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Automatic Water Level Controller

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Abstract: ***This is an Arduino based automatic water level controller and indicator project. Here, we are going to measure the water level by using help of ultrasonic sensors. The ultrasonic sensors use the principle of "echo". When sound waves are transmitted, they after striking any obstacle return. So, by using this principle we can calculate the time of travel for outgoing as well as returning. By calculation we can calculate the distance. Here we use this concept in our project. The motor pump automatically turns ON when the water level is low. Actually there is a lot of drinking water crisis in India and also in other countries. Today we need to preserve water at any cost. In India, we can see many houses as overhead tanks and they keep on overflowing water. It wastes a lot of water as well as electricity. If we do not do anything on this matter than we can face huge scarcity of water. In this project I Am going to implement automatic water level controller so that we no longer have to manually switch ON and OFF the motor. The device automatically monitors the water level and hence triggers the relay which in turn triggers the motor. This helps in reducing wastage of water as well as electricity. This also reduces manpower as we no longer need to operate it manually.***

Keywords: Automatic, Ultrasonic sensor, Relay, LCD

1. Literature Review

- Design and Development of Automatic Water Flow Meter (International Journal of Computer Science, Engineering and Applications (IJCSEA) Vol.3, No.3, June 2013)

This research paper by **Ria Sood, Manjit Kaur, Hemant Lenka** emphases on the need of water level controller in irrigation in agriculture. It says that every crop requires require different amount of water and this can be done by using automatic water level controller which will also help in reducing wastage of water. Here they use a technique to measure flow of rate of water in irrigation pipelines. It uses a Hall Effect Sensor to measure the rate flow. G1/2 Hall Effect water flow sensor is used as a sensing unit with a turbine rotor inside it whose speed of rotation changes with the different rate of flow of water.

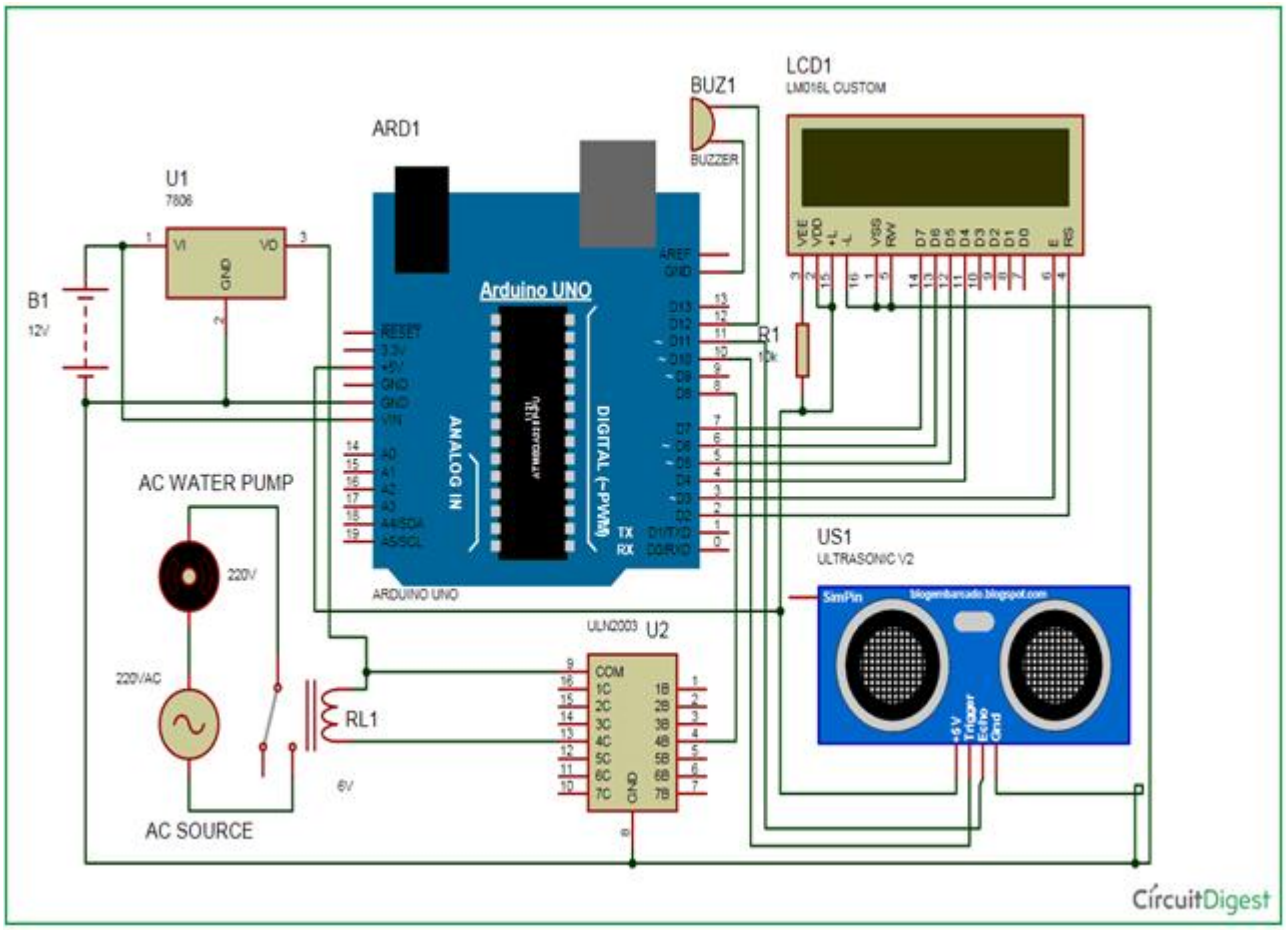
- Automatic Water Level Controller with Short Messaging Service (SMS) Notification (International Journal of Scientific and Research Publications, Volume 4, Issue 9, September 2014)

This research paper by **Sanam Pudasaini, Anuj Pathak, Sukirti Dhakal, Milan Paudel** presents a system of an automatic water level controller with SMS notification. SMS notification was added to automatic controller system so that water can be managed by user during load shedding. Two systems work synergistically; automatic level controller system and SMS system. The program was developed in Arduino program developing environment and uploaded to the Microcontroller. Water level in the system is controlled automatically. The controller operates on a battery power. Whenever the system encounters empty level and the status of load shedding, the SMS notification is sent to the user. The system will automate the process by placing a single sensor unit in the tank that will periodically take measurements of the water level and will control the motor automatically. This system eliminates the efforts of people for daily filling of the tank and checks for overflow.

- Automatic Water Level Control System (International Journal of Science and Research (IJSR))

This research paper by **Asaad Ahmed Mohammedahmed Eltaieb , Zhang Jian Min** involves designing and development of automatic water level control system had exposed to the better way of software and hardware architecture that blends together for the interfacing purposes. The system employs the use of advance sensing technology to detect the water level. It uses Arduino and uses relay to control motor. Different wires are attached at different Junctions of the Beaker. When we pour water in the beaker. The water comes in contact with the wire and tells the level of water in the tank. Accordingly, they have displayed the level of water on LCD display. And uses relay to turn ON and OFF the motor.

2. Arduino Layout



3. Why use Water Level Controller?

- **Saves Power**

By using our project, we can save power. I can be used in places where there is problem of Load Shedding. As it is automatically controlled, it limits the amount of electricity. As today energy conservation is the utmost need, using one of these devices is useful.

- **Saves Money**

Now, as we know that automatic water level controller conserves power, it saves money as well. Water regulation is optimized using this device that means wastes electricity and wasted water is kept at a minimum. This saves a huge amount of money along with manpower.

- **Works Automatically**

The most utmost advantage of water level controller I that it can work on its own. It is because of relay and timer switches that there is no need to operate them manually. This means that a lot of human work is reduced.

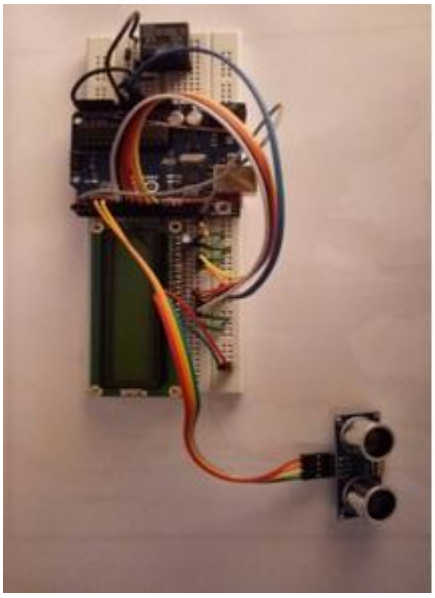
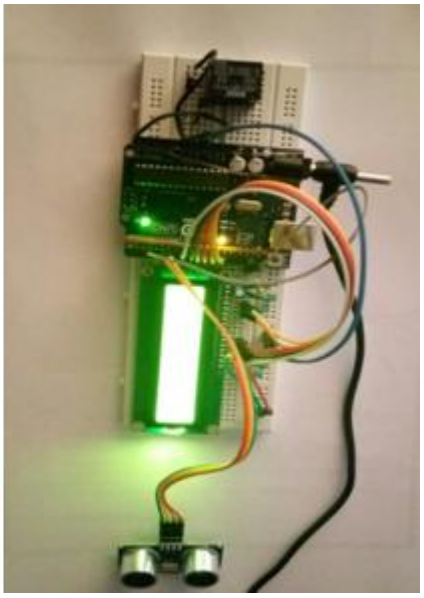
- **Maximizes Water**

Additionally, water usage can be maximized with a water level controller. Often, water pumps get more use during the middle of the day. A water level controller is helpful because it automatically provides more water during the middle of the day and less water at night. As a result, water remains at its appropriate level at all times.

4. Methodology

- Ultrasonic sensor module's trigger and echo pins are directly connected to pin 5 and 6 of Arduino.
- Relay is connected to pin A5 of Arduino board. We define ON_THRESHOLD as 30 and OFF_THRESHOLD a 10.
- A 16X2 LCD is connected to pins 13,12,11,10,9,8 of Arduino uno.
- LCD display shows the water level and status of the motor.
- When empty water level reaches at distance about 30 cm then Arduino turns ON the water pump by driving relay. And now LCD will show "LOW Water Level" "Motor turned ON", and Relay turns On triggering the motor.
- When empty water level reaches at distance about 10 cm then Arduino turns OFF the water pump by driving relay. And now LCD will show "High Water Level" "Motor turned OFF", and Relay turns Off triggering the motor.

5. Snapshots of Our Project

6. Conclusion

This project has achieved the main objectives. Moreover, this project involved designing and development of automatic water level control system had exposed to the better way of software and hardware architecture that blends together for the interfacing purposes. The system employs the use of advance sensing technology to detect the water level.

- This system is very beneficial in rural as well as urban areas.
- It helps in the efficient utilization of available water sources.
- If used on a large scale, it can provide a major contribution in the conservation of water for us and the future generations.

7. Future Work

Automatic water level monitoring system has a good scope in future especially for agriculture sector. There are any areas where we need water level controller. It could be agricultural fields, overhead tanks. We can make this project wireless by using NRF transmitter and receiver. We can also add Ethernet shield so that we can get all the information using mobile phones and control it accordingly.

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