WATER LEVEL INDICATOR USING 555 TIMER

A MINI PROJECT REPORT

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CHAPTER 1

INTRODUCTION

Water Level Indicator may be defined as a system that indicates the level of water in any water reservoir. It is very simple to install and easy to use. The equipments required for designing this circuit are readily available in the market and of low value. The circuit does not need any AC auxiliary supply, it operates on a Dc voltage source(9v DC). Thus, it is a very low consumption circuit. Also, the various the processes taking place in the manufacturing of this system does not have any effect on the environment.

As we all know, the drinking water in India has reached its extreme alarming proportions. It may soon lead to the nature of global crisis. Therefore, it is very important to preserve the elixir of life, water. The water tank overflow at homes is one of the very common problem to us that leads to the wastage of water which again leads to a lot of water loss. It is the duty of every individual to try and save as much water as possible since it is very precious to us. The water tank overflows as the level of water in the tank cannot be randomly guessed. Also, sometimes people have to wait and stop doing other activities until the tank is full which again is time consuming. This problem can be controlled by designing a simple circuit, using cheap and readily available electronic components, called 'Water Level Indicator' which works on the concept that water conducts electricity.

BLOCK DIAGRAM

| Overhead water tank | → | IC NE555 Timer | → | Buzzer |

Fig.1. Block Diagram

CHAPTER 2

COMPONENTS REQUIRED

- NE555 Timer
- Resistor,R1=1k
- Resistor,R2=100k
- Capacitor, C=2.2uf
- Buzzer
- 9v Battery
- Connecting wires

DESCRIPTION OF COMPONENTS:

NE555 TIMER: It is an integrated circuit employed in a range of timer, pulse generation and oscillator applications.

Fig.2. NE555 Timer

FEATURES:

- 555 timer can be operated at a large vary of power supply from 5v to 18v.

- It is out there in three different packages- eight pin metal will package, 8 pin   DIP, 14 pin DIP

- Timing can be anyplace from microseconds to hours.

- High output current and may operate in each astable and monostable modes.

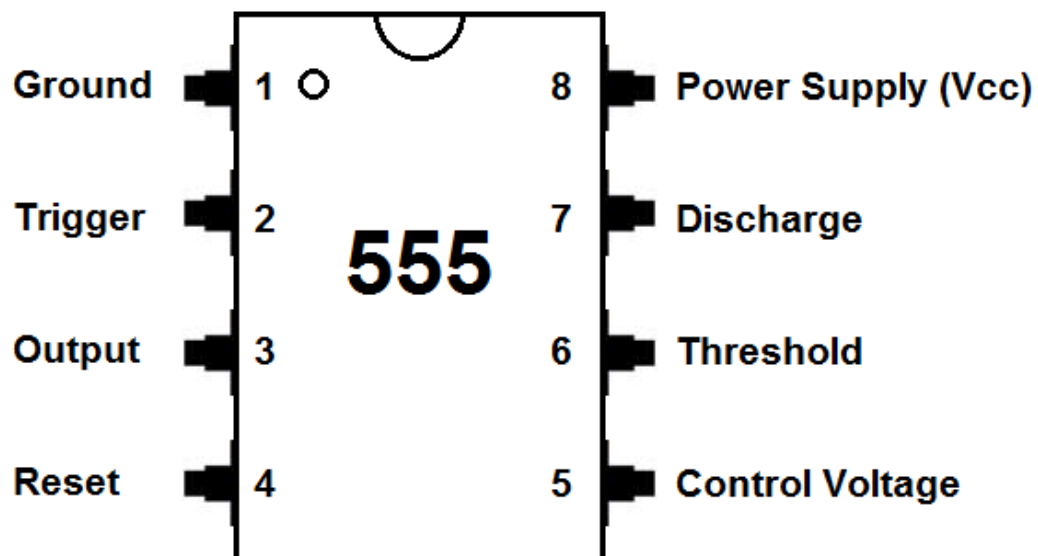- It incorporates a temperature stability of 0.005% per degree.

PIN DIAGRAM:

Fig.3. Pin Diagram

Pin 1 (Ground): Connects to the 0v power offer.

Pin 2 (Trigger): Detects 1/3 of rail voltage to create output HIGH. Pin two has control over pin six. If pin two is LOW, and pin six is LOW, output goes and stays HIGH. If pin six is HIGH, and pin two goes LOW, output goes LOW whereas pin two LOW.

Pin 3 (Output): (Pins three and seven are in phase.) Goes HIGH and LOW and can deliver up to 200mA.

Pin 4 (Reset): Internally connected HIGH via 100k.

Pin 5 (Control): Open

Pin 6 (Threshold): Detects 2/3 of rail voltage to create output LOW provided that pin 2 is HIGH. This pin has a very high impedance (about 10M) and can trigger with about 0.2uA.

Pin 7 (Discharge):Goes LOW once 6 detects 2/3 rail voltage however pin 2 should be HIGH. If pin 2 is HIGH, pin 6 will be HIGH or LOW and pin 7 remains LOW. Goes OPEN (HIGH) and stays HIGH once pin 2 detects 1/3 rail voltage (even as an occasional pulse) once pin 6 is LOW. (Pins 7 and 3 are in phase) Pin 7 is equal to pin 3 however pin 7 doesn't go high - it goes OPEN. However it goes LOW and can sink about 200mA.

Pin 8 (Supply): Connects to the positive power supply (Vs). This may be any voltage between 4.5V and 15V DC.

RESISTORS: A resistor is a passive two terminal component which opposes the flow of current and its opposing property is called resistance.

Resistors are used to reduce and control the flow of current in the circuit.

In the proposed system, we use two resistors, 1Kohm resistor and a 100Kohm resistor.
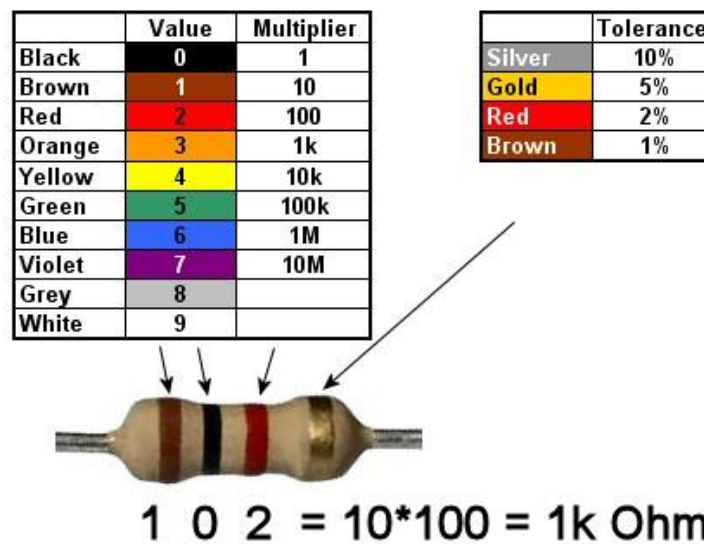
Resistor Color Codes

	Value	Multiplier
Black	0	1
Brown	1	10
Red	2	100
Orange	3	1k
Yellow	4	10k
Green	5	100k
Blue	6	1M
Violet	7	10M
Grey	8	
White	9	

	Tolerance
Silver	10%
Gold	5%
Red	2%
Brown	1%

1 0 2 = 10*100 = 1k Ohm

Fig.4. Color coding of 1k ohm resistor

E12 Range, Resistor 100KΩ, 5% Tolerance, Carbon Film
www.iamtechnical.com

Brown	Black	Yellow	Gold

Fig.5. Color coding of 100k ohm resistor

CAPACITORS: Capacitors are also known as condensers, they store energy. They are made of one or pair of conductors. The property possessed by it is known as capacitance and the unit is 'Farad'.

Capacitor is a linear and a bilateral device. Capacitor follows ohm's law, so it is a linear device. Current in a capacitor can flow through both the sides or directions of a capacitor, hence it is also a bilateral device.

Capacitor has two terminals and current can flow through any one of these two terminals.

In the proposed system, we use a 2.2uF capacitor.

Fig.6. Capacitor

BUZZERS: Buzzer is a mechanical device that is used to produce a tone, alarm or sound. It beeps when the required water level is reached. A buzzer or beeper is a sound flagging device,[1] which might be mechanical, electromechanical, or piezoelectric (piezo for short). Run of the mill employments of signals and beepers incorporate alert gadgets, clocks, and affirmation of client info.

Fig.7. Buzzer

BATTERY:

Fig.8. Battery

Battery is a device which is having many electrochemical cells in it in series or in any fashion in order to store desired quantity of electrical energy.

CONNECTING WIRES: Connecting wires act a medium for the flow of current from one point in the circuit to another point.

They draw power from one point of the circuit and supply it to the required point.

Current cannot travel in air, and therefore for the flow of current through the circuit we need a medium, which is provided by the connecting wires so that the circuit is closed.

Fig.9. Connecting wires

BREADBOARD:

A breadboard is a solderless gadget for brief model with hardware and test circuit structures. Most electronic parts in electronic circuits can be interconnected by embeddings their leads or terminals into the gaps and afterward making associations through wires where proper.
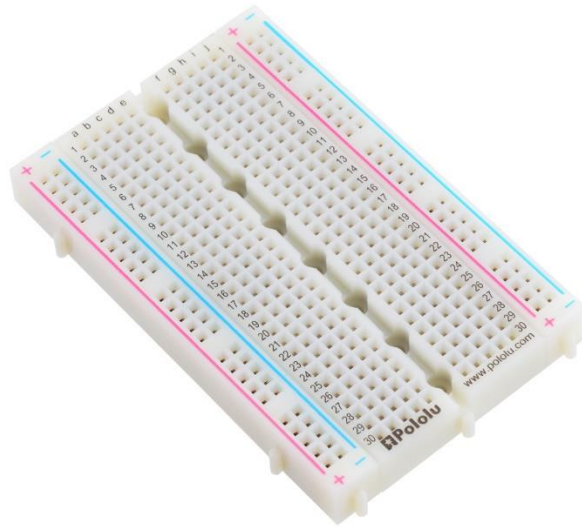
Fig.10 Breadboard

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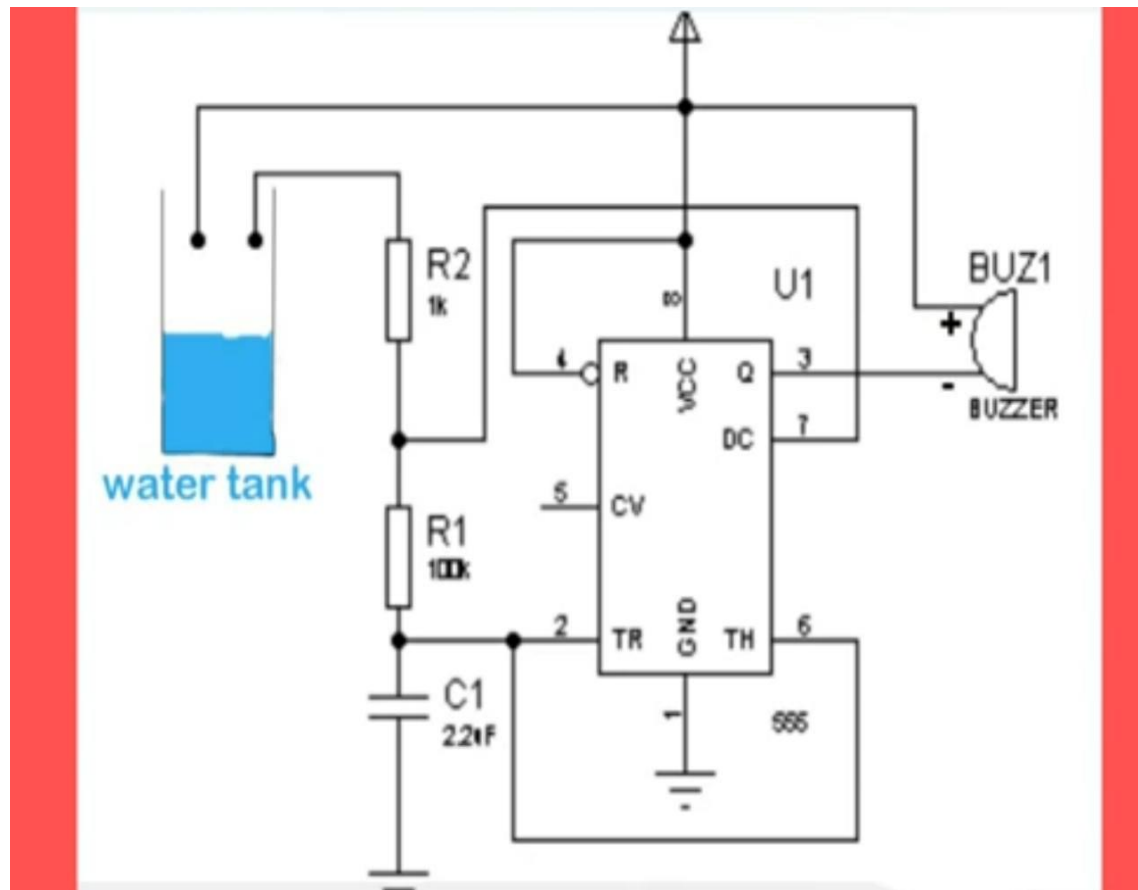
CHAPTER 3

CIRCUIT DIAGRAM:

Fig.11. Circuit Diagram

CONSTRUCTION:

In the proposed system, the pins of the IC NE555 timer are connected accordingly,

- Pin 1 is connected to the ground
- Pin 2 and Pin 6 are shorted and connected to the terminals of the 2.2uF capacitor (which is grounded) and 100kohm resistor.
- Pin 3 is connected to the negative of the buzzer.
- Pin 4 is connected to the supply.
- Pin 7 is connected to the terminals of 1k and 100k resistors.
- Pin 8 is connected to the supply.

The positive terminal of the buzzer is given to one of the sensor probes and the 1k resistor is connected to the other sensor probe.

WORKING:

At the required level, the two probes that are shown in the circuit should be placed. Less than few centimeters should be the distance between the two probes to ensure that the conduction between the probes can take place when water is touched to these probes. When the 9v supply is given from the battery, the 555 circuit will get enabled and the output of the 555 timer produces a square wave output with a certain frequency when the water level rises to the height of the probes. This information is given back to the control panel to trigger the buzzer. Therefore the buzzer produces sound to give the output. Hence, it alerts us and we can switch off the motor.

The logic used in this circuit is, 555 timer is enabled when its reset pin is connected to logic high. As the water level is maximum the pin which is used is enabled and this helps to drive the 555 timer into a stable mode.

CHAPTER 4

APPLICATIONS:

Water level Indicator can be used in

- Hotels,
- Factories,
- Homes,
- Apartments,
- Commercial complexes,
- Drainage, etc.
- In underdeveloped rural areas.
- It can be fixed for single phase motor, three phase motors, fuel level indicator in vehicles, and liquid level indicator in the huge container companies on the tank walls.

FUTURE WORK:

We can improve the circuit by using sensor in the circuit which will block the power supply to the pump or the motor. As a result the future project will not be as cheaper as this one, but we will try our best to keep it. When the 9v supply is given from the battery, the 555 circuit will get enabled and the output of the 555 timer produces a square wave output with a certain frequency when the water level rises to the height of the probes. This information is given back to the control panel to trigger the buzzer. The buzzer produces sound to give the output. Hence, it alerts us and we can switch off the motor. It can be fixed for single phase motor, three phase motors, fuel level indicator in vehicles, and liquid level indicator in the huge container companies on the tank walls. We can improve the circuit by using sensor in the circuit which will block the power supply to the pump or the motor. As a result the future project will not be as cheaper as this one, but we will try our best to keep it. When the 9v supply is given from the battery, the 555 circuit will get enabled and the output of the 555 timer produces a square wave output with a certain frequency when the water level rises to the height of the probes.

- Simple
- Affordable
- Easy to use
- Easy to install
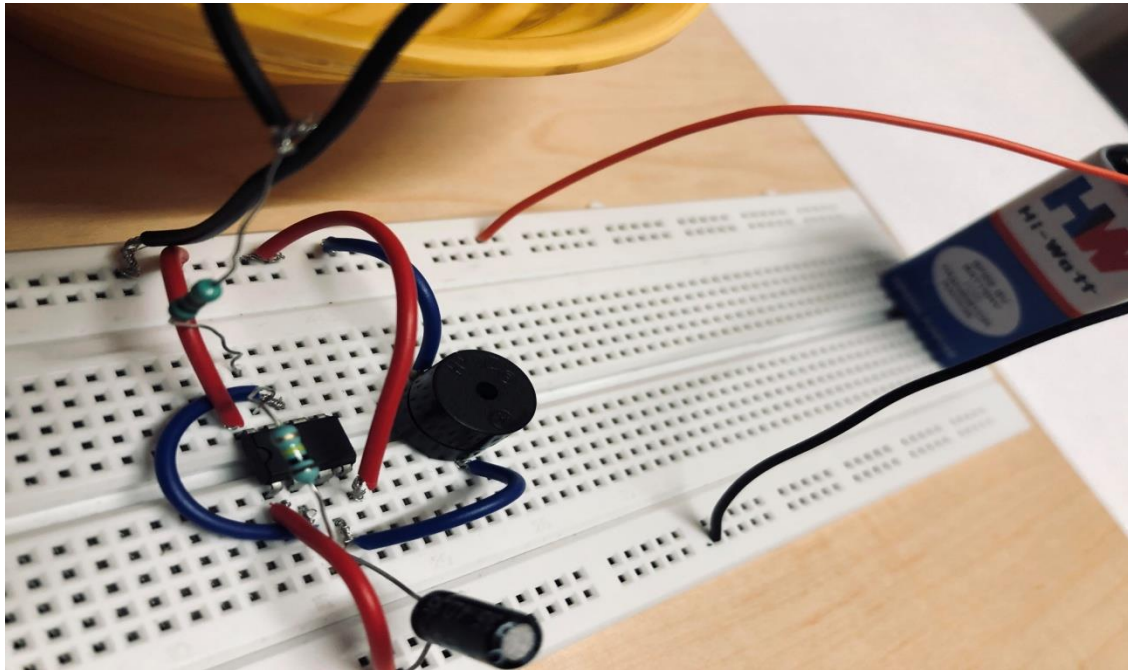- Available for all
- Smaller in size

MODEL:

Fig.12a

This picture shows the components required for the construction of the water level indicator, that is

- NE555 Timer
- Capacitor
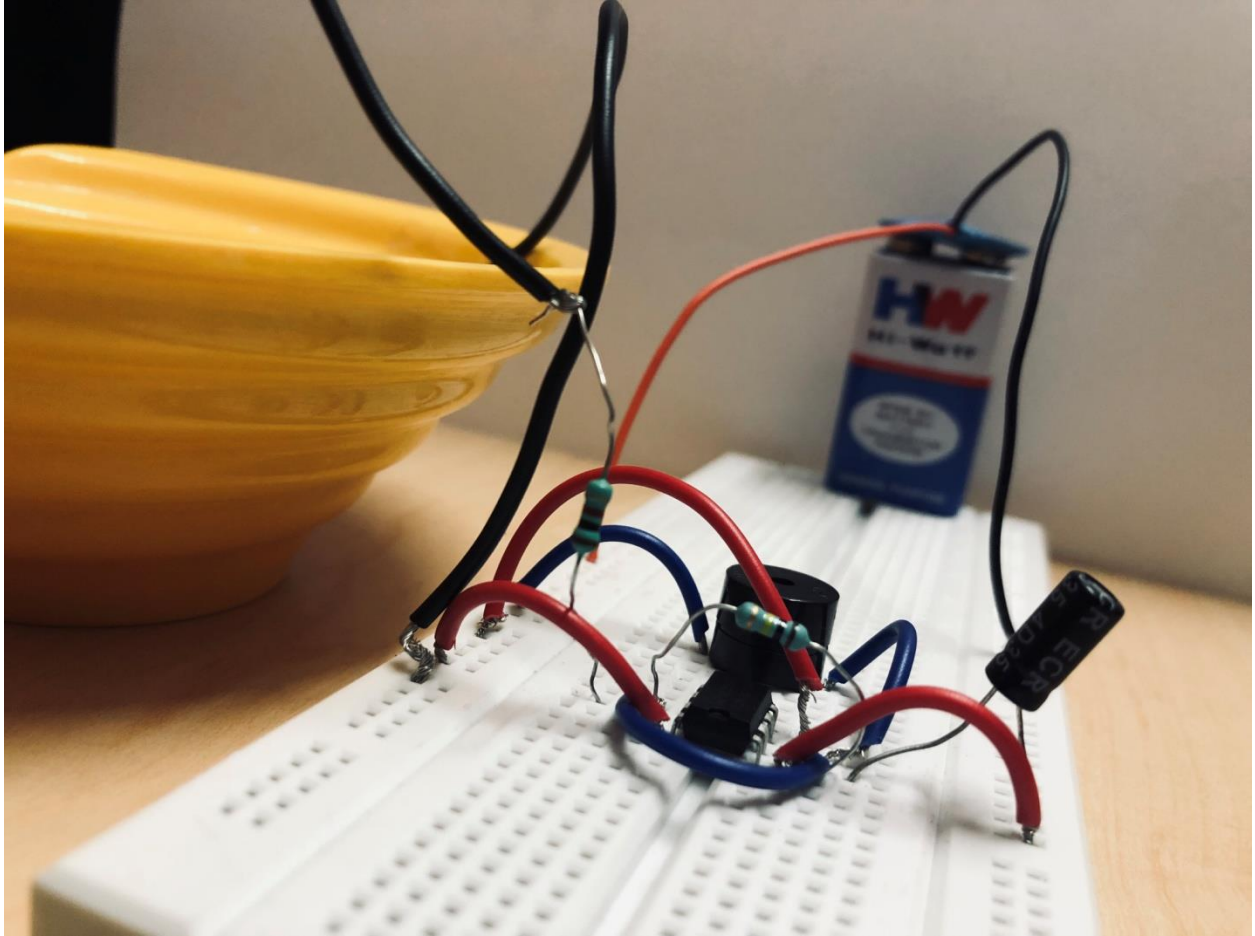- Resistors
- Buzzer
- Battery
- Connecting wires

Fig. 12b

This picture shows the construction of the system.

As seen in the diagram,

Pin1 is connected to the ground and Pin 8 is connected to the supply

Pin 2 and Pin 6 are shorted

Pin 3 is given to the output(buzzer)

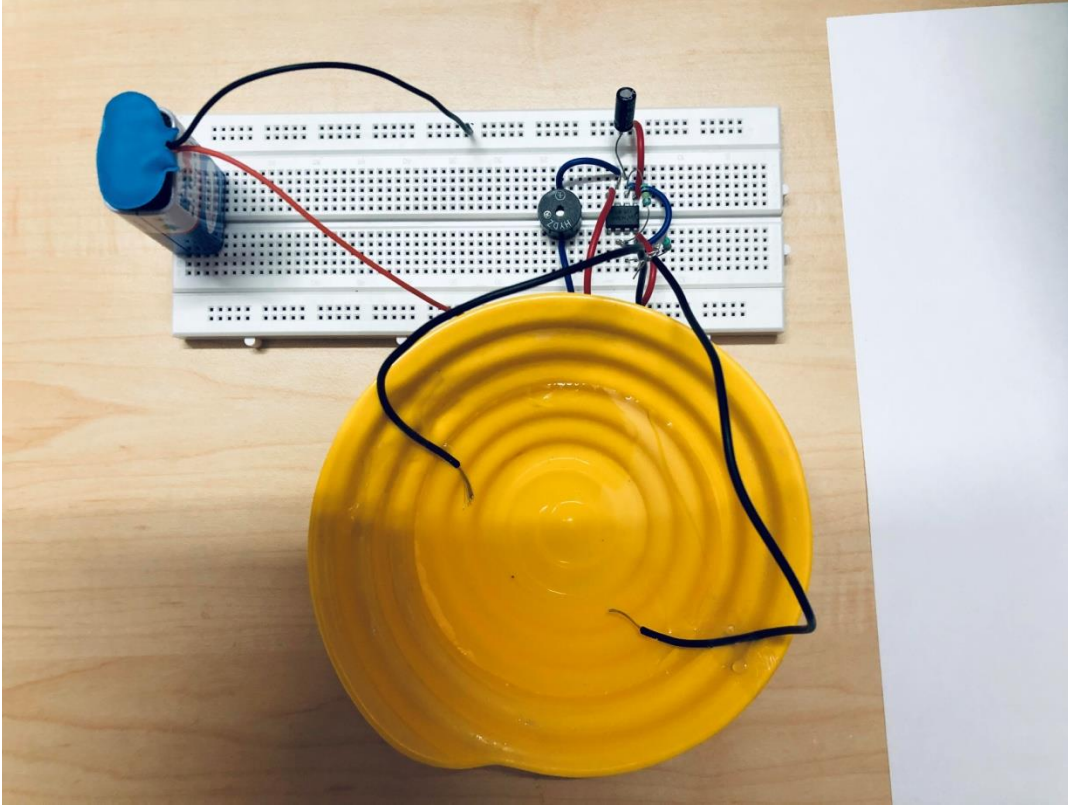The resistors and capacitors are connected according to the circuit diagram

Fig.12.c

The picture shows the working of the water level indicator.

When the water reaches the required level, the two sensor probes which are placed at a minimal distance sense the water and conduct electricity hence completes the circuit and provides output to the buzzer which beeps to alert the person to switch off the motor

CONCLUSION:

The project has been successfully completed by having established an user-friendly and environment friendly system which can be implemented using simple, low cost electronic components.

Water level controller is a simple yet effective way to prevent wastage of water. Its simplicity in design and low cost components make it an ideal piece of technology for the common man.

One of the basic necessities of all living beings, water, is being wasted due to the uncontrolled use and negligence of human beings. Therefore, it is important that we try and control the wastage of water as much as we can.

Water level indicator is a simple electronic device that can help us save water by alarming us when the water has reached the required level.

As the water reaches the required level, the water level indicator uses the sensor probes to alert us that the water level has been reached and we can switch off the motor hence preventing the overflow of water.

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