Project Report
On
water tank monitoring system
(IOT)

Submitted to: Mr. Piyush Agarwal
Submitted by: Krishna Pratap Singh
Section : D
Class roll no : 17
University roll no : 2016821

Acknowledgement

This project would not have taken shape without the contributions of many who have extended help in one or the way .

I would like to take this opportunity to express my thanks to my father and mother who have provided the entire moral backing and encouragement all through the course duration .

A discussion on the project work, with my seniors in the college was also great source of help and without which it would not have been possible to achieve the results reported in this project .

I would like to express my sincere gratitude to my mentors,

Prof. piyush agarwal (Project supervisor) for his useful comments on the subject matter and for the knowledge I gained by sharing ideas with him.

Finally, it is pleased to acknowledge the indebtedness to all those who devoted themselves directly or indirectly to make this project report success.

Abstract

- Water source is necessary and an important factor in agricultural and farm production and is a key of our quality of life as well. Monitoring water level of a water source, such as water tank or borewell etc., plays a key role in agricultural. For example if a water level drops below the threshold level for pumping in a borewell, the pump motor may get damaged due to dry running. In such case monitoring water level and controlling the water pump accordingly becomes necessary task. There are many other situations where water level monitoring is an important task. It may be used to preserve water or to study the water usage of a water source. This paper proposes a prototype system design, implementation and description of required tools and technologies to develop Internet of Things (IoT) based water level monitoring system which can be implemented in future smart villages in India

Introduction

- Towns in India will before long be changing to savvy towns as Government of India carries Smart Village drive to the country. The smart village initiative will promote digital inclusion which will enable the enhanced access Subsequently the Internet of Things (IoT) plays a significant part to play in Smart Village in India. In IoT empowered Smart Village each actual item, a thing, will be associated with the Internet and empower clients to keep track of its status and to control it from a distance. to services through Information Technology (IT) enabled platforms. This will help users to access to services provided by such objects as and when required. IoT can be used in s mart village to develop Smart Agriculture, Smart Dairy, Smart Schools, Smart Healthcare and Smart Grid solutions. IoT in agriculture can be used for better management of resources used in crop production. Water is one of the important substances used in crop production. It must be saved to avoid water shortage in future. One such method for saving water is to screen and concentrate on its use and in like manner its usage ought to be made due. Checking water level of a water source, for example, water tank or borewell and so forth, assumes a key part in water the board. Monitoring water level in a water source can be utilized to save water and to concentrate on the water use. Subsequently checking water level is a significant undertaking in farming.

Description:

- This task assists us with realizing the water level in the tank whether it is in the base level or the greatest level dependent on detecting the degree of water to foresee the compartment/tank is filled or not and show its outcome with the assistance of screen and LED lights demonstrating the level of water level. The undertaking intends to fill the water tank consequently with next to no human cooperation with the assistance of a siphon to save the wastage of water and the time being the flood of the water, with the assistance of IoT application the task is executed with applied sensors

- This task focused on minimal expense programmed water level monitering framework

Materials

- Arduino Pro mini

- HC-SR04 ultrasonic sensor

- Led

- Buzzer

- Jumper wires

- Lcd(16*2)

- Water pump

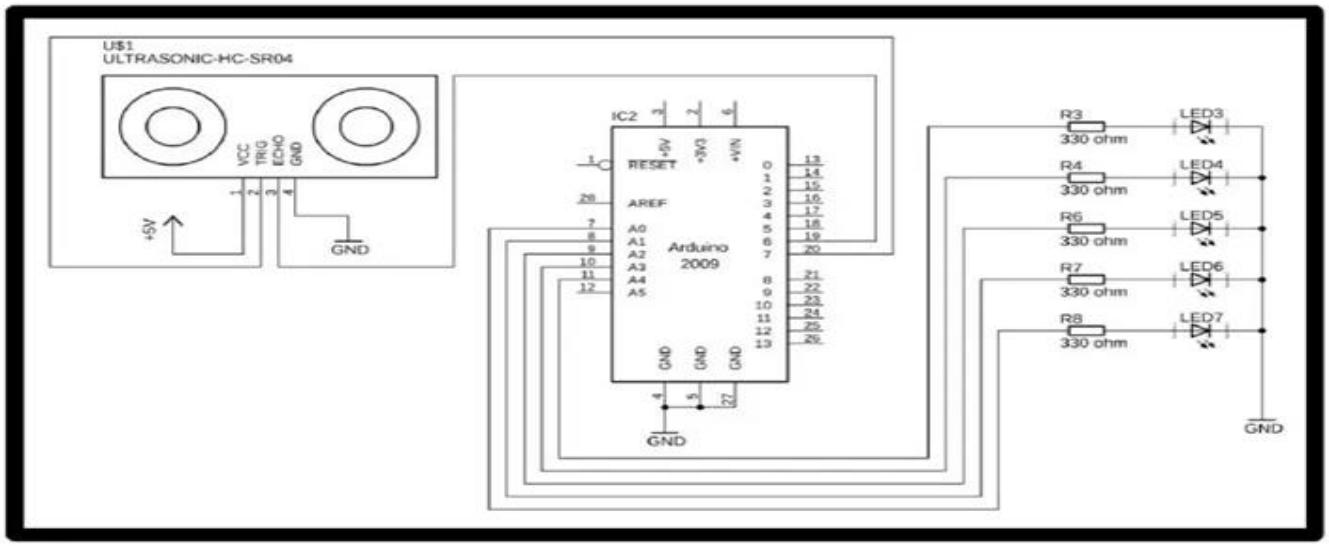
- breadboard

Methodology

A tank monitoring system can sort out the issues associated with a water tank. Thus, it is also possible to check the level of the water using a sensor so that whenever the water goes low, the pump turns on automatically. Also, to avoid the overflow of water, it detects when the water level goes above the set limit, which turns off the pump automatically.

- The water level in the tank is continuously monitored by the ultrasonic sensor mounted on top. As the water level in the tank drops below 20 percent, the pump is turned on using the relay mechanism and is kept on until the tank is full. The pump is then turned off and the loop iterated again.
- This tutorial focuses on implementing an Arduino-based system to monitor the water level in a tank using an ultrasonic sensor, which also controls a relay-connected pump based on the input from the sensor.
- After gathering the required components, it’s time to implement a circuit following the circuit diagram.

Estimated Block diagram :



Two water levels are set based on the total tank height. The lower level is at 20 percent of the total height, and the upper level is set at 90 percent of the total tank height.

The ultrasonic sensor is mounted on the top of the tank. When the tank is 20 percent full, the distance between the U.S. and the water surface will be:

$h_{20\%}$= Total height – height of 20% filled water

Similarly, when the tank is 90 percent full, the distance between the U.S. and the water surface will be:

$h_{90\%}$= Total height – height of 90% filled water

when the distance of the water surface from the ultrasonic sensor is greater than $h_{20\%}$, the pump is on. The pump is kept on until the set upper water level is achieved, then it automatically turns off. This happens when the distance of the water surface from the ultrasonic sensor is less than $h_{90\%}$.

HC-SR04 SENSOR FEATURES

-Operating voltage: +5v

-Theoretical measuring distance: 2cm to 450cm

-Practical measuring distance: 2cm to 80cm

-Accuracy: 3mm

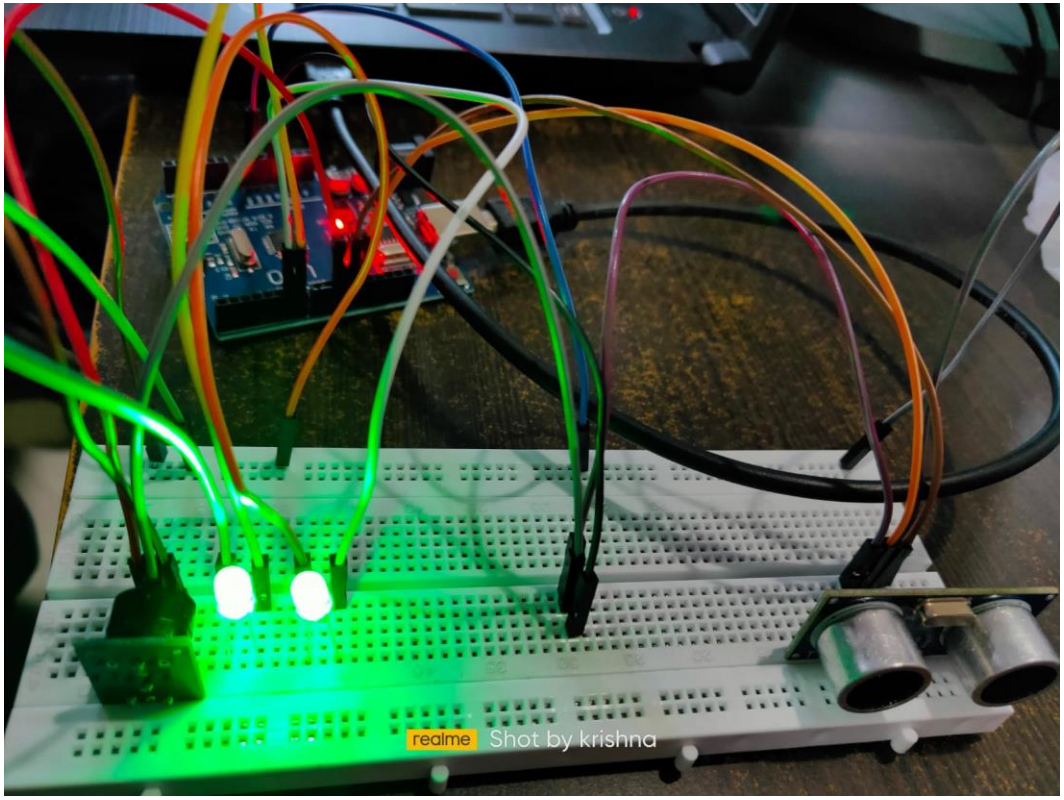
-Measuring angle covered: <15°

-Operating current: <15ma

-Operating frequency: 40hz

Arduino IDE Setup

Install the Arduino integrated development environment (IDE) software on your PC, then connect the Arduino board to the PC using the USB cable. Set the board as "Arduino UNO" and port to whichever board is connected in the "Tools" menu of the IDE. You can find the port number by going to the "Device Manager" window on your Windows PC.



Code

```
#define pump 13
const int trigPin = 12;
const int echoPin = 11;
const int buzzer = 10;
int led1=6;
int led2=7;

 int dist;
 long time;

void setup() {
pinMode(trigPin, OUTPUT);
pinMode(echoPin, INPUT);
pinMode(led1,OUTPUT);
pinMode(led2,OUTPUT);

pinMode(buzzer, OUTPUT);

pinMode(pump, OUTPUT);
Serial.begin(9600);
}
```

```
void loop() {

digitalWrite(trigPin, LOW);
delayMicroseconds(2);
digitalWrite(trigPin, HIGH);
delayMicroseconds(10);
digitalWrite(trigPin, LOW);
digitalWrite(pump, LOW);

time = pulseIn(echoPin, HIGH);
dist= (time/2)/29.1;

if (dist <= 10)
{
  digitalWrite(buzzer, LOW);

  digitalWrite(led1, HIGH);
  digitalWrite(led2, HIGH);
  digitalWrite(pump, LOW);
  Serial.print("tank is full….!!");
}
```

```
else if(dist<=30){
  digitalWrite(buzzer, LOW);

  digitalWrite(led1, LOW);
  digitalWrite(led2, HIGH);
}
else {
  digitalWrite(buzzer, HIGH);

  digitalWrite(led1, LOW);
  digitalWrite(led2, LOW);
    digitalWrite(pump, LOW);
}

// display the distance between water level and sensor
Serial.print("Distance -> ");
Serial.println(dist);
}
```

Output

```
Distance -> 97
Distance -> 98
Distance -> 94
Distance -> 94
Distance -> 96
Distance -> 99
Distance -> 99
Distance -> 97
tank is full....!!Distance -> 10
tank is full....!!Distance -> 10
tank is full....!!Distance -> 10
tank is full....!!Distance -> 8
tank is full....!!Distance -> 7
tank is full....!!Distance -> 8
Distance -> 185
Distance -> 728
tank is full....!!Distance -> 7
tank is full....!!Distance -> 7
tank is full....!!Distance -> 7
tank is full....!!Distance -> 8
tank is full....!!Distance -> 8
tank is full....!!Distance -> 8
tank is full....!!Distance -> 7
tank is full....!!Distance -> 7
tank is full....!!Distance -> 6
tank is full....!!Distance -> 6
tank is full....!!Distance -> 6
tank is full....!!Distance -> 7
Distance -> 14
```

Applications

- Can be used in water tanks to control water levels
- Automatically turn ON/OFF pumps
- Can be used in factories, commercial complexes, apartments, home,
- Fuel tank level gauging
- Oil tank level control
- High & low-level alarms
- Pool water level control

Conclusions and future work

- The project proposes a simple water level monitoring system with different levels indicated. It also signifies when the water level is below and above then the requirement. System design and architecture is as discussed, thus being a cost effective and simple strategy to monitor the water level system. Future Work can involve the analysis of water level in a particular area so that the wastage of water is prevented . We can also include the **Global System for Mobile Communications (**GSM)-based system where the message will be sent to the particular authorized person when the water level is below the required level.