

IOT-Enabled Environmental Monitoring in Parks Project Documentation

Project Overview

Project Title: IOT-Enabled Environmental Monitoring in Parks

Objective: To deploy IOT devices for real-time monitoring of environmental conditions in public parks.

1. Introduction

Public parks are essential urban spaces that need consistent monitoring to ensure environmental quality for visitors. Environmental monitoring using IOT technology provides real-time insights into crucial parameters like temperature, humidity, and air quality, enabling better management and user experience.

2. Hardware Setup

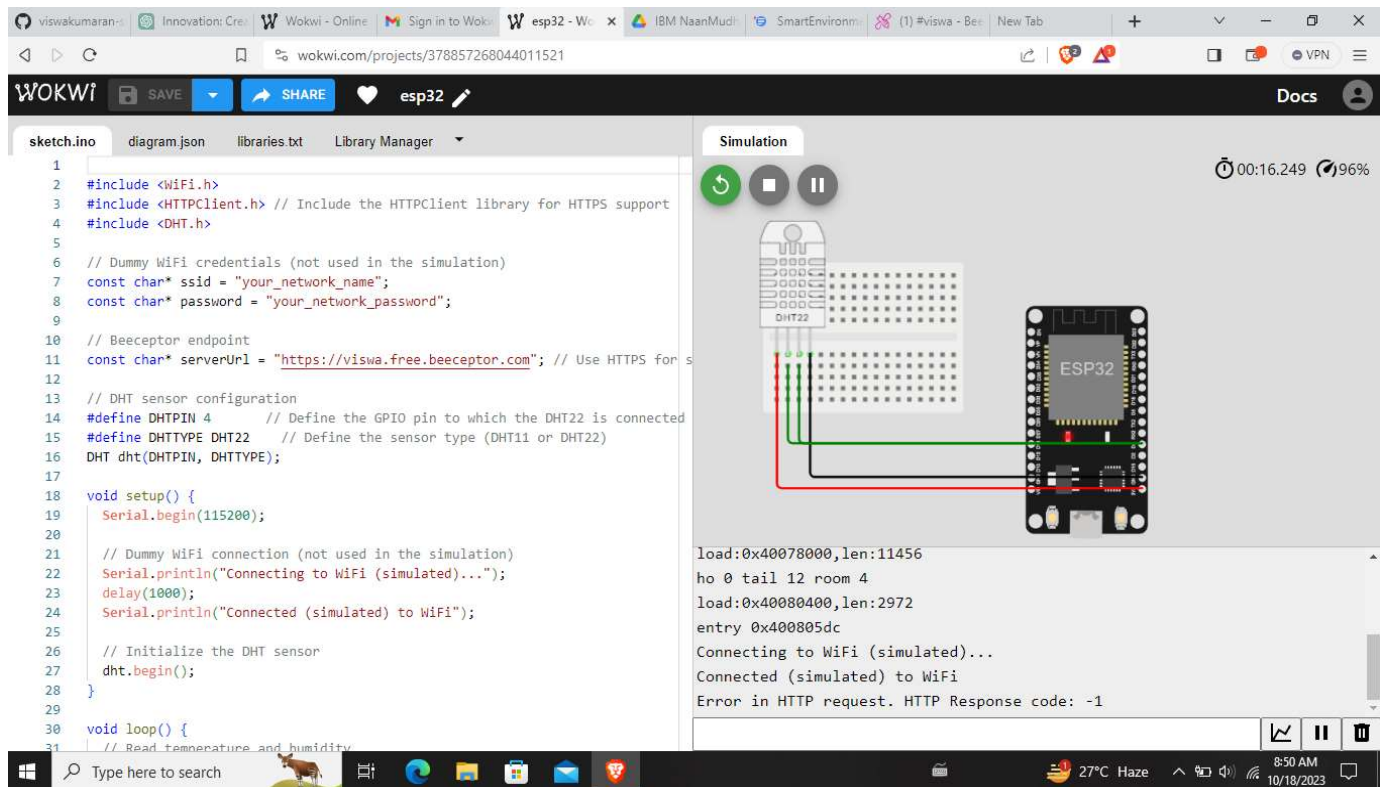
Microcontroller: Arduino atmega 328 ,ESP32

Sensors: DHT22 Temperature and Humidity Sensor.

Communication: Wi-Fi Module for Internet Connectivity

Sensor Installation

Sensors are placed strategically across the park, including playgrounds, gardens, and seating areas. Each sensor is protected in weather-resistant enclosures for durability.



3. Python Script

- Python script that were used to find temperature and humidity.

```
#include <DHT.h>
```

```
#define DHTPIN 4
```

```
#define DHTTYPE DHT22
```

```
DHT dht(DHTPIN, DHTTYPE);
```

```
void setup()
```

```
{
```

```
  Serial.begin(115200);
```

```
  dht.begin();
```

```

}

void loop()

{
    delay(2000); // Delay between readings
    float temperature = dht.readTemperature();
    float humidity = dht.readHumidity();
    if (isnan(temperature) || isnan(humidity))
    {
        Serial.println("Failed to read from DHT sensor!");
    }
    else
    {
        Serial.print("Temperature: ");
        Serial.print(temperature);
        Serial.println(" °C");
        Serial.print("Humidity: ");
        Serial.print(humidity);
        Serial.println(" %");
    }
}

```

- **python script that were used to link with public server and display real time data with monitoring platform**

```

#include <WiFi.h>
#include <HTTPClient.h>
#include <DHT.h>
const char* ssid = "your_network_name";
const char* password = "your_network_password";
const char* serverAddress = "https://viswa.free.beeceptor.com";
const int serverPort = 80
#define DHTPIN 4
#define DHTTYPE DHT22
DHT dht(DHTPIN, DHTTYPE);

void setup()
{
  Serial.begin(115200);
  Serial.println("Connecting to WiFi (simulated)...");
  delay(1000);
  Serial.println("Connected (simulated) to WiFi");
  dht.begin();
}

void loop()
{
  float temperature = dht.readTemperature();
  float humidity = dht.readHumidity();

  if (isnan(temperature) || isnan(humidity))
  {
    Serial.println("Failed to read from DHT sensor!");
    return;
  }

  HTTPClient http;
  String url = "http://" + String(serverAddress) + ":" + String(serverPort) + "/endpoint";
  http.begin(url);
  http.addHeader("Content-Type", "application/x-www-form-urlencoded");
  String postData = "temperature=" + String(temperature) + "&humidity=" + String(humidity);
  int httpResponseCode = http.POST(postData);

  if (httpResponseCode > 0)
  {
    Serial.print("HTTP Response code: ");
    Serial.println(httpResponseCode);
    String response = http.getString();
    Serial.print("Server Response: ");
    Serial.println(response);
  }
}

```

```
else
{
  Serial.print("Error in HTTP request. HTTP Response code: ");
  Serial.println(httpResponseCode);
}

http.end();

delay(60000); /
}
```

Library that were used in wokwi:

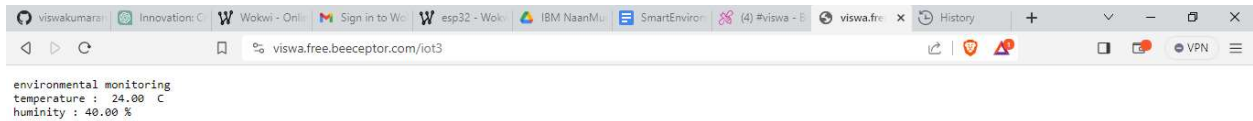
1. DHT sensor library
2. DHT 22
3. Wifi
4. httpclient

4. Cloud Platform Configuration

Platform: beecceptor

Rules: IOT Rules Engine for Data Processing

Setting the mock rules we can display the received data on any site, using the beecceptor endpoint link.



5. Data Visualization and Analysis

- Data is visualized using a web-based dashboard developed with HTML, JavaScript, and Chart.js. Users can view real-time environmental conditions and historical data for analysis.
- Alerts are configured based on predefined thresholds. Notifications are sent via email and SMS using AWS SNS (Simple Notification Service).

6. Conclusion

The IOT-Enabled Environmental Monitoring system in parks provides accurate, real-time data for park management. It enhances visitor experience, aids maintenance efforts, and ensures a healthy environment. Challenges faced during

deployment were resolved, leading to a successful implementation.