

In this we have used ThingSpeak Software as data sharing platform for our smart water management IOT project.

ThingSpeak:

ThingSpeak is an IoT analytics platform service that allows you to collect, store, analyse, visualize, and act on data from sensors or other devices.

Key Features:

- Real-time data collection.
- Ability to store and retrieve historical data.
- Integration with MATLAB for advanced analytics.
- Support for MQTT and REST APIs for data exchange.

Account Creation: Start by creating a ThingSpeak account on the official website.

Create a Channel: In ThingSpeak, data is organized into channels. Create a new channel for each type of data you

want to collect.

ThingSpeak™

Channels

Apps

Devices

Support

Commercial Use

How to Buy

RK

New Channel

Name

Water Management

Description

Field 1

Field 2

Field 3

Field 4

Field 5

Field 6

Field 7

Field 8

Metadata

Tags

(Tags are comma separated)

Link to External Site

http://

Link to GitHub

https://github.com/

Help

Channels store all the data that a ThingSpeak application collects. Each channel includes eight fields that can hold any type of data, plus three fields for location data and one for status data. Once you collect data in a channel, you can use ThingSpeak apps to analyze and visualize it.

Channel Settings

Percentage complete:

Calculated based on data entered into the various fields of a channel. Enter the name, description, location, URL, video, and tags to complete your channel.

Channel Name:

Enter a unique name for the ThingSpeak channel.

Description:

Enter a description of the ThingSpeak channel.

Fields:

Check the box to enable the field, and enter a field name. Each ThingSpeak channel can have up to 8 fields.

Metadata:

Enter information about channel data, including JSON, XML, or CSV data.

Tags:

Enter keywords that identify the channel. Separate tags with commas.

Link to External Site:

If you have a website that contains information about your ThingSpeak channel, specify the URL.

Show Channel Location:

Latitude:

Specify the latitude position in decimal degrees. For example, the latitude of the city of London is 51.5072.

Longitude:

Specify the longitude position in decimal degrees. For example, the longitude of the city of London is -0.1275.

Elevation:

Specify the elevation position meters. For example, the elevation of the city of London is 35.052.

Video URL:

If you have a YouTube™ or Vimeo® video that displays your channel information, specify the full path of the video URL.

Link to GitHub:

If you store your ThingSpeak code on GitHub®, specify the GitHub repository URL.

Using the Channel

Fill in the Field What should we needed, Here we use Water Level in CM and pHvalue

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Channel Settings

Percentage complete

50%

Channel ID

2327527

Name

Water Management

Description

esp32 data

Field 1

Water Level in CM

Field 2

pHValue

Field 3

Field 4

Field 5

Field 6

Field 7

Field 8

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Using the Channel

You can get data into a channel from a device, website, or another ThingSpeak channel. You

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ThingSpeak™

Channels ▾Apps ▾Devices ▾Support ▾

Commercial UseHow to BuyRK

My Channels

New Channel

Search by tag

Q

Name ▾	Created ▾	Updated ▾
<div><div>Water Management</div><div>PrivatePublicSettingsSharingAPI KeysData Import / Export</div></div>		

Help

Collect data in a ThingSpeak channel from a device, from another channel, or from the web.

Click **New Channel** to create a new ThingSpeak channel.

Click on the column headers of the table to sort by the entries in that column or click on a tag to show channels with that tag.

Learn to **create channels**, explore and transform data.

Learn more about **ThingSpeak Channels**.

Examples


- [Arduino](#)
- [Arduino MKR1000](#)
- [ESP8266](#)
- [Raspberry Pi](#)
- [Netduino Plus](#)

Upgrade


Need to send more data faster?

Need to use ThingSpeak for a commercial project?

Upgrade



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Setting Up IoT Devices:

1)Choose Your Platform: ThingSpeak is compatible with a variety of IoT platforms such as Arduino, Raspberry Pi, ESP8266, and others.

2)Install Libraries: Depending on your IoT platform, install the necessary libraries to enable communication with ThingSpeak.

Sending Data to ThingSpeak:

1)Generate API Keys: Create API keys for your ThingSpeak

account to authorize your devices.

2)Configure IoT Devices: Set up your devices to send data to ThingSpeak using the provided API keys.

3)Use REST API or MQTT: ThingSpeak supports both RESTful API and MQTT for data communication.

Visualizing Data:

1)Channel Views: ThingSpeak provides customizable channel views where you can see your data in tabular or graphical formats.

2)MATLAB Visualizations: Advanced users can leverage MATLAB Visualizations for more sophisticated data analysis and plotting.

Program:

```
#include <Wire.h>
#include <WiFi.h>
#include <ThingSpeak.h>
```

```
const char *ssid = "Wokwi-GUEST";
const char *password = "";
```

```
#define TRIG_PIN 26
#define ECHO_PIN 25
#define POTENTIOMETER_PIN A0
const float contaminationThreshold = 7.0;
```

```
unsigned long channelID = 2327527; // Use Your ThingSpeak Channel ID
const char *writeAPIKey = "3K1OPPG28L2BIA3E"; // Use Your ThingSpeak Write API Key
```

WiFiClient client;

```
void setup() {  
  Serial.begin(115200);  
  connectToWiFi();  
  ThingSpeak.begin(client);  
  pinMode(TRIG_PIN, OUTPUT);  
  pinMode(ECHO_PIN, INPUT);  
}
```

```
void loop() {  
  float distance = readUltrasonicDistance();  
  float pHValue = analogRead(POTENTIOMETER_PIN) / 100.0;  
  Serial.print("Ultrasonic Distance: ");  
  Serial.print(distance);  
  Serial.println(" cm");
```

```
  Serial.print("pH Value: ");  
  Serial.println(pHValue);
```

```
  if (pHValue < contaminationThreshold) {  
    Serial.println("Water is contaminated!");  
  } else {  
    Serial.println("Water is clean.");  
  }
```

```
  ThingSpeak.setField(1, distance);  
  ThingSpeak.setField(2, pHValue);
```

```
  int updateSuccess = ThingSpeak.writeFields(channelID, writeAPIKey);
```

```
  if (updateSuccess) {  
    Serial.println("ThingSpeak update successful");  
  } else {  
    Serial.println("Error updating ThingSpeak");  
  }
```

```
  delay(2000);
```

```
}
```

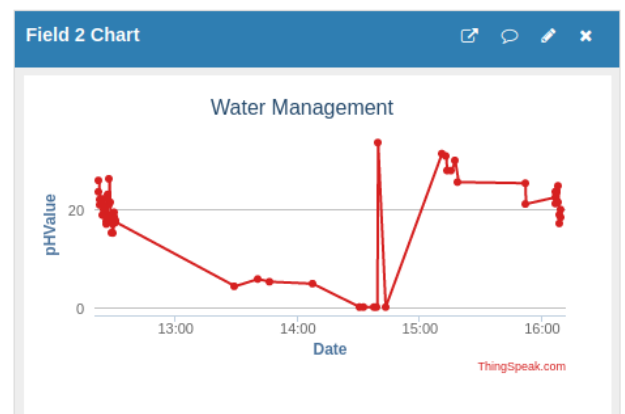
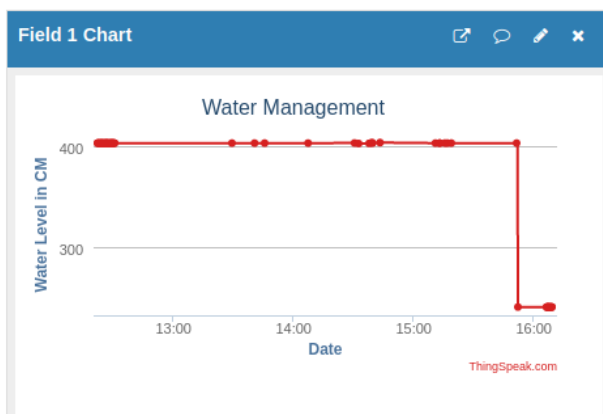
```
void connectToWiFi() {  
  Serial.print("Connecting to WiFi");  
  WiFi.begin(ssid, password);
```

```
  while (WiFi.status() != WL_CONNECTED) {  
    delay(1000);  
    Serial.print(".");  
  }  
}
```

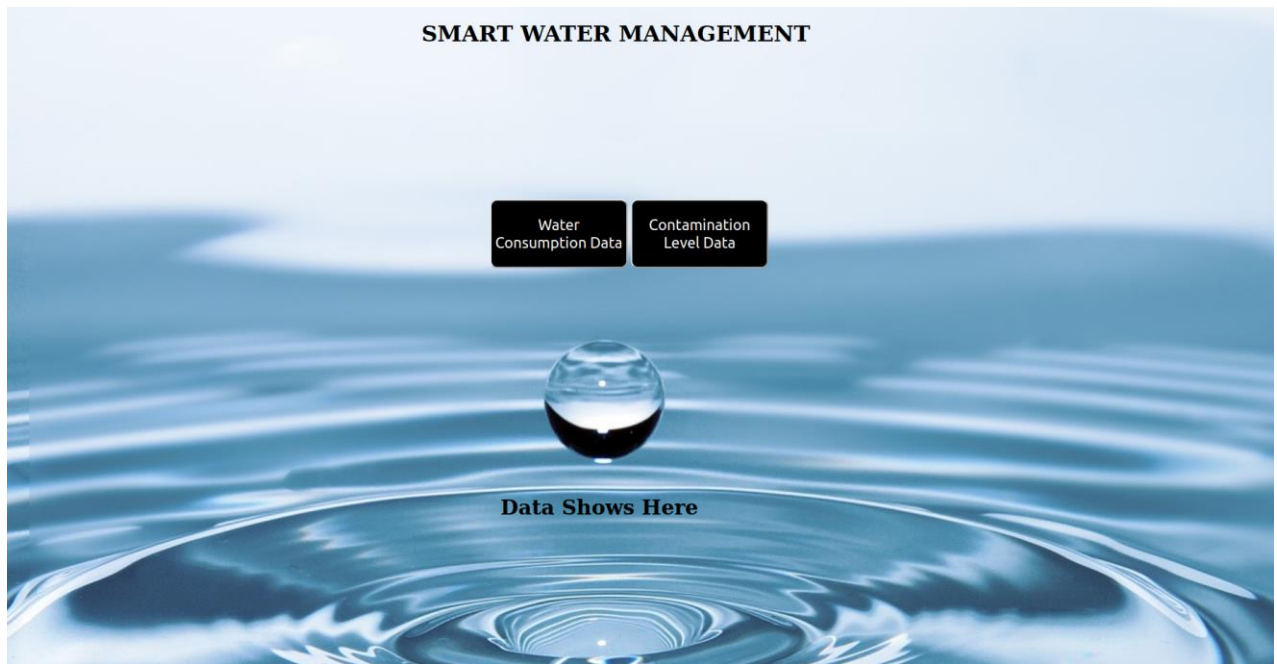
```
Serial.println("\nConnected to WiFi");  
}
```

```
float readUltrasonicDistance() {  
  digitalWrite(TRIG_PIN, LOW);  
  delayMicroseconds(2);  
  digitalWrite(TRIG_PIN, HIGH);  
  delayMicroseconds(10);  
  digitalWrite(TRIG_PIN, LOW);  
  
  return pulseIn(ECHO_PIN, HIGH) * 0.0343 / 2;  
}
```

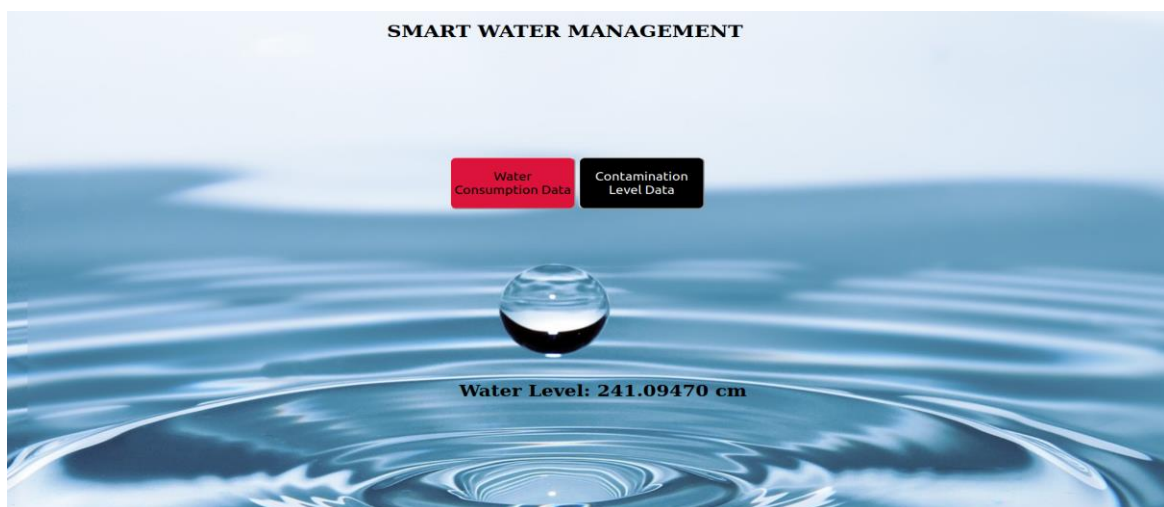
Output:



Website for viewing the real time data for smart water management:



If we click the Water Consumption Data Button then it will show the output where it says Data Shows Here:



If we click the Contamination Level Data Button then it will show the output where it says Data Shows Here:

SMART WATER MANAGEMENT

Water
Consumption Data

Contamination
Level Data

Contamination Level: 19.82000, Status: Contaminated