Tank water flow automation

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ABSTRACT: Water is the most valuable thing on earth that life sustains on this planet. We use water in almost every home activity for drinking, washing, and many more. With the increase in population and industries, the availability of clean water has become a problem. Therefore it is crucial to find an efficient solution for water monitoring and monitoring system. In this paper, we have mentioned our research based on an autonomous water tank filling system using IoT with the help of embedded sensors to monitor the tank status with keeping in mind saving water as well as electricity.

keywords-Monitoring ,water saving, IoT ,Sensors,Cloud.

1.INTRODUCTION

Water is the most crucial natural resource for life to sustain on earth, On the surface of the earth, it exists in three different states: solid, liquid, and gas. Ice is one type of it that exists in solid form. Seawater makes up the majority of it in liquid form, and the remaining fraction can be found in lakes, rivers, and undersea. In gaseous form, it can be found in the atmosphere. Water is essential for life on Earth. In plants, it is used in photosynthesis. In humans, it is used in cooking, washing, drinking, bathing, and other activities. Mars, Venus, and Mercury are the only planets in our solar system without water, which is why life cannot exist on them. The earth is the only planet in our solar system with water in its environment. as a needed for us to recognise the significance of water. Fresh water is becoming polluted as a result of increased global warming, water pollution, and numerous other issues, and our supply is getting smaller. Since there are too many people, the water is being wasted..The clean water ratio is just depleting day by day, it is just that we innovate new technologies for water conservation to fulfill the need for clean water for upcoming generations and backward areas. In our daily life, we have seen many areas where water is spilled or wasted unnecessarily. Factories, industries, and home utilities are the main areas where we see water wastage more often. We have seen factories lay out their biproduct to open water bodies like lakes, rivers, etc. This technique is causing a lot of water pollution, whereas in societies we are often seeing people using a large quantity of fresh water for their daily needs, like washing their vehicles, bathing, and toothbrushing while the tap is running which eventually makes their private tanks empty even faster. For this problem with the help of IoT, we want to contribute to society to save water for the upcoming generation and save

the earth. Modern technology has contributed a lot to water conservation techniques, in many cities and villages there is a water supply shortage problem and in some, people are taking the water supply for granted and wasting it. We can still manage to save the planet by saving water for the generation and upcoming ones, only possible when we start from the ground roots in our daily life in societies or neighboring homes we see private submersibles are used for water extraction for personal use and in that hurry people forgot to switch off the motor which eventually causes extreme water loss.Water depicts the world's natural beauty in its numerous forms. We shall create new ideas to save water and its resources so that life can continue on this planet with the aid of contemporary technology and the Internet of Things (IoT). Water also sculpts the beauty of nature.

The internet of things (IoT)has connected the world from anything to anywhere so for this problem automation is the key which can save both waters as well as electricity. The use of automation in homes, factories, buildings, etc. will allow us to conserve water in a drastic way that we were wasting unknowingly. We are going to bring a drastic change in the automation sector where we will use IoT to solve these kinds of problems where we are facing the tank overflowing problem. Our main motivation for doing this project is to save water and the earth for our upcoming future generations. No life can sustain on earth without water. Our product will be contributing to saving water in a decent manner where it will be providing home automation to the common man at a reasonable price as well as contributing to saving water. Our product will be installed in different areas like houses, factories, industries, and wherever there is a submersible that pumps water to a private tank because it will not only provide automation but it will also reduce the man work that will be required for the switching on and switching off of the motor in the right time, where there is a huge chance of error of not switching off the motor in the right time and eventually losing liters of water and electricity. Our product will also indirectly save electricity through its smart end technology which we will see next in the paper description.

The rest of the paper contains the following details, the related previous work on the automation field in this area, the architecture of the proposed model, results, and discussion, and finally the future directions of this article.

2.LITERATURE REVIEW

The internet of things(IoT)has connected the world from anything to anywhere. Nowadays automation has become a very handy thing that eases the workload of human beings, automation is being used for most of the things that we are using in our daily life like remote starting our car, security checks of our home via digital cameras, anti-theft alarms, etc.

Autonomous water filling system by S.Nalini Durga, M.Ramakrishna, and G.Dayanandam created a model using Arduino Uno and IoT, with the help of a water sensor, potentiometer, solenoid valve, and GSM shield. The system works in the manner that the main flow of the water is detected by the water sensor and it intimates the same to Arduino then the availability of electricity is checked with the help of a potentiometer. After the validation, the system checks for the water level using an Ultrasonic sensor if the water level is not full up to the mark it will trigger the motor once the level is reached the motor is been shut off. This is a great invention that will solve the problem of water overflowing and saves electricity as well. But this product is a high-budget product that many cannot afford, we need a low-cost product with the same qualities or better.

The second paper is from the Engineering physics international Conference in this model they used an Arduino Uno microcontroller, HC-Sr04, a Relay, a water pump, some connector cables

male and female, a plastic box for fixing the architecture, an LCD, a potentiometer, a printed circuit board (PCB) this system is suitable for to be used in our homes, factories, and industries to decrease the value of energy consumption and water overflowing. The third paper is Automated Water Management System (WMS) by Rakib Ahmed and Mahfida Amjad. This article uses the WMS framework to monitor whether the water tank level is high or low. if any

client needs to change the water temperature then he/she can likewise make it happen. Smart Water Flow Control and Monitoring System, by Janhavi Sawanth V, Lourd Mary J, Madduleti Vidya, and Mounika D, is the fourth paper. Equipment with a naturally aspirated engine (Pipe and ball). In order to organically control the water, this paper used natural equipment. David Muscarine and Robert B. Donner's automated multiport flow-through water pumping and sampling .This project uses an AMPS SYSTEM. The AMPS is convenient, smaller, flexible, straightforward, and dynamic, permitting it to be utilized in numerous settings furthermore, effortlessly custom fitted to address specialist issues. Automation of Residential Water Flowmeter by Aditya Kumar Thakur, Shiwanshu Shekhar, Akash Priyadarshee, Deepak Kumar, Shashi Kumar, Nitish Shrivastava, Aniket Sinha. This paper has several advantages such as user-friendly, cost-effectiveness, etc. and hence it can be used as an alternative for saving water.5). Urban water supply automation – today and tomorrow by Gustaf Olsson the paper reflects encounters most memorable endeavor to apply programmed control in water frameworks was back in 1973. Automation of submersible pumps and designs by M. Babu Prasad, Dr. M. Sudha Siphon framework application. This paper proposes and recommends a plan answer for sub siphon framework application particularly at the point when they are utilized for series and equal blend for seepage, water system, and salvage.The Automatic Control Model of the Water Filling System with Allen Bradley Micrologix 1400 PLC is the fifth research paper we have chosen for our study. The system's formulation entails understanding how to enter and execute ladder logic in a PLC. A water filling automation system was designed using Allen Bradley Micrologic 1400 type 1766-L32BXB PLC.

Samuel C. Olisa, Christopher N. Aseigbu, Juliet E. Olisa, Bonaventure O. Ekengwu, Abdulhakim A. Shittu, and Martin C. Eze's "smart two-tank quality and level detection system via IoT" is the sixth research study we have chosen for our study. In many cultures and colonies, the two-tank water system—which uses two overhead tanks to maintain the water flow of the residences in that area—is a typical practise. The water flow in these is handled by electronic pumps in pipeline networks, but there is a disadvantage in that we have little control over the pumping system and the water quality is unknown to us in the current system. In this work, control is provided using an Android mobile application, Ultrasonic pulse-echo technique was used in this system. Three-level conditions (LC_1, LC_2, LC_3), and water quality check conditions (QC_1, and QC_2)were devised and used in an intelligent control algorithm system.

The seventh paper we selected for our research is Bernadette Coelho, Ph.D.'s "Efficiency achievements in water supply systems- A review." The author of this paper has discussed the WSS (Water Supply System), how to enhance the "Water Filling System," how to create an effective leakage-proof system, how to estimate water demand in various locations, how to optimise the pump system, and real-time operation. They have utilised renewable energy sources to ensure that all of these services operate effectively. Hydraulic simulation: These models, which reproduce the nonlinear dynamics of a network depicted at particular periods, are computerised representations of systems that play an essential role in management and operational control.GIS integration enables the collection, administration, analysis, and presentation of information with a geographic context. Pumping apparatus Energy expenses for WSS pumping are typically Although pumps can be adjusted accordingly, in most situations they are only turned on when the identical reservoirs are at their maximum permissible level. The accompanying expenses would be greatly decreased if the pumps were run in accordance with the day-to-day variations in the energy tariff as well as the patterns of water usage. They have done excellent studies to promote water conservation measures.

3.METHODOLOGY

In this research, we tried to solve the problem of water conservation using automation by IoT. In this project, we used various materials listed in customized Printed Circuit board (PCB)which Contains (555 timer IC, BC547(NPN) transistor, 1N4007 Diode, LED (1.5), 1k

resistor, 22k resistor, 180k resistor, 1M resistor, 100 nF(104)Capacitor, 12v SPDT, and Connectors) which is the main central processing unit of the system.
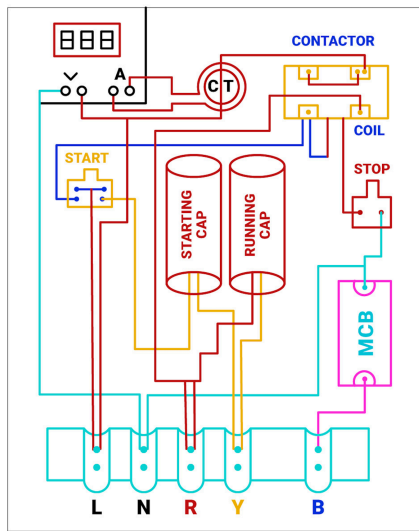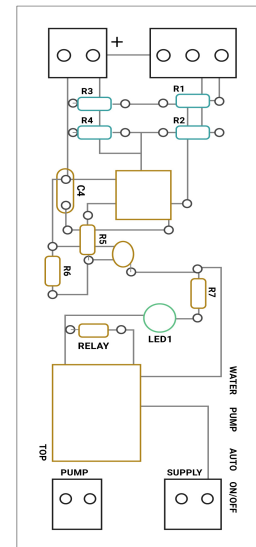

Figure 3.1. Structure of the model.

Figure 3.2. PCB Design.

With the help of connectors and male and female cables, we have done the necessary connections to the sensors that have to be connected to the overhead tank, the stop switch, and for the submersible. The system works properly after all these connections are done systematically in the scheduled test whenever the water touches the sensor it intimates the PCB and stops the submersible immediately every time which makes our product a huge success. The system works in an order in which first we have to switch on the submersible which will command the water to flow towards the tank and the tank will get filling, once the water level reaches the marked area where the sensor is placed the sensor will directly intimate the system to shut down that will make the submersible to stop pumping water and the submersible turns off. The circuit diagrams show's how the connectors and different components of the system join with each other and make the system work. This system will shutdown the submersible once the water level reaches the sensor it will intimate the PCB to shutdown the motor immediately. Our system is a huge success as it does the same thing without fail everytime the circuit completes and the system always shuts down to stop the motor.

4.RESULTS AND DISCUSSION.

Our proposed system produced the best outcome as it was tested on various overhead tanks and each time the results were positive.It gave us the liberty to be tension free about the submersible shutting down. Various similar products in the market offer similar kinds of technology but with less efficiency, there is a floating ball technique that is often used in Aquagards and overhead tanks also, but the drawback of it is that it's not efficient always and the chances of the system to fail are higher as the ball may be stuck somewhere and the functionality of the system effects. but on the other hand, our system works on sensors that whenever the water level touches the sensor initiate the PCB to stop the motor without fail, the system also has a low price range that will attract. common public to install this system in their homes and make their home a more automated space where they will be eventually contributing to saving planet earth. Our system limits in the areas where every time the water level goes down we have to manually switch on the motor and make it work.

5.CONCLUSION.

   Our intention in building this project was to use modern-world technology to solve modern problems. we wanted to build a system that will eventually help us to make our home water supply waste minimal and parallel electricity saving, we came up with a smart "Tank Water-flow Automation System", which solved the problem eventually. Our system enables the user to be free after they have switched on the system for once, Our system took care of the system shut down after the tank is full automatically which eventually reduced the workload of the user, saved water, and saved electricity. Our system is a low-budget product that every common man can install in their home to automate their house by these functions and have a futuristic great feeling. We are working more toward this product and we will be focusing on making the product more advanced where it will be fully automatic by keeping in mind the low price range for the common people.

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