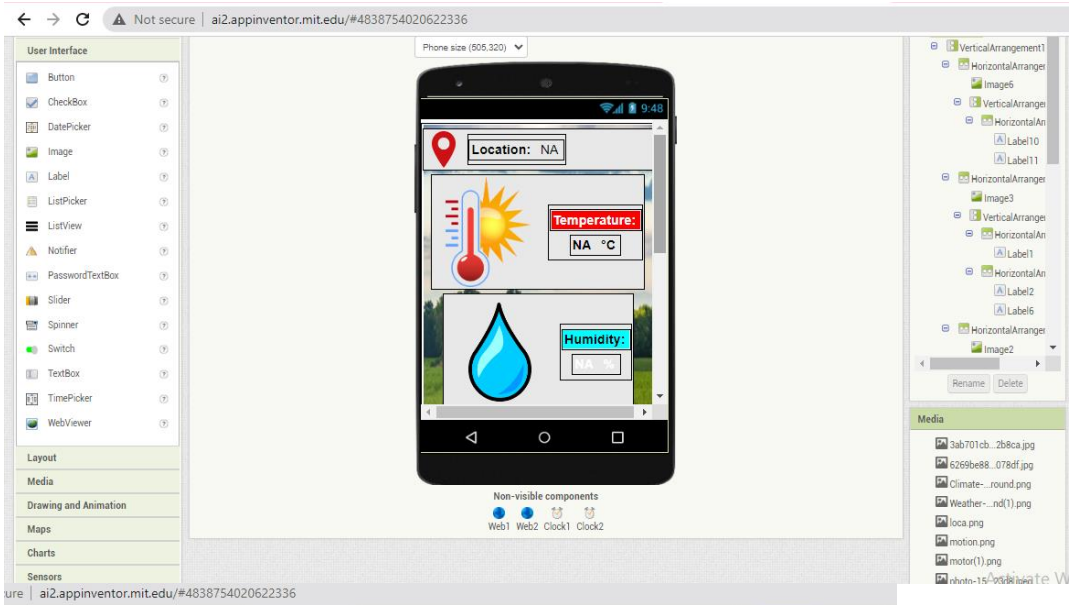
Sprint – 3

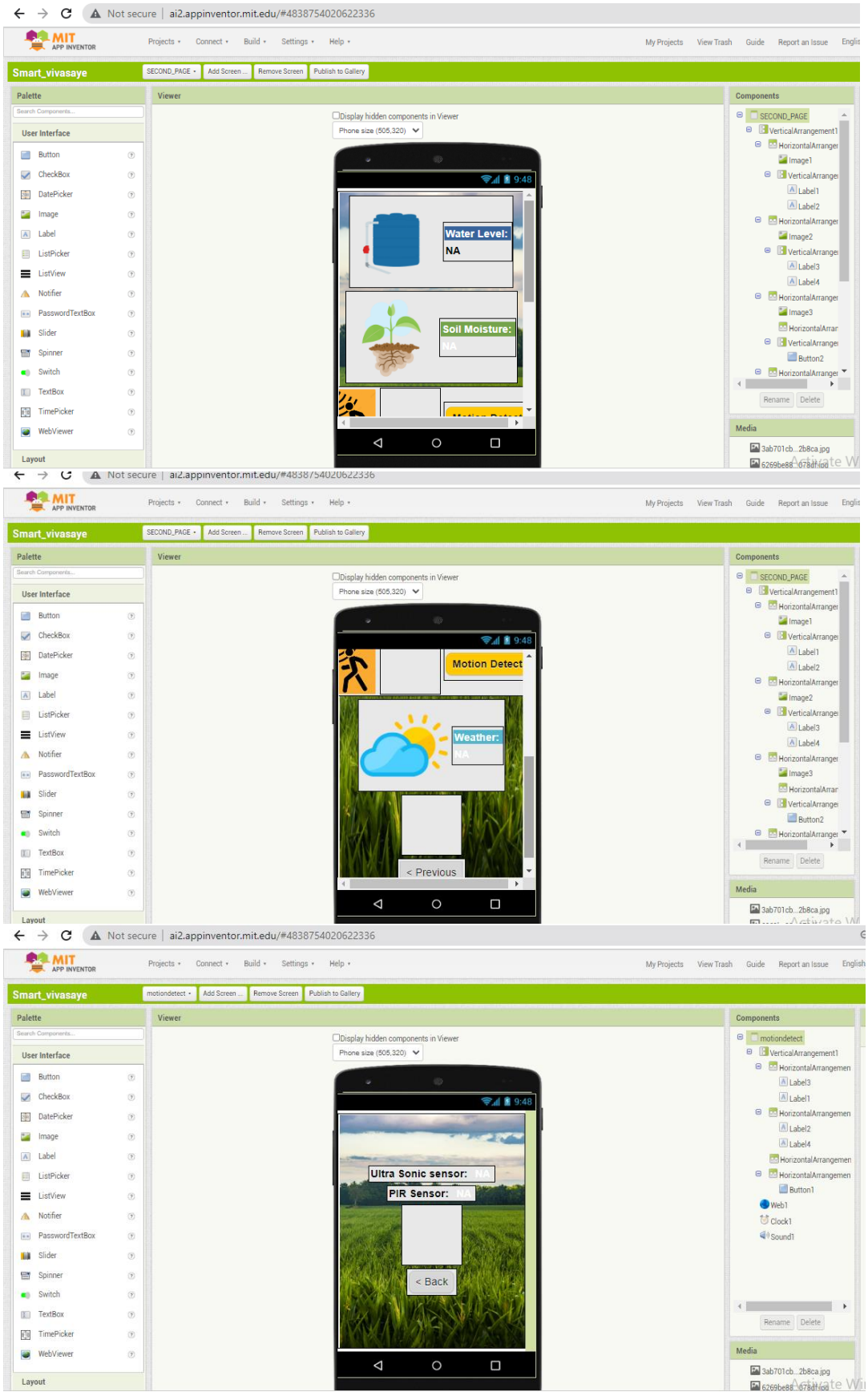
Date	10 Nov 2022
Team ID	PNT2022TMID47541
Project name	IoT Based Smart Crop Protection System forAgriculture

1.MIT App Design

Screen 3

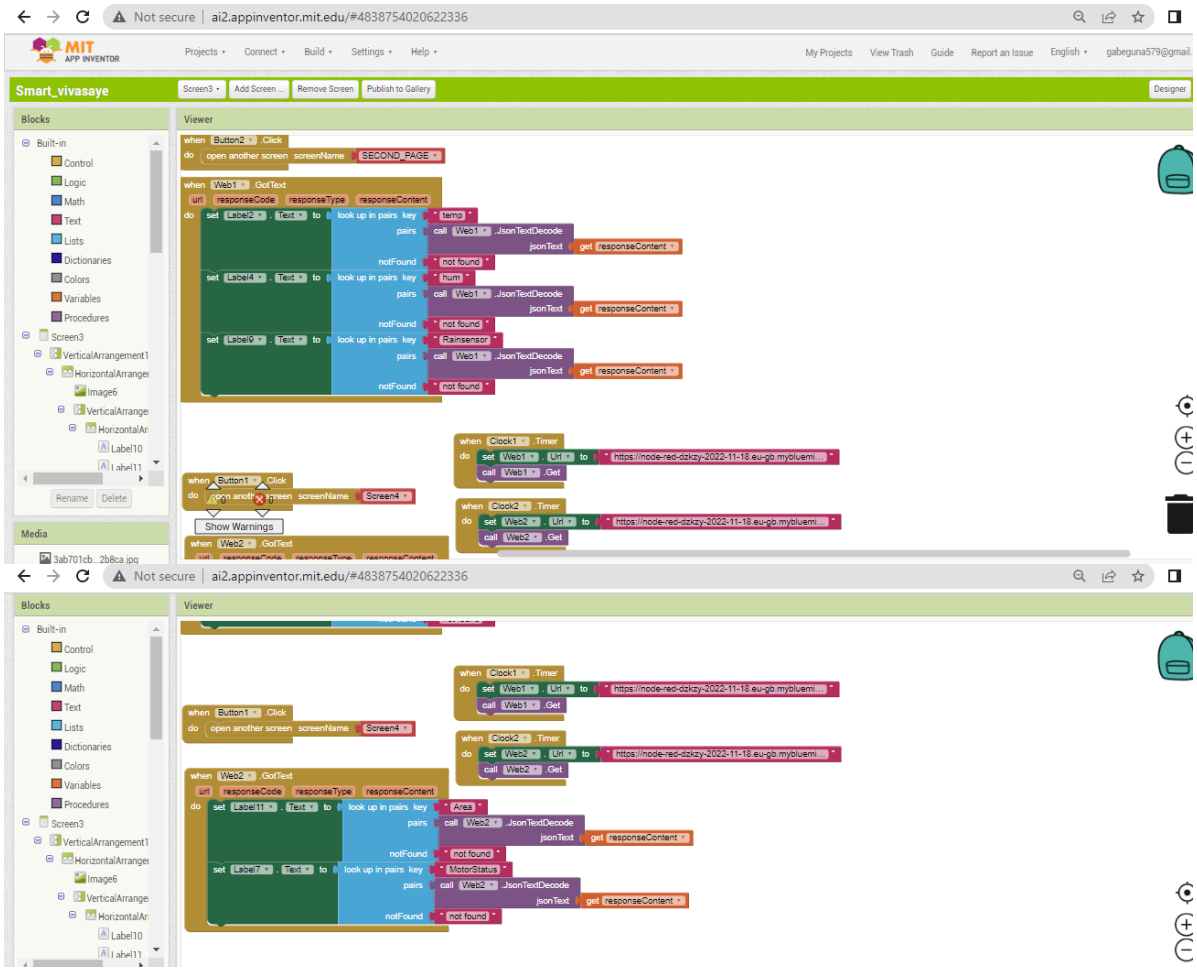


Second Page

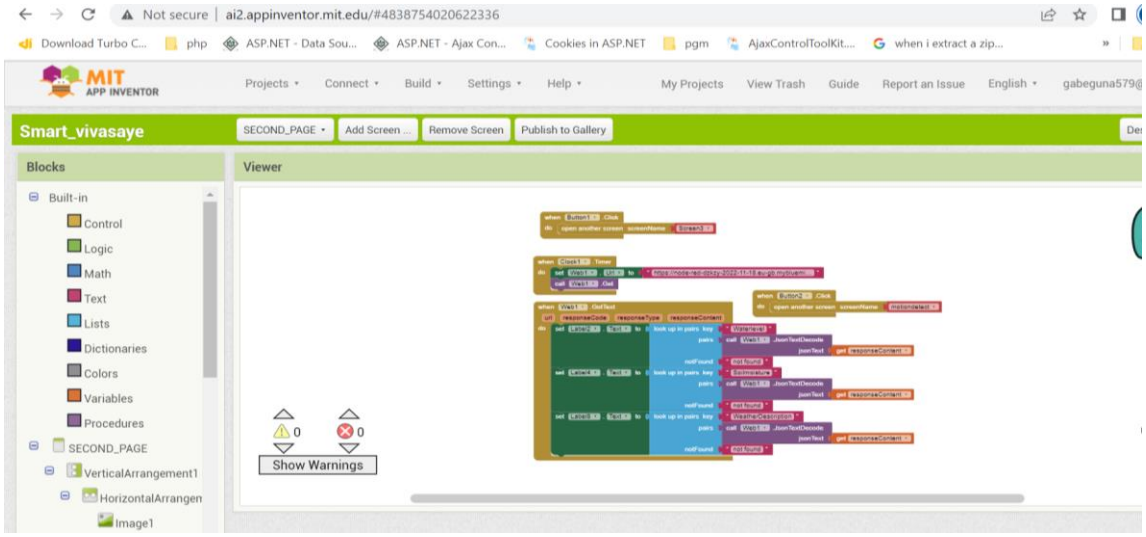


2.MIT App Inventor Blocks

Screen 3



Second Page



3.Python code for Monitoring field

```
while True:

        motorstatus = ""
        waterlevel=random.randint(1,20)
        Waterusing=""
        if waterlevel < 2:
                waterusing =str(waterlevel) + " feet Water Level Low"
        else:
                waterusing =str(waterlevel) + " feet Using rain water"

        soilmoisture=random.randint(0,872)
        if soilmoisture <200:
                motorstatus="Motor on automatically"

        else:
                motorstatus="Motor off automatically"

        response = requests.get(complete_url)
        x = response.json()
        if x["cod"] != "404":
                y=x["name"]
                z = x["weather"]
                weather_description = z[0]["description"]
        data = { 'Waterlevel' : waterusing, 'SoilMoisture': soilmoisture, 'MotorStatus':motorstatus, 'Area':str(y),'WeatherDescription':str(weather_descripti
        #print data
        def myOnPublishCallback():
                print ("Published Waterlevel = %s " % waterusing, "SoilMoisture = %s %%" % soilmoisture, "MotorStatus = %s" % motorstatus," Area="+str(y)," Weath

        success = deviceCli.publishEvent("event_1", "json", data, qos=0, on_publish=myOnPublishCallback)
        if not success:
                print("Not connected to IoTF")
        time.sleep(10)


        deviceCli.commandCallback = myCommandCallback


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

4.Wokwi Code for Monitoring field

```
#define PIN_TRIG 27
#define PIN_ECHO 26
#define TFT_DC 2
#define TFT_CS 15
#define SOUND_SPEED 0.034

const int DHT_PIN = 13;
int pirpin = 12;
int BUZZER_CHANNEL = 0;
int ultrabuzzer=33;
int temperaturepin=35;
const float BETA = 3950;
int pirState = LOW;
String payload;



const String endpoint = "https://api.openweathermap.org/data/2.5/weather?lat=10.2776&lon=78.5424&app
const String key = "dff65ece7cd56e5609a961090c1815a5";

DHTesp dhtSensor;
Adafruit_ILI9341 tft = Adafruit_ILI9341(TFT_CS, TFT_DC);
```

```
{"country":"IN","sunrise":1669164245,"sunset":1669206033},"timezone":19800,"id":12
e":"Ponnamarāvati","cod":200}
Area: "Ponnamarāvati"
Weather_Details: [{"id":804,"main":"Clouds","description":"overcast clouds","icon"
Sending payload: {"temperature":47.60,"Humid":68.00,"PIR_Sensor":"No Motion
Detected","Ultrasonic_Sensor":"No Motion Detected","Rain_Sensor":"Normal Rain"}
Publish ok
```

Download Turbo C... | php | ASP.NET - Data Sou... | ASP.NET - Ajax Con... | Cookies in ASP.NET | pgm | AjaxControlToolKit.... | when i extract a zip... | Oth

WOKWI SAVE SHARE

esp32-ili9341-hello.ino | diagram.json | libraries.txt | Library Manager

```
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";// Server Name
char publishTopic[] = "iot-2/evt/event_1/fmt/json";// topic name and type of event perform and forma
char subscribetopic[] = "iot-2/cmd/command/fmt/String";// cmd  REPRESENT command type AND COMMAND IS
char authMethod[] = "use-token-auth";// authentication method
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;//client id

WiFiClient wifiClient; // creating the instance for wificlient
PubSubClient client(server, 1883, callback ,wifiClient); //calling the predefined client id by passi

void setup() {
  Serial.begin(9600);
  dhtSensor.setup(DHT_PIN, DHTesp::DHT22);
  tft.begin();
  ledcSetup(BUZZER_CHANNEL, 8000, 12);
  pinMode(PIN_TRIG, OUTPUT);
  pinMode(PIN_ECHO, INPUT);
  ledcAttachPin(ultrabuzzer, BUZZER_CHANNEL);
  analogReadResolution(10);
  pinMode(temperaturepin,INPUT);
  wificonnect();
  mqttconnect();
}

int value=0;
void loop() {
  HTTPClient http;
    http.begin(endpoint + key);
    int httpCode = http.GET();
    if (httpCode > 0) {
        String payloadweather = http.getString();
        Serial.println(httpCode);
```

Simulation

```
{"temp":297.04,"feels_like":297.42,"temp_min":297.04,"temp_max":297.04,"pressure":
dity":74,"sea_level":1011,"grnd_level":994},"visibility":10000,"wind":
{"speed":1.81,"deg":185,"gust":2.28},"clouds":{"all":96},"dt":1669221916,"sys":
{"country":"IN","sunrise":1669164245,"sunset":1669206033},"timezone":19800,"id":12
e":"Ponnamarāvati","cod":200}
Area: "Ponnamarāvati"
Weather_Details: [{"id":804,"main":"Clouds","description":"overcast clouds","icon"
```

WOKWI SAVE SHARE Docs

esp32-ili9341-hello.ino | diagram.json | libraries.txt | Library Manager

```
  if (httpCode > 0) {
    String payloadweather = http.getString();
    Serial.println(httpCode);
    Serial.println("Http Status Code: "+httpCode);
    Serial.println(payloadweather);
   JSONVar myObject = JSON.parse(payloadweather);

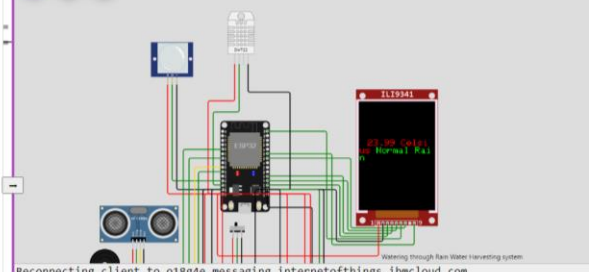
   if (JSON.typeof(myObject) == "undefined") {
    Serial.println("Parsing input failed!");
    return;
   }
   Serial.print("Area: ");
   Serial.println(myObject["name"]);
   Serial.print("Weather_Details: ");
   Serial.println(myObject["weather"]);
  }

  else {
   Serial.println("Error on HTTP request");
  }

  http.end(); //Free the resources

TempAndHumidity  data = dhtSensor.getTempAndHumidity();
float t=data.temperature;
float h=data.humidity;
payload = "{\"temperature\":";
payload += t;
payload += "," "\"Humid\":";
payload += h;
payload += ",";
```

Simulation 00:45.845




```
Reconnecting client to o18g4e.messaging.internetofthings.ibmcloud.com
iot-2/cmd/command/fmt/String
subscribe to cmd OK

Sending payload: {"temperature":47.60,"Humid":68.00,"PIR_Sensor":"No Motion
Detected","Ultrasonic_Sensor":"No Motion Detected","Rain_Sensor":"Normal Rain"}
Publish ok
```

WOKWI SAVE SHARE

esp32-ili9341-hello.ino | diagram.json | libraries.txt | Library Manager

```
  if (!client.loop()) {
    mqttconnect();
  }

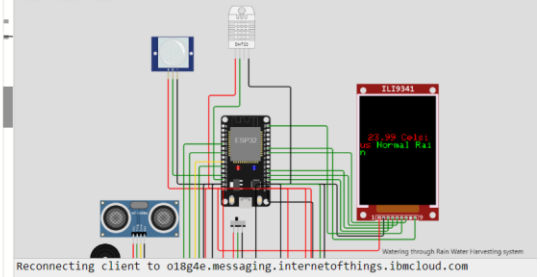

  int state = digitalRead(pirpin);

  if (state == HIGH) {
    if (pirState == LOW)
  {
      tft.fillScreen(ILI9341_BLACK);
      tft.setTextColor(ILI9341_RED);
      tft.setTextSize(3);
      tft.setCursor(0, 120);
      tft.println("Motion Detected");
      pirState = HIGH;
      ledcWriteTone(BUZZER_CHANNEL,500);
     payload += "\"PIR_Sensor\":";
      payload +="\"Motion Detected\"";
      payload += ",";

  }
  }
   else if (pirState == HIGH) {

      tft.fillScreen(ILI9341_BLACK);
      tft.setTextColor(ILI9341_RED);
      tft.setTextSize(3);
      tft.setCursor(0, 120);
      tft.println("Motion ended");
      ledcWrite(BUZZER_CHANNEL, 0);
```

Simulation

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Publish ok
```

WOKWI SAVE SHARE Docs

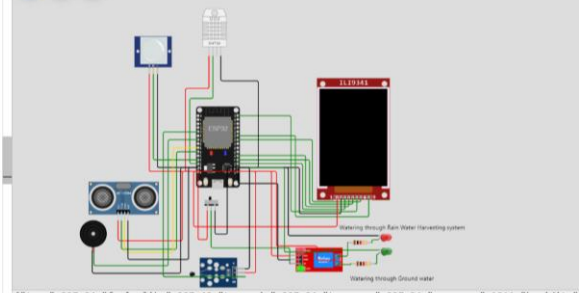
esp32-ili9341-hello.ino | diagram.json | libraries.txt | Library Manager

```
      ledcWrite(BUZZER_CHANNEL, 0);
      pirState = LOW;
      payload += "\"PIR_Sensor\":";
      payload +="\"Motion Ended\"";
      payload += ",";

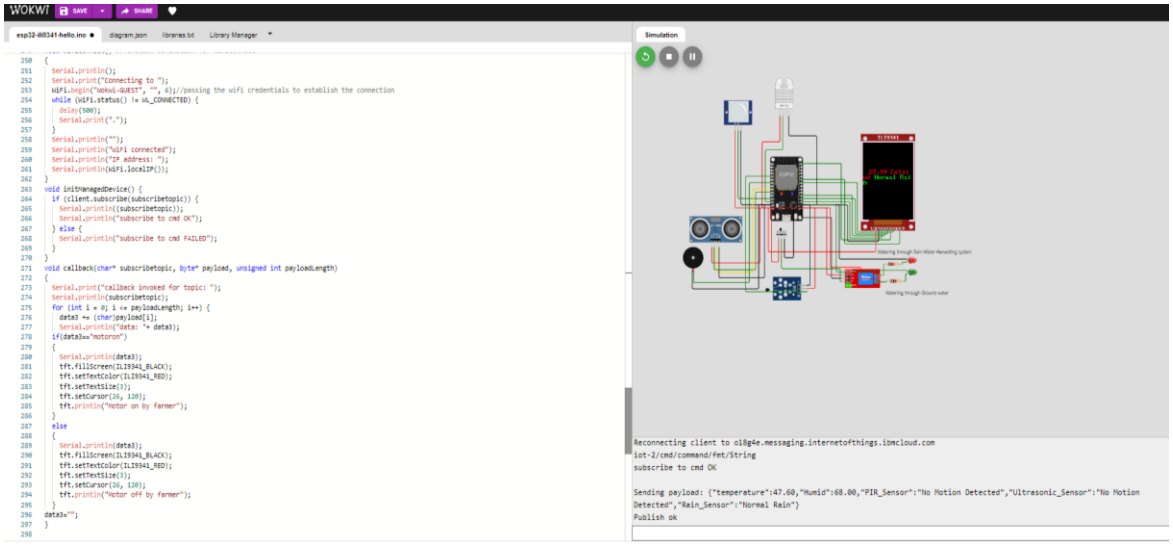
}
else
{
payload += "\"PIR_Sensor\":";
      payload +="\"No Motion Detected\"";
      payload += ",";
}

  digitalWrite(PIN_TRIG, HIGH);
  delayMicroseconds(10);
  digitalWrite(PIN_TRIG, LOW);
  int duration = pulseIn(PIN_ECHO, HIGH);
  int distance = duration * SOUND_SPEED/2;
  delay(1000);
  if(distance<100)
  {
    tft.fillScreen(ILI9341_BLACK);
    tft.setTextColor(ILI9341_RED);
    tft.setTextSize(3);
    tft.setCursor(1, 120);
    tft.println("Motion Detected in 100 cm range");
    ledcWriteTone(BUZZER_CHANNEL,300);
    //ledcWriteNote(BUZZER_CHANNEL, (note_t)NOTE_G, 5);
    payload += "\"Ultrasonic_Sensor\":";
      payload += "\"Motion Detected in 100cm range\"";
      payload += ",";
  }
  else
  {
    ledcWrite(BUZZER_CHANNEL, 0);
```

Simulation

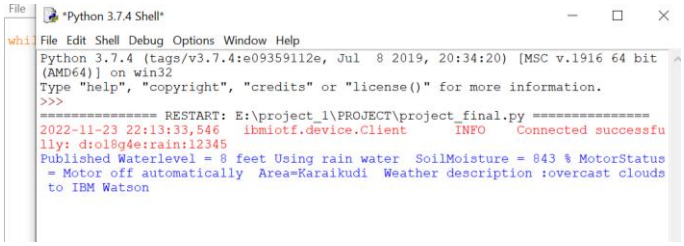



```
{"temp":297.04,"feels_like":297.42,"temp_min":297.04,"temp_max":297.04,"pressure":1011,"humidity"
ea_level":1011,"grnd_level":994},"visibility":10000,"wind":
{"speed":1.81,"deg":185,"gust":2.28},"clouds":{"all":96},"dt":1669221916,"sys":
{"country":"IN","sunrise":1669164245,"sunset":1669206033},"timezone":19800,"id":1259413,"name":"P
rāvati","cod":200}
Area: "Ponnamarāvati"
Weather_Details: [{"id":804,"main":"Clouds","description":"overcast clouds","icon":"04n"}]
```

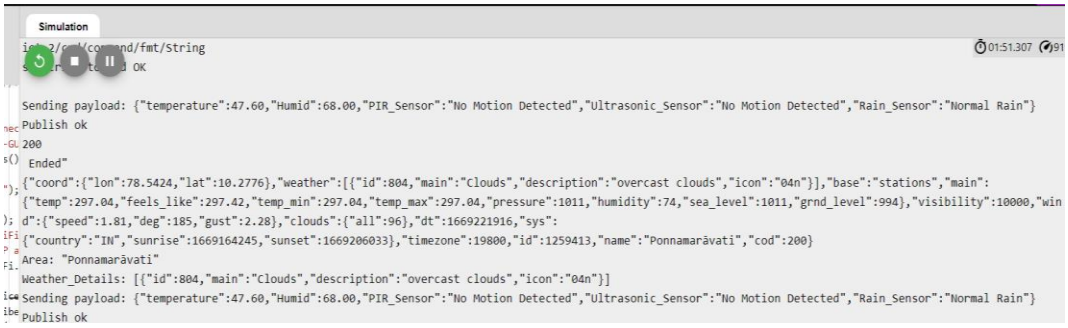


5.Output

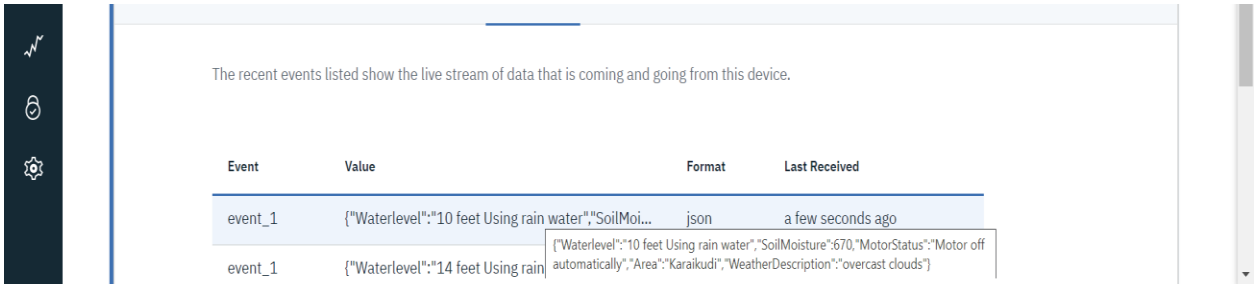
Python file output



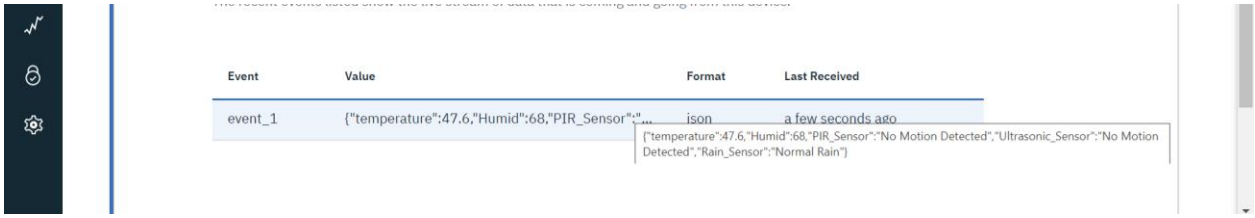
Wokwi output



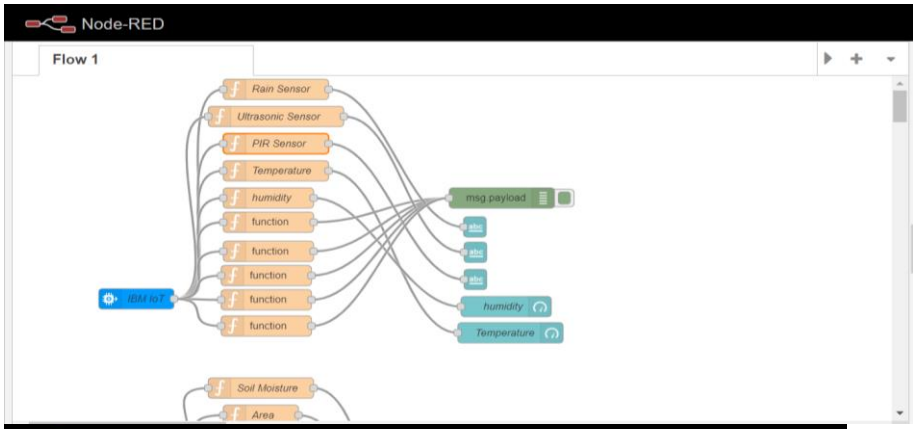
6.Payload sent from Python to IBM Watson IoT Platform

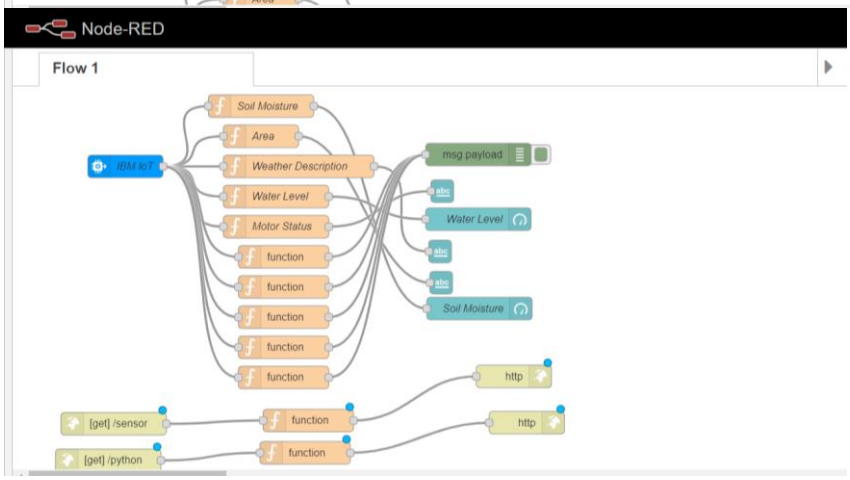


7.Payload sent from Wokwi to IBM Watson IoT Platform

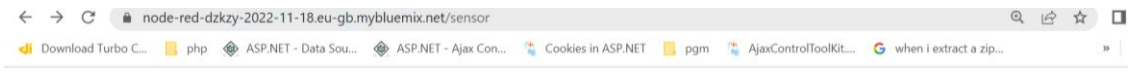


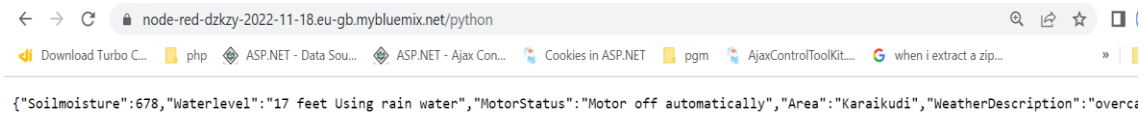
8. Node-Red flows



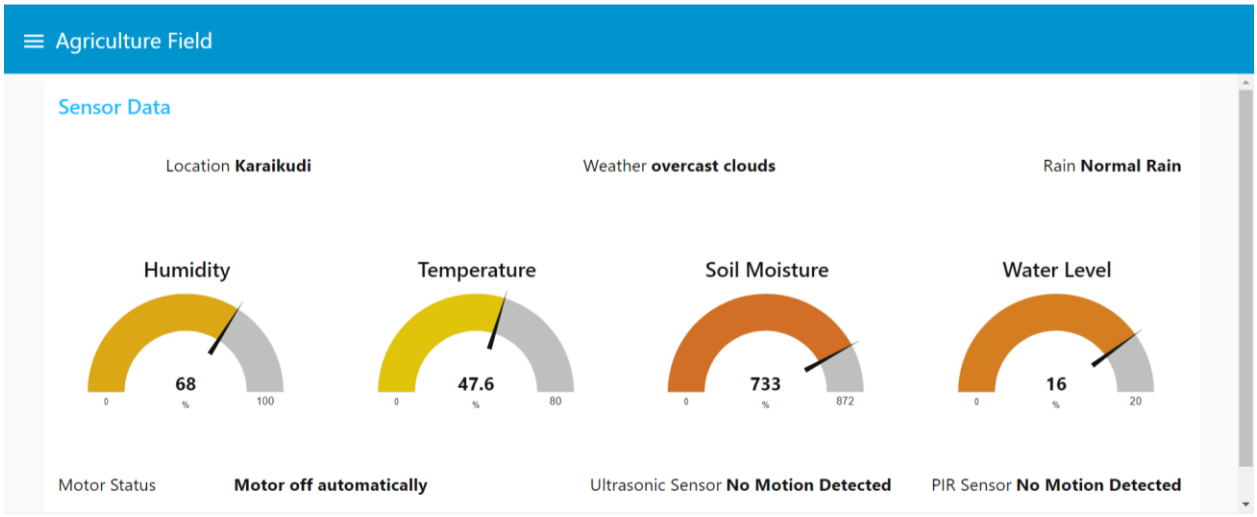


9.Payload sent from IBM Watson IoT Platform to Node-Red

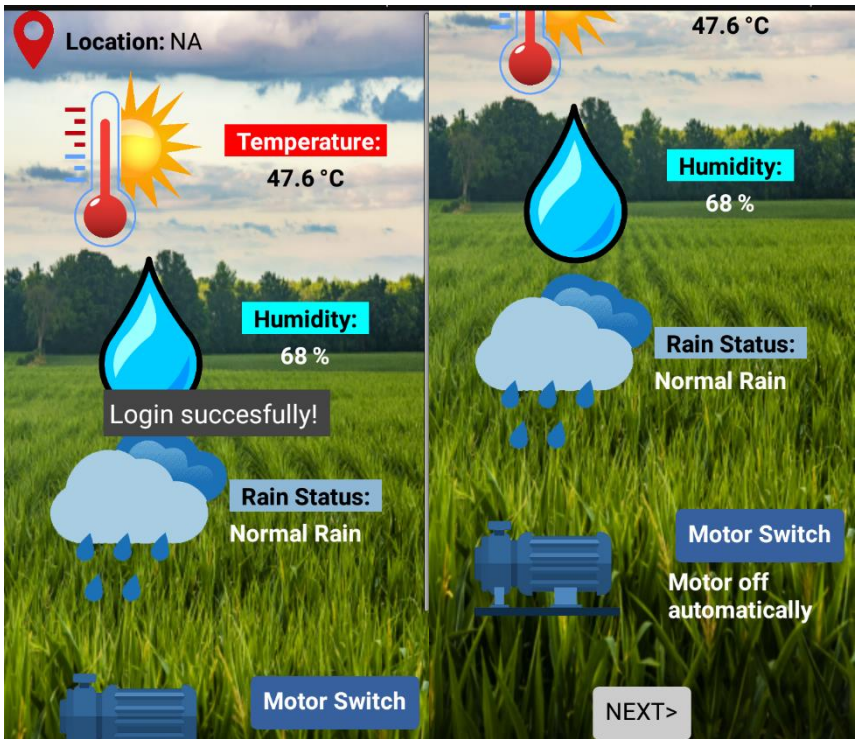




10.Node-Red Dashboard



11. App Screenshots




Water Level:
2 feet Using rain water
Soil Moisture:
485
Motion Detection
Weather:
overcast clouds
< Previous
Ultra Sonic sensor: No Motion Detected
PIR Sensor: No Motion Detected
< Back