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Water Level Monitoring System Using IOT

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A B S T R A C T

Water tank overflow is a common problem which leads to the wastage of water. Though there are many solutions to it like ball valves which automatically stop the water flow once the tank gets full. But being electronics enthusiastic wouldn't you like an electronic solution for it? So here is a simple and handy day that will guide you to make a circuit which will detect the water level and will raise an alarm upon getting the water tank full or a present level. Water level indicator is a modern way of measuring the water level using latest technologies like sensors, Arduino The main aim of the project is to calculate the water level at any instant of time if the tank is filled completely. I would like to use Arduino and ultrasonic sensor to make it possible. This may be useful to conserve water and helps us not to waste water. A Water Level Indicator is used to detect and indicate the water level in an overhead tank or any other water container. In this paper, we investigated the design of a water level sensor device using Arduino Nano that can detect the level of water in a water storage system.

Keywords: Arduino, sensors, Transmitter and Receiver, IOT indication.

1. Introduction

The facility requirements in many industries, farms, hostels, hotels, offices include an overhead tank for water, which is usually fed through an electric pump that is switched off when the tank is filled up and switched on when it is empty. So, the most common way of knowing when the tank is filled is by observing when it overflows the brim. Depending on the type of liquid being handled, overfilling of such tank could lead to a great liquid material losses ranging in the order of thousands of naira per week depending on the extent of such application. These losses can be prevented if the tank is monitored automatically by incorporating a feedback. Water level indicator using ultrasonic sensor & Arduino is an amazing and very useful project. . The objective of this project is to notify the user the amount of water that is present in the overhead water tank. This project can be further enhanced to control the water level in the tank by turning it on, when the water level is low, and turning it off when the water level is high. Thus, the Arduino water level indicator helps in preventing wastage of water in overhead tank. A transmitter circuit and a receiver circuit. The transmitter circuit makes use of an ultrasonic sensor to measure the water level in terms of distance A Water Level Indicator is used to detect and indicate the water level in an overhead tank or any other water container. In this paper, we investigated the design of a water level sensor device using Arduino UNO that can detect the level of water in a water storage system. An ultrasonic sensor is used to generate ultrasonic waves, a water sensor to detect the water level, LEDs to signify the importance of different water levels, PC to observe the levels of water. We indicated a green LED for safe water level, one red LED for about to reach max level and two red LEDs for maximum water level.

2. Background Research

Knowing the level of water in an overhead tank is a tedious task which usually leads to climbing up the stairs to the tank and checking the level manually or allowing the water overflowing from the top. But electronic water level indicators can fix this issue. Most of the available systems use dipped electrodes or float switches, which may not perform well in the long run. This project provides a different approach to knowing the water level using an Ultrasonic module with Arduino and with LEDs. This method is contactless, so issues like corrosion of the electrodes won't affect this system. The initial electric water controllers in the early 1990's helped professionals to track water levels in chemical industries, and also in agricultural and irrigation projects. They were initially used in tracking liquid levels in irrigation lakes, water tanks, boilers etc. However, the initial designs proved to be imperfect and a long-term solution were attempted with solid state electronics. These new solid-state electronics along with integrated electronics offer greater performance with low cost as well efficient along with easy installation. These sensors take less energy and can be used for continuous operation.

3. Future Scope

In future, we want upgrade this circuit with some sensor which can automatically stop the power supply of the driving pump or motor. As a result the future circuit is not very cheaper the present one, but we try our best to.

- Make it simple

- Easy to use
- Easy to install
- To make Available for all

4. Industries-Based Application

The water level indicator circuits are used in factories, chemical plants, and electrical substations and in other liquid storage systems. There are many possible uses for this simple system, examples include monitoring a sump pit (to control pump activation), rainfall detection, and leakage detection. Electronic water level circuits have the capability of alerting if there is a water leak somewhere in the factory. When the water level is too high or too low or exceeds the higher limit, it can detect the water level easily by hearing an alarm sound or from different colors of a light bulb. We can also measure the fuel level in motor vehicles and the liquid level containers which are huge in the companies.

5. Market Potential

Market Potential of this water level indicator is very high for following reason:

- Simple circuit: This water level indicator consists with a simple circuit. It is so simple to install and it's so much easy to use.
- Low cost the equipment's required for this circuit are readily available in the market and of very low value.
- Low voltage consumption the circuit does not need any AC auxiliary supply, it operates on DC voltage source (9 V DC). Thus it is a very low consumption circuit.
- Pollution control Process Involved in the manufacturing of this item does not have any effect on environment.

6. Advantage of Proposed System

1. Save Power: In an era of energy conservation, these devices are very beneficial to save energy. Hence electrical power wastage can be reduced. These sensor control water levels and minimize the usage of electricity.
2. Automatically works: These sensors can work automatically when connected to timer devices.
3. These are low cost and easy to install devices.
4. The design is compact and with low maintenance and cam clearly indicate the water levels in the overhead tank.
5. AS they can be fully automatic, they save time and avoid seepage of roofs and walls due to overflowing tanks.

4. Problem Definition

Water tank overflow is a common problem which leads to the wastage of water. Though there are many solutions to it like ball valves which automatically stop the water flow once the tank gets full. But being electronics enthusiastic wouldn't you like an electronic solution for it? So here is a simple and handily that will guide you to make a circuit which will detect the water level and will raise an alarm upon getting the water tank full or a present level. Water level indicator is a modern way of measuring the water level using latest technologies like sensors and Arduino.

4. Functional Analysis

The Ultrasonic Sensor sends out a high-frequency sound pulse and then times how long it takes for the echo of the sound to reflect back. The sensor has 2 openings on its front. One opening transmits ultrasonic waves, (like a tiny speaker), the other receives them, (like a tiny microphone).

The speed of sound is approximately 341 meters (1100 feet) per second in air. The ultrasonic sensor uses this information along with the time difference between sending and receiving the sound pulse to determine the distance to an object. It uses the following mathematical equation:

Distance = Time x Speed of Sound divided by 2

The circuit is designed to indicate three levels of water stored in the tank: low but not empty, half and full but not overflowing. When there is no water in the tank, all the LCDs are off as an indication that the tank is completely empty. When water level increases and touches the sensor, the Red LCD will glow indicating that there is water within the tank. As the water level continues to rise and reaches half the tank, Yellow LCD will glow. When the water in the tank rises to full an alarm is made by the buzzer as an indication that the tank is full

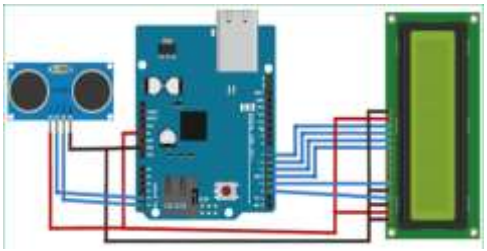

Fig Circuit Diagram

Durability

The only problem can be occur was the ultrasonic sensor become rusted because of the high humidity inside the tank. So we had to change it into a waterproof ultrasonic sensor (JSN- SR04T).

Also, a buzzer may be included if LEDs are not preferred.

1. Hotels and restaurants, residential as well commercial complexes, factories, drainage etc can use these water level indicators. They can be fixed for any motor as they can be easily amalgamated into any circuit.
2. These sensors can be used as fuel level indicators in vehicles and as liquid level indicators in chemical industries.

Conclusion

The water level Indicator employs a simple mechanism to detect and indicate the water level in an overhead tank or any other water container. If used on a large scale, it can provide a major contribution in the conservation of water for us and the future generations. In these days, when the Earth's reserve of consumable water is decreasing every moment, every drop has its value. Applications of Water Level Indicator, if this system is used at residence to monitor the water level in the water tank, we may fix the sensor such that it faces the water in the tank. The main control board with indication LEDs can be fixed inside the home at any comfortable visible position any multi-cored cables can be used to connect the sensor and the rest of the circuitry

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