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IoT June-July batch

OUTSTANDING PROJECT 2

2.IoT -Smart Vision Based Doorbell:

Design a Smart doorbell that can easily be powered by an AC socket and whenever someone at the door presses the doorbell button, it will play a specific song on your phone and sends a text message with a link of video streaming page where you can see the person at the door from anywhere in world.

Introduction:

Nowadays, Security system is one of the most researched fields and with increasing security threats, companies are launching new smart security products to combat these threats. IoT is an added advantage in this field which can automatically trigger an event, like calling the police, fire brigade or your neighbor, in case of any emergency. In this project i will be using **ESP32** and **camera** to build a **Smart Wi-Fi door bell.** This Smart doorbell can easily be powered by an AC socket and whenever someone at the door presses the doorbell button, it will play a specific song on your phone and sends a text message with a link of video streaming page where you can see the person at the door from anywhere in world.

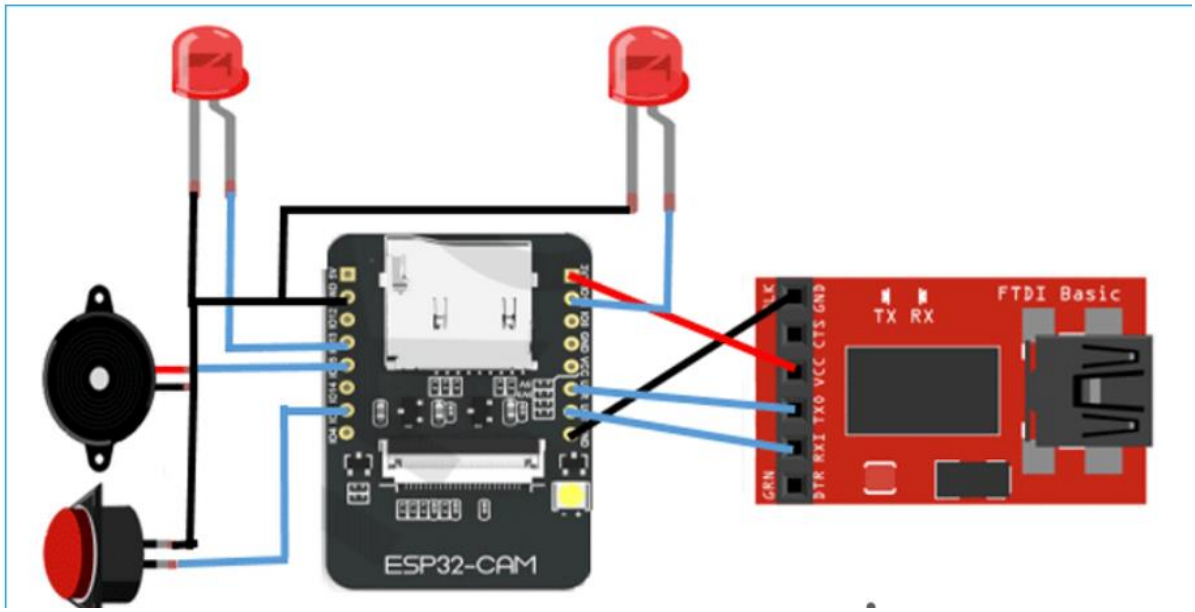
Components required:

- ESP32-CAM
- FTDI Programming Board
- 220V AC to 5V DC Converter

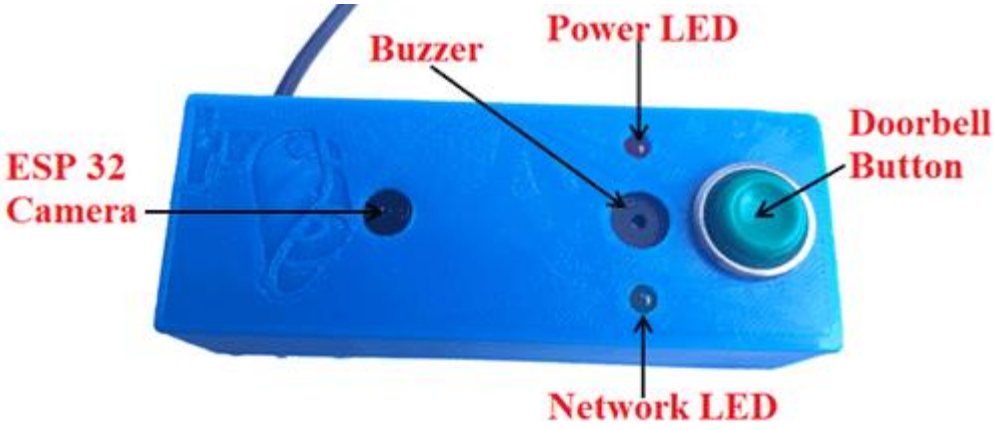
- Buzzer
- Push Button
- LED (2)

Circuit Diagram:

Circuit diagram for this **Smart Wi-Fi Doorbell** is very simple, just connect two LEDs, a push button and a buzzer to ESP32 GPIO pins. A buzzer is used to make a sound whenever the button is pressed. One LED is used to indicate the power status, and the other LED is used to indicate the network status. Network LED will be in a high state if ESP is connected to a network otherwise, it will blinks



This is how the **Wi-Fi video doorbell** setup will look in 3D printed casing:

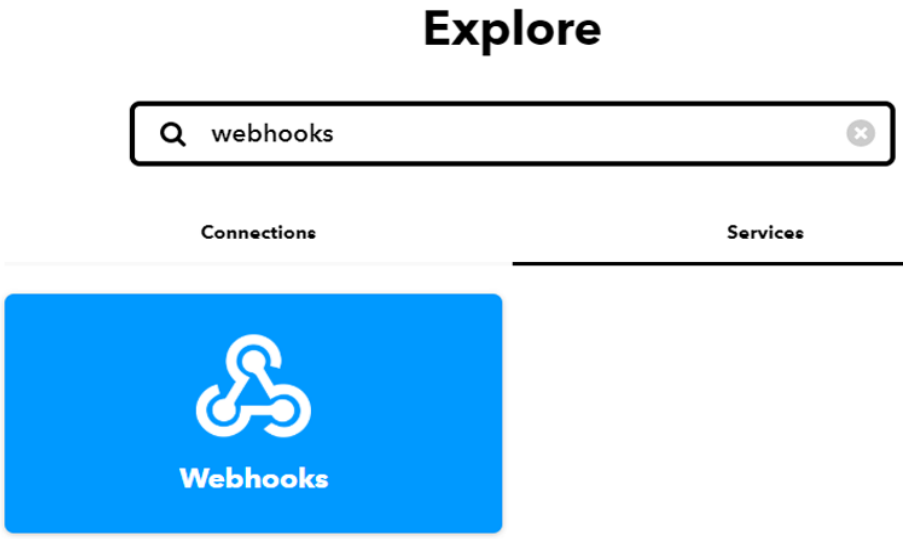


IFTTT Setup for Wi-Fi Doorbell:

IFTTT is a free web-based service that allows users to create chains of simple conditional statements, called “recipes”, which are triggered based on changes to other web services such as Gmail Facebook, Instagram, and Pinterest. IFTTT is an abbreviation of “If This Then That”.

First login to IFTTT with your credentials or Sign Up if you don’t have an account on it.

Now search for ‘Webhooks’ and click on the Webhooks in Services section.

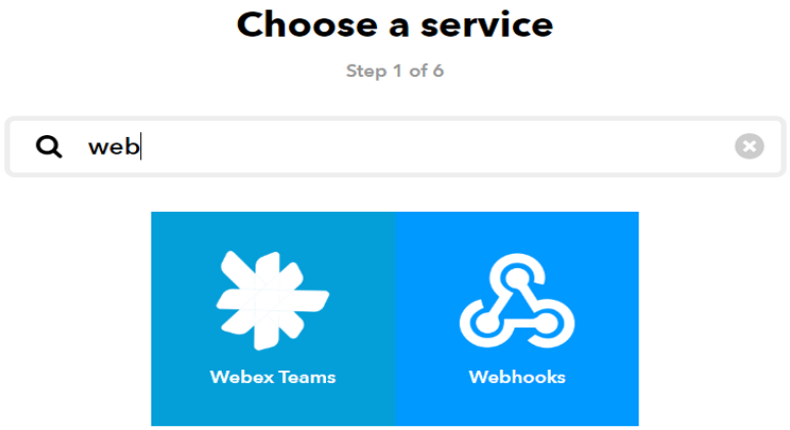


In the Webhooks window, click on ‘Documentation’ in the upper right corner to get the private key. Copy this key. It will be used in the program.

After getting the private key, now we will create an applet using Webhooks and Email services. To create an applet, click on your profile and then click on ***'Create.'***

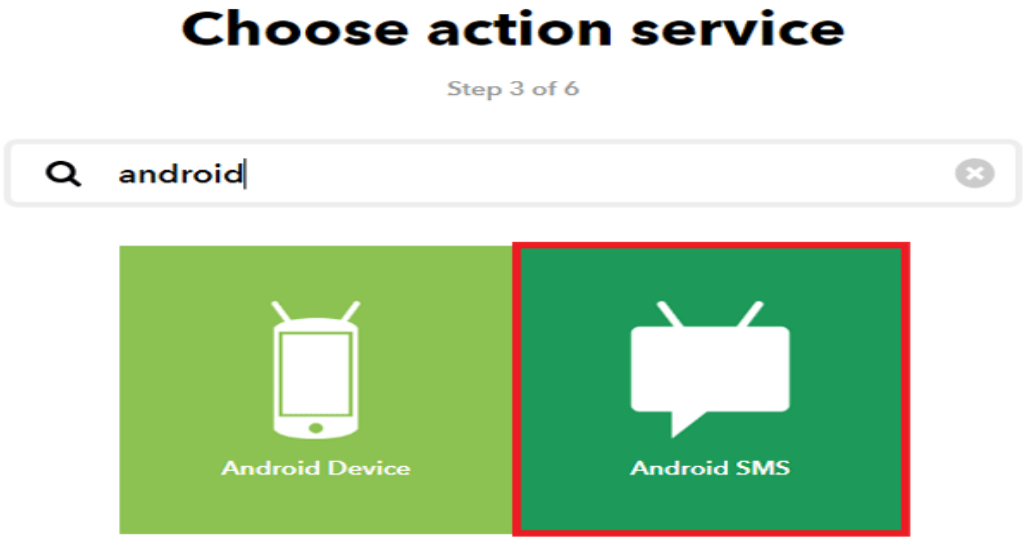
Now in the next window, click on the **'This'** icon.

Now search for Webhooks in the search section and click on '***Webhooks.***'

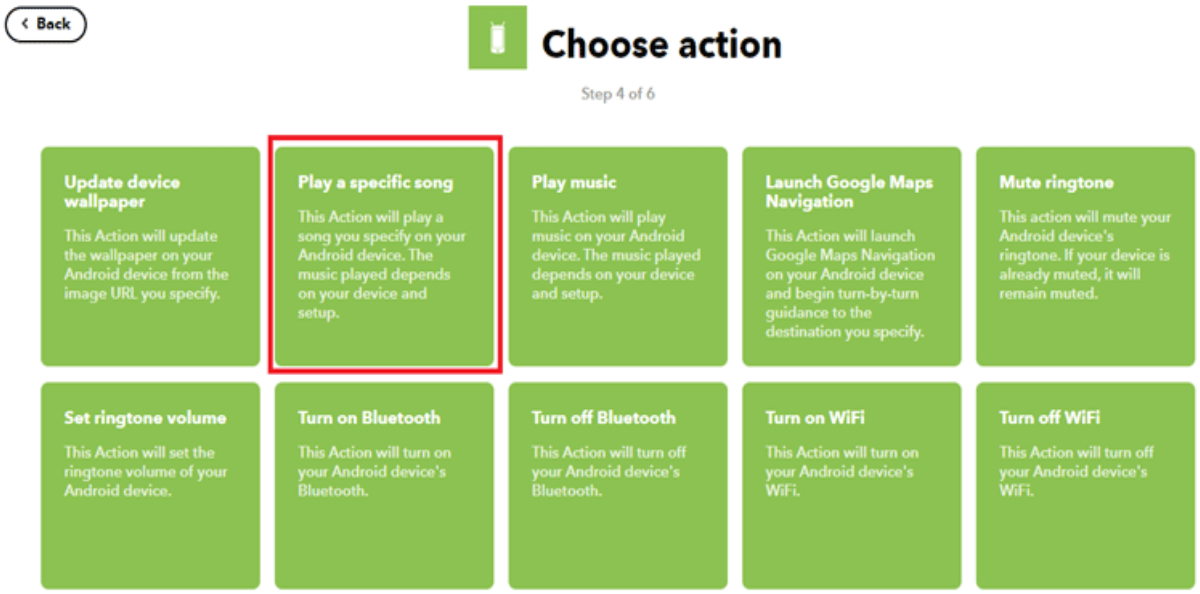


Choose '**Receive a Web Request'** trigger and in the next window, enter the event name as button pressed and then click on create a trigger. To complete the applet, click on ***'That'*** to create a reaction for the button pressed event.

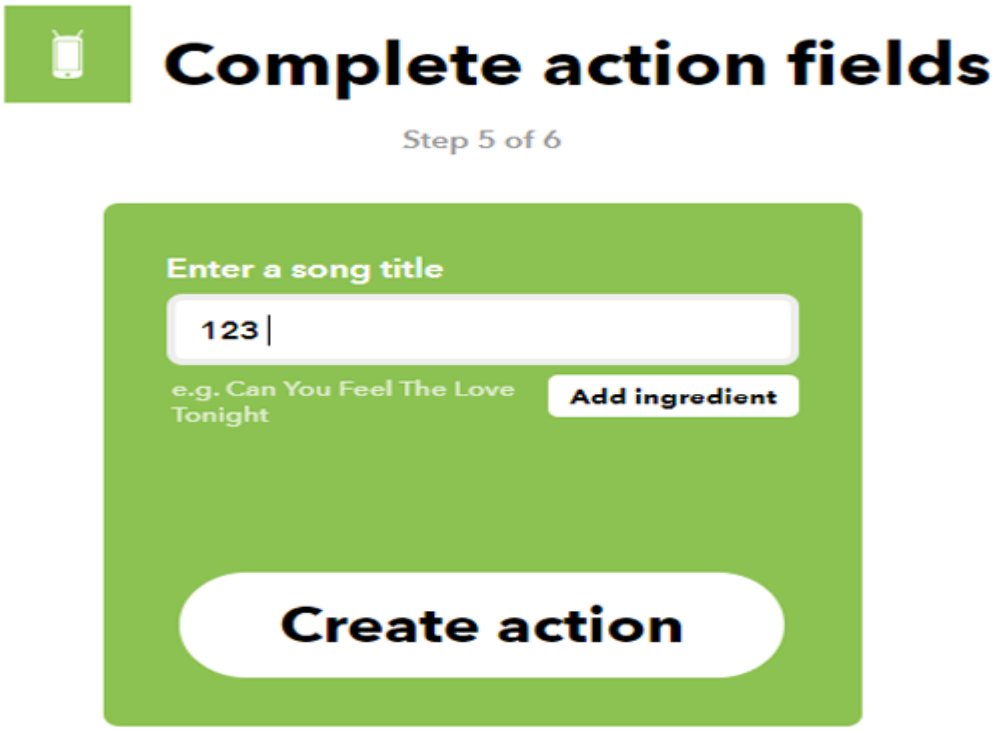
we will play a specific song on the phone when the IoT doorbell button is pressed. For that search for 'Android device' in the search section.



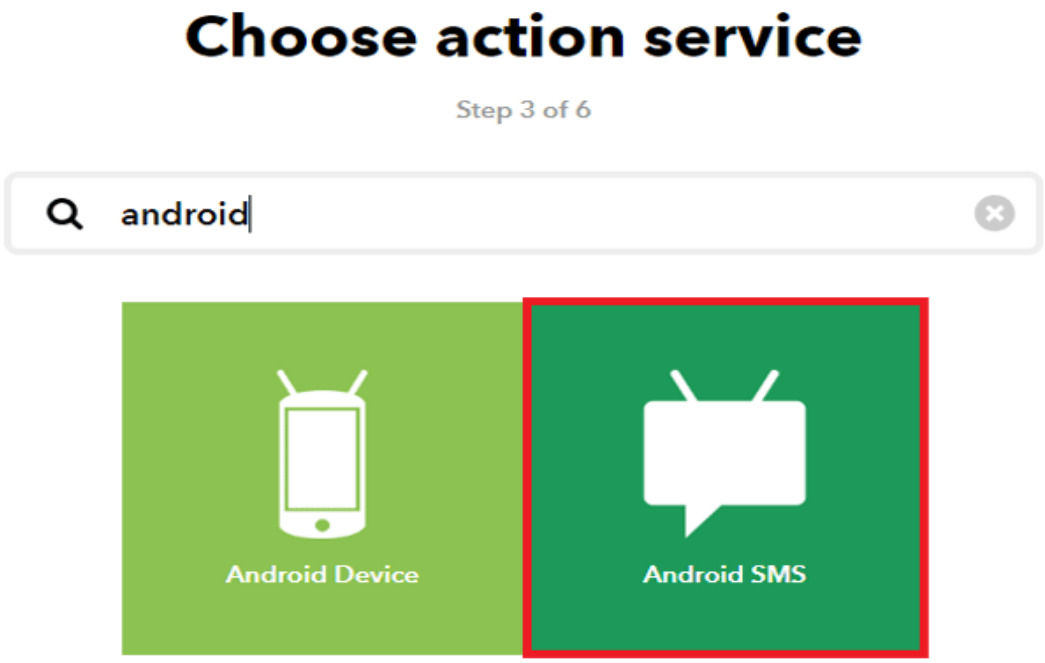
Now in Android Device, choose ***'Play a specific song'*** trigger.



Now enter the song title that you want to play when the doorbell button is pressed. In my case, I'm playing a song named '123' from my Google play music. You can also use Spotify or other music apps.



After that, click on '**Create action'** and then ***'Finish'*** to complete the process. Now create another applet to send a message with the webpage link to the phone when the doorbell button is pressed. So, to create this applet choose '**Webhooks'** in **'this' section** and in ***'that'*** section choose **'Android SMS.'**



Now it will ask to enter the phone number and message body. For this **Wi-Fi doorbell** project, we are sending a message with the Webserver link so that you **can see the live video streaming directly.**

Explanation of code:

First, include all the required library files for this code.

```
#include "esp_camera.h"
#include <WiFi.h>
```

Then enter the Wi-Fi credentials.

```
const char* ssid = "Wi-Fi Name";
const char* password = "Wi-Fi Password";
```

After that, enter the IFTTT hostname and private key that you copied from the IFTTT website.

```
const char *host = "maker.ifttt.com";
const char *privateKey = "Your Private Key";
```

Define all the pins that you are using in this project. I'm using the GPIO 2, 14 and 15 pins to connect the push button, LED and buzzer.

```
const int buttonPin = 2;
const int led1 = 14;
const int buzzer = 15;
```

Inside the void setup loop, define the button pin as input and LED and buzzer pins as output.

```
void setup()
 {
  pinMode(buttonPin, INPUT);
  pinMode(led1, OUTPUT);
  pinMode(buzzer, OUTPUT);
```

It will try to connect to Wi-Fi using the given credentials, and when connected to a network LED state will change from low to high.

```
WiFi.begin(ssid, password);
  int led = LOW;
  while (WiFi.status() != WL_CONNECTED)
{
    delay(500);
    Serial.print(".");
    digitalWrite(led1, led);
    led = !led;
  }
  Serial.println("");
  Serial.println("WiFi connected");
  digitalWrite(led1, HIGH);
```

While disconnected from a network ESP32 will restart until it connects to a network.

```
while (WiFi.status() == WL_DISCONNECTED) {
    ESP.restart();
    digitalWrite(led1, LOW);
    Serial.print("Connection Lost");
```

ESP32 will read the button state, and if the button is in the LOW state (pulled high), i.e., a button has been pressed, it sends the event and turns on the buzzer for 3 seconds.

```
int reading = digitalRead(buttonPin);
if (buttonState == LOW)
 {
send_event("button_pressed");
Serial.print("button pressed");
digitalWrite(buzzer, HIGH);
delay(3000);
digitalWrite(buzzer, LOW);
```

Code:

```
#include "esp_camera.h"
#include <WiFi.h>
// WARNING!!! Make sure that you have either selected ESP32 Wrover Module,
//           or another board which has PSRAM enabled
// Select camera model
//#define CAMERA_MODEL_WROVER_KIT
//#define CAMERA_MODEL_ESP_EYE
//#define CAMERA_MODEL_M5STACK_PSRAM
//#define CAMERA_MODEL_M5STACK_WIDE
#define CAMERA_MODEL_AI_THINKER
#include "camera_pins.h"
void send_event(const char *event);
const char* ssid = "Galaxy-M20";
const char* password = "ac312124";
const char *host = "maker.ifttt.com";
const char *privateKey = "hUAAAz0AVvc6-NW1UmqWXXv6VQWmpiGFxx3sV5rnaM9";
const int buttonPin = 2;
int buttonState;            // the current reading from the input pin
int lastButtonState = LOW;   // the previous reading from the input pin
const int led1 = 14;
```

```
const int buzzer = 15;
long lastDebounceTime = 0;  // the last time the output pin was toggled
long debounceDelay = 50;    // the debounce time; increase if the output flickers
void startCameraServer();
void setup()

 {
  pinMode(buttonPin, INPUT);
  pinMode(led1, OUTPUT);
  pinMode(buzzer, OUTPUT);
  Serial.begin(115200);
  Serial.setDebugOutput(true);
  Serial.println();
  camera_config_t config;
  config.ledc_channel = LEDC_CHANNEL_0;
  config.ledc_timer = LEDC_TIMER_0;
  config.pin_d0 = Y2_GPIO_NUM;
  config.pin_d1 = Y3_GPIO_NUM;
  config.pin_d2 = Y4_GPIO_NUM;
  config.pin_d3 = Y5_GPIO_NUM;
  config.pin_d4 = Y6_GPIO_NUM;
  config.pin_d5 = Y7_GPIO_NUM;
  config.pin_d6 = Y8_GPIO_NUM;
  config.pin_d7 = Y9_GPIO_NUM;
  config.pin_xclk = XCLK_GPIO_NUM;
  config.pin_pclk = PCLK_GPIO_NUM;
  config.pin_vsync = VSYNC_GPIO_NUM;
  config.pin_href = HREF_GPIO_NUM;
  config.pin_sscb_sda = SIOD_GPIO_NUM;
  config.pin_sscb_scl = SIOC_GPIO_NUM;
  config.pin_pwdn = PWDN_GPIO_NUM;
  config.pin_reset = RESET_GPIO_NUM;
  config.xclk_freq_hz = 20000000;
  config.pixel_format = PIXFORMAT_JPEG;
```

```
  //init with high specs to pre-allocate larger buffers
  if(psramFound())

{
    config.frame_size = FRAMESIZE_UXGA;
    config.jpeg_quality = 10;
    config.fb_count = 2;
  }

Else

 {
    config.frame_size = FRAMESIZE_SVGA;
    config.jpeg_quality = 12;
    config.fb_count = 1;
  }
#if defined(CAMERA_MODEL_ESP_EYE)
  pinMode(13, INPUT_PULLUP);
  pinMode(14, INPUT_PULLUP);
#endif
  // camera init
  esp_err_t err = esp_camera_init(&config);
  if (err != ESP_OK)

 {
    Serial.printf("Camera init failed with error 0x%x", err);
    return;
  }
  sensor_t * s = esp_camera_sensor_get();
  //initial sensors are flipped vertically and colors are a bit
saturated
  if (s->id.PID == OV3660_PID)

 {
    s->set_vflip(s, 1);//flip it back
    s->set_brightness(s, 1);   //up the blightness just a bit
    s->set_saturation(s, -2);   //lower the saturation
  }
```

```
  //drop down frame size for higher initial frame rate
  s->set_framesize(s, FRAMESIZE_QVGA);
#if defined(CAMERA_MODEL_M5STACK_WIDE)
  s->set_vflip(s, 1);
  s->set_hmirror(s, 1);
#endif
  WiFi.begin(ssid, password);
  int led = LOW;
  while (WiFi.status() != WL_CONNECTED)

 {
    delay(500);
    Serial.print(".");
    digitalWrite(led1, led);
    led = !led;
  }
  Serial.println("");
  Serial.println("WiFi connected");
  digitalWrite(led1, HIGH);
  startCameraServer();
  Serial.print("Camera Ready! Use 'http://");
  Serial.print(WiFi.localIP());
  Serial.println("' to connect");
}
void loop()

 {
    while (WiFi.status() == WL_DISCONNECTED)

 {
    ESP.restart();
    digitalWrite(led1, LOW);
    Serial.print("Connection Lost");
    }
   int reading = digitalRead(buttonPin);
   if (reading != lastButtonState)
```

```
 {
   lastDebounceTime = millis();
  }
  if ((millis() - lastDebounceTime) > debounceDelay)
  {
    // if the button state has changed:
    if (reading != buttonState)
    {
      Serial.print("Button now ");
      Serial.println(HIGH == reading ? "HIGH" : "LOW");
      buttonState = reading;
// When the button is in the LOW state (pulled high) the button
has been pressed so send the event.
      if (buttonState == LOW)

{
        send_event("button_pressed");
        Serial.print("button pressed");
        digitalWrite(buzzer, HIGH);
        delay(3000);
          digitalWrite(buzzer, LOW);
      }
    }
  }
  // save the reading.  Next time through the loop,
  lastButtonState = reading;
}
void send_event(const char *event)
{
  Serial.print("Connecting to ");
  Serial.println(host);
  // Use WiFiClient class to create TCP connections
  WiFiClient client;
  const int httpPort = 80;
  if (!client.connect(host, httpPort))

 {
   Serial.println("Connection failed");
```

```
    return;
  }
  // We now create a URI for the request
  String url = "/trigger/";
  url += event;
  url += "/with/key/";
  url += privateKey;
  Serial.print("Requesting URL: ");
  Serial.println(url);
  // This will send the request to the server
  client.print(String("GET ") + url + " HTTP/1.1\r\n" +
               "Host: " + host + "\r\n" +
               "Connection: close\r\n\r\n");
  while(client.connected())
  {
    if(client.available())
    {
      String line = client.readStringUntil('\r');
      Serial.print(line);
    } else {
      // No data yet, wait a bit
      delay(50);
    };
  }
  Serial.println();
  Serial.println("closing connection");
  client.stop();
}
```