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Water Level Detection System in Overhead Tanks using Embedded Systems

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Abstract: Monitoring of overhead tanks physically is a troublesome undertaking. Overhead tanks are here and there situated at outrageous positions on the housetops which makes the activity significantly increasingly troublesome. The tanks are left unmonitored at evenings and a great deal of water gets squandered because of flood. Wastage of water amid shortage can't be ignored. A programmed water level observing framework can take care of the issue. Prior, programmed water level observing frameworks have been concocted utilizing IOT. There can be an upgrade in the past framework utilizing inserted frameworks. The framework utilizes a water level sensor which will detect the dimension of water when it has achieved a basic circumstance and a bell which will send a caution. This will help in keeping the flood of water. Different segments of the framework incorporate a LED screen and a hand-off. The framework will likewise inform the individual when the water achieves a particular dimension before the basic circumstance happens. The yield of the sensor will be given as contribution to the Arduino board. A Wi-Fi module in the framework will give us observed information progressively. The framework is effective and advantageous for day by day use.Keywords—Embedded System, Arduino board, Wi-Fi module, LED screen, relay.

I. INTRODUCTION

It is rightly said," Technology is a boon to the society". Nowadays, we are able to control anything from anywhere through devices. This has made our lives simpler. There still exists a lot of problem of water scarcity in our country. In such a case we cannot afford wastage of water India is suffering from water shortage for cultivation and drinking despite the fact that many big rivers, some of them perennial rivers, flow through some parts of India. Over the years, increasing population, growing industrialization, expanding agriculture and rising standards of living have pushed up the demand for water. Efforts have been made to collect water by building dams and reservoirs and creating ground water structures such as wells. The collection of water during heavy rainfall in overhead tanks is very important for the survival of people in many drought prone areas in India. Lack of electricity also contributes to a major water shortage problem. Irregularity in electricity compels the people to monitor the water at any time. If the water is not monitored due to some reason, there is immediate shortage of water in the households. This paper gives a clear idea of an embedded system which is helpful in monitoring the level of water in overhead tanks manually. The system is connected to the internet using Wi-Fi module so that we are able to obtain the real time reading of the water level at any time. The system provides monitoring authorities both to the user as well as the admin. It is helpful is reduction of time and effort of an individual as in case of the former manual monitoring system.

II. HARDWARES USED

A. Arduino Uno

Arduino Uno is a microcontroller which is used to control a specific circuitry of electronic devices. Arduino Uno is one of the three types of Arduinos which are available in the market. The rest two are Arduino mega and Arduino nano. The main difference between these three is the number of pins present on them. Arduino is generally used to control the electronic devices attached to it. It acts as the controlling hub.

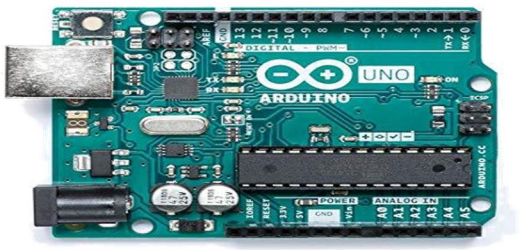


Fig 1. Arduino Uno[1]

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All the code goes in the Arduino through the Arduino IDE. There are ports on the arduino which are used as an interface between the electronic devices to be connected and the Arduino. The code could be written in any embedded programming language, mostly in C or C++.
The uno consists of 14 digital input-output pins out of which 6 can be used for PWM outputs and there are 6 analog pins. Arduino can be programmed in any way the user wants it to work.

B. Relay

Relay is a circuit board which is used as a switch for devices. It works on low and high signals. The main purpose of using a relay is to control circuits by a low power signal or if the whole circuit is to be operated by a single signal.

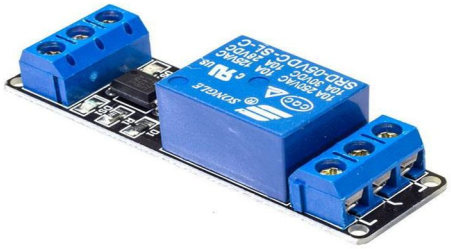


Fig 2. Relay[2]

The working of relay switch depends on its architecture. Some relays used electromechanical techniques to trigger the switch. The basic idea of using a relay is to cannel the whole circuit to one single trigger. The relay consists of a solenoid and an armature. Whenever current is passed through the relay , the solenoid creates a field due to which the armature moves and the circuit is open or closed.

C. WIFI Module

Wifi module is an electronic device which is used in the projects or devices to connect to the internet and perform a wide range of operations.

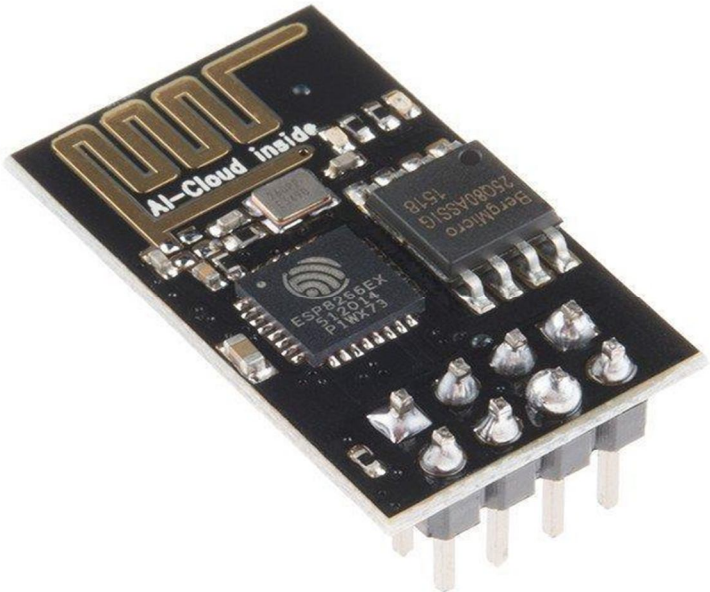


Fig 3. Wi-Fi Module[3]

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One of the most popularly used wifi modules is ESP8266 which is also called Node mcu. This module needs a3.3v input. It runs on COM1 port and needs the wifi setup on the Arduino IDE. It comes with 17 GPIO pins out of which the last 6 are used to connect to flash memory.

D. LCD Screen



Fig 4. LCD screen[4]

LCD is a flat panel display or an electronically modulated optical device.It is used to display the message of the system to the user.These screens are versatile in nature because they have a wide range of applications. They are used as television screens,instrument panels, aircraft,computer monitors etc .The most used lcd is 16*2 lcd which has two arrays of digital output containing 16 characters each.There are 16 pins on the lcd.

The embedded system proposed in the system consists of the setup based on Arduino UNO, ultrasonic sensor, voltage regulator and an Wi-Fi module. It is placed at the top of

1) Papers Related To The Proposed System ARE

a) Water Level Monitoring System: This system is based on gsm module. The system notifies the user of the water level through a SMS using a sim card. The module consists of a sim900 module to match the bandwidth of the service provider. Arduino is programmed with the gsm module to send the message to the already defined user phone number.

b) Robotized Water Level Monitoring System: This paper displays a framework taking a shot at the structure and development of a computerized water level. This is an advanced system which uses a switch to trigger the alarm once the water tank goes full. The alarm is triggered by the signals of the gsm module using an alarm client. The framework is totally based on the idea to screen the water level. There is a ringer installed in the system. The sensors keep on sensing the water level and trigger the alarm when the threshold situation is passed.

c) Water Monitoring System Using Radio Frequency: This paper works on the radio frequency mechanism. The radio frequency checks the water level of the tank using the electromagnetic waves and the distance of the water level from the maximum level of the water that can reach.

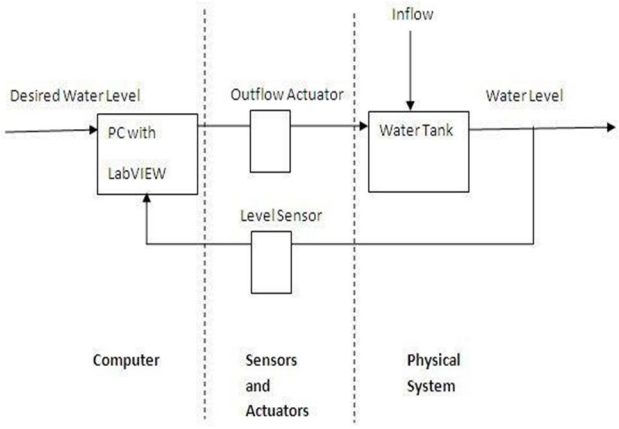


Fig 5. Block diagram[5]

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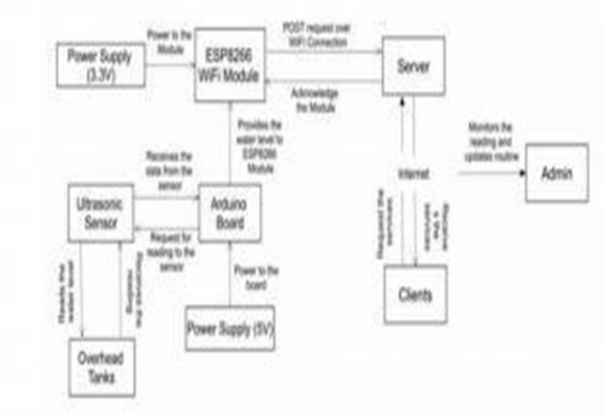


Figure 6: Proposed framework design of Water Level Monitoring

d) Web Server: Web server is an important part of the whole system. We can receive time to time updation of the system only through internet.

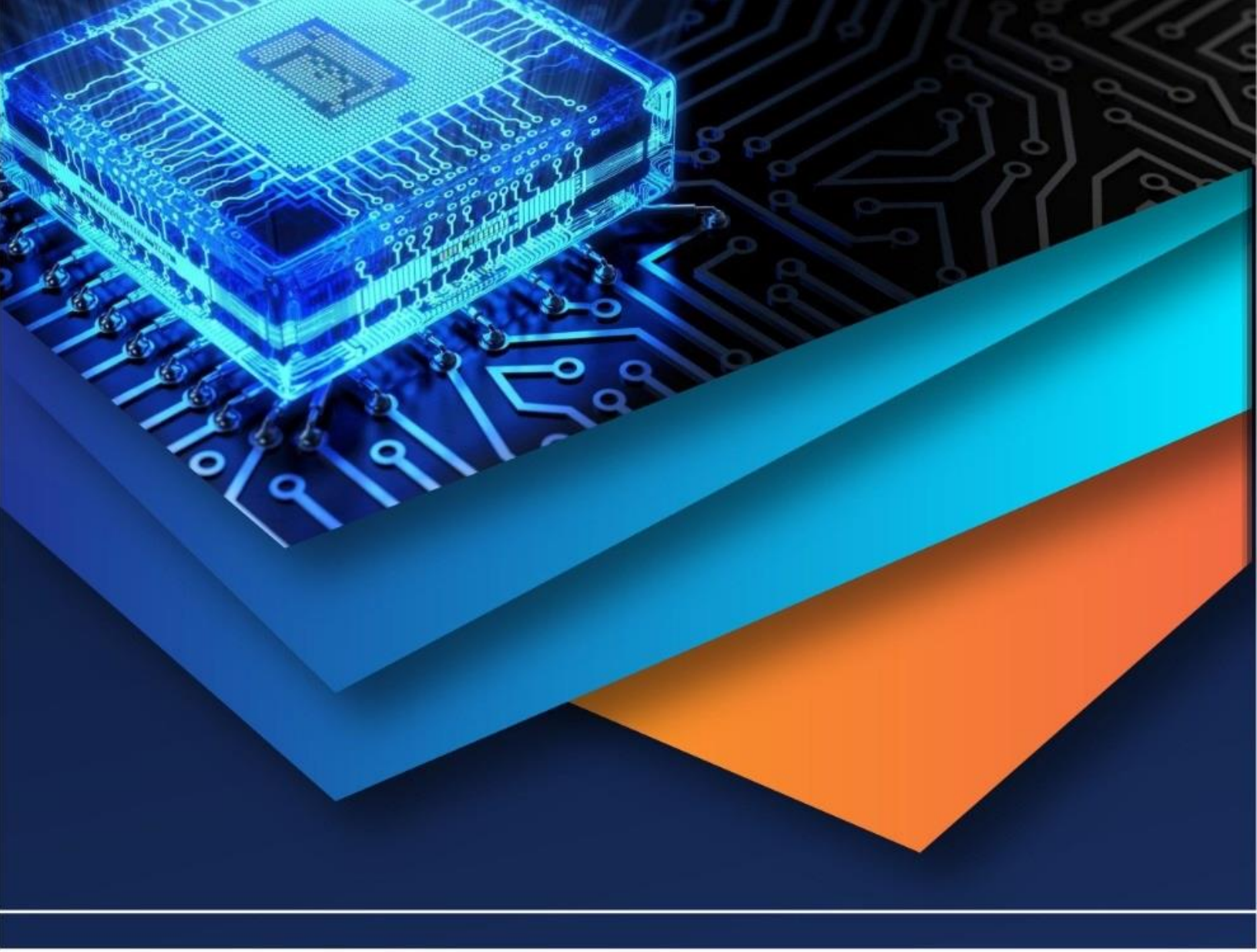
III. CONCLUSION

The proposed system is efficient and cable enough to solved the above mentioned problems.

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