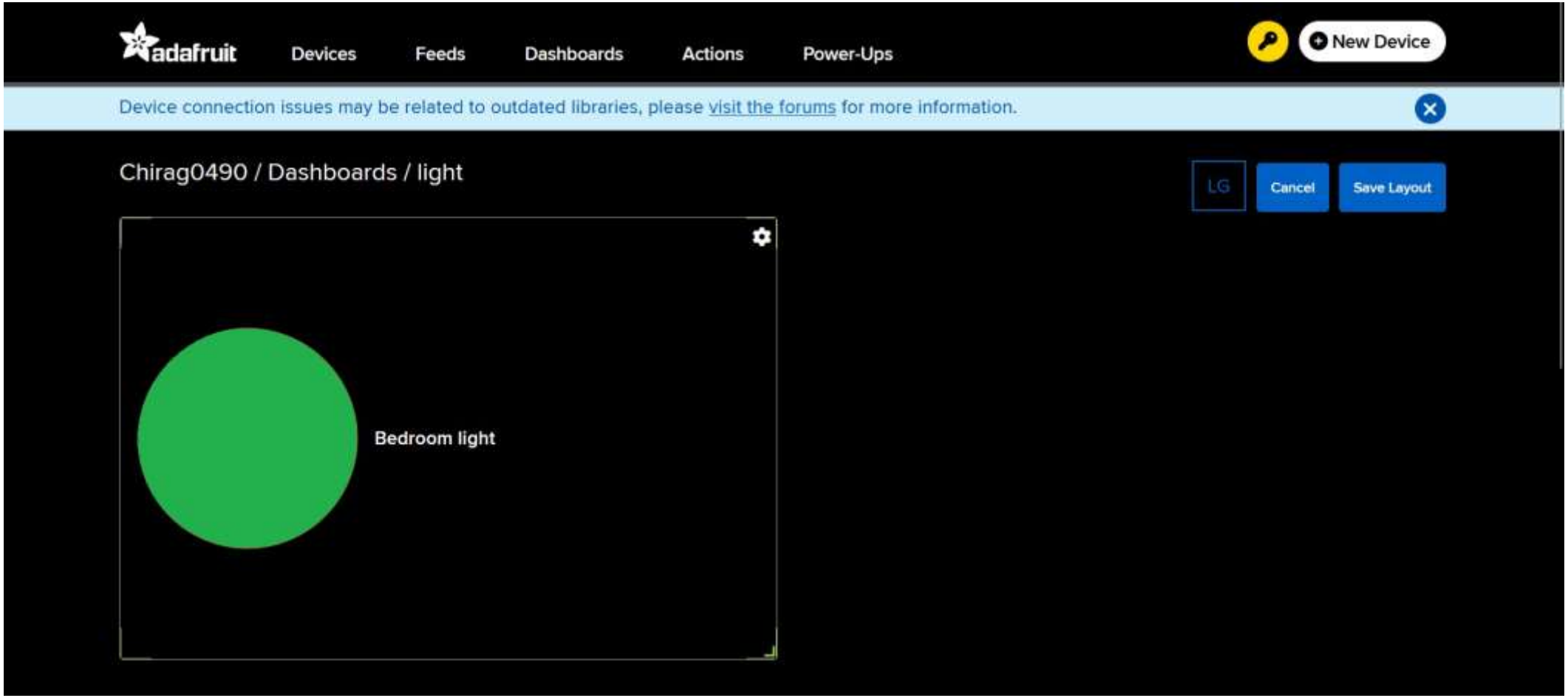
1

If you say "Okay Google, activate off", then Send data to Lightstatus feed

by chiragvinchurkar73

Connected

1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Devices
Feeds
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Device connection issues may be related to outdated libraries, please visit the forums for more information.
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