



IJRASET

International Journal For Research in
Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 10 **Issue:** VI **Month of publication:** June 2022

DOI: <https://doi.org/10.22214/ijraset.2022.44271>

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Smart Water Quality Monitoring System using IOT and Electronic Sensors

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Abstract: Water plays an Important role in our day to day life, our body consists of 70% of water, and the major diseases are caused due to the bad quality of water. How much ever we filter the water their might be few impurities in it, so we are using Internet of Things technology and sensors to measure the quality of water. Internet Of Things (IOT) is used in different area of research for monitoring and collecting data on a particular project. Smart Water Quality Monitoring System is necessary nowadays due to increase in pollution and other industrial waste which is being dumped in the water bodies, which makes water polluted even after purifying it. Around 40% of the death's are caused due to water pollution around the world. With the help of smart water quality monitoring system we can find out if the water is pure or impure at an affordable cost.

Keywords: Internet of Things (IOT), Temperature Sensor, Turbidity Sensor, Quality of water, arduino board, Smart water monitoring system, Wireless network.

I. INTRODUCTION

This At the present time, drinking water is the most precious and valuable for all the human beings, thus the quality of water needs to be checked continuously; as drinking water utilities face new challenges in real-time operations. This challenges occurred because of limited water resources, growing population, aging infrastructure, global warming, etc. Any imbalance in the water quality would seriously make an impact on the health of human beings. As we know that the traditional methods for monitoring quality of water involves the manual collection of water sample at various places and followed by laboratory analytical techniques in order to check the quality of water. Such an approach takes a long time and it has been no longer to be considered an efficient way.

The main objective of the proposed system is to monitor the water quality in real-time. As in the proposed system, arduino board is used as a core controller along with a several water quality parameter measuring sensors for measuring the parameters of water. The arduino board is the main processor of the system which controls and process the data generated by the sensors. The parameter measuring sensor involves the temperature sensor, turbidity sensor, ultrasonic sensors. These three parameter shows the quality of water, whether it is polluted or not. For viewing the parameter of water in real-time we are using Wi-Fi module and also arduino is connected in parallel with LCD screens for checking the parameter values.

II. LITERATURE SURVEY

Several experiments have been performed over the force of many years by different groups of scholars. Here are some of the following groups :

Mr. Aaina Venkateswaran, Harsha Menda P and Prof Priti Badar with the title, IoT Based System for water Quality Monitoring in the year 2017. The primary objective of their experiment was to use image processing technology, smart sensor designing using Zigbee for remote sensing monitoring and analysing the quality of water.

Vaishnavi V Daigavane and Dr. M.A Gaikwad have performed an experiment under the title, IoT Based System for water Quality Monitoring in the year 2017. The primary objective of their group is detecting more parameters using GSM network and sensors to monitor the quality of water.

A.N.Prasad, K.a.Mamun, F.R. Islam and H.Haqva have performed an experiment under the title, Smart Water Quality Monitoring System in the year 2017. The primary objective of their group is to use four different water sources and monitor the quality using GSM technology.

Mr.Swapnil Katole and Prof. Yogesh Bhute have performed an experiment under the title, Real Time Water Quality Monitoring System based on IoT platform in the year 2017. The primary objective of their group was to be cost friendly in monitoring the water quality by viewing data on cloud through WiFi module.

Karthick. T, Gayatri Dutt, Tarunjot Singh Kohli and Snigdha Pandey have performed an experiment under the title, Prediction of Water Quality and Smart Water Quality Monitoring System in IoT environment in the year 2018. The primary objective of their group is to compare their results with WHO standards.

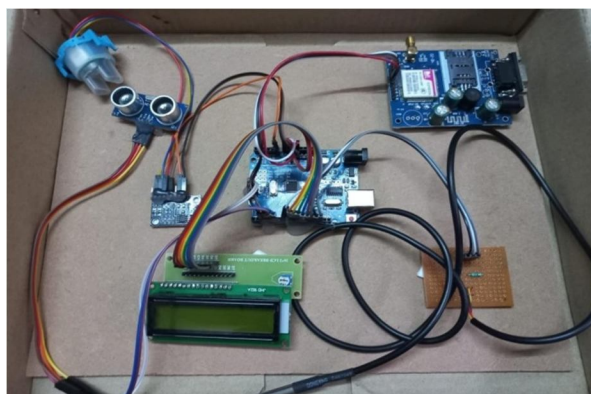
Anuradha T, Bhakti, Chaitra R and Pooja D have performed an experiment under the title, IoT Based Low Cost System for Monitoring of Water Quality in Real Time in the year 2018. The primary objective of their group is to measure the temperature, PH, Turbidity and TDS values to check whether water issuitable for human beings and plants.

Jianhua Dong, Guoyin Wang, Huyong Yan, Ji Xu & Xuerui Zhang have performed an experiment under the title, Survey of smart water quality monitoring system in the year 2014. The primary objective of their group is to utilize cloud computing, Dynamic features and visualization to monitor the quality of water.

III. PROPOSED SYSTEM

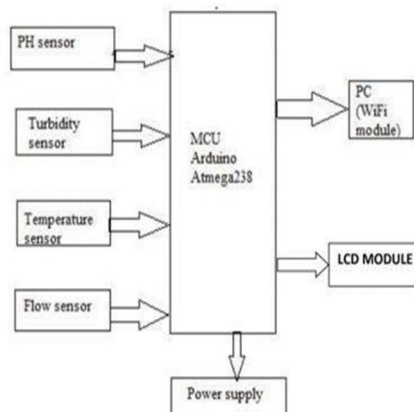
In this proposed system, the proposed block diagram consists of several sensors (Temperature, Ultrasonic sensor, Turbidity) which is connected to core controller. Each sensor measure its values like temperature, quality, flow of water and sends the data to arduino. The core controller access the sensor values and process them to transfer the data through internet. arduino is used as a core controller. The sensor data is viewed in the phone and lcd module through Wifi module which is connected to arduino, this helps us to know aboutthe water quality. The quality of water can be easily known using this project. This project results in providing safe and harmless water. Alert message will be sent directly,so they can react immediately and take action accordingly.It provides information regarding water flow, temperature, quality of water through turbidity .These data is processed by arduino and gives us the data that water is harmful or not

A. Model Picture



IV. SYSTEM ARCHITECTURE

Water quality management system uses sensor like temperature which is used to measure water temperature and turbidity which measures the quality of water and IR sensor which helps to know the quantity of water and flow sensor which helps in reducing the wastage of water. These all data is collected by the arduino and it process the data according to the values and helps us to know the quality of water. These all values can be seen through lcd modules or through phones and it will help us to know if water is harmful or not



V. RESULTS

| Type of water | Water quality | Temperature(indegrees centigrade) | Level | Water condition |
|--------------------|---------------|-----------------------------------|-------|-----------------|
| Tap water | 223 | 27 | 68% | Good |
| Salt water | 197 | 27 | 71% | moderate |
| Mud water | 163 | 26 | 78% | Less moderate |
| Tap water | 221 | 32 | 58% | Good |
| Salt water | 180 | 25 | 62% | Moderate |
| Mud water | 150 | 14 | 43% | Less moderate |
| NPK | 100 | 28 | 40% | Danger |
| Mineral water | 235 | 26 | 88% | Very good |
| Mud and salt water | 146 | 26 | 28% | Less moderate |
| Chlorine | 190 | 22 | 60% | moderate |
| Distilled water | 260 | 17 | 47% | Very good |
| Hard water | 102 | 29 | 50% | Danger |
| Soft water | 228 | 26 | 67% | Good |
| Rain water | 186 | 17 | 38% | Moderate |
| Fresh water | 200 | 21 | 86% | Good |
| Rain and tap water | 194 | 18 | 67% | Good |

VI. CONCLUSION

This presents a detailed survey on the tools and techniques employed in existing smart water quality monitoring systems. Also a low cost, less complex water quality monitoring system is proposed. The implementation enables sensor to provide online data to consumers. This can be improved by incorporating algorithms for anomaly detections in water quality.

VII. FUTURE SCOPE

The future scope of this project is monitoring environmental conditions, drinking water quality, treatment and disinfection of waste water etc. This system could be implemented in various industrial processes. The system can be modified according to the needs of the user and can be implemented along with lab view to monitor data on computers.

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