# REPORT ON WATER LEVEL ALERTING SYSTEM

## Description:

Water level monitoring has several environmental benefits and is a common measurement for a variety of companies and organisations. Monitoring water flow can aid in the detection of prospective changes in water flow, as well as increased or decreased water volume levels, which may signal flow path modifications or warn of potential surface level floods.

## Abstract:

This project uses a microcontroller(Arduino uno), an ultrasonic sensor, and an LED. This is an example of an embedded system. The ultrasonic sensor emits ultrasonic waves that are reflected back after colliding with an item in front of it. The distance between the sensor and the item is determined by the time it takes for the signals to bounce back.

## Component Description

### Power Supply:

All devices, switches, and the Arduino is powered by an external power supply.

### Microcontroller(Arduino uno):

Performs all of the operations that our system requires. Processes the signals received by the ultrasonic sensor to determine the distance between the object and the sensor.

### Ultra-Sonic Sensor:

Ultrasonic signals are sent and received to determine the distance between the sensor and the item.

### LED

Indicates the user by turning on the light.

## High Level Requirements

Must be able to do things like: -

- Determine the distance between the ultrasonic sensor and the water in front of it and show it on a LED.
- When the distance between the ultrasonic sensor and the water is too short, the LED will glow.

## Low Level Requirements

Low level requirements must have

- Interface HC-SR04 (Ultrasonic sensor) with Arduino uno
- Interface LED With Arduino uno
- Interface Buzzer with Arduino uno

## SWOT ANALYSIS

### Strengths

- To show the distance between the object(water) and the Ultrasonic sensor and alert using a LED
- Simple to understand and easy to setup.
- Simple method to check whether the distance between the object and the Ultrasonic sensor is very small by turning on the LED
- Ultrasonic sensors are highly accurate and can detect small variations

### Weakness

- Ultrasonic sensors have trouble reading reflections from soft, curvy, thin, and small objects.
- Distance measurement is limited.

## Opportunities

- Everyone can use it in their daily lives -This benefit means that water level monitoring is commonly used in some of the following applications:
- Flood monitoring
- River level monitoring and many more

## Threats

- Other sensors that are more efficient than the ultrasonic sensor can be utilised.
- There are many other similar applications available.

# 4W's & 1H

## Who

Common people can use this to see the level of water in the tank to minimize the wastage of water.

## What

This is a utility application that uses the buzzer to determine distance and also warn the user if the water level is very high.

## When

Human can't watch continuously this system alerts them through LED.

## Where

This application can be used by anyone from any background to determine distance or verify if an object is present in front of him.

## How

Developed using Arduino UNO and implemented on SimulIDE.

# Architecture:

## Block diagram:

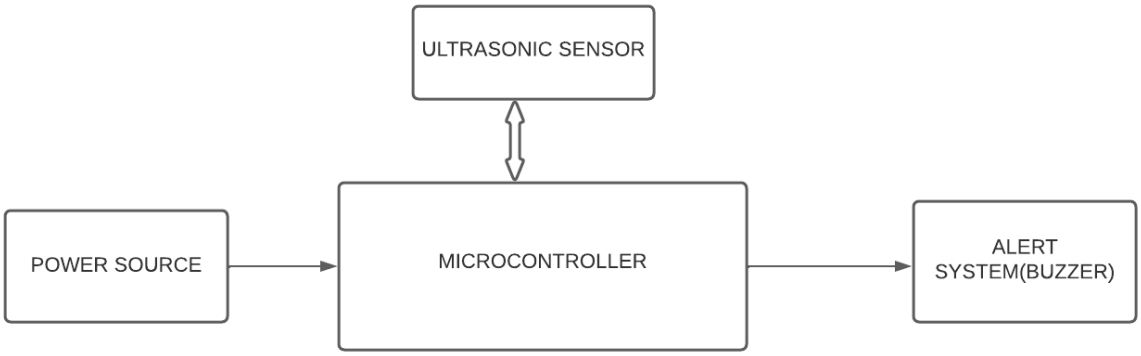


Fig a: Block diagram of the system

## Structural diagram:

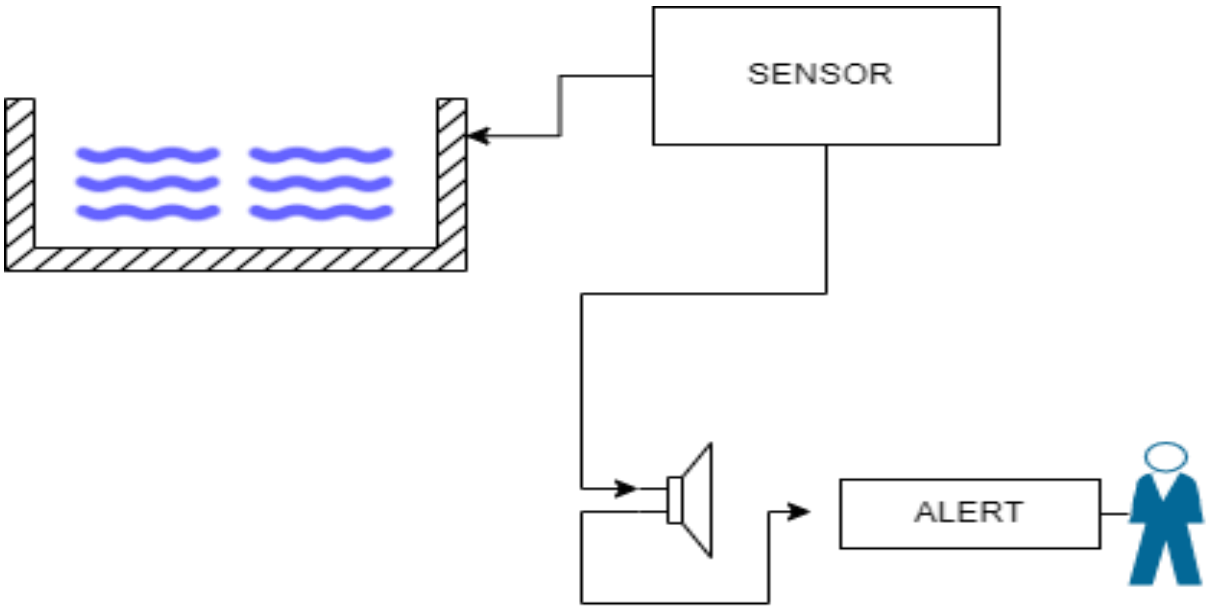


Fig b: Structural diagram of the system

## Flow chart:

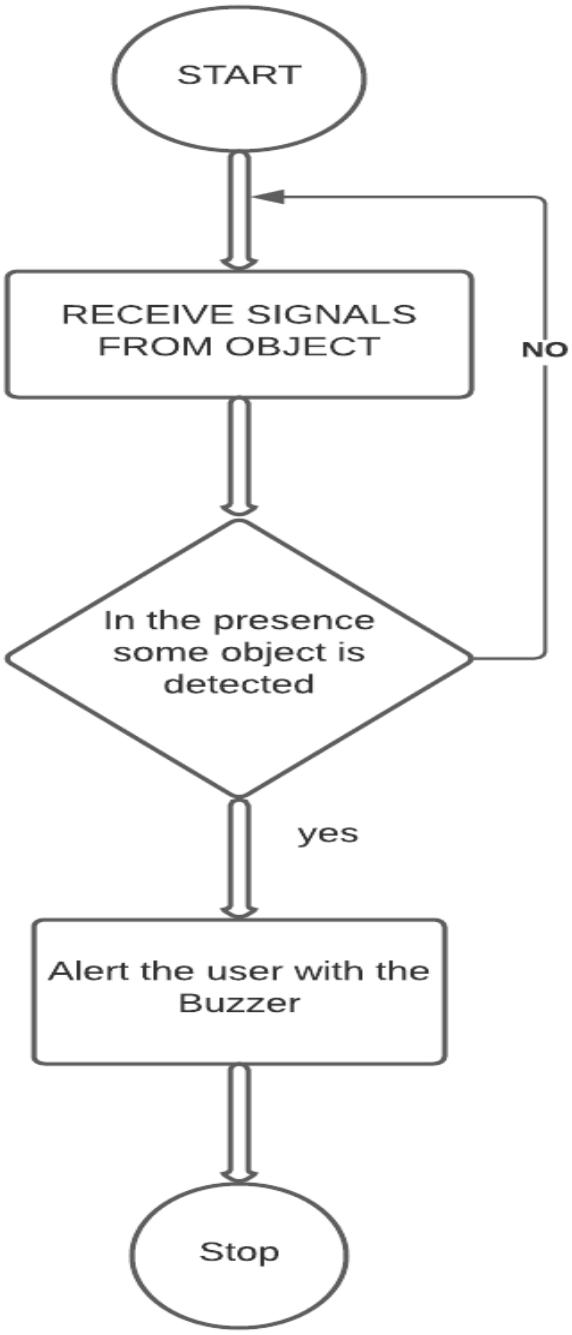


Fig c: Flow Chart of the system

## Circuit diagram:

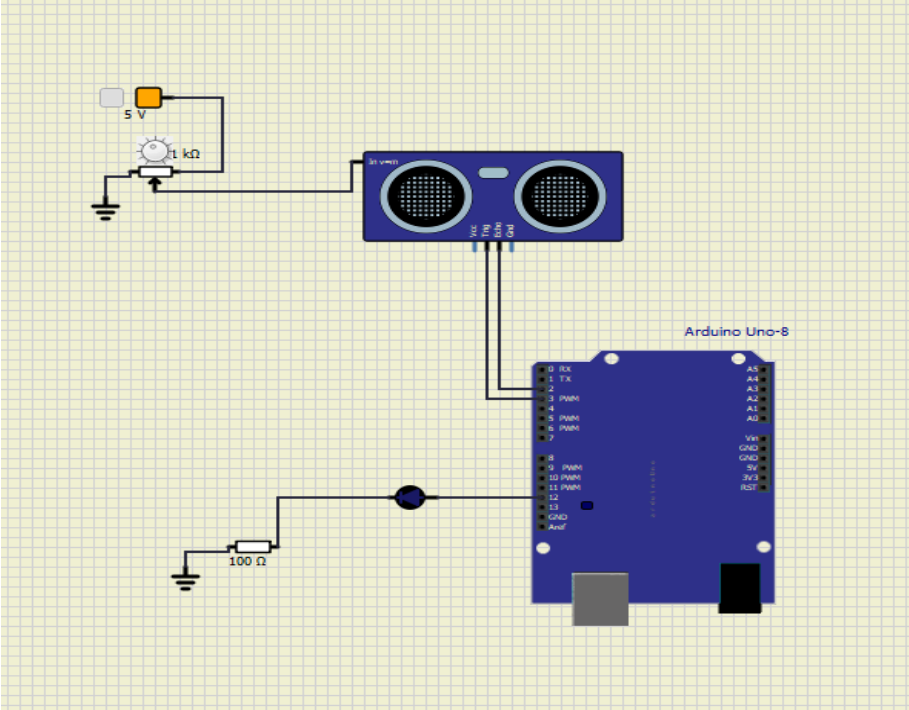


Fig d: Circuit diagram of the system

- **Test Plan and Output:**

- **High level test plan**

| Test ID | Description | Exp I/P | Exp O/P | Actual Output | Type Of Test |
|---|---|---|---|---|---|
| **H_01** | Integrate Ultrasonic sensors with Microcontroller | None | Successful Integration | Successful Integration | Requirement based |
| **H_02** | Integrate LED with Microcontroller | None | Successful Integration | Successful Integration | Requirement based |

- **Low level test plan**

| Test ID | Description | Exp I/P | Exp O/P | Actual Output | Type Of Test |
|---|---|---|---|---|---|
| **L_01** | Use Potentiometer to give input to the ultrasonic sensors | - | - | - | Requirement based |
| **L_02** | Detect Distance of any water wave placed in front of ultrasonic sensor | For simulation, a potentiometer is used to provide the expected input for an ultrasonic sensor. | LED Turns on | LED turned on | Requirement based |
| **L_03** | If object is far away from the sensor. | For simulation potentiometer is used to provide the expected input for an ultrasonic sensor. | LED Turns off | LED turns off | Requirement based |

# Results:

Warning if the object is close to the sensor:

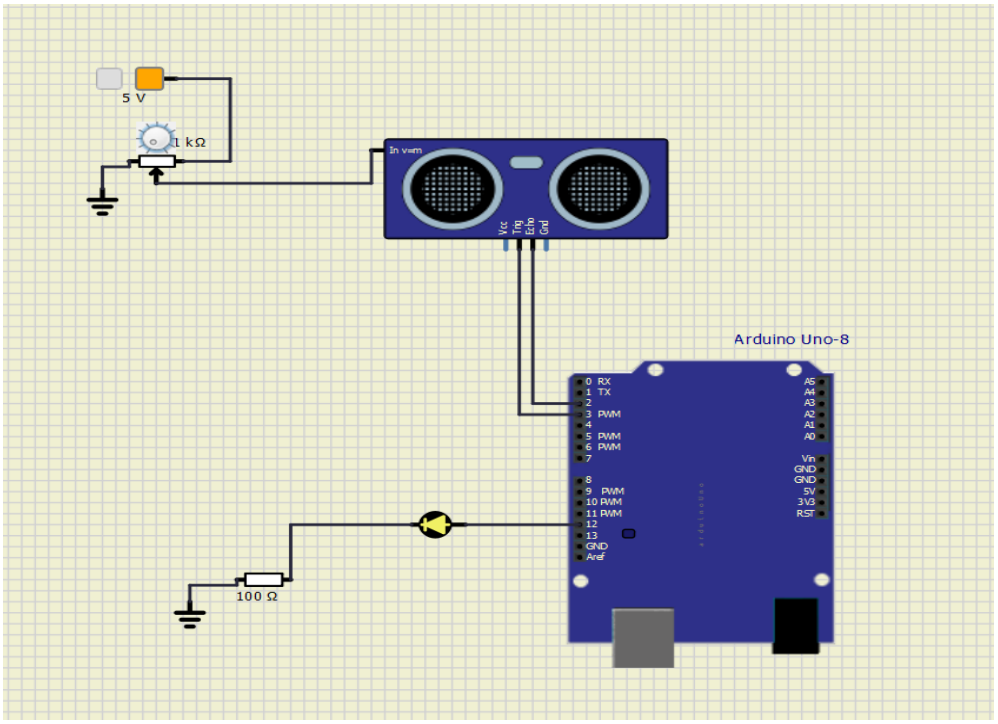


Fig e: When LED is On

Warning if the object is far from the sensor:

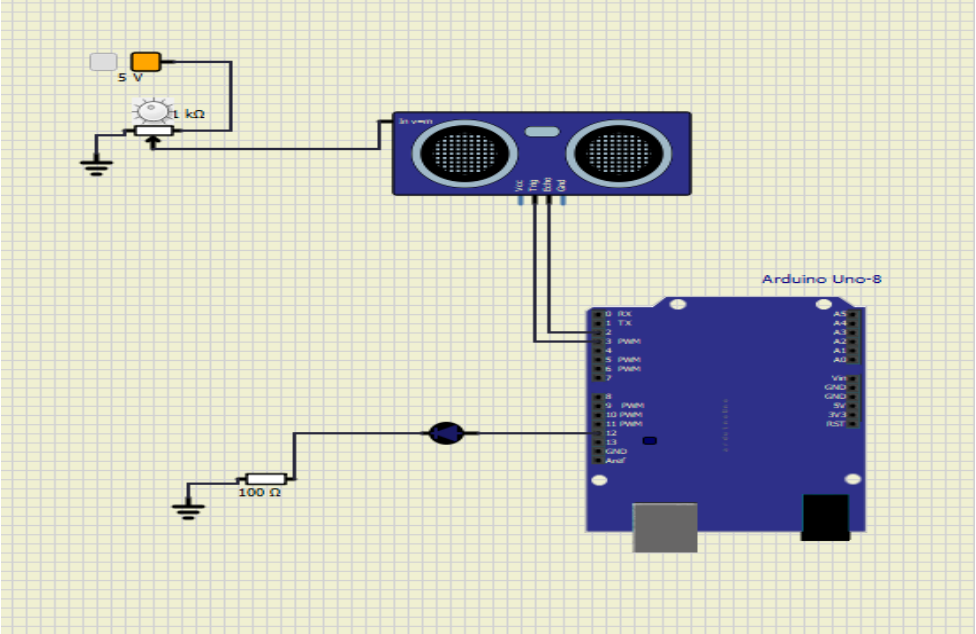


Fig f : When water is far LED is Off.

## Conclusion:

Water level alerting system alerts user if the water level is incresing which helps the users to take necessary action. . The ultra sonic senors used in the project have worked properly in order to detect the water wave and alert the user about the water level.