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Real Time Quality Monitoring System for Water in IoT Environment

Deepthi N[1], Rahul R A[1], Kiran M[1], Aishwarya S[1], Poorna Prajna K M[1]
[1]*Student, Computer Science, Maharaja Institute of Technology, Visvesvaraya Technological University, Mysuru, India.*
Corresponding Author: deepthin_cse@mitmysore.in

Abstract: - The water quality should be monitored properly to certify whether the quality is good or not. In this approach we confer a plan and development of an inexpensive system for checking the water quality using the technology called internet of things. The sensors are the most valuable things we used here to measuring different parameters of water. Here we consider the PH, temperature, and turbidity as the main parameters. After getting the values from the different sensors we will monitor those values through core controller.

Keyword: - ***PH, turbidity, temperature, IOT, sensors, core controller.***

I. INTRODUCTION

The drinking water is most needed for all the human beings; these utilities faces new provocations in day to day working. The limited water resources create all this challenges, ageing framework etc. to handle with the existing water we need a better system. Some of the conventional methods to check quality involves collecting water samples from different geographical areas, followed by laboratory analytical techniques in order to check the water quality. For these approaches the time duration is high and difficult to process. And also the current system has some drawbacks.

So we need to monitor the water continuously for better result. The approaches proposed on the new technology must be fit for particular area and for large system is not fit. By considering all the issues, we are going to design and develop a low-priced system for real time quality monitoring system for water. In our system we are used low powered microcontroller and to view the results we used android application.

II. LITERATURE REVIEW

"Jayti Bhatt,Jignesh Patoliya:-" "Real Time Water Quality Monitoring System". In this paper we describe about monitoring the quality of water. Therefore, to monitor the water in real time we have I0T has the new technology. we have used different sensors which are used to measure the parameters of water such as pH, turbidity, conductivity, dissolved oxygen and temperature. The microcontroller processes values measured by this sensor and transmits the processed without any physical contact using Zigbee protocol to raspberry pi which is the core controller. In the end, using cloud computing the data can have viewed on internet.

"Sokratis Kartakis, Weiren Yu and Julie A. McCann:-" "Adaptive Edge Analytics for Distributed Networked Control of Water Systems" This paper shows that their approach remarkably lowers the number of communications between back-end servers and the sensor devices, along with that it can also successfully limit events like water burst so that they can save up to 90% communications. This can be done by using the arrival times of the vibration variations that we get at sensor positions [2].

"Nikhil Kedia:-" "Water Quality Monitoring for Rural Areas-A Sensor Cloud Based Economical Project." Basically the authors have attention to the whole methods of water quality monitoring, sensors, information dissolution policy, and embedded design, government role, network operator and villagers in certifying correct information dissolution. Sensor Cloud domain is also explored by this. Here in this paper there will be automatic improvement of water quality. At the time of improving the water automatically, by using the technology and economic practices daily without fail the water quality can be improved and can create the awareness among people [3].

"Mithila Barabde, Shruti Danve entitled: "Real Time Water Quality Monitoring System". This proposes Quality Monitoring System for Water based on sensors. Basically they have concentrated to obtain the good quality of water with high mobility, high frequency and low powered and this is the uniqueness of this system. This system consists of nodes for data monitoring, a remote station and a base station. Data's of pH, turbidity, conductivity, etc are collected by the base station which is sent to the remote monitoring station. It displays in the PC after processing. If the value obtained is greater than the threshold value an SMS alert is sent to the station [4].

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Vaishnavi V.Daigavane and Dr. M. A Gaikwad: - "Water Quality Monitoring System Based on IOT". In the paper it gives the design and development of the system. To measure the chemical and physical parameters several sensors are used in this system. The core controller processes the values measured by the sensors. Arduino Uno is core controller used in this paper. Finally, using the Wi-Fi module user can view the sensor data [5].

K. Spandana, V.R. Sheshagiri Rao: - "Internet of Things Based Smart Water Quality Monitoring System". In the paper they used the method called data acquisition process for monitoring the quality water. They have measured the values from the sensors. This values will be sent to the microcontroller for interfacing. After all the processing of the data the information obtained is sent to the web server in this paper but we sent to the android application called blynk server. And at last they have used the buzzer because if the sensors do work properly then this buzzer will be on [6].

Vaishnavi V.Da1gavane and Dr. M. A Ga1kwad: - "Water Quality Monitoring System Based on IOT". Here they are used [7]. the same methodology as mentioned in the paper number [1] and [10].

"@Tha. Sugapriyaa, S.Rakshaya, K. Ramyadevi, M Ramya, P.G. Rashmi:-" "Smart water Quality Monitoring System for Real Time Applications". This system which they developed also gives an alert message to the public [8].

Anuradha T:- "The Monitoring of Water Quality in I0T Environment". Firstly, we used different sensors for monitoring of our system. After this sensors deployment we will get values from each of them. These values are used to control the main part of our system i.e core controller by sending the values to it. Here in our system we have used Raspberri Pi as our micro controller. Finally, all this values which are processed can be viewed on internet using cloud computing at last [9].

AshwiniDoni, Chidanada Murthy M.V and Dr. M Z Kurian: - "Water Quality Monitoring System using IOT". In the above mentioned paper we have designed a system that is very low in price to monitor the water. We have used different sensors like pH, turbidity, temperature for communication purpose a platform of microcontroler system and GPRS are used [10].

III. METHODOLOGY

A. *Block Diagram*

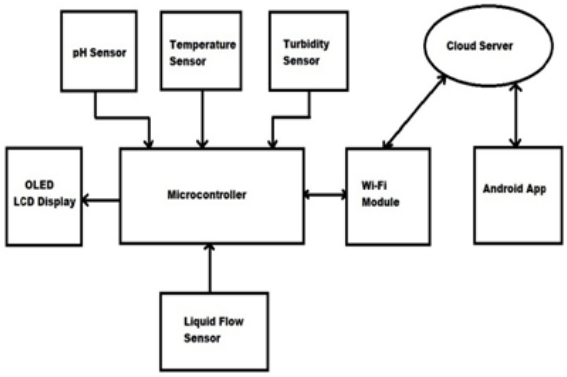

Fig.1. Working Model Block Diagram

System consist of a Microcontroller which includes drivers for interfacing. As we have seen, we have few sensors which includes pH sensor, temperature sensor, turbidity sensor and flow sensor. so, when it comes to pH sensor we cannot just use the sensor as it is. First we have to calibrate the pH sensor using Buffer solution (100ml). Using the buffer solution, we need to calibrate the sensor. First we have to take sufficient amount of distilled water and two types of buffer tablets that is acidic tablet (pH 4) and neutral tablet (pH 7). So, putting the acidic tablet into a distilled water makes acidic solution and neutral solution by neutral tablet. The acidic solution turns into dark yellow and neutral solution will have no color change. The microcontroller collects the sensors data and analyses the collected data. After the predefined analysis it sends the signals to Wi-Fi to transfer the collected data to the cloud server using MQTT protocols. On the receiver side of the cloud android app used to monitor the data. In the app we can monitor every parameter and it can be store in its database for future references.

When the data of the sensor is abnormal it shows the pop up notification

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B. Model Setup

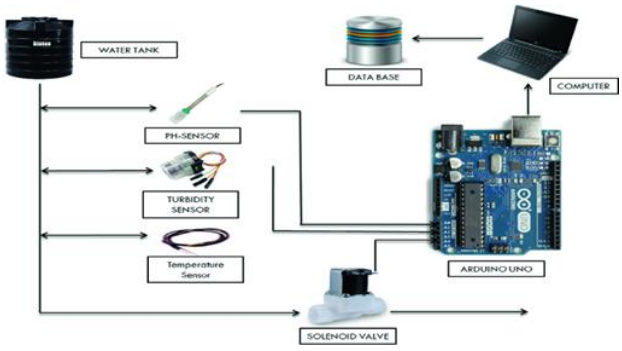

Fig.2. Experimental Setup

Working procedure:

We have taken 4 plastic tubs to segregate the water according to the water quality. First, the water is taken into the first tub, using a motor pump it will be sent to the second tub where the sensors (pH, temperature, turbidity) are deployed. After having sufficient water in the first tub, it will be sent to the second tub when water will be checked in terms of quality. If water satisfies the condition of pH (between 4.5 to 7) and turbidity (4.5), then it will be sent to the third tub. If the quality of water is not satisfied, then the water will be drained out by a motor pump to the fourth tub. This water quality is not good. We have also taken a Buffer solution using which we again conduct this process in order to check whether pH sensor is proper or not.

IV. Results and Discussion

Checking the water quality is an important essential thing, and it is useful and important to know whether the water is good and safe to drink or not. This set up of project will be helpful in analyzing the results in different ways like.

Fig.3. Results of Water quality

V. Conclusion and Future Scope

This proposed system for real time application which is most efficient and also a low-priced, that confirmed after the implementation. The certain amount of pollution that controls and the sudden alerts are send through notifications and alarm. This project can also control or avoids the disease that can occur through water. The severe level of pollutants in the rivers can be taken immediate actions. This monitoring process can be done by using the less number of trained individuals. The installation of the system can be done easily when it is near to the target area.

The system capacity can be increased to obtain more efficient reliable results. We can also add different sensors to calculate the water parameters like conductivity, chemical oxygen demand(COD), oxygen level, ammonia nitrogen, nitrate, and nitrite, and also phosphate.

References

[1]. Jayti Bhatt, Jignesh Patoliya, "IOT Based Water Quality Monitoring System", International Journal of Industrial Electronics and Electrical Engineering, ISSN: 2347-6982, April 2016.

[2]. Aaina Venkateswaran, Harsha Menda P, Prof Priti Badar, "An IoT Based System for Water Quality Monitoring", International Journal of Innovative Research in Computer and Communication Engineering: An ISO:2017 Certified Organization, Vol. 5, Issue 4, April 2017.

[3]. R.Mithila, N.Nirmal Kumar, R.Raja, S.Rubasri, Mr.M.Nepolean, "An IoT Based Self Regulating Sensors for Water Quality Monitoring", SSRG International Journal of Electronics and Communication Engineering(SSRG-IJECE)-Special Issue ICETSST April 2018.

[4]. Mr. Swapnil Katole, Prof. Yogesh Bhute, "The Real Time Water Quality Monitoring System Based on IoT Platform", International Journal on Recent and Innovation Trends in Computing and Communication, Volume: 5 Issue: 2, IJRITCC|February 2017.

[5]. Auradha T, Bhakti, Chaithra R, Pooja D, "IoT Based Low-priced System for Monitoring of Water Quality in Real Time", International Research Journal of Engineering and Technology(IRJET), Volume: 05 Issue: 05 | May-2018.

[6]. Harshad Meshram, Ganesha Dekate, "Water Quality Monitoring System based on IOT Platform", IOSR Journal of Engineering(IOSRJEN), ISSN (e): 2250-3021, ISSN (p): 2278-8719, Vol. 09, Issue 5 (May,2019), ||S (VI) || PP 37-40.

[7]. K. Spandana, V.R. Sheshagiri Rao, "Internet of Things (IoT) Based Smart Water Quality Monitoring System", International Journal of Engineering & Technology, 7 (3.6) (2018) 259-262.

[8]. Vaishnavi V.Daigavane and Dr. M. A Gaikwad, "Water Quality Monitoring System Based on IOT", Advances in Wireless and Mobile Communications. ISSN 0973-6972 Volume 10, Number 5 (2017), pp. 1107-1116.

[9]. Nikhil R, Rajender R, Dushyantha G R, M N S Khadri, Jagadevi N Kalshetty, "Smart Water Quality Monitoring System using IOT Environment", International Journal of Innovations in Engineering and Technology (IJIET), Volume 10 Issue 4 July 2018.

[10]. Bhavesh Patil, Dr. Jyothi Digge, "Water Quality Monitoring in IOT Environment", IOSR Journal of Engineering (IOSRJEN), ISSN (e): 2250-3021, ISSN (p): 2278-8719, PP 20-25, 2018.

[11]. Tha. Sugapriyaa, S.Rakshaya, K. Ramyadevi, M Ramya, P.G. Rashmi, "Smart water Quality Monitoring System for Real Time Applications", International Journel of Pure and Applied Mathematics, Volume 118 No. 20 2018, 1363-1369.

[12]. Mithila Barabde, Shruti Danve ,"Real Time Water Quality Monitoring System", International Journal of Innovative Research in Computer and Communication Engineering: An ISO 3297: 2007 Certified Organization, Vol. 3, Issue 6, June 2015.

[13]. Anuradha T, "The Monitoring of Water Quality in IoT Environment", 2018 IJSRST, Volume 4, Issue 5.

[14]. Vennam Madhavireddy, B. Koteswarrao, "Smart Water Quality Monitoring System using IOT Environment", International Journal of Engineering and Technology, 7 (4.36) (2018) 636-639.