IEEE IoT with ML Internship Project

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Topic: Home automation using BLYNK APP and Raspberry Pi.

Aim: To simulate automation of home applications like fan and light using temperature and Ldr sensors using raspberry pi and blynk app. Also update the data in thingspeak cloud and get mobile notification using IFTTT.

Hardware Components required:

- Raspberry PI 3B+
- DHT11(Temperature and humidity sensor)
- LDR sensor
- Active buzzer
- DC motor
- Motor driver(l298)
- Led
- Jumper wires (M to M, M to F)
- Breadboard
- 12 V Battery

Software required:

- Python IDLE
- Blynk App
- Thingspeak cloud
- IFTTT app

Circuit diagram:

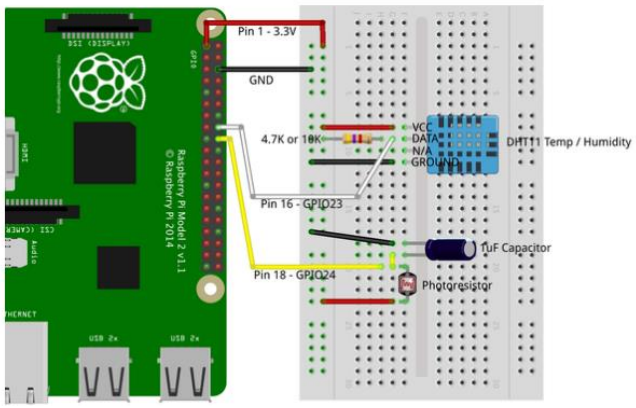


Fig 1: Circuit for DHT11 sensor

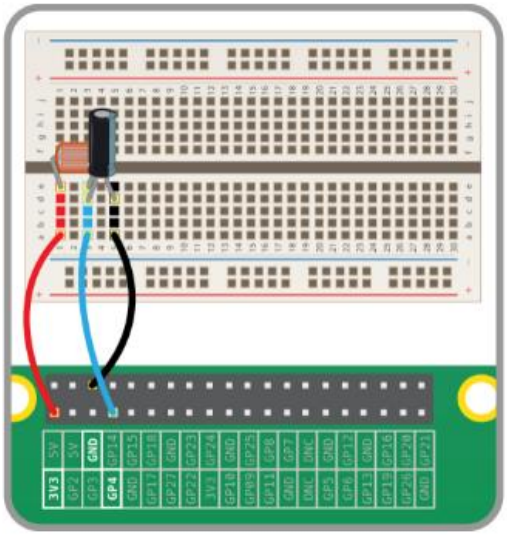


Fig 2: Circuit for LDR sensor

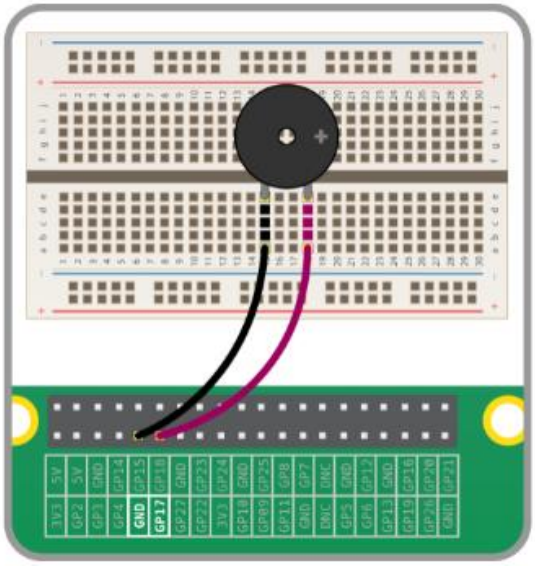
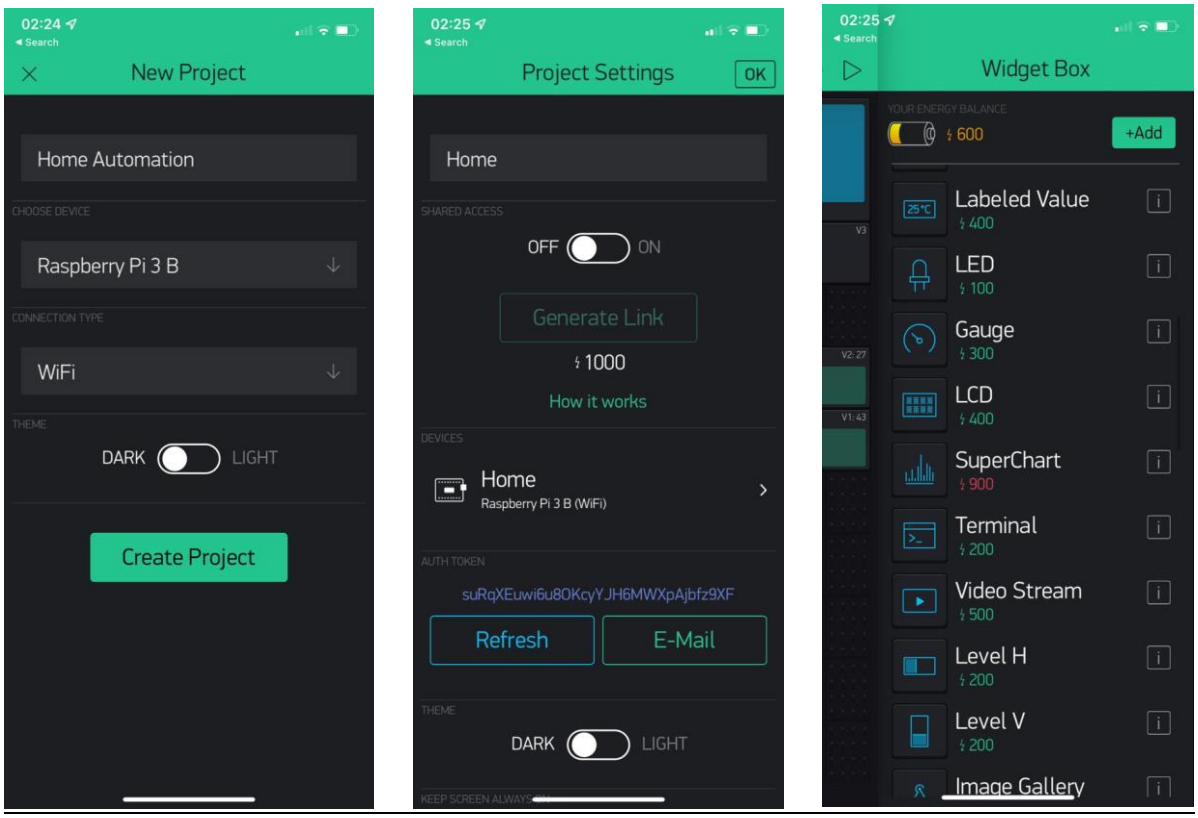


Fig 3: Circuit for Buzzer

Blynk App setup:



First create a new project with the given specifications. Next you will recive an auth token which will be used to link up with your python code . Then you need to create your own layout with given parameters.

Code:

```
import BlynkLib
import RPi.GPIO as GPIO
import time
import Adafruit_DHT
from time import sleep
try:
   import urllib.request as urllib2
except ImportError:
   import urllib2

baseURL1 = 'http://api.thingspeak.com/update?api_key=Y8C2YRBY4RMT2JJ1&field1='
baseURL2 = 'http://api.thingspeak.com/update?api_key=Y8C2YRBY4RMT2JJ1&field2='
baseURL3 = 'http://api.thingspeak.com/update?api_key=Y8C2YRBY4RMT2JJ1&field3='

sensor=Adafruit_DHT.DHT11
gpio=17
GPIO.setmode(GPIO.BCM)
GPIO.setwarnings(False)
GPIO.setup(21,GPIO.OUT)
```

```
blynk = BlynkLib.Blynk('suRqXEuwi6u8OKcyYJH6MWXpAjbfz9XF')
delayt = .1
value = 0
ldr = 7
buzzer=23
GPIO.setup(buzzer,GPIO.OUT)
GPIO.setup(11,GPIO.OUT)

def rc_time (ldr):
    count = 0

    #Output on the pin for ldr
    GPIO.setup(ldr, GPIO.OUT)
    GPIO.output(ldr, False)
    time.sleep(delayt)

    #Change the pin back to input
    GPIO.setup(ldr, GPIO.IN)

    #Count until the pin goes high
    while (GPIO.input(ldr) == 0):
        count += 1

    return count

@blynk.VIRTUAL_WRITE(0)
def my_write_handler(value):
    print('Current V0 value: {}'.format(value))
    if value==['1']:
        GPIO.output(21,True)
        print('on')
    else:
        GPIO.output(21,False)
        print('off')
@blynk.VIRTUAL_READ(2)
def my_read_handler():
    blynk.virtual_write(2,temperature)
    blynk.virtual_write(1,humidity)
    blynk.virtual_write(3,value)


GPIO.output(buzzer,GPIO.LOW)

while True:

    humidity, temperature = Adafruit_DHT.read_retry(sensor, gpio)
    print('LDR Value:')
    value = rc_time(ldr)
```

```
print(value)
if humidity is not None and temperature is not None:
  print('Temp={0:0.1f}*C  Humidity={1:0.1f}%'.format(temperature, humidity))

  if temperature>32 or humidity>50:
     GPIO.output(buzzer,GPIO.HIGH)
     print ("Beep")
     sleep(0.5) # Delay in seconds
     GPIO.output(buzzer,GPIO.LOW)
     #Switch on Fan
     #GPIO.output(11,GPIO.HIGH)
else:
  print('Failed to get reading. Try again!')

f1 = urllib2.urlopen(baseURL1 +str(temperature))
f1.read()
f1.close()
f2 = urllib2.urlopen(baseURL2 +str(humidity))
f2.read()
f2.close()
f3 = urllib2.urlopen(baseURL3 +str(value))
f3.read()
f3.close()

blynk.run()
try:

   while True:
      print("Ldr Value:")
      value = rc_time(ldr)
      print(value)
      if ( value <= 10000 ):
            print("Lights are ON")
            GPIO.output(21,GPIO.HIGH)
            time.sleep(2)
      if (value > 10000):
            print("Lights are OFF")
            GPIO.output(21,GPIO.LOW)
            time.sleep(2)
except KeyboardInterrupt:
   pass
finally:
   GPIO.cleanup()

blynk.run()
```

Hardware Implementation:

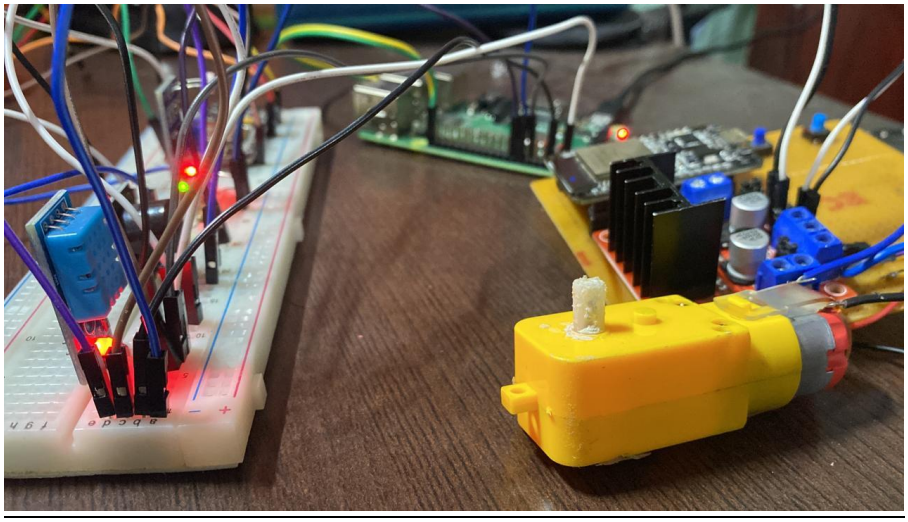


Fig 4: Entire components connected.

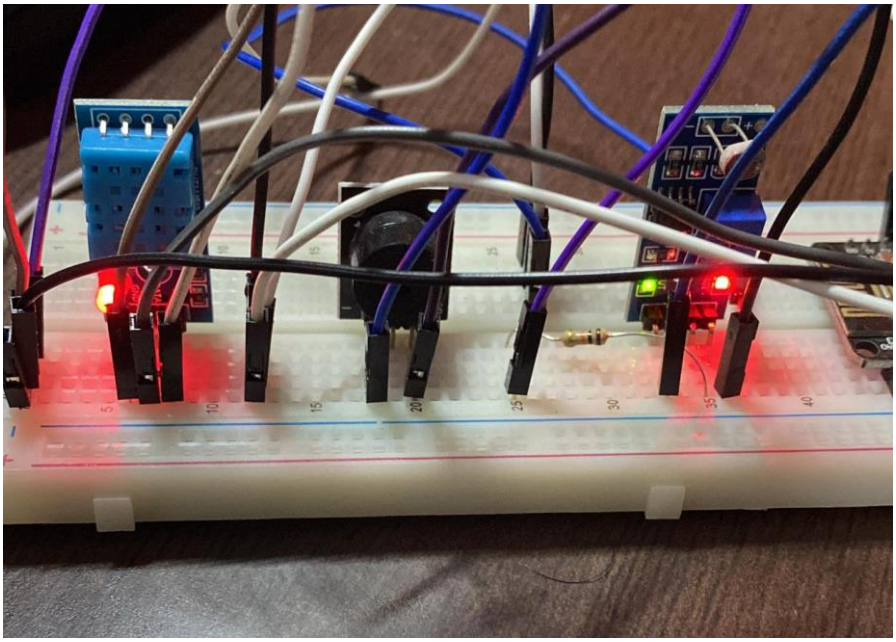


Fig 5: Breadboard connections of DHT11, Buzzer, Ldr sensor.

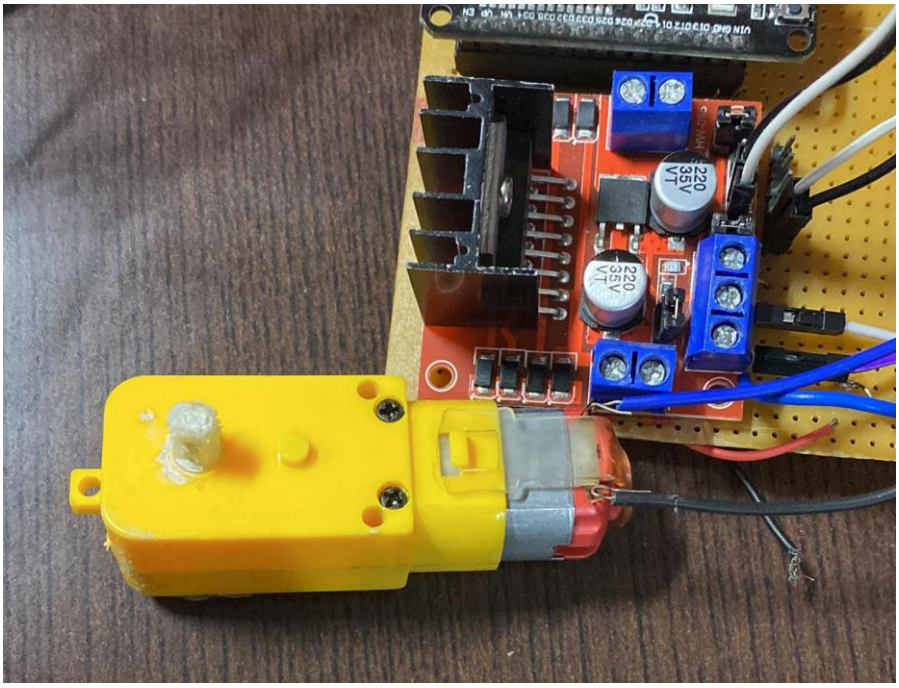


Fig 6: DC motor with Motor board in PCB

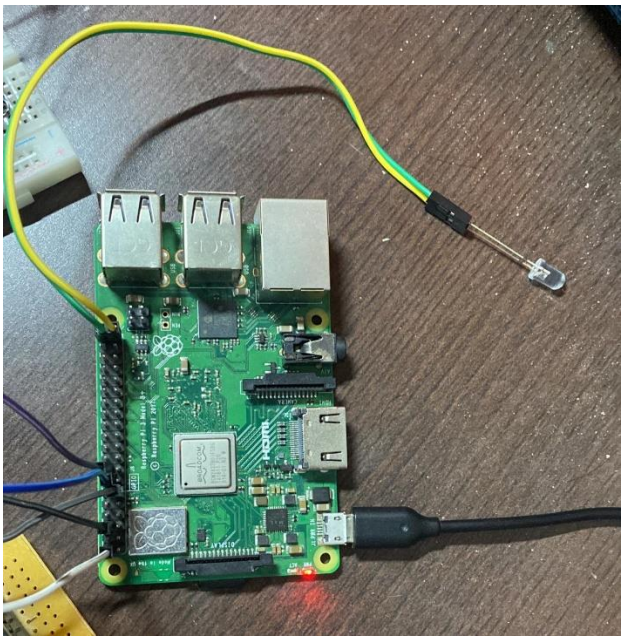
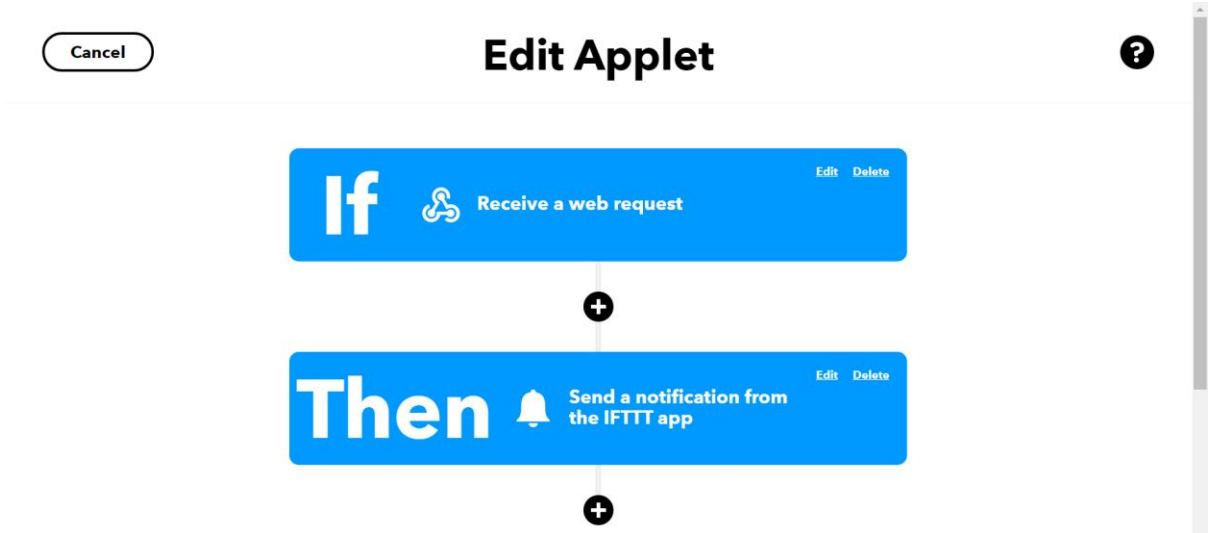


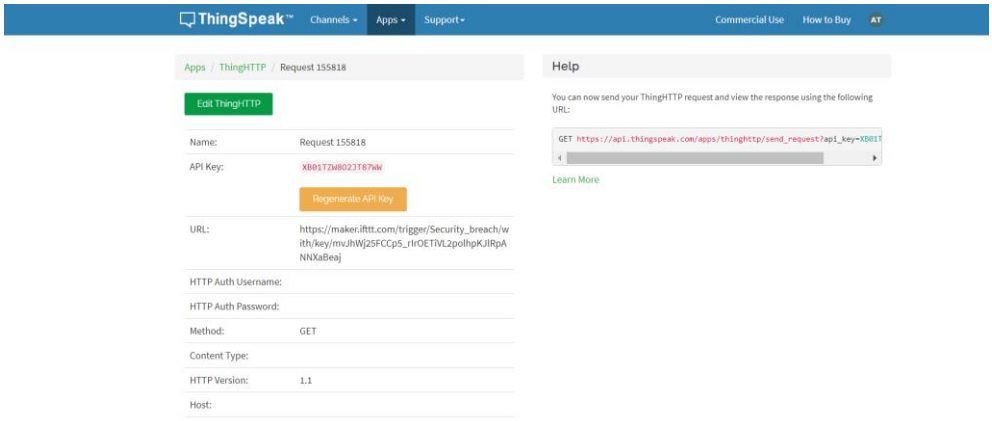
Fig 7: Raspberry pi with full connections with an LED

Implementation IFTTT with Thingspeak:

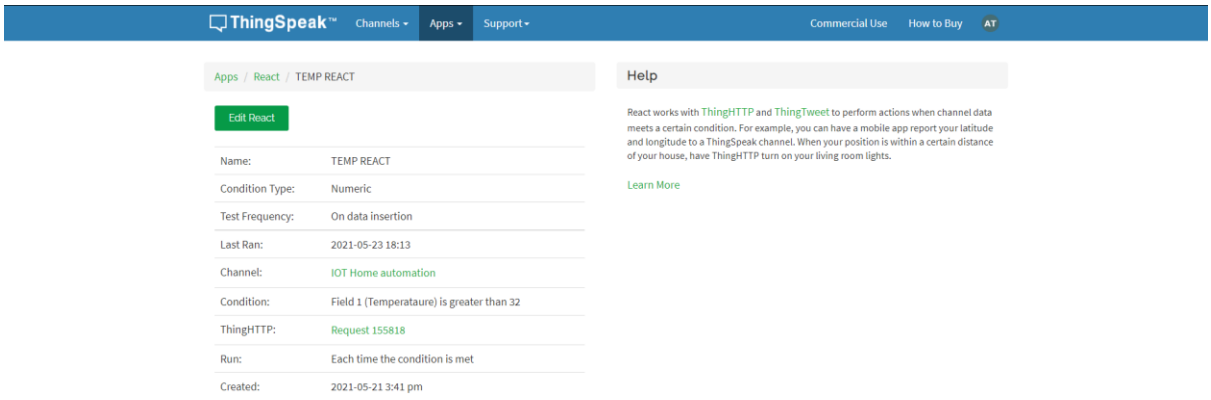
- Create a Webhook Applet in IFTTT



- Create ThingHTTP in Thingspeak with IFTTT trigger url

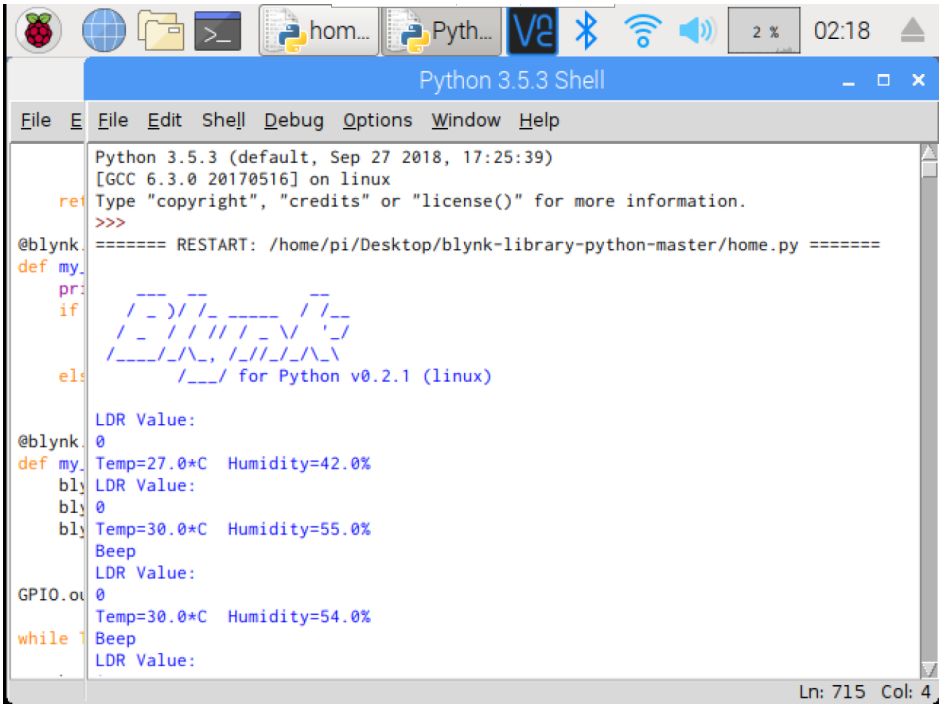


- Create a HTTP React in Thingspeak which triggers HTTP when condition temperature greater than 32 is met

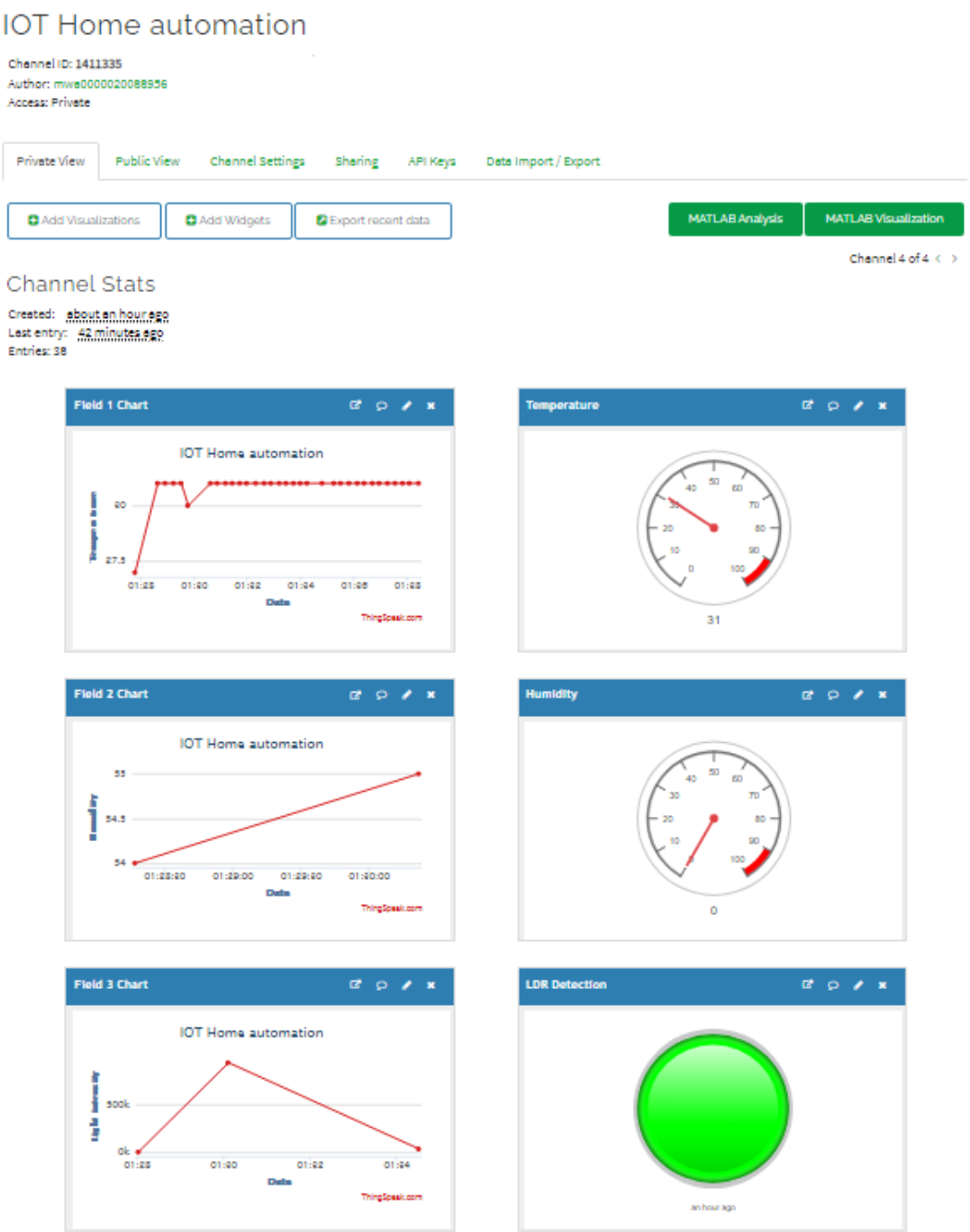


Result:

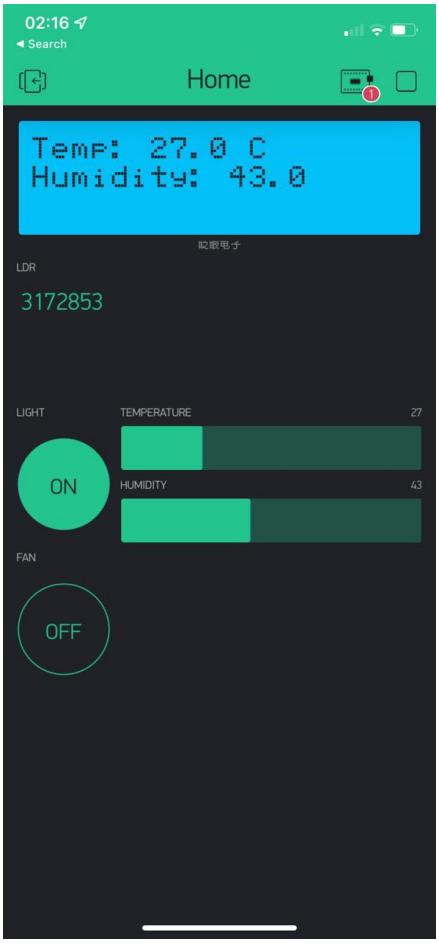
- Code output when run in IDLE:



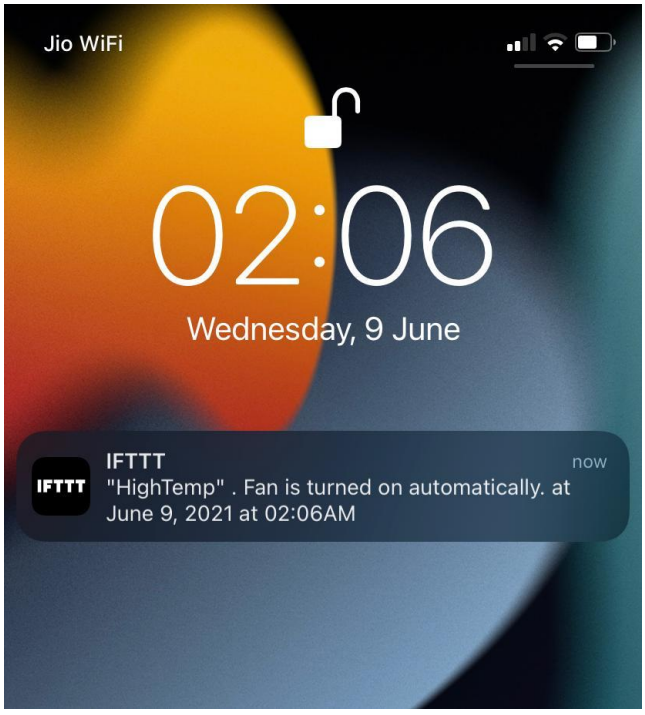
- Thingspeak Cloud data logging:



- Blynk App results:



- IFTTT Notification in phone:



Project Demo Video Link:

https://drive.google.com/file/d/1V22Teaagx40WAB-cOchPKYDhSwvKunBv/view?usp=sharing

Inference:

Hence, Home automation using Raspberry pi, Blynk app and Thingspeak was successfully created and verified.