Journal of Current Research in Engineering and Science
Bi-Annual Online Journal (ISSN : 2581 - 611X)

Volume 6 –Issue 2,August 2023
Paper:60

WATER QUALITY MONITORING SYSTEM USING IOT

Mrs. RAGAVI PRIYA S[1], KAVIANJALI K S[2], MYTHILI S U[3], NISHANTHINI N[4], PRIYA M[5]

Assistant Professor, Department of Computer Science and Engineering, SNS College Of Technology, Coimbatore, Tamil Nadu, India

Department of Computer Science and Engineering, SNS College of Technology, Coimbatore, Tamil Nadu India
Department of Computer Science and Engineering, SNS College of Technology, Coimbatore, Tamil Nadu India
Department of Computer Science and Engineering, SNS College of Technology, Coimbatore, Tamil Nadu India
Department of Computer Science and Engineering, SNS College Of Technology, Coimbatore, Tamil Nadu, India

Abstract**: One of the main concerns for green globalisation today is water contamination. Water characteristics including pH, turbidity, andtemperature must first be estimated in order toprevent pollution because changes in these parameters' values indicate the presence of contaminants. We create a low-cost system for real-time water quality monitoring. Water parameters are currently found through chemical tests or laboratory tests, where the testing apparatus is stationary and samples are fed into theapparatus. As a result, the current technique for checking the quality of the water is manual, laborious, and time-consuming. The testing apparatus can be positioned in the water resourcesand detecting systems to improve the frequency. pollution can be done at a distance. In the real of embedded, this project suggests a Sensor-Based Water Quality Monitoring System that monitors the physical and chemical characteristics of the water. You may measure the water's propertiesincluding temperature, turbidity, and pH The corecontroller is capable of processing the measured values from the sensors. A core controller can be created with an Arduino Uno. Finally, an LCD monitor can be used to view the sensor data. Our project's ability to obtain a water monitoring system with high frequency, high mobility, andcheap power makes it special. The use of water quality monitoring systems will help all types of individuals.

Keywords: Internet of things, Embedded, Sensor, Monitoring, Water quality.

1. INTRODUCTION

The Internet of things describes physical objects with sensors, processing ability, software and other technologies that connect and exchange data with other devices and systems over the Internetor other communications networks.

Water is a fuel for all life and no lives can survey without water on this planet. Hazardous of various category are collapsed with the drinkingwater which arrives through industrialization, globalization, urbanization, agriculture etc. It is a need to check the water regularly using agile technologies. From our project we assure that waterquality measuring is done automatically.

The Central Pollution Control Board (CPCB) had established many continuous monitoring stations onwater body across the country, which checks the quality of water either monthly or yearly. This is to make sure that the water standard is being maintained in desired level. Also It has significancethat it is monitored on daily basis. The pollution controlling requirement and the measures for the effectiveness of pollution control in water is finishedby using Water quality monitoring. CPCB have plans to develop the water standard monitoring network across Ganga river valley. All the stations are operating in real time and central site can acquiredata from several of the above stations using GPRS/GSM or 3G cellular serviceability. And the price of the system differs in proportion to the components used. Our proposed model consists of various sensors which compute the standard of water in real-time for effective action, and is economical, accurate, and only less manpower required.

Totally there are 50 lakh public water sources in our country. Including unreported, totallythere are 60 lakh water sources Which is tested twice/year for bacterial analysis. And once/year for chemical analysis. According to NRDWP 120 lakh water samples to be tested/year. And water testing method was started in the year 1988, from 1988 to 1991 Substrate technique was used to identify the target bacteria. And in 1996 Epidemiological

Journal of Current Research in Engineering and Science
Bi-Annual Online Journal (ISSN : 2581 - 611X)

Volume 6 –Issue 2,August 2023
Paper:60

method was used to recognize the water quality but in this method many water borne diseases weremissed. And from 1995 to 2007 the number ofobserved specimen with BOD values less than 3mg/I were between 57-69%.

2. LITERATURE SURVEY

The Internet of Things (IoT) and Remote Sensing (RS) techniques are used in various fields ofstudy to monitor, collect, and analyse data fromremote locations. The quality of water available to people has deteriorated significantly as a result of the vast increase in global industrial output, rural-to-urban migration, and over-utilization of land and searesources. The widespread use of fertilisers in agriculture, as well as other chemicals in industries such as mining and construction, has significantly contributed to the global decline in water quality. The parameter references obtained from the variouswater sources will be used to construct classifiers that will be used to perform automated water analysis in the form of Neural Network Analysis. Ina nutshell, the system has proven its worth by providing accurate and consistent data throughout the testing period, and with the added feature of incorporating IoT platforms for real time water monitoring, this should be a strong contender in thereal time water monitoring solution market. Water isa necessity for human survival; therefore, mechanisms must be put in place to rigorously test the quality of water made available for drinking in town and city articulated supplies, as well as the rivers, creeks, and shoreline that surround our townsand cities. The availability of high-quality water is critical for preventing outbreaks of water-borne diseases and improving overall quality of life. Because the Fiji Islands are located in the vast Pacific Ocean, a frequent data collection network isrequired for water quality monitoring, and IoT and RS can improve existing measurements. This paperdescribes a smart water quality monitoring system for Fiji that makes use of IoT and remote sensing technology.

3. PROPOSED SYSTEM

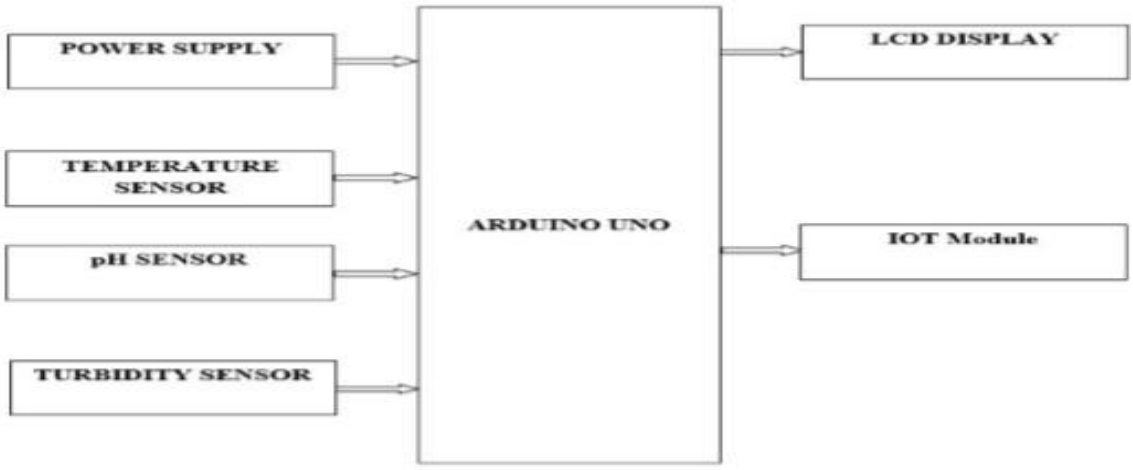

Figure 1.1 Block Diagram

In Figure 1.1, The sensors used thetemperature sensor, turbidity sensor and pH sensorare connected to the Arduino UNO. IOT module is connected to the Arduino UNO, which performs theIOT based functionality. The LCD display is connected to the Arduino UNO to view the data. Thepower supply is given to the Arduino UNO. This is the complete set up.

In this system it makes use of three sensors(Turbidity, temperature, pH) and the Arduinocontroller connected with internet of things. The Processing module microcontroller, and the transmission IOT Module .The three sensors capturethe data in the analogy signals. The ADC converter which converts the three signals information's into the digital format. The digital signals are passed to the Arduino controller which is together with the transmission module. The microcontroller in Arduino will examine itself and course the digital information, and here the available lcd display. Theoutput value which can be viewed on the LCD. TheEmbedded-C language is used for writing the code.

Journal of Current Research in Engineering and Science
Bi-Annual Online Journal (ISSN : 2581 - 611X)

Volume 6 –Issue 2,August 2023
Paper:60

The water quality monitoring system employs sensors such as, pH, temperature, and turbidity to get the data parameters. These sensors are positioned inthe water will analyse the quality of the water resources.

3.1. MODULE LIST

3.1.1 LOGIN

Thing Speak provides instant visualizationsof data posted by your devices to Thing Speak. Withthe ability to execute MATLAB® code in Thing Speak you can perform online analysis and processing of the data as it comes in. Thing Speak isoften used for prototyping and proof of concept IoTsystems that require analytics. Think speak server isused to store water levels and parameters in our project.

3.1.2 TEMPERATURE MONITORING

A temperature sensor is a device that detects and measures hotness and coolness and converts it into an electrical signal. The LM35 seriesare precision integrated-circuit temperature devices with an output voltage linearly proportional to the Centigrade temperature. The LM35 device has an advantage over linear temperature sensors calibratedin Kelvin, as the user is not required to subtract a large constant voltage from the output to obtainconvenient Centigrade scaling. The LM35 device does not require any external calibration or trimming to provide typical accuracies of ±¼°C at room temperature and ±¾°C over a full −55°C to 150°C temperature range. Lower cost is assured bytrimming and calibration at the water level.

3.1.3 TURBIDITY MONITORING

The sensor helps calculate the quality of clear water, i.e., the number of particles in water. It utilizes light to identify whether the water is opaqueor murky by transmitting light beams. Excess turbidity can reduce marine life and reproduction and cause various forms of human illness. The sensor generates both analog and digital mode output. The turbidity sensor detects water quality by

Figure 1.2 Basic setup of model

measuring level of turbidity. It is able to detectsuspended particles in water by measuring the light transmittance and scattering rate which changes with the amount of total suspended solids (TSS) in water.As the TTS increases, the liquid turbidity level increases. The Turbidity Sensor includes high- quality Hach StablCal™ 100 NTU standard for quick calibration and a high-grade glass cuvette for water sample.

3.1.4 pH MONITORING

The sensor measures the amount of alkalinity and acidity in water and other metrics. When used correctly, the smart solutions can measure the safety and quality of the product and theprocesses occurring at a wastewater or manufacturing plant. It has an electrode of measurement and reference. With every increase in pH values, the concentration of hydrogen ions decreases ten-fold, reducing the intensity of acidic water. pH is a scale used to specify how acidic or basic a water-based solution is. Acidic solutionshave a lower pH, while basic solutions have a higherPH. Thus pH sensor has the ability to determine thePH of any solution, i.e. it tells whether the substanceis acidic, basic or neutral in nature. By knowing thePH Sensor, we can monitor the water quality in Agricultural Farm and also in Fish Farming.Similarly, PH Sensor has a wide range of applications like wastewater treatment, pharmaceuticals, chemicals & petrochemicals.

Journal of Current Research in Engineering and Science
Bi-Annual Online Journal (ISSN : 2581 - 611X)

Volume 6 –Issue 2,August 2023
Paper:60

3.1.5 DISPLAY

LCD (Liquid Crystal Display) is a type of flat panel display which uses liquid crystals in its primary form of operation. It is used to display the temperature, turbidity and pH value. There are manydisplay devices used by the hobbyists. LCD displaysare one of the most sophisticated display devices used by them. Once you learn how to interface it, it will be the easiest and very reliable output device used by you! More, for micro controller, based project, not every time any debugger can be used. SoLCD displays can be used to test the outputs.

Now a day's water pollution is one of the biggest fears for the green globalization. To preventthe water pollution, first we have to estimate the water parameters like pH, turbidity, temperature as the variations in the values of these parameters. Wehave identified a suitable implementation model thatconsist of different sensor devices and othermodules. In this implementation model we usedArduino uno, using this Embedded C language in Arduino uno to run program. We have implementedthree types of sensors (temperature, pH, turbidity) and fixed with Arduino uno to execute the output. Implementing our project in think speaker to view the graph of all the parameter values. Through usingthis technique we get our output. Using our project many people can gain and used in many places like public places, office, other field technologies.

4.CONCLUSION

Water detection sensors with a special benefit and an established GSM network are used for the monitoring of turbidity, PH, and temperature of water. The device can automatically check the quality of the water, is inexpensive, and does not need anyone to be on duty. Testing the quality of thewater should therefore be more affordable, practical,and quick. The method is very adaptable. Otherwater quality criteria can only be monitored with this system by updating the required sensors andsoftware applications.

5. FUTURE ENHANCEMENT

The prototype checks and tests alkalinity ofwater, pH level, water temperature etc. Drinking water treatment could be the future scope of this project. Also the waste water treatment could be an application of this project. Water monitoring systemhas focused solely on measuring the quality of waterusing sensors such as pH and turbidity. Some of them have included cloud based module into their system for online view of sensor data. Issues to be addressed in future water monitoring include more systematic efforts to identify contaminants relevant for compromised water qualities, as well as improved quantification of compounds that are of high biological activity.

REFERENCE

[1] Anuradha , Bhakti, Chaitra R , Pooja D, \"IoT Based Low Cost System for Monitoring of Water Quality in Real Time\", International Research Journal of Engineering and Technology (IRJET)Volume: 05 Issue: 05, May-2018.

[2] N.N. Beri, "Wireless Sensor Network BasedSystem Design for Chemical Parameter Monitoringin Water", International Journal of Electronics Communication & Soft Computing Science and Engineering, vol. 3, no. 6,2014.

[3] R. P. N. Budiarti, N. Widyatmoko, M. Hariadi and M. H. Purnomo, "Web scraping for automated water quality monitoring system: A case study of PDAM Surabaya", 2016

[4] S.Geeta,S.Goutami "Internet of Things enabled real time water quality monitoring system" SpringerOpen journal Vol 5, pp. 1-19, 2017.

[5] Jayti Bhatt, Jignesh Patoliya, Iot Based Water Quality Monitoring System, IRFIC, 21feb,2016.M.Naganaik,P.Vijaya Bhaskar,S.Rajendra Kumar, Design and simulation of Smart Water Quality Monitoring System in IoT Environment,2018 IJCRT | Volume 6, April 2018.

Journal of Current Research in Engineering and Science
Bi-Annual Online Journal (ISSN : 2581 - 611X)

Volume 6 –Issue 2,August 2023
Paper:60

[6] Nikhil Kedia, Water Quality Monitoring forRural Areas- A Sensor Cloud Based Economical Project, in 1st International Conference on NextGeneration Computing Technologies(NGCT 2015) Dehradun, India, 4-5 September 2015.

[7] Poonam J. Chavan, Manoj Mechkul "IoT BasedWater quality Monitoring" IJMTER Journal, Vol 3,pp.746-750, April 2016.

[8] A. N. Prasad, K. A. Mamun, F. R. Islam and H. Haqva, "Smart Water Quality Monitoring System", 2015 2nd Asia-Pacific World Congress onComputer Science and Engineering, 2021.

[9] A. Purohit and U. Gokhale, "Real Time Water Quality Measurement System based on GSM", IOSR Journal of Electronics and Communication Engineering (IOSR-JECE), vol. 9, no. 3, pp. 63-67, May-Jun. 2014.