Automatic Overhead Tank Level Indication

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Abstract –Water, one of our basic necessity of life, is in scarcity today. It is our duty to stop wastage and save it for our next generations. Every good deed starts from home, so here's a small innovation in our day to day life. This paper aims to design an innovative idea to display water level of the overhead tank with water usage details, fill up the tank automatically when empty and stop the water supply when filled completely without wasting a drop of water. This system has a contactless sensor to acquire the water level and displays the same on our mobile screen connected via Bluetooth technology.

Key Words: **Sensor, Indicator, Water level, Tank, Usage, Arduino, Ultrasonic, Bluetooth.**

1. INTRODUCTION

We are living in the world of automation where we need quick and smart work done by machines around us. An overhead tank level indicator is such a smart device which gives you the information of water level of the tank while you're just resting on your bed. This device continuously checks the water level and sends you the updates on your mobile phone, starts the water supply when the tank is empty, switches off the supply with an alarm to notify the tank is full. The salient features of this smart device is

- No wastage of water
- Water level indication
- Water usage indication
- Automatic turn on/off water supply
- Alarm to notify tank is full

2. METHODOLOGY

The system consists of Arduino board interfaced with Ultrasonic sensor, Bluetooth HC-05 Module, RGB Led and Buzzer. The ultrasonic sensor (input device) is mounted on the top of overhead tank to acquire the water level details. Consequently the RGB Led and buzzer are our output units. The RGB led changes its color for every different level of the overhead tank. Also the buzzer alarms when the overhead tank is full.

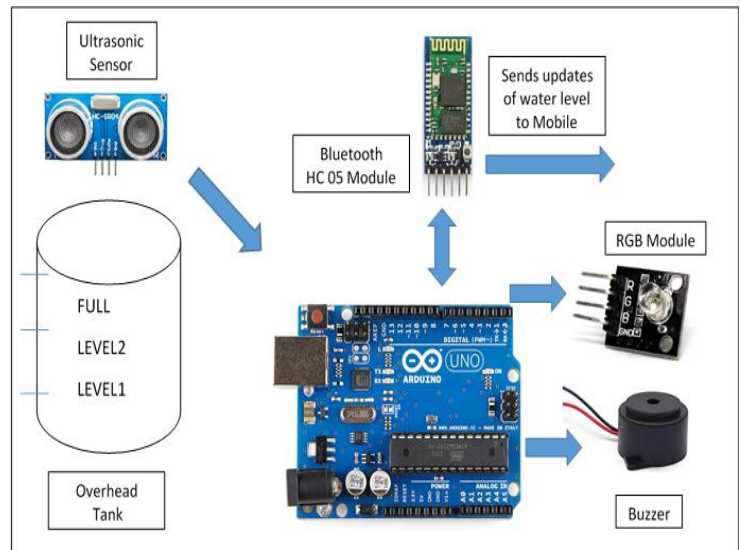The following block diagram describes the project in a nutshell.

Fig -1: Block Diagram of the system

3. THE PROCESS

The contactless ultrasonic sensor is mounted on the overhead tank continuously checking the water level, also the updates are sent to mobile via Bluetooth interface.

According to the level, the water supply is automatically turned ON. The overhead tank is divided into three levels, namely level 1or low level, level 2 or medium and level 3 i.e. tank full. Apart from the accurate values of level displayed on mobile screen, the RGB led also changes its color for easy visualization. The following table states RGB color displayed here.

Table -1: RGB colors

LEVEL 1 / LOW LEVEL	GREEN COLOR
LEVEL 2 / MEDIUM LEVEL	YELLOW COLOR
LEVEL 3 / TANK FULL	RED COLOR

When the water level reaches the final stage, the supply is automatically turned OFF and the system initiates the alarm for the same.

Another unique feature of this system is to notify the water usage on the mobile screen.

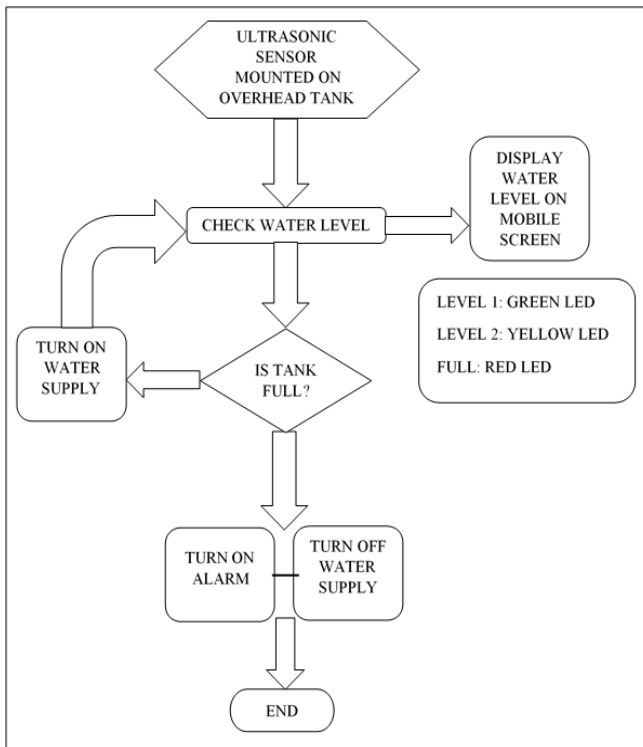The following diagram shows the process flow of the system.

Fig -2: Flow Diagram of the system

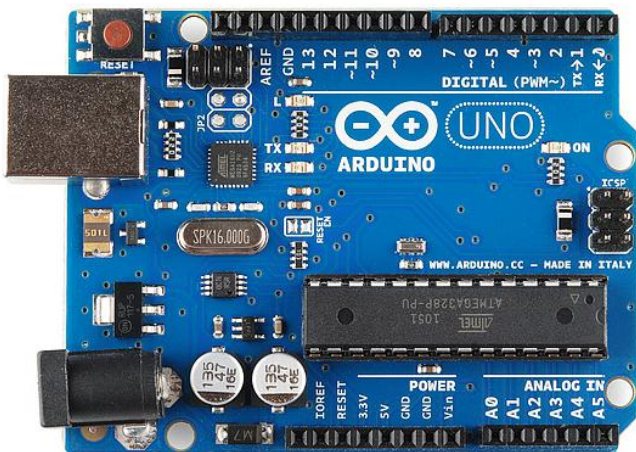## 4. COMPONENT DESCRIPTION
4.1 Arduino

Fig -3: Arduino Uno Board

Arduino Uno board has ATmega328 microcontroller chip, works on 5v supply, 32KB flash memory, 16MHz crystal oscillator, 14 Digital input-output pins with 6 PWM outputs and 6 analog input pins.[1]

4.2 Ultrasonic Sensor

Fig -4: Ultrasonic Sensor

The ultrasonic sensor works on sonar technology. It has a transmitter-receiver pair, the TX transmits an ultrasonic wave and RX receives it back if obstructed by an object/surface. The time duration of this return journey is determined and later converted into distance in our code.

4.3 Bluetooth Module

Fig -5: Bluetooth HC-05 Module

The Bluetooth HC-05 module is an easy plug and play device. It connects to the Arduino board with serial communication pins.
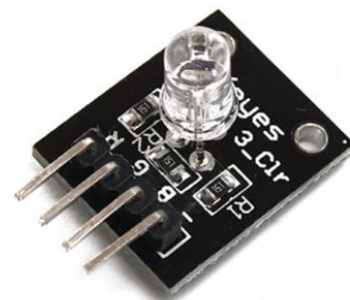
4.4 RGB Led

Fig -6: RGB led

RGB led is used for the water level display. It emits light in different colors, as per values given to it.
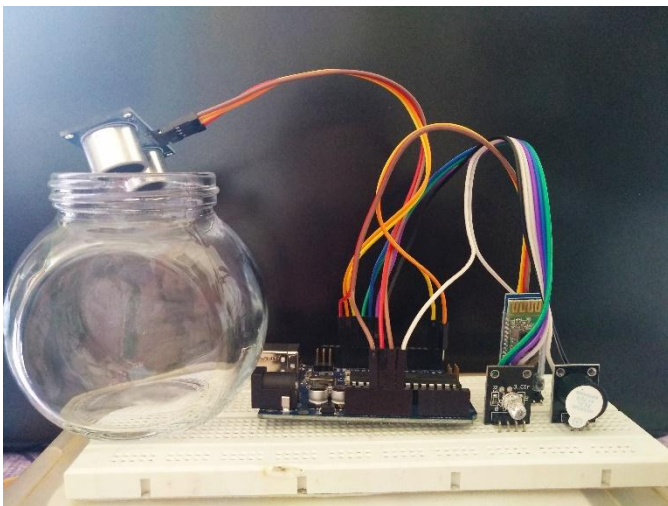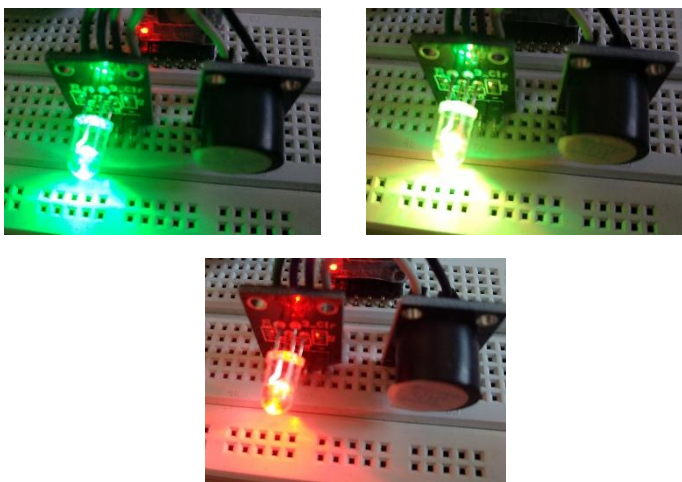
4.5 Alarm

Fig -7: Buzzer

5V Buzzer is used here to notify the user that the overhead tank is full.

5. THE PROTOTYPE MODEL

Fig -8: The prototype model

Fig -9: RGB led output

Fig -10: Water level display on mobile screen

6. CONCLUSION

This system is developed as a prototype model which can be implemented in our practical environment to save water and time.

REFERENCES

[1]   https://www.arduino.cc/

BIOGRAPHIES

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Works as an Assistant Professor at ITM $_{SLS}$ Baroda University
An Electronic enthusiast with 4 years of teaching experience.