A

Project Report On

Green House Monitoring & Control System

by

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on

Internet of Things

under the guidence of

SmartBridge

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1.INTRODUCTION

1.1 Overview

The objective of this report is to propose IoT based Green House Monitoring And Control System which aids the farmer in controlling the motors in his Green House remotely by checking the weather as well as soil conditions of the field through a Web App And Mobile App.

A Green house is a structure that is built on walls and a transparent roof and is designed to maintain regulated climatic conditions.These structures are used for the cultivation of plants,fruits and vegetables which require a particular level of parameter. Plants needs sustainable climatic conditions to grow and yield a good crop.Green house monitoring allows the farmer to know the temperature,humidity and soil moisture content.

1.2 Purpose

The Project entitled Green house monitoring and control system is an on-line information system with HTTP web based server designed using python, Ibm cloud,Node-Red,Mit Inventor App and aimed at providing a common server for many users connected across the internet

Online interactive system provides an interactive desktop application to user to check the humidity, temperature and requried conditions to grow plants in a sustained climate conditions and yield a good crop.It also provides a web app to check the details of temperature,humidity and gives an option to on and off the motor depending on the requirements.

SCOPE:-

Smart Agriculture System based on IoT can monitor soil moisture and climatic conditions to grow and yield a good crop.

Farmer is provided a mobile app using which he can monitor the temperature, humidity and soil moisture parameters along with weather forecasting details.

Based on all the parameters he can water his crop by controlling the motors using the mobile application.

Even if the farmer is not present near his crop he can water his crop by controlling the motors using the mobile application from anywhere.

2.LITERATURE SURVEY

2.1 Existing problems

•The system does not have information about regular changes on temperature and humidity.
•The system does not have the option to turn motor on and off automatically based on soil moistures.
•The system does not send any alert messages to user regarding high temperature or low temperatue.
•High humidity can cause crop transpiration.

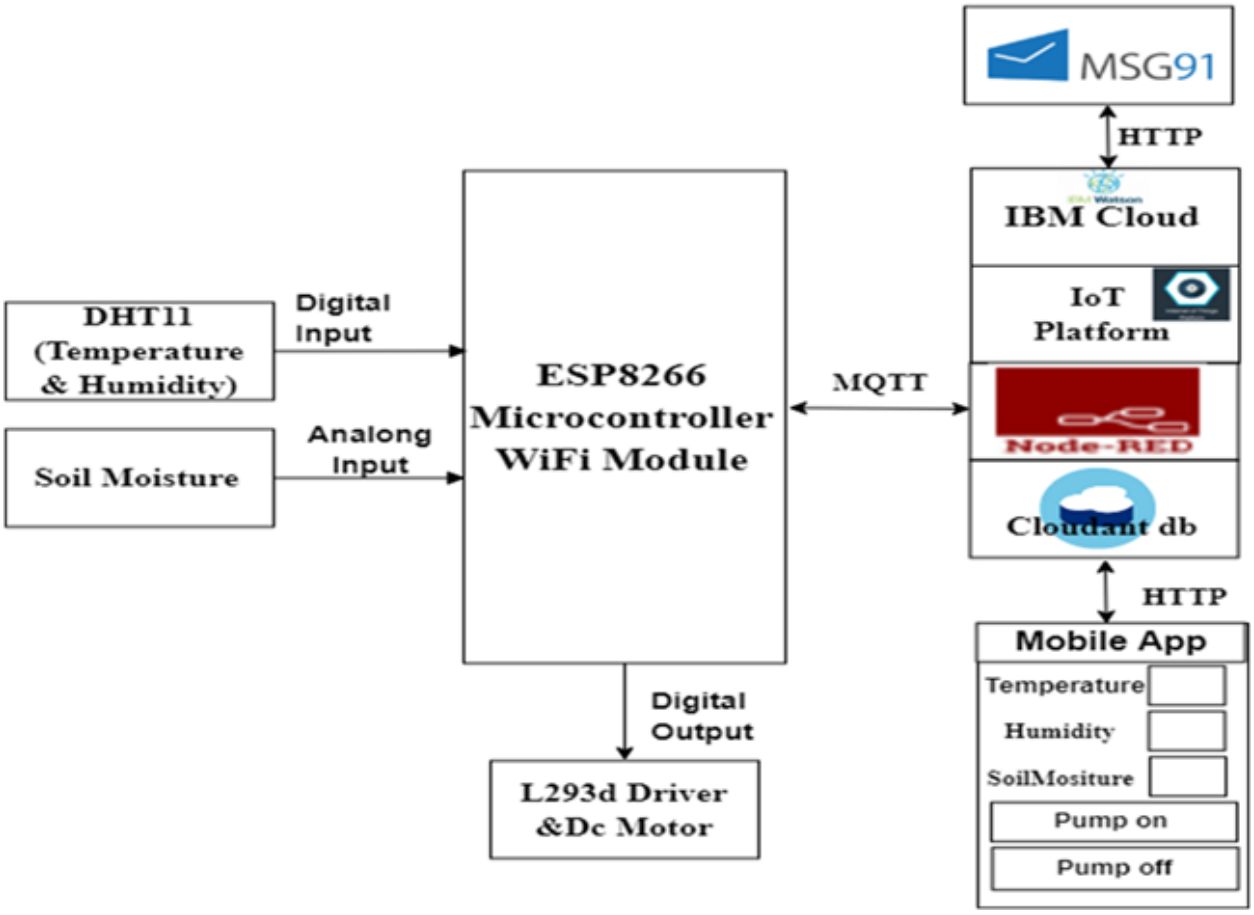
2.2 PROPOSED SOLUTION

•User can know the temperature and humidity values using a web application or moblie appliction.
•user can on and off the motor on moblie app or web application deponding on situation.
•If any parameters reach beyond the threshold values user is notified with alert message.

3.THEARITICAL ANALYSIS

3.1 Block Diagram

⁂Below is the block diagram of the project.



3.2 HARDWARE AND SOFTWARE DESIGNING

Hardware specification:

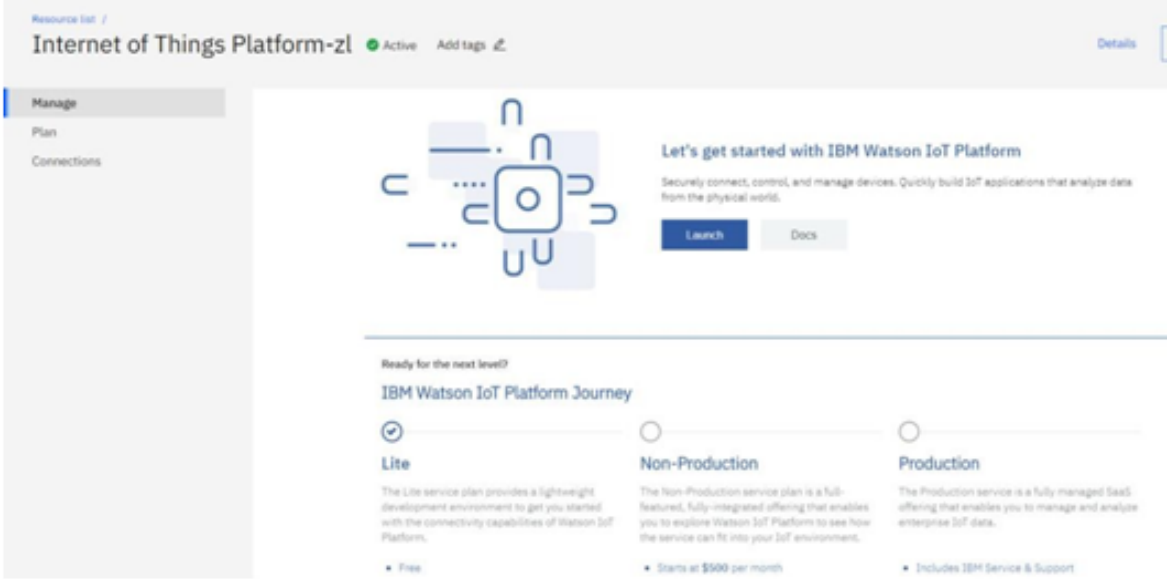
•processor : AMD Ryzen 5 2500U with radeon VegaMobile Gfx 2.00GHz
•8 GB RAM
•64 Bit Operating System

Software Specification:

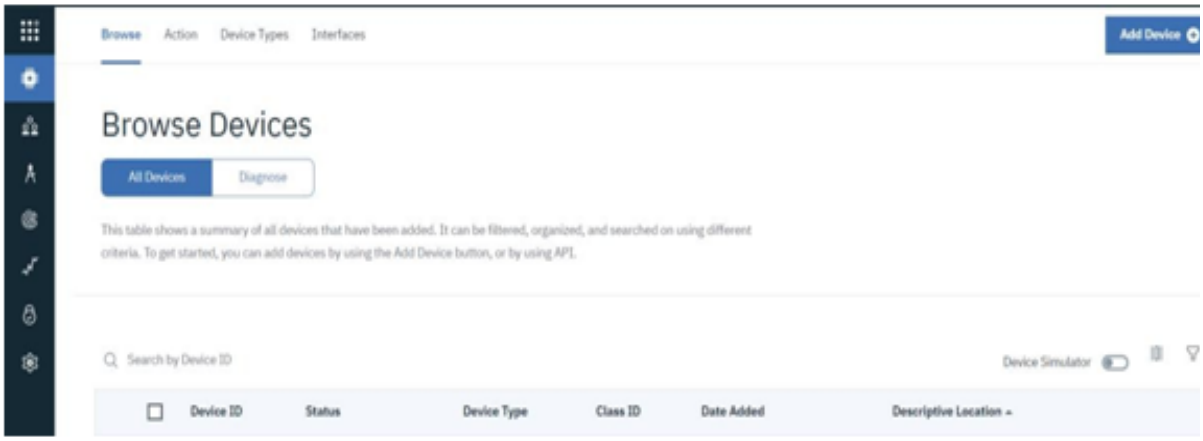
•DataBase : node-red-qcmio-cloudant-1594306440289-79244(cloudant-db)
•python,node-red,Mit-App inventor

4.Designing Procedure:-

1. Sign-up for IBM Academic Initiative Account through the linkhttps://my15.digitalexperience.ibm.com/b73a5759-c6a6-4033-ab6b-d9d4f9a6d65b/dxsites/151914d1-03d2-48fe-97d9-d21166848e65/academic/home Sign-in to your IBM cloud account from the linkhttps://cloud.ibm.com/login. There, go to Catalog and search for IoT in the search bar. Then select Internet of Things platform and subscribe for the desired plan and click create. Now, in the menu, go to Resource List click on Services then on Internet of Things Platform and then click Launch, as shownbelow:



2 .Now in the Watson IoT platform,click on the Add Device button at the top right corner, as shown below.



3. Now, once the data is received by the cloud,we use a special tool called Node-Red, alow-code programming tool for event-driven applications, to build a Web-App. To install Node-Red on windows, go tohttps://nodered.org/docs/getting-started/windows.
(For further details on how to use Node-Red, visit https://nodered.org/docs/user-guide/)

NODE RED FLOWS

Flows :-

fig 1: This flow is used to give the information about motor on/off conditions
.**fig 2:**This flow is used to give the information about temperature and humidity ,soil moisture.

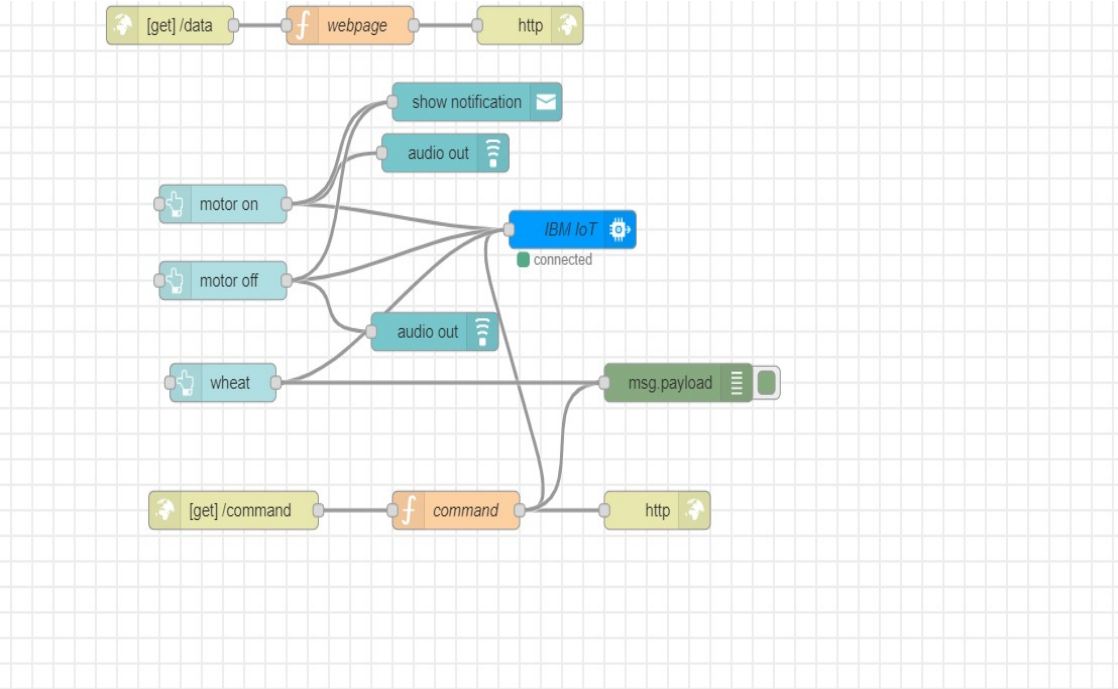


figure-1

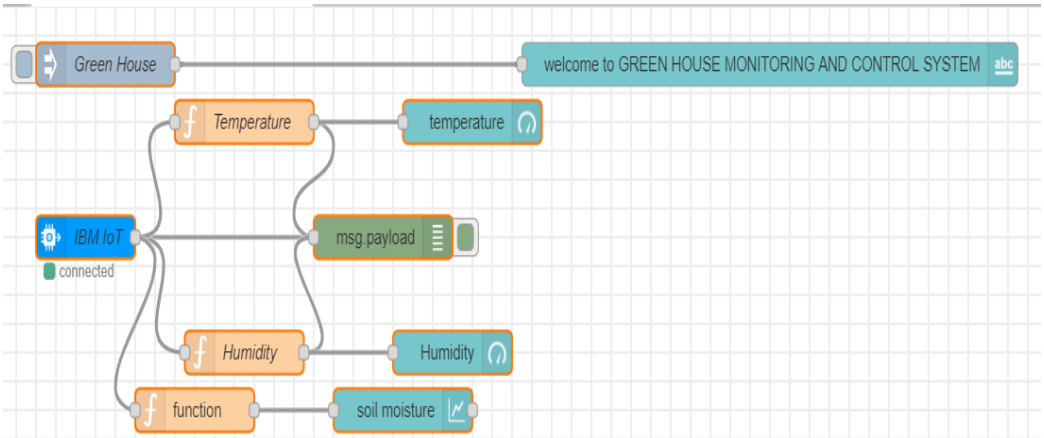
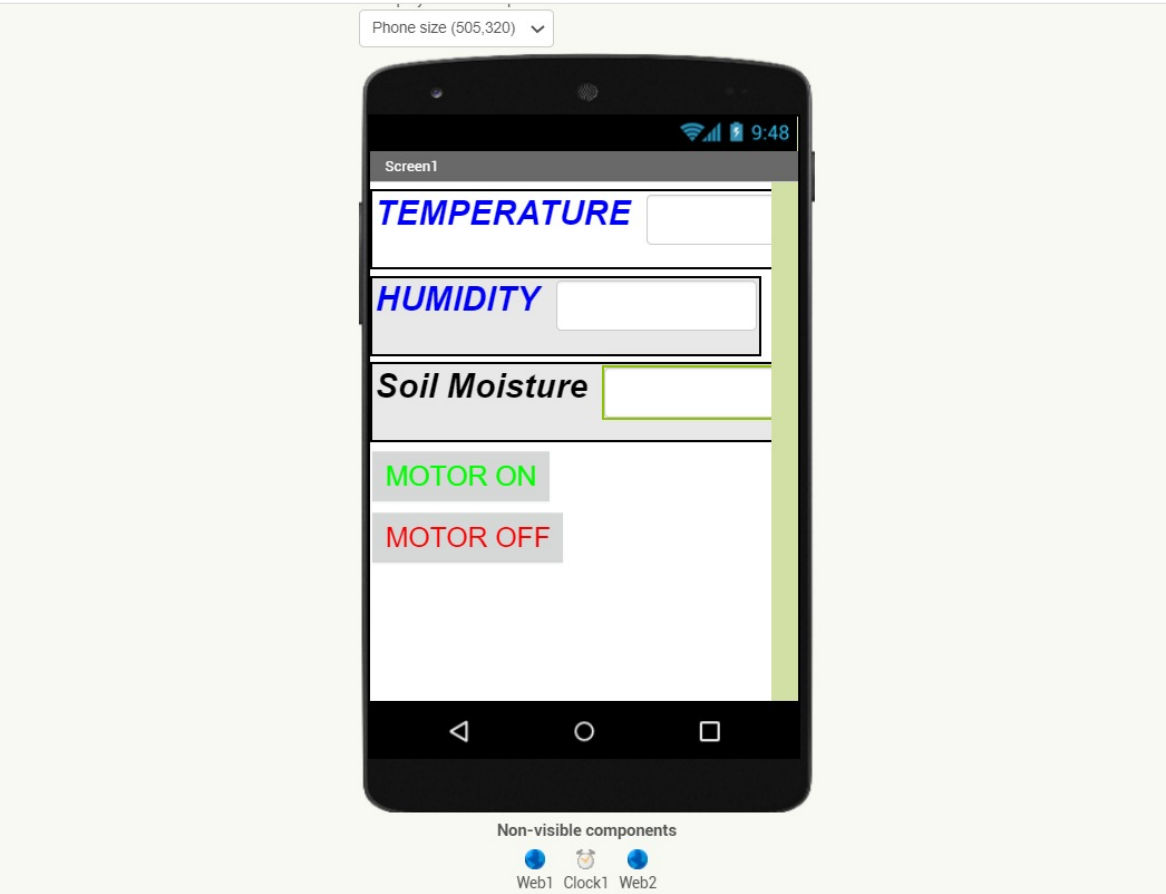
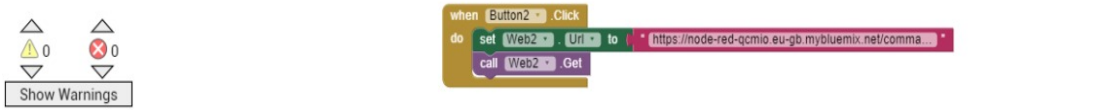


FIGURE-2

MIT_APP INVENTOR:



∗This is designer part of the mobile app



∗This is the backend application of the mobile app.

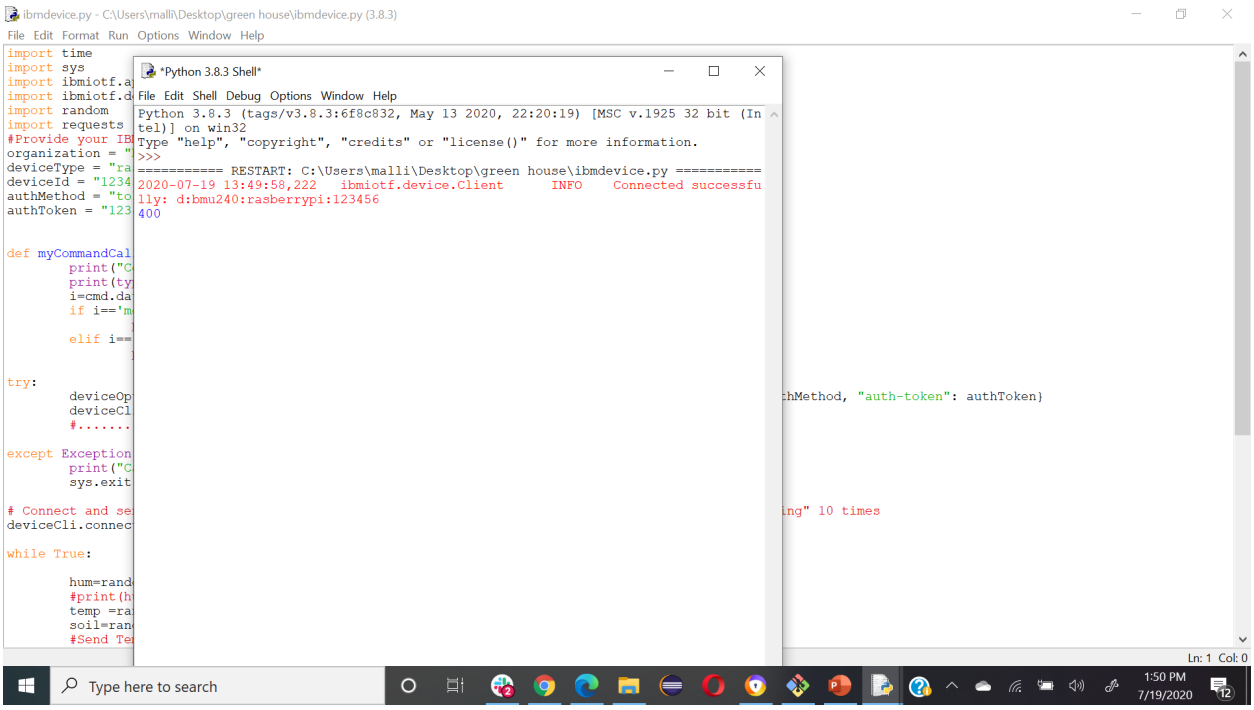
PYTHON CODE to retrieve commands from IBM Watson IOT Platform:

```
import time
import sys
import ibmiotf.application
import ibmiotf.device
import random
import requests
#Provide your IBM Watson Device Credentials
```

```
organization = "bmu240"
deviceType = "rasberrypi"
deviceId = "123456"
authMethod = "token"
authToken = "12345678"


def myCommandCallback(cmd):
        print("Command received: %s" % cmd.data)#Commands
        print(type(cmd.data))
        i=cmd.data['command']
        if i=='motoron':
                print("motor is on")
        elif i=='motoroff':
                print("motor is off")

try:
        deviceOptions = {"org": organization, "type": deviceType, "id": deviceId,
"auth-method": authMethod, "auth-token": authToken}
        deviceCli = ibmiotf.device.Client(deviceOptions)
        #.....................................

except Exception as e:
        print("Caught exception connecting device: %s" % str(e))
        sys.exit()

# Connect and send a datapoint "hello" with value "world" into the cloud as an event of
type "greeting" 10 times
deviceCli.connect()

while True:

        hum=random.randint(10, 40)
        #print(hum)
        temp =random.randint(30, 80)
        soil=random.randint(10,60)
        #Send Temperature & Humidity to IBM Watson
```

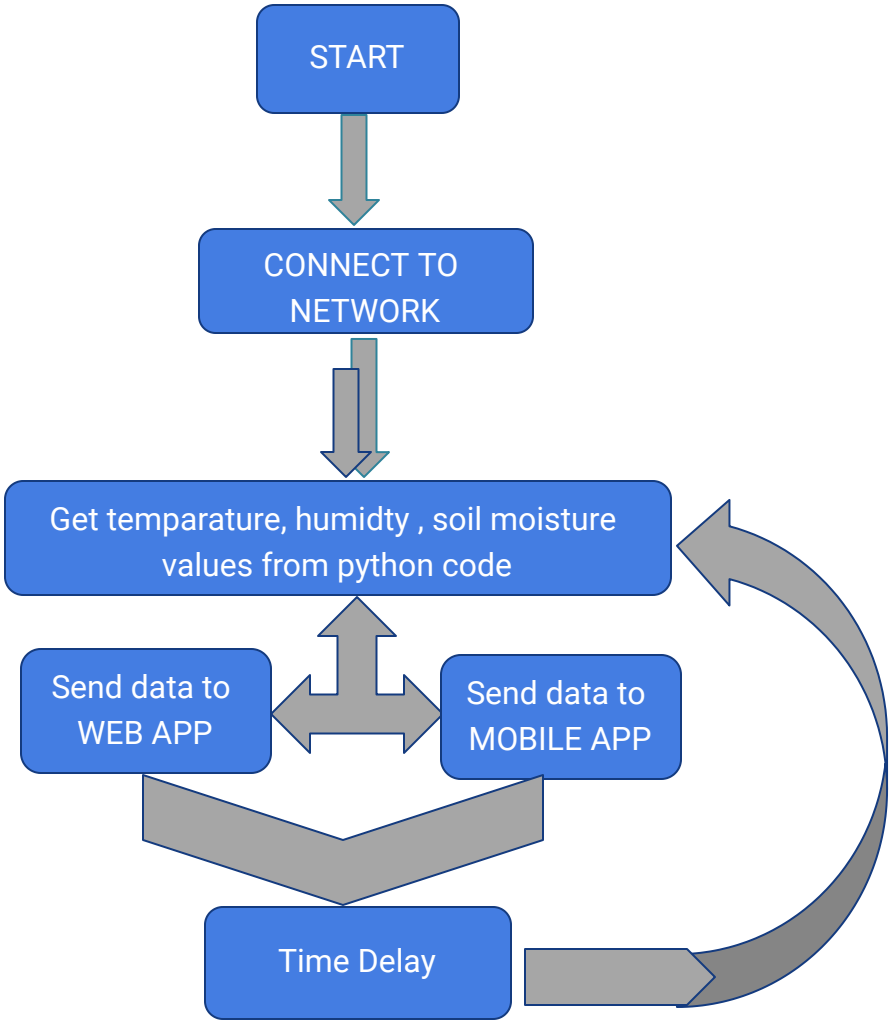
```
        data = { 'Temperature' : temp, 'Humidity': hum, 'soilmoisture':soil }
        #print (data)
        def myOnPublishCallback():
            print ("Published Temperature = %s C" % temp, "Humidity = %s %%" %
hum,"soilmoisture= %s %"%soil, "to IBM Watson")

        success = deviceCli.publishEvent("Weather", "json", data, qos=0,
on_publish=myOnPublishCallback)
        if not success:
            print("Not connected to IoTF")
        time.sleep(2)

        deviceCli.commandCallback = myCommandCallback


r=requests.get('https://www.fast2sms.com/dev/bulk?authorization=nO5pF9ULeKwo8Ev
HfVImxDaB1XqMbdGrs20C74ZluYhA3tTJzyNze7VmUb1AYkhZySL69xa3goW84qpK&se
nder_id=FSTSMS&message=temp is above threshold
values&language=english&route=p&numbers=9182519168,9912233583')
        if temp>=70:
                print(r.status_code)



# Disconnect the device and application from the cloud
deviceCli.disconnect()
```

Output of the python code :



5.FLOWCHART:

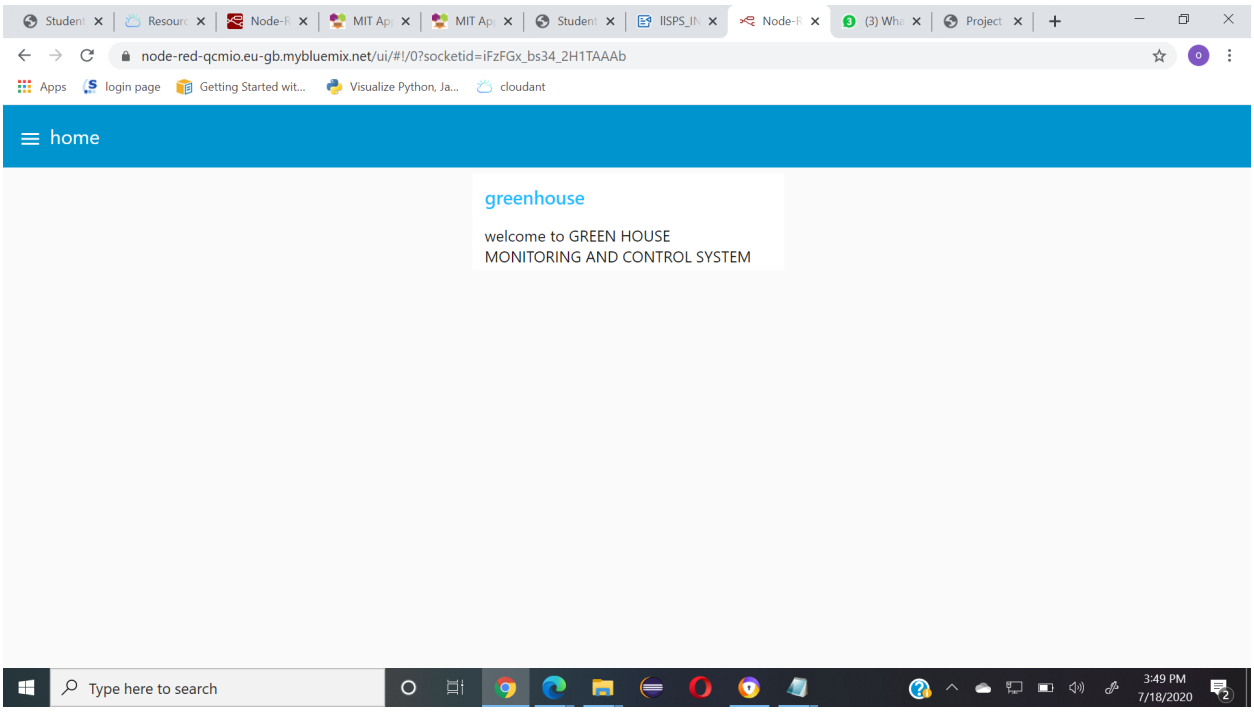
here is the flow chart describing the working of IOT based **Green House Monitoring & Control System.**

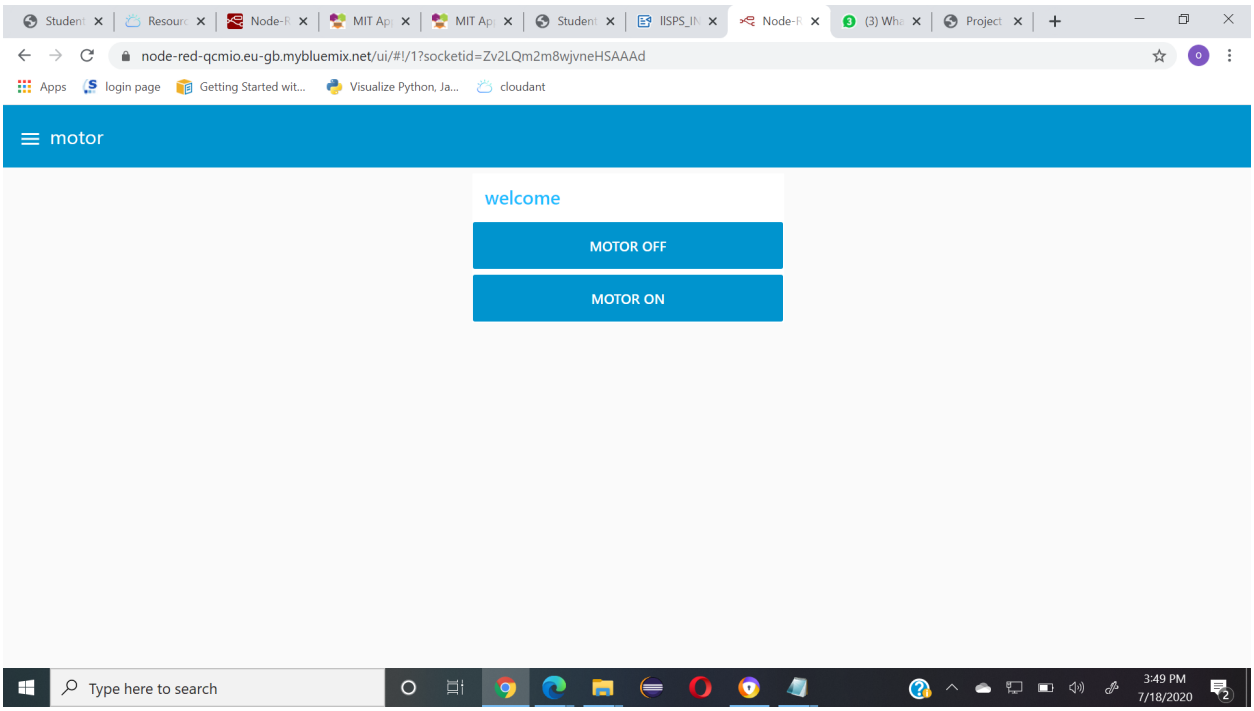


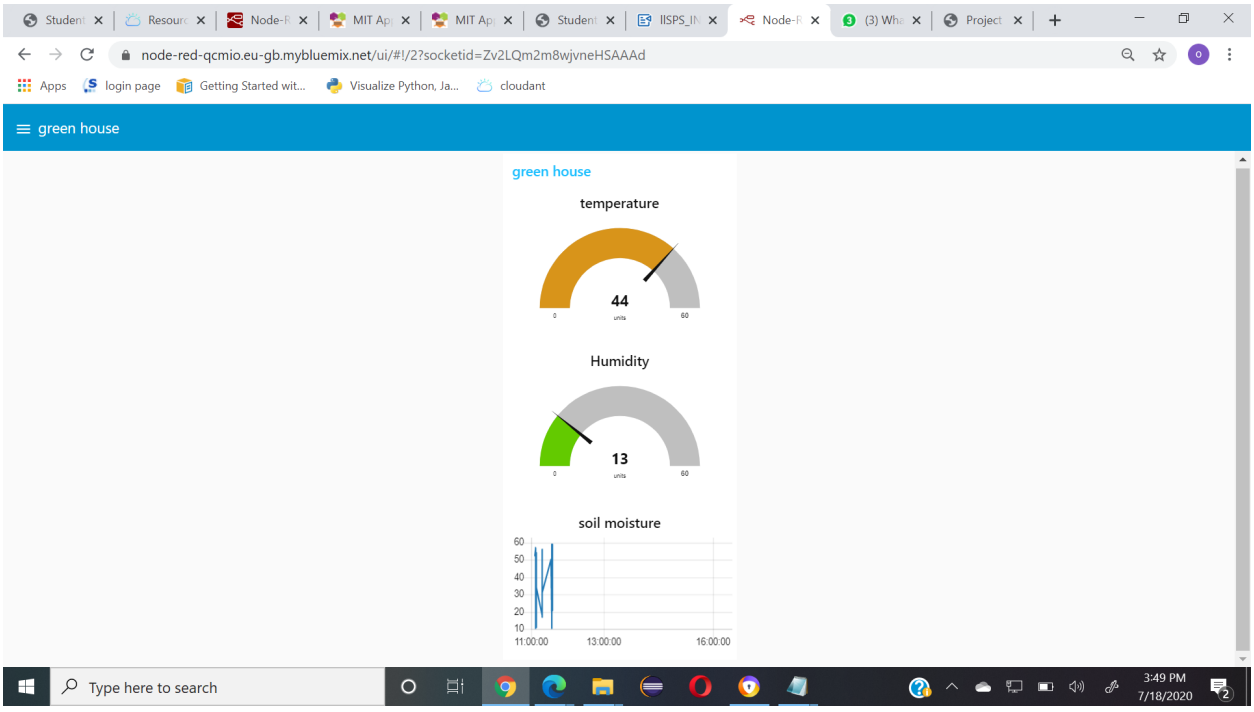
6.RESULT:-

Following the above designing procedure results in a web Application that is used by the farmers to perform green house monitoring and control system in a smart way.

The web Application generated by the above designing procedure is as follows:




node-red-qcmio.eu-gb.mybluemix.net/ui/#!/1?socketid=Zv2LQm2m8wjvneHSAAAd
motor
welcome
MOTOR OFF
MOTOR ON
Type here to search
3:49 PM
7/18/2020


node-red-qcmio.eu-gb.mybluemix.net/ui/#!/2?socketid=Zv2LQm2m8wjvneHSAAAd
green house
green house
temperature
44
Humidity
13
soil moisture
60
50
40
30
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10
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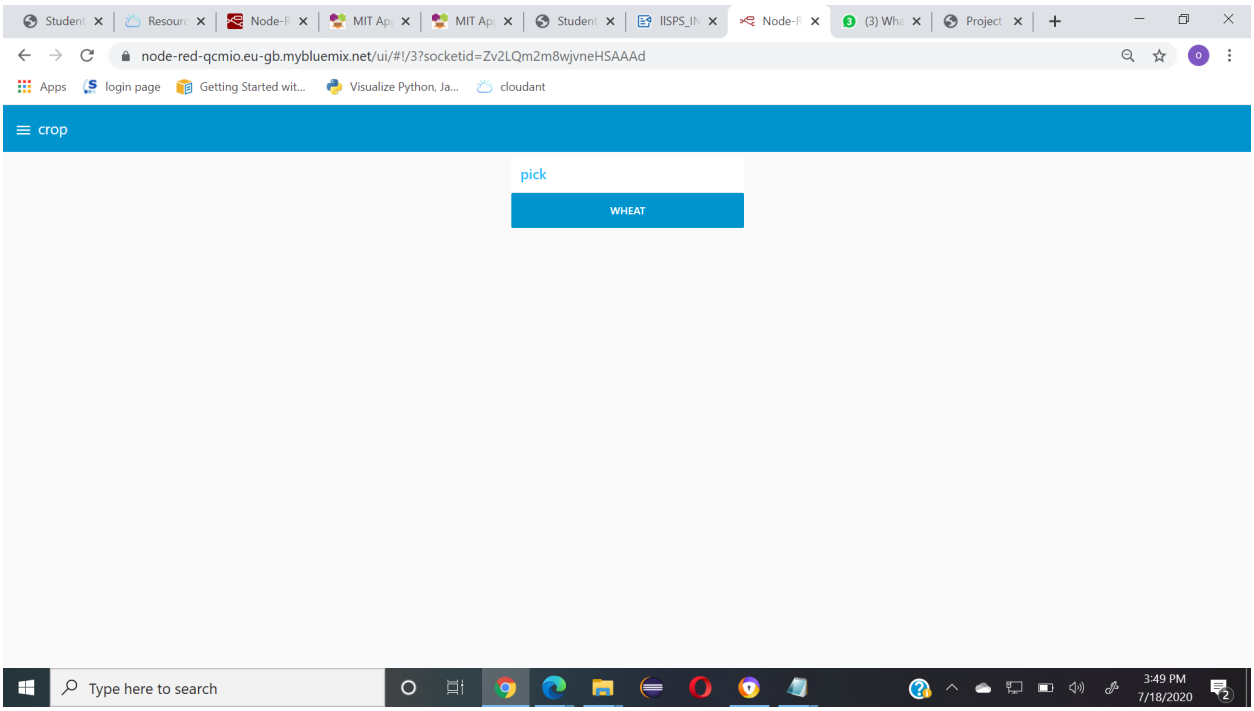
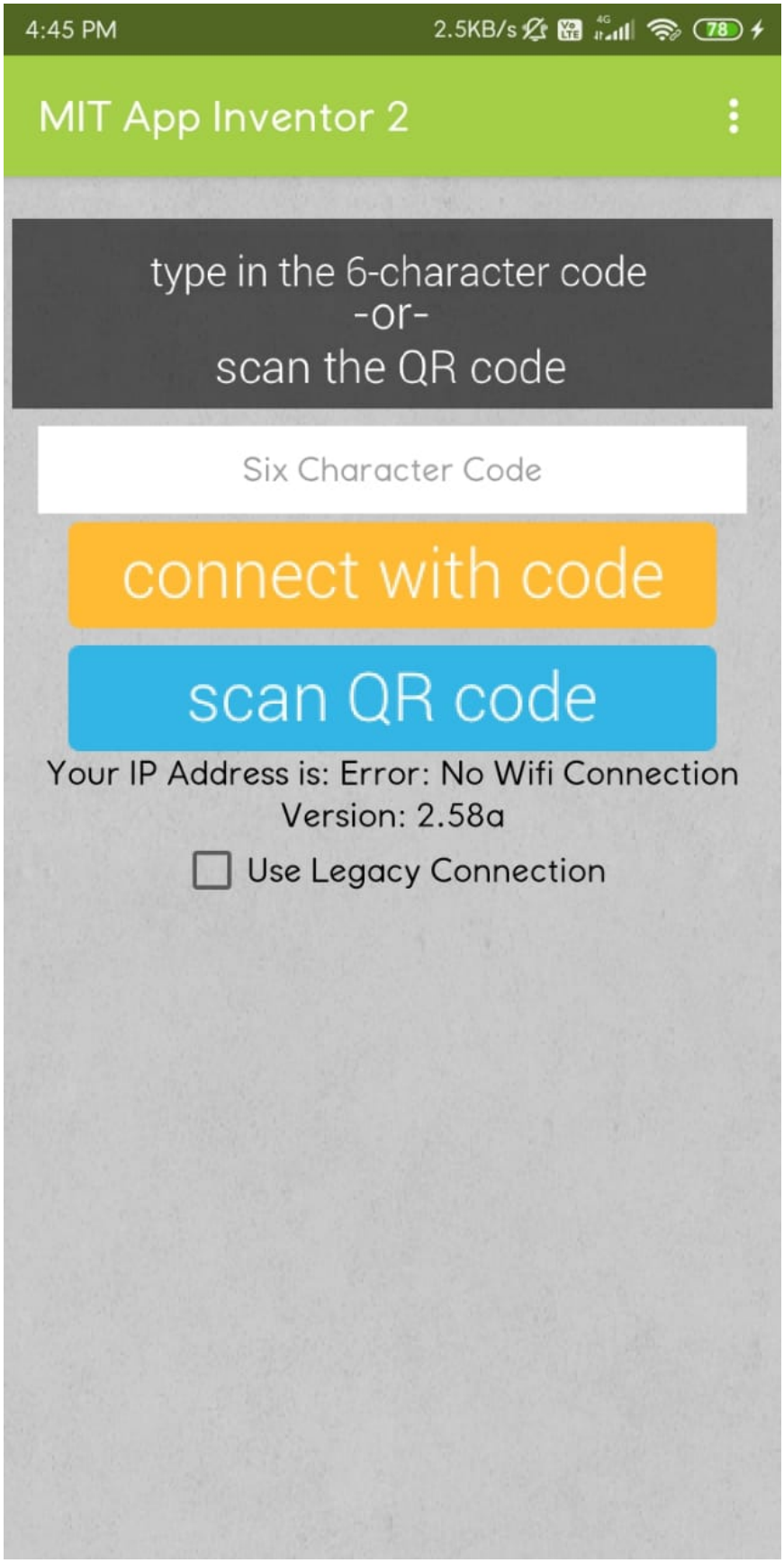
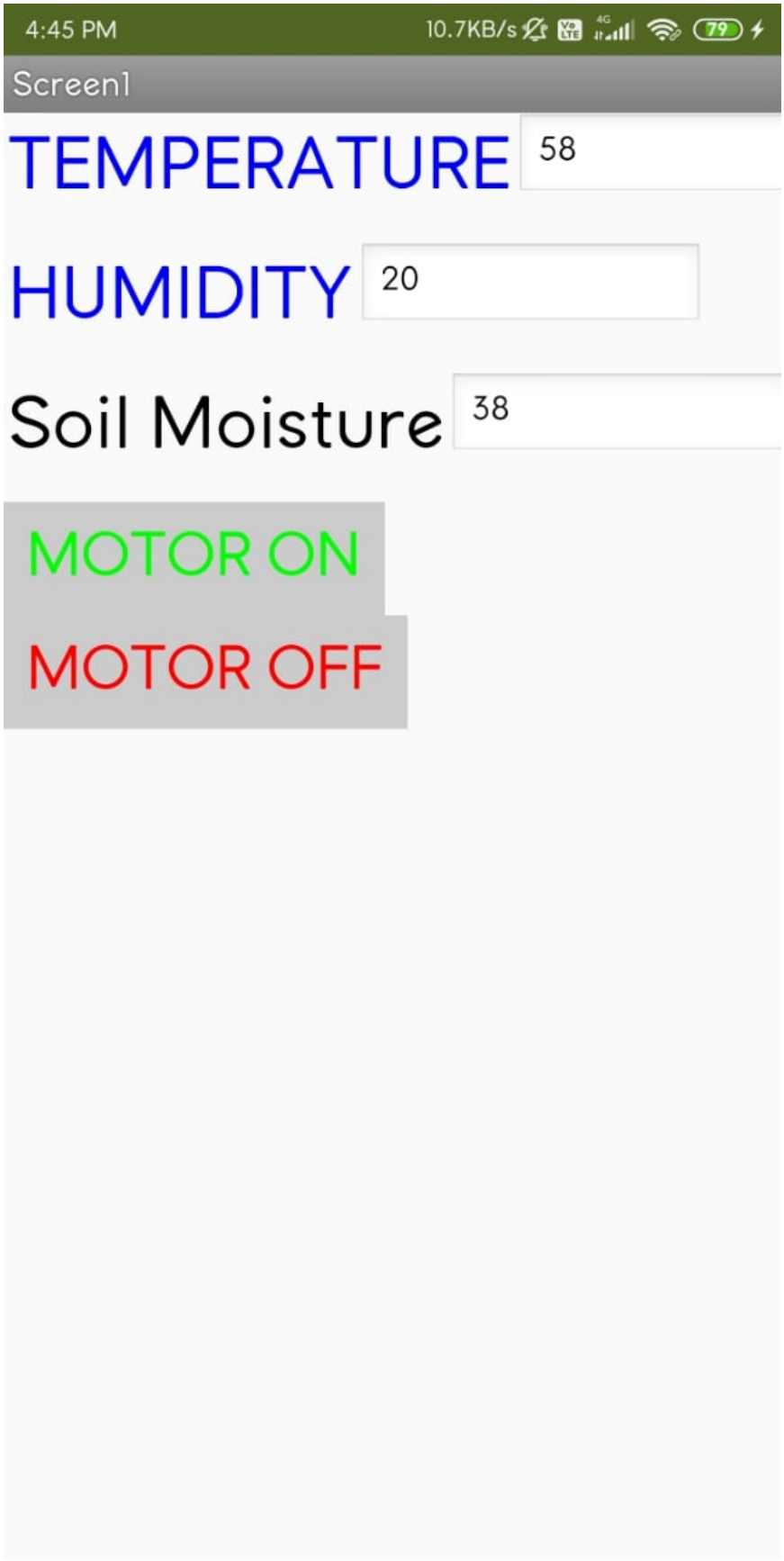
7/18/2020



Following the above designing procedure results in a Mobile Application that is used by the farmers to perform green house monitoring and control system in a smart way.

The Mobile Application generated by the above designing procedure is as follows:


4:45 PM
2.5KB/s
MIT App Inventor 2
type in the 6-character code
-or-
scan the QR code
Six Character Code
connect with code
scan QR code
Your IP Address is: Error: No Wifi Connection
Version: 2.58a
Use Legacy Connection


4:45 PM
10.7KB/s
Screen1
TEMPERATURE
58
HUMIDITY
20
Soil Moisture
38
MOTOR ON
MOTOR OFF

7.Advantages & Disadvantages:

Advantages:

- High profits
- Clean crops
- Soil-free
- Crops can grow in poor areas
- Less staff
- Shorter harvest time
- No ploughing

Disadvantages:

- Expensive
- Lots of planning needed
- Alarms needed
- Income and ability to grow crops need to be balanced against the cost of the system

8.Applications:

- Automatic plant monitoring
- Water pump control
- Climate control
- Intelligent Environment Control System

9.Conclusion:

IoT based **Green House Monitoring & Control System** for Live Monitoring of Temperature and Soil Moisture has been proposed using IoT sensor simulator and Cloud Computing. The IoT based Green House Monitoring & Control System being proposed via this report will assist farmers in increasing the agriculture yield and take efficient care of food production as the System will always provide helping hand to farmers for getting accurate live feed of environmental temperature and soil moisture.

10.Future Scope:

Future work would be focused more on increasing sensors on this system to fetch more data especially with regard to Pest Control and by also integrating GPS module in this system to enhance this Agriculture IoT Technology to full-fledged Agriculture Precision ready product.

11.Bibilography:

https://smartbridge.teachable.com