Smart Water System

IoT Based Water Level Indicator using Ultrasonic Sensor

Source Codes for Blynk ESP32 Water Level Sensor:

```
/*************************************************************************
**
 *  TITLE: IoT-based Water Level Indicator using ESP32, Ultrasonic Sensor & Blynk
with 0.96" OLED
 *  Click on the following links to learn more.
 *  YouTube Video: https://youtu.be/9geREeE13jc
 *  Related Blog : https://iotcircuithub.com/esp32-projects/
 *
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 *
 *  Preferences--> Aditional boards Manager URLs :
 *  https://raw.githubusercontent.com/espressif/arduino-esp32/gh-
pages/package_esp32_dev_index.json,
http://arduino.esp8266.com/stable/package_esp8266com_index.json
 *
 *  Download Board ESP32 (2.0.5) : https://github.com/espressif/arduino-esp32
 *
 *  Download the libraries
 *  Blynk Library (1.1.0):  https://github.com/blynkkk/blynk-library
 *  Adafruit_SSD1306 Library (2.5.7):
https://github.com/adafruit/Adafruit_SSD1306
 *  AceButton Library (1.9.2): https://github.com/bxparks/AceButton
 *************************************************************************
**/

/* Fill-in your Template ID (only if using Blynk.Cloud) */
#define BLYNK_TEMPLATE_ID ""
#define BLYNK_DEVICE_NAME ""
#define BLYNK_AUTH_TOKEN ""

// Your WiFi credentials.
```
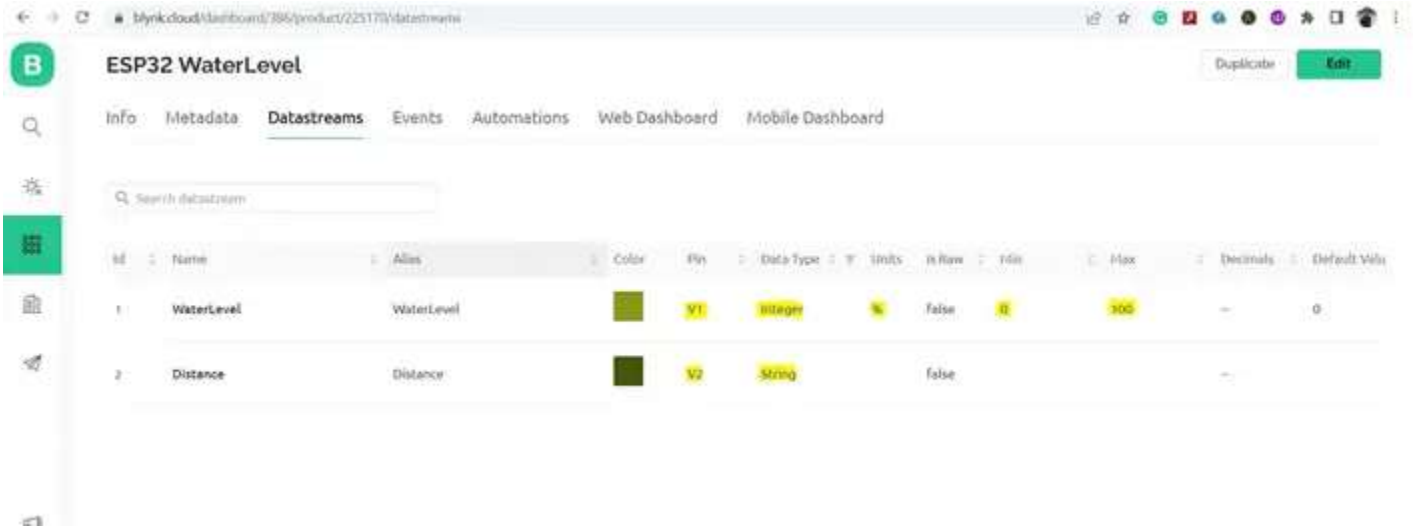

```
// Set password to "" for open networks.
char ssid[] = "";
char pass[] = "";

//Set Water Level Distance in CM
int emptyTankDistance = 70 ;  //Distance when tank is empty
int fullTankDistance =  30 ;  //Distance when tank is full

//Set trigger value in percentage
int triggerPer =   10 ;  //alarm will start when water level drop below
triggerPer

#include <Adafruit_SSD1306.h>
#include <WiFi.h>
#include <WiFiClient.h>
#include <BlynkSimpleEsp32.h>
#include <AceButton.h>
using namespace ace_button;

// Define connections to sensor
#define TRIGPIN    27  //D27
#define ECHOPIN    26  //D26
#define wifiLed    2   //D2
#define ButtonPin1 12  //D12
#define BuzzerPin  13  //D13
#define GreenLed   14  //D14

//Change the virtual pins according the rooms
#define VPIN_BUTTON_1    V1
#define VPIN_BUTTON_2    V2

#define SCREEN_WIDTH 128 // OLED display width, in pixels
#define SCREEN_HEIGHT 32 // OLED display height, in pixels

// Declaration for an SSD1306 display connected to I2C (SDA, SCL pins)
#define OLED_RESET     -1 // Reset pin # (or -1 if sharing Arduino reset pin)
Adafruit_SSD1306 display(SCREEN_WIDTH, SCREEN_HEIGHT, &Wire, OLED_RESET);


float duration;
float distance;
int   waterLevelPer;
bool  toggleBuzzer = HIGH; //Define to remember the toggle state

char auth[] = BLYNK_AUTH_TOKEN;
```

```
ButtonConfig config1;
AceButton button1(&config1);

void handleEvent1(AceButton*, uint8_t, uint8_t);

BlynkTimer timer;

void checkBlynkStatus() { // called every 3 seconds by SimpleTimer

  bool isconnected = Blynk.connected();
  if (isconnected == false) {
    //Serial.println("Blynk Not Connected");
    digitalWrite(wifiLed, LOW);
  }
  if (isconnected == true) {
    digitalWrite(wifiLed, HIGH);
    //Serial.println("Blynk Connected");
  }
}

BLYNK_CONNECTED() {
  Blynk.syncVirtual(VPIN_BUTTON_1);
  Blynk.syncVirtual(VPIN_BUTTON_2);
}

void displayData(int value){
  display.clearDisplay();
  display.setTextSize(4);
  display.setCursor(8,2);
  display.print(value);
  display.print(" ");
  display.print("%");
  display.display();
}

void measureDistance(){
  // Set the trigger pin LOW for 2uS
  digitalWrite(TRIGPIN, LOW);
  delayMicroseconds(2);

  // Set the trigger pin HIGH for 20us to send pulse
  digitalWrite(TRIGPIN, HIGH);
  delayMicroseconds(20);
```

```
  // Return the trigger pin to LOW
  digitalWrite(TRIGPIN, LOW);

  // Measure the width of the incoming pulse
  duration = pulseIn(ECHOPIN, HIGH);

  // Determine distance from duration
  // Use 343 metres per second as speed of sound
  // Divide by 1000 as we want millimeters

  distance = ((duration / 2) * 0.343)/10;

  if (distance > (fullTankDistance - 10)  && distance < emptyTankDistance ){
    waterLevelPer = map((int)distance ,emptyTankDistance, fullTankDistance, 0,
100);
    displayData(waterLevelPer);
    Blynk.virtualWrite(VPIN_BUTTON_1, waterLevelPer);
    Blynk.virtualWrite(VPIN_BUTTON_2, (String(distance) + " cm"));

    // Print result to serial monitor
    Serial.print("Distance: ");
    Serial.print(distance);
    Serial.println(" cm");

    if (waterLevelPer < triggerPer){
      digitalWrite(GreenLed, HIGH);
      if (toggleBuzzer == HIGH){
        digitalWrite(BuzzerPin, HIGH);
      }
    }
    if (distance < fullTankDistance){
      digitalWrite(GreenLed, LOW);
      if (toggleBuzzer == HIGH){
        digitalWrite(BuzzerPin, HIGH);
      }
    }

    if (distance > (fullTankDistance + 5) && waterLevelPer > (triggerPer + 5)){
      toggleBuzzer = HIGH;
      digitalWrite(BuzzerPin, LOW);
    }
  }

  // Delay before repeating measurement
  delay(100);
```

```
}


void setup() {
  // Set up serial monitor
  Serial.begin(115200);

  // Set pinmodes for sensor connections
  pinMode(ECHOPIN, INPUT);
  pinMode(TRIGPIN, OUTPUT);
  pinMode(wifiLed, OUTPUT);
  pinMode(GreenLed, OUTPUT);
  pinMode(BuzzerPin, OUTPUT);

  pinMode(ButtonPin1, INPUT_PULLUP);

  digitalWrite(wifiLed, LOW);
  digitalWrite(GreenLed, LOW);
  digitalWrite(BuzzerPin, LOW);

  config1.setEventHandler(button1Handler);

  button1.init(ButtonPin1);

  if(!display.begin(SSD1306_SWITCHCAPVCC, 0x3C)) {
    Serial.println(F("SSD1306 allocation failed"));
    for(;;);
  }
  delay(1000);
  display.setTextSize(1);
  display.setTextColor(WHITE);
  display.clearDisplay();

  WiFi.begin(ssid, pass);
  timer.setInterval(2000L, checkBlynkStatus); // check if Blynk server is
connected every 2 seconds
  Blynk.config(auth);
  delay(1000);

}
 void loop() {

  measureDistance();

  Blynk.run();
```

```
  timer.run(); // Initiates SimpleTimer

  button1.check();

}

void button1Handler(AceButton* button, uint8_t eventType, uint8_t buttonState) {
  Serial.println("EVENT1");
  switch (eventType) {
    case AceButton::kEventReleased:
      //Serial.println("kEventReleased");
      digitalWrite(BuzzerPin, LOW);
      toggleBuzzer = LOW;
      break;
  }
}
```


ESP32 WaterLevel
Duplicate
Edit
Info
Metadata
Datastreams
Events
Automations
Web Dashboard
Mobile Dashboard
Search datastream
Name
Alias
Color
Pin
Data Type
Units
Is Raw
Min
Max
Decimals
Default Valu
1
WaterLevel
WaterLevel
V1
Integer
%
false
0
100
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0
2
Distance
Distance
V2
String
false
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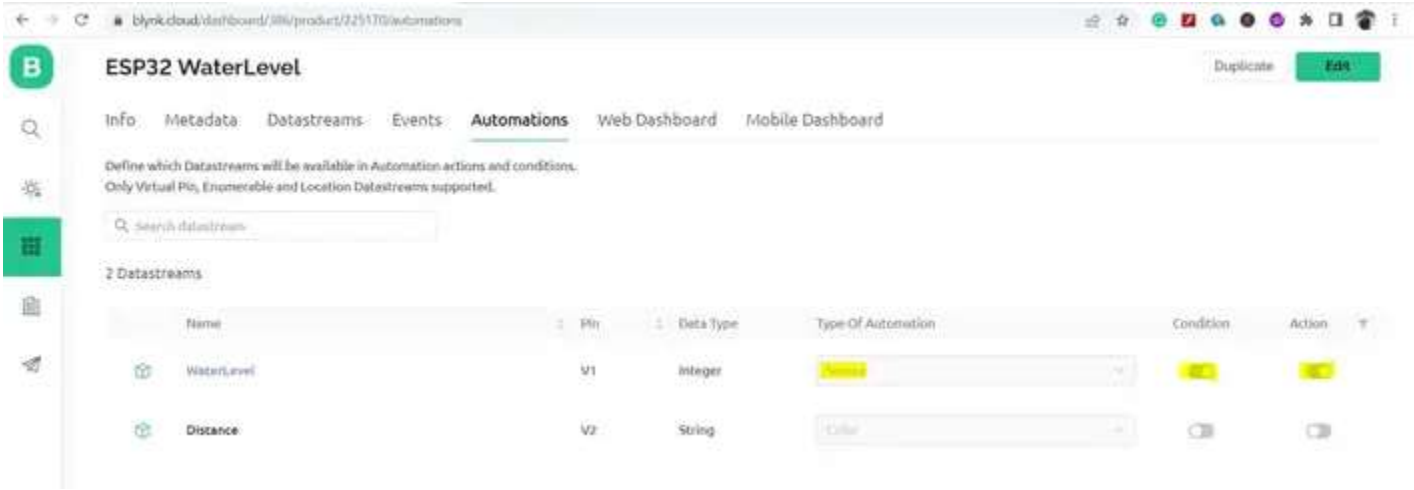
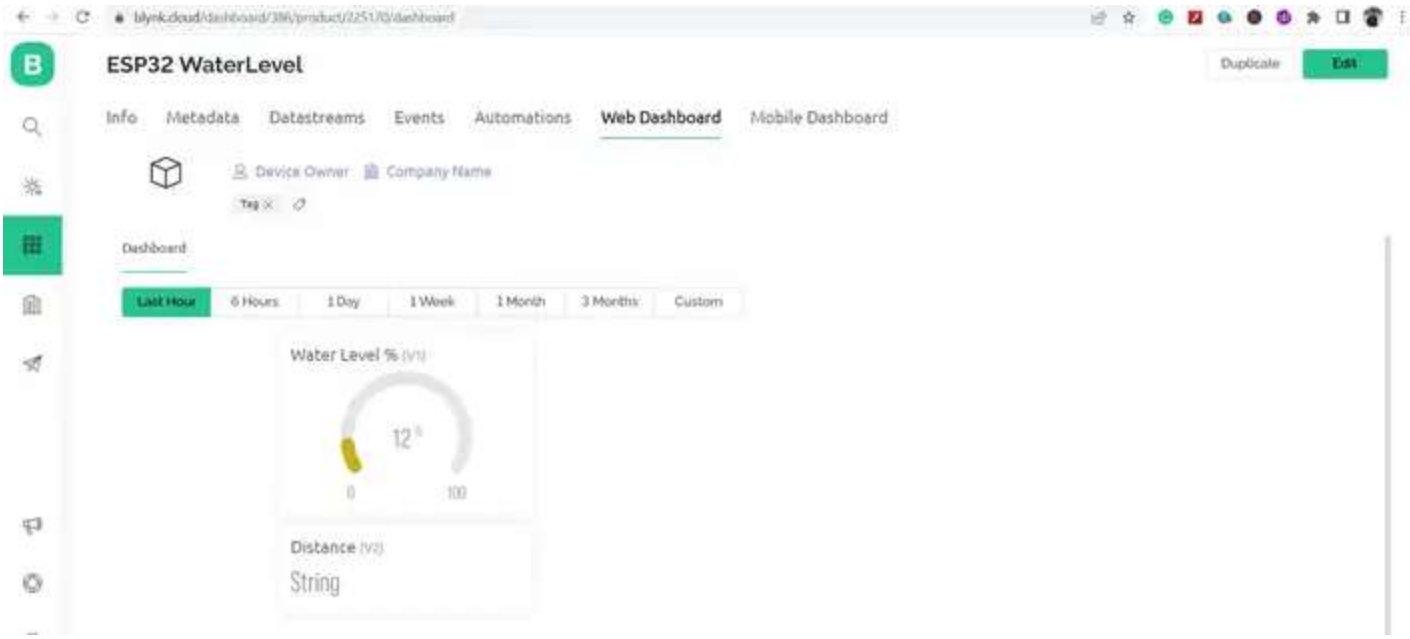

ESP32 WaterLevel
Duplicate
Edit
Info
Metadata
Datastreams
Events
Automations
Web Dashboard
Mobile Dashboard
Define which Datastreams will be available in Automation actions and conditions.
Only Virtual Pin, Enumerable and Location Datastreams supported.
Search datastream
2 Datastreams
Name
Pin
Data Type
Type Of Automation
Condition
Action
WaterLevel
V1
Integer
Distance
V2
String


ESP32 WaterLevel
Duplicate
Edit
Info
Metadata
Datastreams
Events
Automations
Web Dashboard
Mobile Dashboard
Device Owner
Company Name
Tag
Dashboard
Last Hour
6 Hours
1 Day
1 Week
1 Month
3 Months
Custom
Water Level % (V1)
12 %
0
100
Distance (V2)
String