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Water Level Monitoring System using Internet of Things

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ABSTRACT

As a Smart innovation with greatness suggestions gives the better outcome when contrast and Existing System. This work about the water level detecting inside the tank and interface it to Node MCU (which holds wi-fi module to send message) to send status of the tank to Blynk application through Arduino ide code. This gives a thought that the things get associated over organization roll out more brilliant improvement for later. In nowadays everything dependent on the advanced cell and its applications. Along these lines, this venture would be helpful in impending ages. The fundamental point of this framework is to screen the water level at rustic zones with the goal that they can identify the wastage of water and measures can be taken to dodge superfluous flooding of water in the zones where observing is tricky.

Keywords-- IoT, Wi-Fi and Buzzer, Arduino IDE, Blynk Application, Relay, Ultrasonic Sensor, HC 12 Module, ESP8266

I. INTRODUCTION

One of the high-priced and principal resources in the earth is Water. In this project, Internet of Things (IOT) based concept that used to define energy conservation in tank level water monitoring system. The main objective is to have a sensor which track down the level of water and it should alert the user about the water level which is currently available in the tank.

The ultrasonic sensor is placed at the top of the tank in which we will calculate the level of water and if the range of the water from the sensor gets increased, it means that the water in the tank gets low and finally after reaches to a proportion of the system should notify a warning message to the user. The major obligation would be ultrasonic sensor which senses level of water (in distance) from the top of the tank to the bottom of the tank.

The sensor is associated with the system using the wi-fi of node MCU (ESP8266). The Blynk library is installed and connected in the Arduino IDE. The Blynk application is used to get the values and the notifications are send to the mobile for the user purpose. The user can get notified that the tank is empty and can take further steps to fill the water in the tank.

II. LITERATURE REVIEW

2.1 Existing System

This system does not include the water level monitor mode, high cost & harder maintenance. Low genuineness of water level monitor. User experience is demonstrable. It gives in accuracy & more time consumption. This system has not advanced outcome of water level monitor.

2.2 Proposed System

This water level monitoring system based on new Android application and to preserve more energy. Very easy to maintenance. Low cost and flexible water level monitor. This system used Blynk application to point out the water level. It is used to circuit breaker (on/off) and water level monitor by using Blynk Android application in online mode. The Blynk application is also used to do scheduled process of motor on/off & monitor the water level. It can detect error-free level of water in tank.

III. SYSTEM SPECIFICATION

3.1 Software Requirements

3.1.1 Arduino IDE

The Arduino Integrated Development Environment (IDE) is a most awesome aspect breed application (for Windows, MacOS, Linux) that is written in capacities from C and C++. It is utilized to compose and transfer projects to Arduino cordial sheets, yet in addition, with the assistance of outsider centers, other advancement sheets. The source code for the IDE is delivered under the GNU rendition 2.0. The Arduino IDE upholds the dialects C and C++ utilizing uncommon standards of code designing. The Arduino IDE supplies a product library from the wiring project, which gives numerous basic information and yield trails. Client composed code just requires two fundamental capacities, for beginning the portrayal and the primary program circle, that are arranged and connected with a program stub principle() into an executable cyclic leader program with the GNU apparatus chain, likewise included with the IDE dissemination.

The Arduino IDE utilizes the program AVRDUDE to change over the executable code into a book record in hexadecimal encoding that is stacked into the Arduino board by a loader program in the board's

firmware/microcode. Naturally, AVRDUDE is utilized as the transferring apparatus to streak the client code onto official Arduino sheets. With the rising fame of Arduino as a product stage, different merchants began to actualize custom open-source compilers and devices (centers) that can assemble and transfer representations to other MCUs that are not upheld by Arduino's true line of MCUs. In October 2019, the Arduino organization started giving early admittance to another Arduino Pro IDE with investigating and other progressed highlights.

3.1.2 Blynk Application

Blynk is a platform for the Internet of Things. It can control hardware anywhere; it can display, sensor& store data, visualize it and do many other tranquil things. There are three major components in the platform:

- **Blynk App**– allows you to create dazing interfaces for your projects using various widgets we provide.
- **Blynk Server** - responsible for all the communications between the smartphone and hardware. You can use our Blynk Cloud or run your private Blynk server locally. It's open-source, could easily handle thousands of devices and even can be launched on a Raspberry Pi.
- **Blynk Libraries** - for all the popular hardware platforms - enable communication with the server and process all the incoming and out-coming commands.

3.2 Hardware Requirements

3.2.1 Power Module

DC-DC 12V to 3.3V 5V 12V Power Module multitudinousVoltage Conversion module is flexible and easy to use. The module is powered by 6V to 12V DC input, and provides three fixed DC outputs: 3.3V, 5.0V, and a third output which is a direct connection to the DC input.

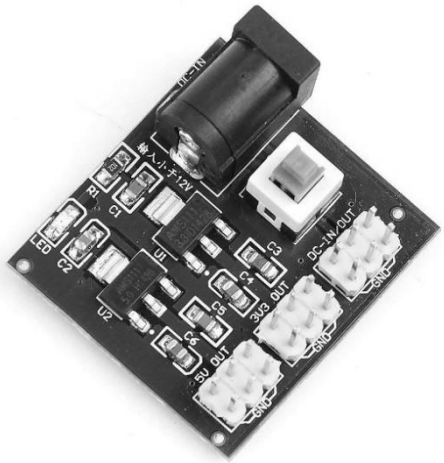

Figure1: Power Module

3.2.2 ESP8266 Wi-Fi Module

The ESP8266 Wi-Fi Module is free-standing SOC (System On a Chip) with integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network.

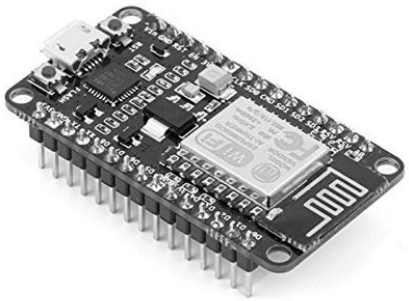

Figure 2: ESP8266 Wi-Fi Module

The ESP8266 is accomplished of either hosting an application or jettison, all the Wi-Fi networking functions from another application processor. Each ESP8266 module comes pre-programmed with an AT command set firmware, meaning, you can simply hook this up to your Arduino device and get about as much Wi-Fiability as a Wi-Fi Shield offers (and that's just out of the box)! It is an extremely cost-effective board with a huge, and ever-growing community.

3.2.3 Ultrasonic Sensor

Ultrasonic sensors can measure space and detect the presence of an object without making physical interaction. They do so by producing and monitoring an ultrasonic echo. Depending on the sensor and object properties, the effective range in air is between a few centimeters up to several meters.

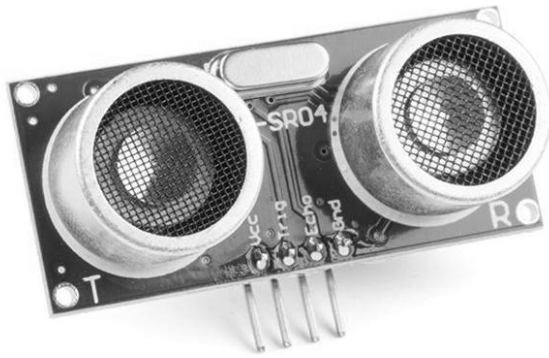

Figure 3: Ultrasonic Sensor

3.2.4 Relay Module

2-Channel 5V Relay Module is a transfer interface board, it can be controlled quickly by a wide range of microcontrollers such as Arduino, AVR, PIC, ARM and so on. It uses a low-level triggered control signal (3.3-5VDC) to control the relay. Triggering the relay operates the normally open or normally closed contacts.

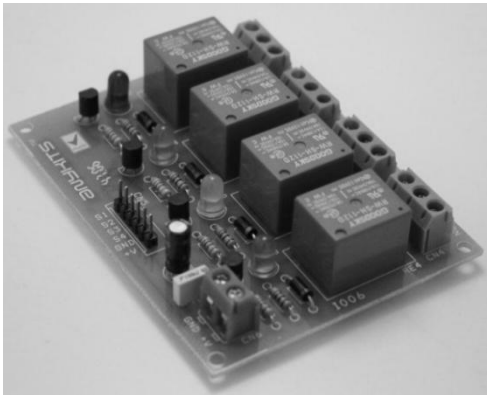

Figure 4: Relay Board

IV. IMPLEMENTATION

The ultrasonic sensor measures the distance amid the tank's top and the water to notify the user, when the water is reduced to a certain fixed limit. The project starts with the connection of components i.e., the ultrasonic sensor with the Node MCU. After the connection, these components are connected to the software. The next thing is the requirement of the specified panel in the software. The code can only be executed and uploaded if the components and the board are correctly set.

The Arduino software just combines the components with the code and the Blynk - mobile based application to notify the user. The code in the software also requires Blynk libraries to get connected. The Major demand would be Ultrasonic sensor which senses level of water (in distance) from the top of the tank to the bottom of the tank.

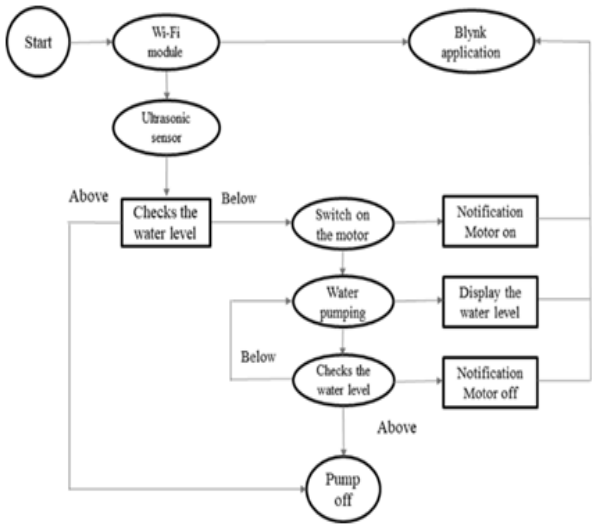

Figure 5: Design

The sensor is connected to the system using the Wi-Fi of Node MCU(ESP8266). The Blynk library is founded and connected in the Arduino.

The Blynk application is used to get the values and notifications in the user's mobile. The user gets notified that the tank is empty and can take further steps to fill the water in the tank. After the Blynk application received the values from the sensor, it will alert the user to take further steps whenever the water level exceeds the given limit.

V. RESULTS

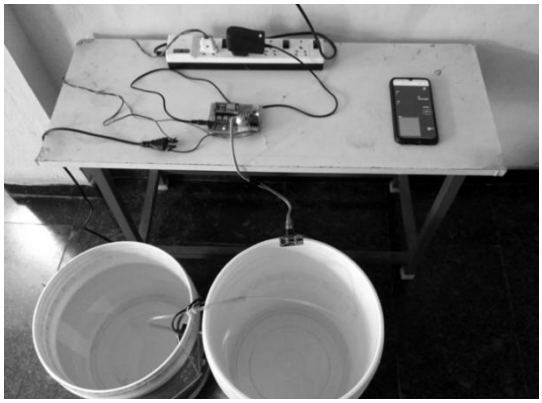

Figure 6: Water Level Monitoring System

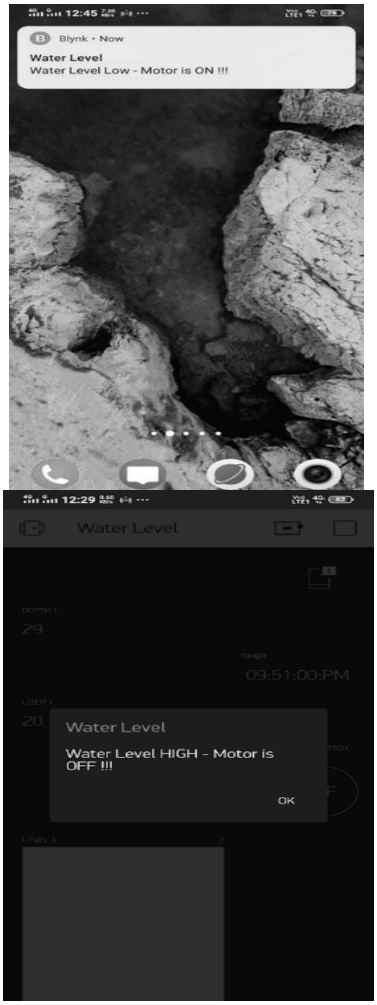

Figure 7: Blynk Application

VI. CONCLUSION

Accordingly, the IOT empowered water level observing framework is finished utilizing the parts and the warning is shipped off the clients utilizing Blynk application. The framework can be distant created with more sensors and can be expanded. With the assistance of sensors and equipment parts we can preserve the water in the sense control the pointless water squandering and saving the power too. By giving alarm message to the client's portable about water level to moderate the energy. Also, this specific application valuable for Home, Small scope enterprises. At long last, the undertaking dependent on straightforward parts actualized which make proficient, cost savvy this is practical. Henceforth this framework gives the apt answer for the clients.

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