

Intelligent Water Quality Management System Using IOT

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ABSTRACT

This project focuses on monitoring and control of use of water in a society. Water is an important resource and must be used carefully. To implement this we are using water level sensor, water flow sensor, ph sensor and arduino board. The sensors will sense the flow of water to each pipe which ultimately tells the usage of water at one block ideally. This water usage data would be sent to cloud using the IOT space. This local cloud data would be sent to the concerned persons mobile application reporting the water used and alerting the user to limit the water use if it gets extended to the limit usage set by municipal government or corporation. If the limit gets extended the user have to pay accordingly. This will be real time operation. The objective of doing so is for limiting and minimizing the usage of water for an average of per person. And secondly, the cloud data will be used as statistic data for use of water at every seasons that is winter, summer and monsoon so that measuring steps for water management can be taken with the appropriate statistics, yielding an avenue for predictive measure.

Keyword: Water management, Flow sensor, Ultrasonic Sensor, Wifi-Module etc.

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I. INTRODUCTION

With rapidly rising population in India, Fresh Water Management is very much essential which demands an increase in agricultural, industrial and other requirements. The Quality of Fresh Water is characterized by “chemical, physical and biological” content. Monitoring the water quality helps in detecting the pollution in water, toxic chemical and contamination. The traditional method still in vogue entails collection of water samples, analyzing it in lab and advice for any water treatment and so forth. Current water pollution monitoring method takes place in 3 main steps:-

- Water sampling
- Testing samples
- Investigative analysis

All of these 3 steps are very expensive, difficult, time-consuming, need expert advice and less efficient. So with the advent of technology, automation can be brought in

water quality monitoring in taking action appropriately rather than relying on manual process.

So in automating the water quality monitoring some amount of technological innovation has crept in which would help in monitoring the quality of water rather than relying on manual process.

1.1 Problem Definition

The problem statement included in the monitoring plan written. Our world and community is facing excessive water usage either for domestic or commercial purposes. It is serious issue, which affects the sustainability of our environment. Water shortages or scarcity may be caused by the current climate change, such as altered weather-patterns, increased pollution, and increased human demand and overuse of water. Therefore, energy and water are directly or indirectly related sustainability issues that may not be seen separately.

1.2 Motivation

An electronic system is designed to control and monitor the level of water in a tank. A similar reservoir based on the water detector sensor information. The electronic system is designed to automatically control and display water levels. The proposed system eliminates manual monitoring and controlling for home, agricultural or industrial users. The system achieves proper water management and enhances productivity from automation.

1.3 Objective

- To increased automation in the water supply control.
- To minimize the manpower
- To determine the water level in the tank
- To get notifications quickly from the server.
- To provide Time/cost efficiency.

II. RELATED WORK

Manual work is increasing over time where workers has to go to respective area where he need to supply water and then turn on or off the particular wall which results in time consuming process.

Md. Omar aruq and Injamamul Hoque Emu [1] "Design and Implementation of Cost Effective Water Quality Evaluation System" presented in 2017. The polluted water could be responsible for our death or other dangerous diseases. For this reason, pure water detection becomes crying need in our life to avoid illness or unnecessary death. This implemented device is cost effective and the accuracy of this device is not so much high but remains in convenient level. In this research paper, a system is developed and discussed which can evaluate the three parameters of water

K. Sri Dhivya Krishnan and P.T.V. Bhuvaneshwari [2] "Multiple Linear Regression used Water Quality Parameter Modeling to Detect Hexavalent Chromium in Drinking Water" presented in 2017. In this research, the presence of hexavalent chromium in drinking water was detected through experimental analysis. The parameters pH, TDS, and conductivity analysis of Na_2CrO_4 , $\text{Na}_2\text{Cr}_2\text{O}_7 \cdot 2\text{H}_2\text{O}$, K_2CrO_4 , and PbCrO_4 were determined. The major contribution of this paper is that the relationship between WQPs are modeled using MLR. Then the WQP values of the test sample were estimated using the developed model.

Dziri Jalal and Tahar Ezzedine [3] "Towards a water quality monitoring system based on wireless sensor networks" presented in 2017. We proposed an efficient anomaly detection algorithm centralized in the sink node where a global and coherent water quality should be obtained from the measurements taken locally. The algorithm takes into account the variable characteristics of the water quality parameters.

Sona Pawara and Siddhi Nalam [4] "Remote Monitoring of Waters Quality from Reservoirs" presented in 2017. In our system we will be using three sensors- temperature sensor,

pH sensor and turbidity sensor to sense the quality of water. These sensors will be connected to an arduino. A transmitter module will be connected to the arduino to which sensors are connected. Sensor data gathered will be transmitted to the receiver module.

Taufiqurrahman and Ni'am Tamami [5] "Smart Sensor Device for Detection of Water Quality as Anticipation of Disaster Environment Pollution" presented in 2016 Water quality is good for water from the local government water company of Surabaya and Malang; mountain spring water, wells water in Malang; and aqua water. Water quality is less good for wells water in Surabaya. While poor water quality for tap water mixed with soap.

III. PROPOSED SYSTEM

The proposed system consists of 3 major stages. Sensing stage, Computing and controlling and Communication stage. The Sensing stage consists of following sensors. pH sensor: If chemical effluents from the industries are let into water bodies the pH value of the water changes depending on type of chemical i.e., either acidic or basic. The pH sensor measures the level of pH in water by measuring the activity of hydrogen ions in water. Temperature sensor: Due to microbial activities temperature of water may increase which is one of the factor deciding the purity. The temperature sensor measures the temperature of water.

3.1 Sensors:-

Arduino Uno: The Arduino Uno R3 is a microcontroller board based on a removable, dual-inline-package (DIP) ATmega328 AVR microcontroller. It has 20 digital input/output pins (of which 6 can be used as PWM outputs and 6 can be used as analog inputs). Programs can be loaded on to it from the easy-to-use Arduino computer program. The Arduino has an extensive support community, which makes it a very easy way to get started working with embedded electronics. The R3 is the third, and latest, revision of the Arduino Uno.

pH Sensor: PH [7] is important parameter for measuring and controlling water quality hence use of pH sensor has been done i.e. if the water is acidic, basic or neutral. The scaling of the pH sensor ranges from 1 to 14, the range between 1 to 6 is considered as acidic while the range between 8 to 14 is considered as alkaline id basic nature and 7 indicates that the water is neutral.

Turbidity Sensor: Turbidity sensor is used for measuring the amount of haziness/cloudiness in the water. The cloudiness of water causes due to mud, soil or suspended plants and animals.

Flow Sensor: Water flow sensor consists of a plastic valve body, a water rotor, and a hall-effect sensor. When water flows through the rotor, rotor rolls. Its speed changes with different rate of flow. The hall-effect sensor outputs the corresponding pulse Signal.

Ultrasonic Sensor:

An ultrasonic sensor is an instrument that measures the distance to an object using ultrasonic sound waves. An ultrasonic sensor uses a transducer to send and receive ultrasonic pulses that relay back information about an

object's proximity. High-frequency sound waves reflect from boundaries to produce distinct echo patterns.

ESP 8266: The **ESP8266 WiFi Module** is a self contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your **WiFi** network. The **ESP8266** is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor.

3.2 Modules

- ▶ Admin
- ▶ User
- ▶ Water Distribution
- ▶ Water Monitoring

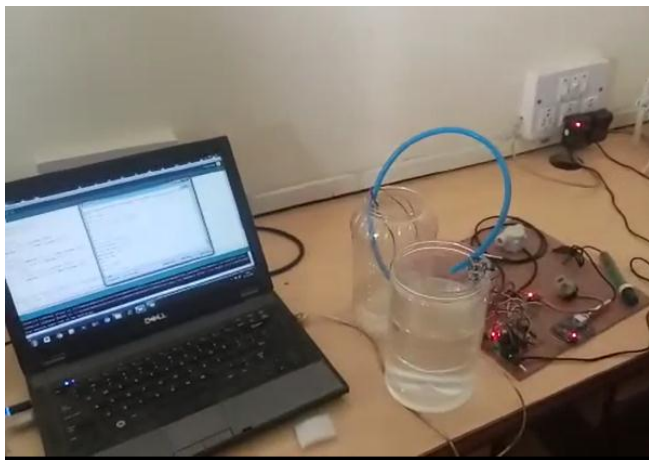
3.3 Application

- Government used for water Management.
- Society Management.
- Private Water Distribution company.

3.4 Advantages of Proposed System

- Cost effective solution for the problem of water quality.
- Level of tank is maintained by the system automatically.
- The controller is able to monitor and control the water supply.
- Communicate current status of the system.
- Continuous get update of water level.

IV. RESULT



V. ACKNOWLEDGMENTS

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VI. CONCLUSION

- The proposed system eliminates manual monitoring and controlling water for home, agriculture, or industrial users.
- The system achieves proper water management and enhances productivity and automation.

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