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POTABLE WATER QUALITY MONITORING SYSTEM USING IOT

MOHAN.K.S[1], MYTHILI..K[2], VAISHNAVI.T[3], BHARAT.D[4], GOKUL VARSHAN .T[5]

[1]Assistant Professor, Department of Information Technology, SNS College Of Technology, Coimbatore, Tamil Nadu, India

[2,3,4,5] Student, Department of Information Technology, 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, npk, and temperaturemust first be estimated in order to prevent 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 the apparatus. 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 resources and 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 properties including temperature, turbidity, and pH. The core controller 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, and cheap 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 Internet or 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 drinking water 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 water quality measuring is done automatically.

The Central Pollution Control Board (CPCB) had established many continuous monitoring stations on water 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 significance that it is monitored on daily basis. The pollution controlling requirement and the measures for the effectiveness of pollution control in water is finished by 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 acquire data 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. In this paper, section 2 examine about the literature survey on surveillance of water quality while section 3 discusses on Internet of Things. Section 4 discusses implementation of water standard surveillance system, and results acquired by way of the system are discussed in section 5. Section 6 concludes the paper.

Totally there are 50 lakh public water sources in our country. Including unreported, totally there 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 method was used to recognize the water quality but in this method many water borne diseases were missed. And from 1995 to 2007 the number of observed 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 of

study to monitor, collect, and analyse data from remote 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 sea resources. 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 various water sources will be used to construct classifiers that will be used to perform automated water analysis in the form of Neural Network Analysis. In a 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 the real time water monitoring solution market. Water is a 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 towns and 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 is required for water quality monitoring, and IoT and RS can improve existing measurements. This paper describes a smart water quality monitoring system for Fiji that makes use of IoT and remote sensing technology.

3. PROPOSED SYSTEM

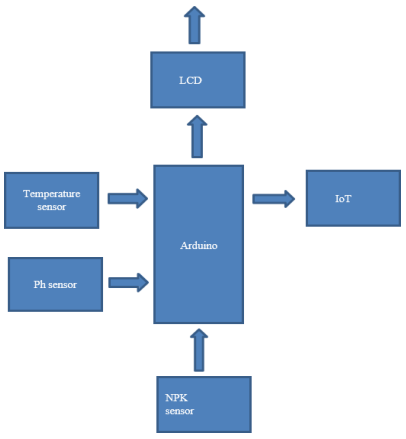

Figure 1.1 Block Diagram

In Figure 1.1, The sensors used the temperature sensor, turbidity sensor and pH sensor are connected to the Arduino UNO. IOT module is connected to the Arduino UNO, which performs the IOT based functionality. The LCD display is connected to the Arduino UNO to view the data. The power 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 Arduino controller connected with internet of things. The Processing module microcontroller, and the transmission IOT Module .The three sensors capture the 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. The output value which can be viewed on the LCD. The Embedded-C language is used for writing the code. The water quality monitoring system employs sensors such as, pH, temperature, and npk to get the data parameters. These sensors are positioned inthe water will analyse the quality of the water resources.

4.MODULE LIST

4.1 Arduino

Arduino can be used to communicate with a computer, another Arduino board or other microcontrollers. The ATmega328P microcontroller provides UART TTL (5V) serial communication which can be done using digital pin 0 (Rx) and digital pin 1 (Tx).

4.2 Temperature Monitoring

A temperature sensor is a device that detects and measures hotness and coolness and converts it into an electrical signal. The LM35 series are 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 calibrated in Kelvin, as the user is not required to subtract a large constant voltage from the output to obtain convenient 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 by trimming and calibration at the water level.

4.3 NPK Monitoring

The main way of this paper is to review different detection of N, P and K contents, humidity of the soil by using sensors and also monitor the temperature and sunlight in the agricultural field. India is such a country which has capacity to produce three crops in a year such by agro- ecological diversities in soil, rainfall,temperature, and cropping system. Indian agricultural productivity is very less compared to world standards due to, use of obsolete farming technology.

Also due to, lack of understanding of the need for sustainability in the poor farming community has made things worse . Fertilizer has been the key input in augmenting food production in India. However , fertilizer used in India is skewed , high in few states having adequate irrigation & dismally low in the NE states .There is also imbalanced use of plant nutrients is considered as the main cause for decline in crop yield and water monitoring.

4.4 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 the processes 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 solutions have a lower pH, while basic solutions have a higher PH. Thus pH sensor has the ability to determine the PH of any solution, i.e. it tells whether the substance is acidic, basic or neutral in nature. By knowing the PH 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.

4.5 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 many display devices used by the hobbyists. LCD displays are 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. So LCD displays can be used to test the outputs.

5. SYSTEM DESIGN OF MODEL

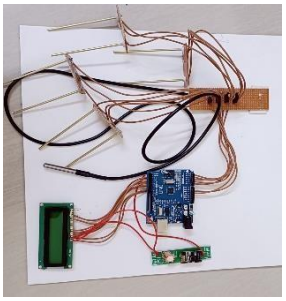

Figure 1.2 Basic setup of model

6. RESULTS

Now a day's water pollution is one of the biggest fears for the green globalization. To prevent the water pollution, first we have to estimate the water parameters like pH, turbidity, temperature as the variations in the values of these parameters. We have identified a suitable implementation model that consist of different sensor devices and other modules. In this implementation model we used Arduino uno, using this Embedded C language in Arduino uno to run program. We have implemented three 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 using this technique we get our output. Using our project many people can gain and used in many places like public places, office, other field technologies.

7. 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 the water should therefore be more affordable, practical, and quick. The method is very adaptable. Other water quality criteria can only be monitored with this system by updating the required sensors and software applications. The process is easy. It is possible to expand the system to track hydrologic conditions, air pollution, industrial and agricultural output, and other variables. It has a wide range of uses and extension value.

8. FUTURE ENHANCEMENT

The prototype checks and tests alkalinity of water, 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 system has focused solely on measuring the quality of water using 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.

9. REFERENCE

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