



AISSMS
INSTITUTE OF INFORMATION TECHNOLOGY
ADDING VALUE TO ENGINEERING



A
PROJECT BASED LEARNING REPORT
ON

**WATER LEVEL INDICATOR USING ULTRASONIC
SENSORS**

SUBMITTED TO THE SAVITRIBAI PHULE PUNE UNIVERSITY, PUNE
IN THE PARTIAL FULFILLMENT OF SECOND YEAR OF ENGINEERING

IN
ELECTRONICS AND TELECOMMUNICATION

BY

SHUBHANGI KAWALE	S190253258
TEJASHREE SAKHARE	S190253227
SHREEYA BHONSLE	S190253253
PRIYA SIRSAT	S190253265
SAMRUDDHI ZAGADE	S190253230

UNDER THE GUIDANCE OF

<<Guide Name>>(14/bold/uppercase)

ACADEMIC YEAR: 2020-21

CERTIFICATE

(Font -16-Times New Roman-Centered)

This is to certify that Project Report entitled
(Font-14-Times New Roman-Centered)

“PROJECT TITLE”

Water level Indicator using Ultrasonic Sensors

Submitted by

Ms. Shubhangi Kawale (S190253258)

Ms. Tejashree Sakhare (S190253227)

Ms. Shreeya Bhonsle (S190253253)

Ms. Priya Sirsat (S190253265)

Ms. Samruddhi Zagade (S190253230)

is the record of bonafide work carried out by them in partial fulfillment of the requirement for the award of the Degree of **Bachelor of Engineering (Electronics and Telecommunication)**, as prescribed by the Savitribai Phule Pune University in the Academic Year 2020-21. (14-Times new Roman)

This project report has not been earlier submitted to any other Institute or University for the award of any degree or diploma. (12/ sentence case)

<<Name >>

Internal Guide

Department of E&TC Engg.

Dr.M.P.Sardey

Head of Department

Department of E&TC Engg.

Dr.P.B.Mane

Principal

**AISSMS Institute Of Information Technology,
Pune.**

Date:

Acknowledgement

It is my great pleasure in expressing sincere and deep gratitude towards my guide **Mrs. Nilima Warade**, Electronics & Telecommunication Engineering Department for **her** valuable guidance and constant support throughout this work and help to peruse additional studies in **domain**.

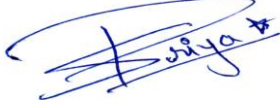
We take this opportunity to thank Head of the Department **Dr.M.P.Sardey** and all staff members of department of Electronics &Telecommunication Engineering AISSMS IOIT, Pune, for cooperation provided by them in many ways.

The motivation factor for this work was the inspiration given by our honorable principal **Dr. P.B.Mane**.

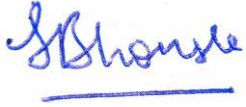
Lastly, I am thankful to those who have directly or indirectly supported for our work.



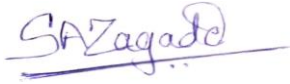
Shubhangi Kawale



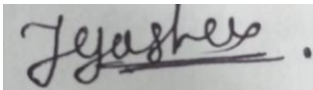
Priya Sirsat



Shreeya Bhonsle



Samruddhi Zagade



Tejashree Sakhare

ABSTRACT

Our project aims to prevent the overflow and wastage of water by using a simple method of measuring the level of water using a sensor and stopping the flow of water through a valve when the water reaches a certain level.

In our project, the water will be flowing through the solenoid valve to fill the tank. An ultrasonic sensor connected to Arduino Uno will be used to measure the level of water in the tank. As soon as the water level reaches particular levels, LEDs will start to glow one by one and when it reaches a level less than 20cm, Arduino will send a signal to the solenoid valve through a single channel relay to close (stop the flow of water). Hence, the tank will be prevented from overflowing.

INDEX

CHAPTER NO.	TITLE	PAGE NO.
	List Of Tables	
	List Of Figures	
	List Of Abbreviations	
1	Introduction	1
1.1	1.1 Literature survey	2.
2	Aim and objective	3
3	Block diagram	4.
4.	Hardware design	5.
5.	Software design	6.
6.	Project Algorithm	7.
7.	Result and Analysis	8.
8.	Reference	9.

LIST OF TABLES

TABLE NO	TITLE	PAGE NO

LIST OF FIGURES

FIGURE NO	TITLE	PAGE NO
1.	Block Diagram	13
2.	Circuit Diagram	14
3.	Project Algorithm	18

LIST OF ABBREVIATIONS

LED	Light Emitting Diode (LED)

1.INTRODUCTION

In relation with the current framework with so much work and too less time to spare, it is very difficult to keep in touch with the water level in the tanks. Water is essential in every hour of our lives. Hardly anyone keeps in track of the level of water in the overhead tanks. The objective of the project is to measure the level of water in the tank and notify the user about the water level through LEDs as well as control the level of water with a valve. This not only helps to keep the tank full but also making it more convenient for our day-to-day chores and also avoiding water wastage. In this project, the water is being measured by using ultrasonic sensors. Initially, the tank is considered to be empty. When the sound waves are transmitted in the environment, they are reflected back as ECHO. This same concept is applied this project. Waves generated by the ultrasonic sensors is sent to the water tank and their time of travelling and coming back is noted and after few calculations we can estimate the level of water in the tank. The solenoid valve is automatically turned OFF when the water level becomes low and turned ON when the tank is full. These alerts are notified through LEDs.

2. LITERATURE REVIEW

The survey conducted by us was with some residential buildings about how they face the problem of water shortage. We also came to know that due to this water shortage issues a complete day water supply gets cut-off. This can be a way to save water but due to this normal people have to suffer because of some mistakes which are done by others. Other information we get from various articles and blogs regarding water scarcity which are as follow: - 1. Times of India article: - “Water crisis back to haunt Sec 51 residents (March 11,2018)” 2. National Geographic blog: - “Short on Water? Don’t Blame it on the Rain (March 5, 2014)” -and several more...

SUMMARY OF LITERATURE SURVEY:

Literature survey was done on our model by various online websites in which our idea was not available anywhere but some of the instances helped us like use of proper sensor and use of valve to stop the flow. Like according to www.sensorson.com we can calculate the volume if we know the flow rate and time interval.

3. AIM AND OBJECTIVES

3.1 Problem Statement

To build a water level indicator and controller using ultrasonic sensor and solenoid valve.

3.2 Objectives

1. To construct a system to automatically detect water level.
2. To indicate the level of water using various colors of LEDs

3.3 Methodology

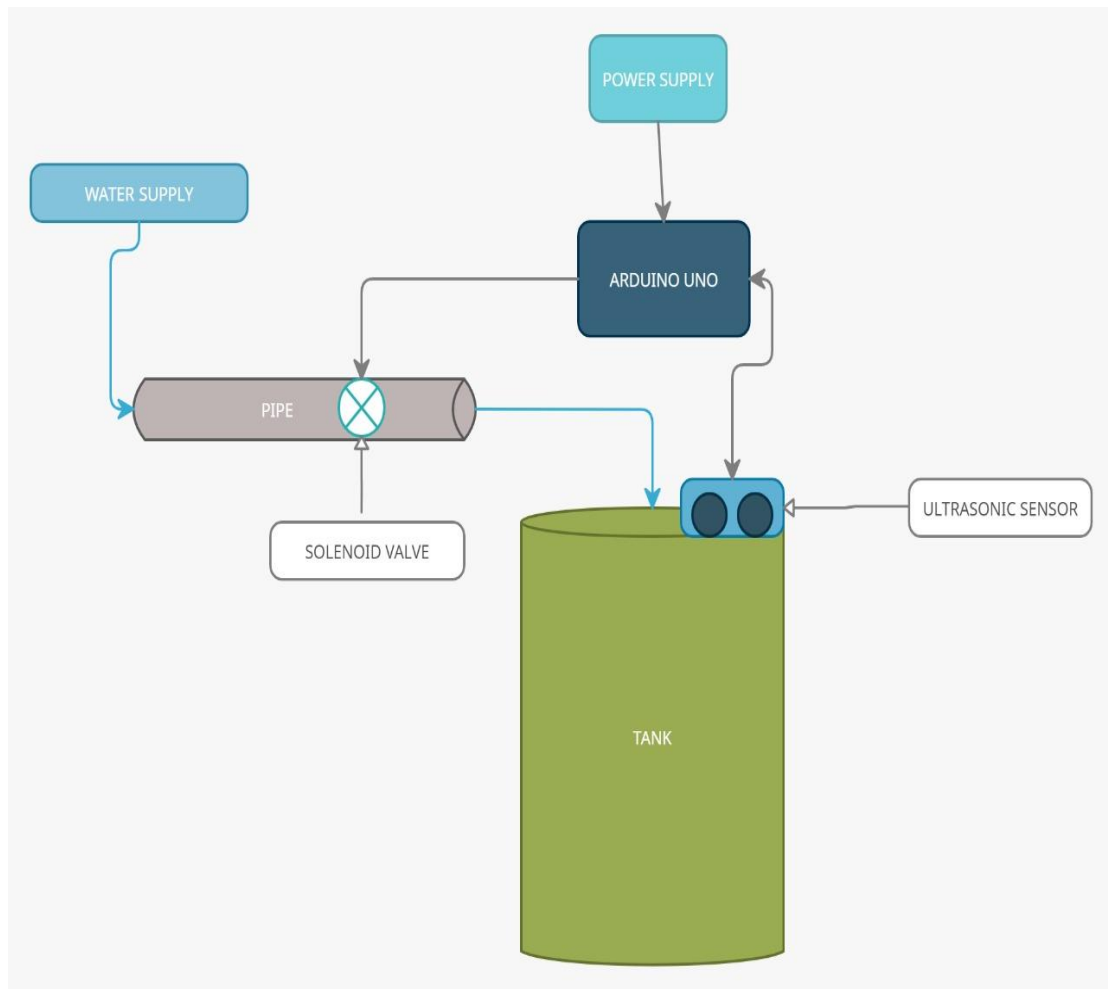
The process involved in the development of the project is very important so that the process goes smoothly without any difficulties. The circuit is designed in such a way that it indicates four levels of water stored in the tank. They are as follows:

1. less than 100cm
2. less than 70 cm
3. less than 40 cm
4. less than 20 cm

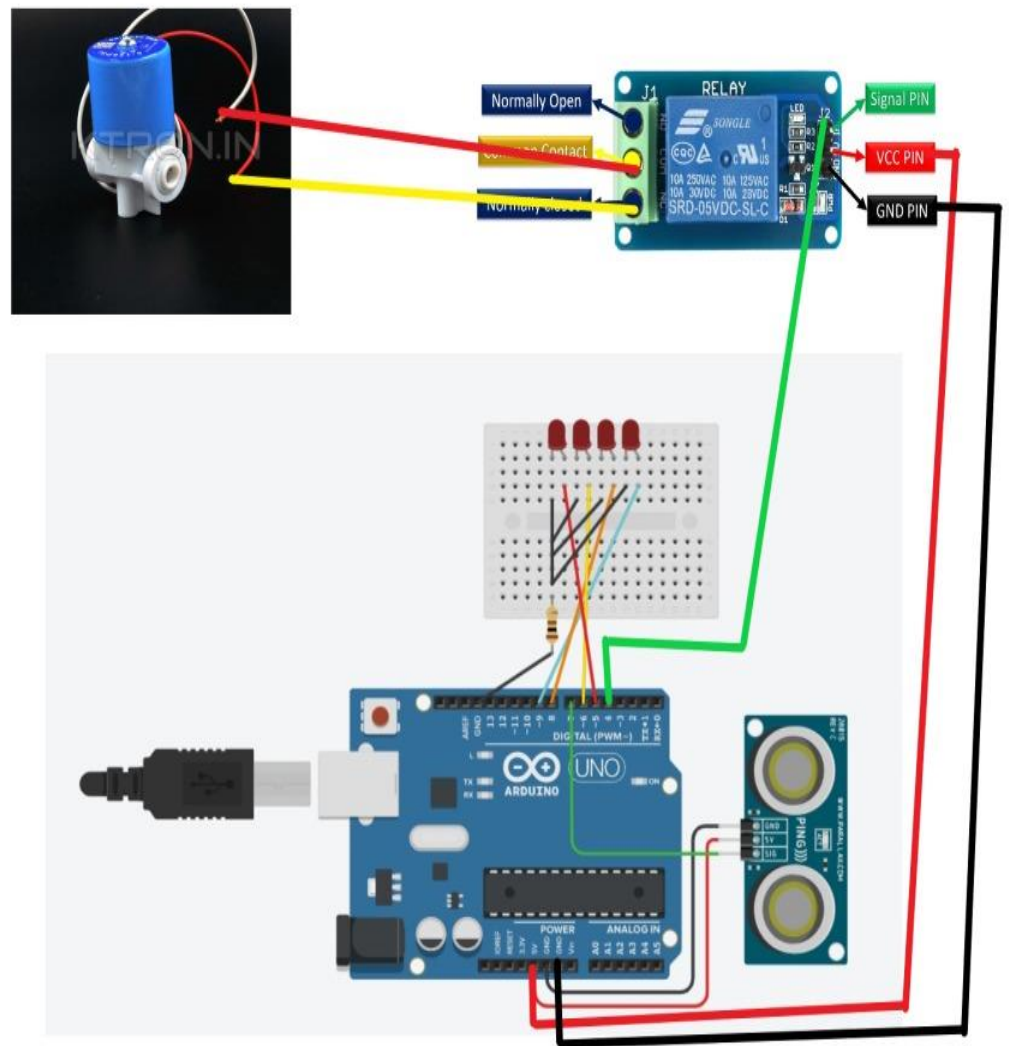
Now the LEDs will glow according to the levels. When the water crosses level one LED will glow, when it crosses level 2 2 LEDs will glow and when the tank is nearly full or close to overflowing all four will glow and the water will stop filling the container.

3.4 Specifications of the System

4. BLOCK DIAGRAM OF THE SYSTEM AND ITS EXPLANATION



5. HARDWARE DESIGN



EXPLANATION: The circuit will consist of Arduino uno as the micro-controller which will be connected to the ultrasonic sensor and the solenoid valve (actuator). Here the ultrasonic ranging module is placed on top of the tank facing the water surface. The water reflects the ultrasonic pulses emitted by the module. The module picks the reflected waves and also measures the time lag. The distance between the water surface and the sensor is calculated from the collected data and the module outputs a pulse whose width is proportional to the distance. Arduino reads the width of this output pulse and does necessary math on it to get the distance. Here the distance between the sensor and the water level is measure. After the water level reaches a particular level (high), the solenoid valve will be given a signal by the Arduino. Arduino will signal the valve to close which will further stop the tank from filling.

6. SOFTWARE DESIGN

(Program code)

```
// define pins numbers
const int trigPin = 4;
const int echoPin = 7;
const int led1 = 5;
const int led2 = 6;
const int led3 = 8;
const int led4 = 9;

// define variables
long duration;
int distance;

void setup() {

    pinMode(trigPin, OUTPUT); // Sets the trigPin as an Output
    pinMode(echoPin, INPUT); // Sets the echoPin as an Input
    pinMode(led1, OUTPUT);
    pinMode(led2, OUTPUT);
    pinMode(led3, OUTPUT);
    pinMode(led4, OUTPUT);
    Serial.begin(9600); // Starts the serial communication
}

void loop() {

    digitalWrite(trigPin, LOW);
    duration = pulseIn(echoPin, HIGH); // Reads the echoPin,
    returns the sound wave travel time in microseconds
    distance= duration*0.034/2; // Calculating the distance
    Serial.print("Distance: "); // Prints the distance on the
    Serial Monitor
    Serial.println(distance);

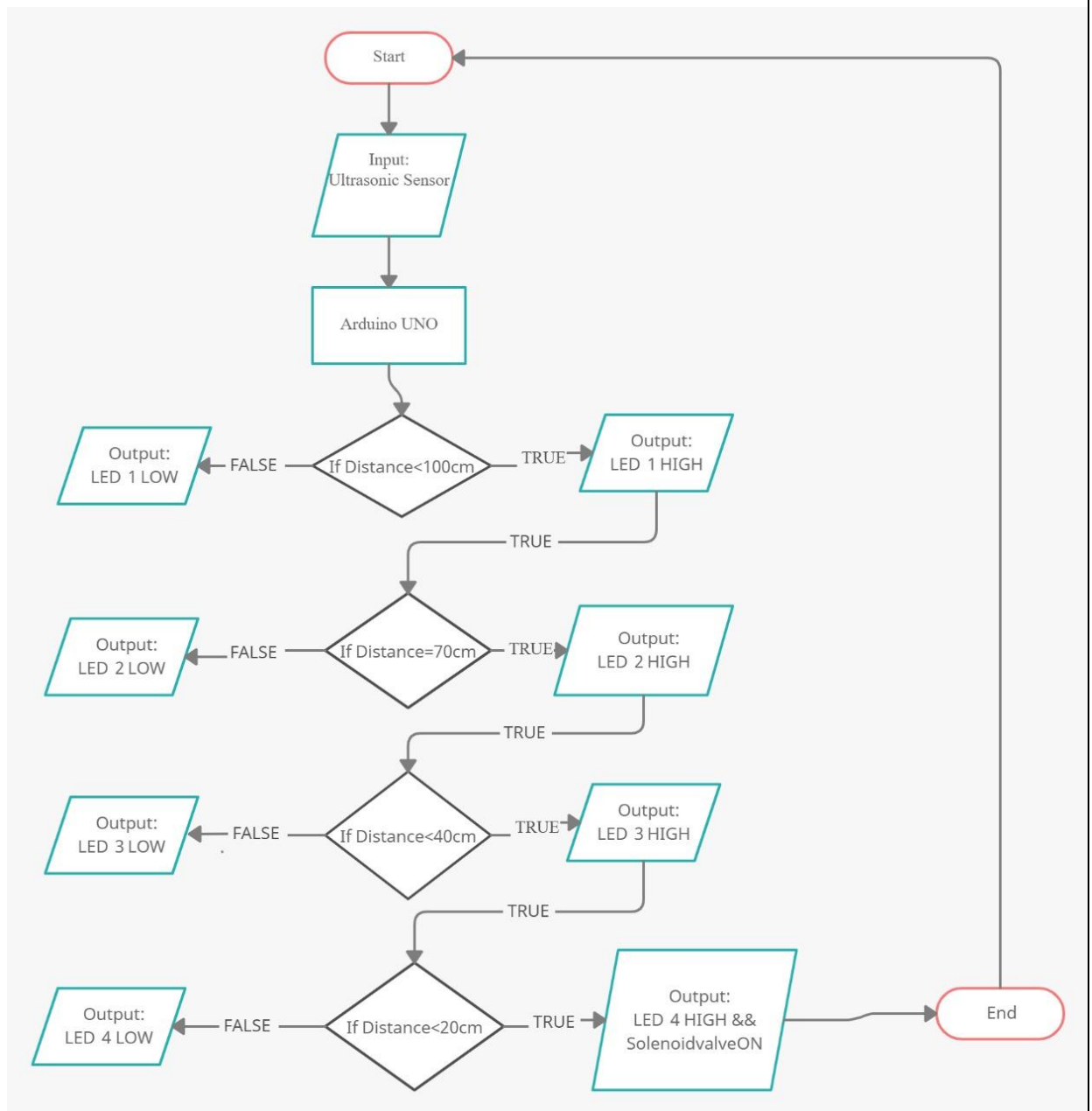
    if(distance < 100)
    {
        digitalWrite(led1,HIGH);
        if(distance < 70)
        {
            digitalWrite(led2,HIGH);
        }
        else
        {
            digitalWrite(led2,LOW);
        }
        if(distance < 40)
        {
            digitalWrite(led3,HIGH);
        }
        else
        {

```



```
        digitalWrite(led3,LOW);
    }
    if(distance < 20)
    {
        digitalWrite(led4,HIGH);
        digitalWrite(trigPin,HIGH);
    }
    else
    {
        digitalWrite(led4,LOW);
    }
}
else
{
    digitalWrite(trigPin,LOW);
    digitalWrite(led1,LOW);
    digitalWrite(led2,LOW);
    digitalWrite(led3,LOW);
    digitalWrite(led4,LOW);
}
}
```

Fig 3. Project Algorithm



7. Test Results and Analysis

- 1) There will be four LEDs.
- 2) When the last LED glows, the solenoid valve will be signaled to close by the Arduino which will stop the tank from filling with water any further.

8. REFERENCES (IEEE Format)

1. <https://www.irjet.net/archives/V7/i5/IRJET-V7I51024.pdf>
2. <https://maker.pro/arduino/projects/water-level-indicator-using-sr04-sensor>
3. <https://waterlevelcontrols.com/water-level-indicator/#:~:text=Purpose%20of%20Water%20Level%20Indicator,back%20to%20the%20adequate%20level>

APPENDIX

A1	Bill of material.
A2	Important Datasheets, Application notes
A3	Project participation certificates.