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IoT Based Water Level Monitoring System with an Android Application

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Abstract-The principle objective of our assignment is to display the water level as well as controlling with IoT and android application. Wastage of water within the modern state of affairs, merely because of overflowing tanks isn't less expensive. Conventional water tanks can neither reveal nor manage the water stage in tank, main to huge amount of wastage. A few different technologies had sure drawbacks in a few or the alternative way. The want of removal of those quick-comings and offering an efficient and competitively priced solution has been the principle focus of this assignment. The IoT platform we are using is Arduino which is an open source. The water level within the water tank is split into most, minimal and nominal degrees indicated by using exclusive colorings for each. An ultrasonic sensor is positioned on the floor of the tank to sense the water stage and the distance is dispatched to the android utility through Arduino. We can display the tank manually using an on/off button provided within the android utility. The android application is a user interface which displays the tank format, a button for guide operation and a led for indicating the motor popularity.

Keywords-*ESP 8266, Ultrasonic Sensor, Android application, Arduino and LED*

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1. INTRODUCTION

Water is one of the maximum critical fundamental desires for all residing beings. Water is an important part of ordinary life. Due to global environmental scenario, water control and conservation is crucial for human survival. Now-a-days, there were large needs of purchaser based totally humanitarian tasks that would be rapidly developed the usage of net of factors (IoT). But our proposed gadget measures water level in actual-time and helps the user to display the water tank remotely the use of android software. Within the previous technique, the user have to check for the water stage sometimes, its miles waste of time.

The proposed system is fully automated. Here human work and time are saved. We proposed an IOT based water monitoring system that measures water level in real-time. Smart water tank: an IOT based android application implements IOT, with which, the user can directly monitor and control the working of tank through the smart phone, from anywhere. The android application is developed to check the level of water and can manually stop the motor if necessary. Automatically the motor can be switched off whenever the level of water reaches the maximum and minimum levels.

2. BASIC CONCEPTS

A. Arduino UNO

It is an IoT platform which has an external Wi-Fi module that can connect to internet via hotspot using its SSID and Password. It can be programmed to implement logic statements as per requirement of the project. The ultrasonic sensor reads the distance of water surface and returns it to Arduino UNO. TheArduino UNO, when connected to internet, uploads this value to cloud, which is an open source IoT platform. Also it retrieves some values from cloud which are set by user in the android application. Accordingly, the functioning of motor depends upon the current water level and the maximum and minimum levels.

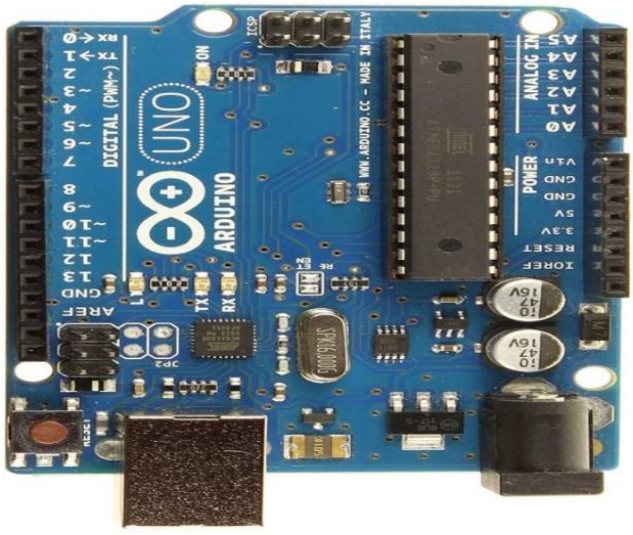

Fig.1:Arduino Uno

B. Blynk – Android Application

Blynk is a Platform with iOS and Android apps to control Arduino, Raspberry Pi and the likes over the Internet. It is a digital dashboard where we can build a graphic interface for our project by simply dragging and dropping widgets.

C. Ultrasonic Sensor

Hc-sr04 ultrasonic is a ranging sensor. this low cost sensor affords 2cm to 400cm of non-contact sizefunctionality with a ranging accuracy that can attain up to 3mm. each hc-sr04 module includes an ultrasonic transmitter, a receiver and a manipulate circuit.

Fig.2:Ultra Sonic Sensor

3. ARCHITECTURE DIAGRAM

A framework engineering or frameworks design is the applied model that characterizes the structure, conduct, and more perspectives of a system. A design is a formal depiction and portrayal of a framework, composed in a way that backings thinking about the structures and practices of the framework.

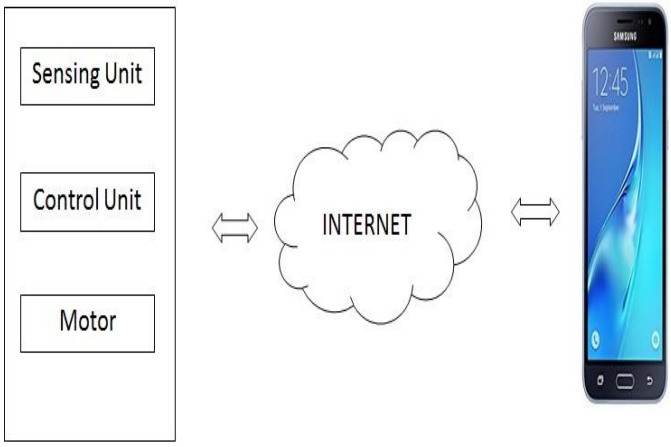

Fig.3: Block Diagram

Figure 3 represents the overall procedure of our system. Whenever the water level exceeds the maximum level or decreases through the minimum level the motor switch will automatically on/off accordingly. The android application and hardware are connected through Arduino via Wi-Fi hotspot or Internet.

4. WORKING

In this project, we have used Arduino UNO as microcontroller. The values of maximum and minimum levels are obtained by Arduino using ESP. These values are set in the code written for Arduino UNO. The current level of water is obtained from the ultrasonic sensor. Depending upon these values, the motor is turned ON / OFF.

Sl. No.	Conditions of Water Level	Motor Status
1	Water level below minimum level	ON
2	Water level equal to or greater than maximum level	OFF
3	Water level in between minimum and maximum levels	Status can be controlled by the user

Table1: Proposed Working of water and Tank

Arduino is Associate in Nursing ASCII text file natural philosophy platform supported easy to use hardware and software system. Arduino boards square measure ready to scan inputs lightweight on a detector, a finger on a button, or a Twitter message and switch it into an associate in nursing output and activating a motor, turning on associate in nursing LED, commercial enterprise one thing on-line. You will tell your board what to try to causation a group of directions to the microcontroller on the board.

Blynk is a Platform with IOS and mechanical man apps to regulate Arduino, Raspberry Pi and therefore the likes over the net. It is a digital dashboard wherever you'll be able to build a graphic interface for your project by merely dragging and dropping widgets. It's a digital dashboard wherever you'll be able to build a graphic interface for your project by merely dragging and dropping widgets. It's very straightforward toline everything up and you may begin tinkering in under five minutes. Blynk isn't tied to some specific board or protect. Instead, it's supporting hardware of your selection. Whether or not your Arduino or Raspberry Pi is connected to the net over Wi-Fi, local area network or this new ESP8266 chip, Blynk can get you on-line and prepared for the net of Things. It will management hardware remotely, it will show device information, and it will store information, visualize it and do several alternative cool things.

5. IMPLEMENTATION

Depending on the water levels the status of motor will be automatically controlled. If water level is in between both the levels, then the user can exercise control by toggling the status of motor from the android application. Buttons – ON and OFF have been provided for the same. The application is designed in such a way that it will show the instantaneous value of current status of water in percentage.The height of tank is to be set once in Arduino. This height shall be used to determine the percentage of water. Calculations of the current water level

will be done with this. Making decisions with percentage proves to be easier to implement the logic in programming.

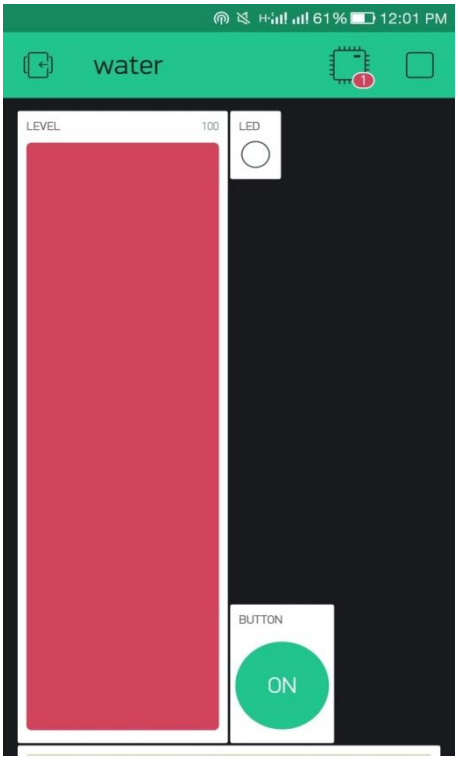

Fig.4: Screenshot of water tank when it is full

Figure 4 shows that the tank is full and motor will be off automatically as soon as the tank is full which can be seen in Figure 5.

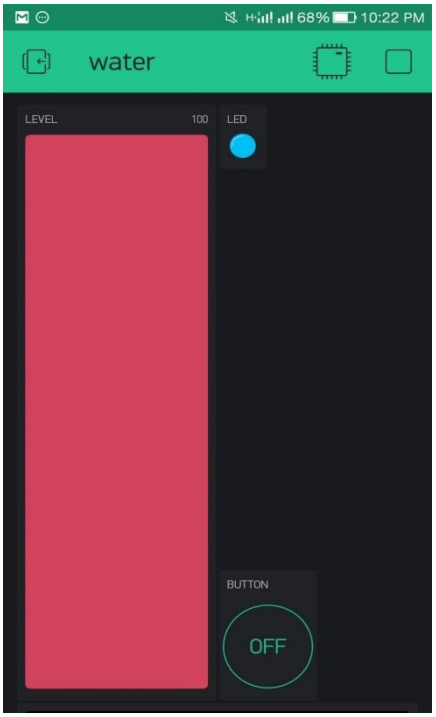

Fig.5: Water Tank is about to fill, Motor is OFF

Figure 5 is the screen which appears when the tank is full. As soon as the tank is full, it shows the tank layout as pink in color and automatically ledglows-on and motor onstate. When the motor is stopped, the android application displays the water level in percentage format

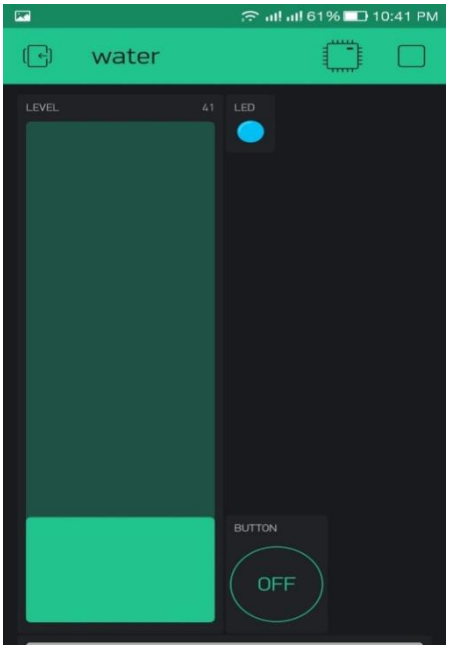

Fig.6: Water Tank is at nominal level & filling so, Led glows ON

Figure 6 is the screen which appears when the tank is at above minimum level. When the tank is at nominal level and the motor is in working condition the LED glows and motor is ON. The color indication of water at nominal level is green. The user can stop the motor at desired level. When the user wishes to clicks on the off button, then the motor will automatically stop, which results in LED glows off. When the motor is stopped, the android application displays the water level in percentage format.

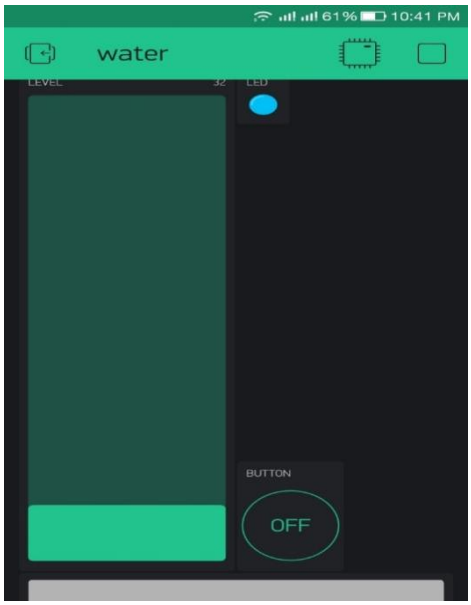

Fig.7: Water Tank is minimal level so, Led glows ON and motor is in ON state

Figure 7 is the screen which appears when the tank is at minimum level. When the tank is at minimum level and the motor is in idle state the LED glows off and motor is in OFF status. The color indication of water at nominal level is light green. The user can either stop the motor or start the motor. When the water is at minimum level the motor automatically starts and which resembles the LED glows. If the user doesn't need the tank to fill completely then he can stop the motor. When the motor is stopped, the android application displays the water level in percentage format

6. CONCLUSION

In this paper, we have been discussing about the elements of Smart phone and Water tank system. We actualized the discontinuous notice framework using the current tank system. There are a few preferences. Our connotation of this study is to become a line up to a flexible and competitively priced, simple configurable and most significantly, a transportable system which may solve our water wastage drawback.We have used ESP and Ultrasonic sensor which reduces cost effectively and makes this project economical. Also, this project doesn't require special different tank for it, existing water tanks can be used. We have successfully implemented this project.

7. APPLICATIONS AND FUTURE SCOPE:

This project has enormous applications. It can be installed in the following areas:

1. Private houses or bungalows
2. Housing societies
3. Apartments
4. Institutions like schools and colleges, hostels
5. Hospitals
6. Offices
7. Municipal overhead tanks (with slight changes in hardware)

This project can be implemented for a wide range of different sizes of water tanks making it a completely reliable solution.

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