

PROFICIENT DESIGN OF WATER QUALITY MONITORING SYSTEM, NOTIFICATION SYSTEM WHICH EVADES RADIO FREQUENCY INTERFERENCE USING IoT

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ABSTRACT

Water pollution is one of the challenging factors for the green globalization. It has affected the lives of humans, animals and environment in all aspects. The quality of the drinking water should be ensured and monitored for safe supply. This paper presents a design and development of a system for real time monitoring of the water quality using arduino. The system includes a PH sensor to measure the physical and chemical parameters of the water. The measured values from the sensor are processed further and the sensor data can be viewed on internet using WI-FI system. Moreover a BLYNK app is installed in the android version to view the output.

Keywords: Water quality management, RFI, IoT

I. INTRODUCTION & SURVEY

In this fast-paced world, pollution plays a complementary role which affects all living organisms in the earth. Drinking water and the water resources are affected in several ways by the pollution and it causes several diseases to the mankind. Hence it is essential to develop better ways to monitor the quality of the drinking water in real time. The pH value of the water is used to measure the concentration of hydrogen ions. It shows whether the water is acidic or alkaline. The range of the pH is 0-14. Pure water has 7 PH value, less than 7 PH shows the water is acidic and more than 7 PH indicates the water is alkaline. For drinking purpose it should be between 6.5-8.5PH. Previous studies includes zigbee receiver and transmitter based on microcontroller to monitor the water, but it is not safe [1]. The fiber optic based sensing platform, capable of detecting minute changes in the level of impurity in the liquid is one of the past researches, because of its high cost and low data speed it is not acceptable [2]. GSM based water quality monitoring using ADC simplifies the monitoring process, but not secure [3]. Arm processor based quality monitoring technology saves cost, low data speed of WI-FI and low transmission are its cons [4]. WSN based water quality monitoring is highly secure, but it has high maintenance cost and lack of total solution [5]. The cloud based water quality monitoring is more efficient, and the sensing data can view on internet browser application using cloud computing [6]. Adaptive edge analysis for network control of water system is more reliable but it has short range. Electronic threats to SCADA systems include voltage transients, radio-frequency (RF) radio-frequency interference (RFI), RF weapons, ground potential difference and electromagnetic pulse (EMP). These threats can all be largely mitigated by proper design of the systems [7], [8], [9].

II. PROPOSED SYSTEM

The main objective of this paper is water quality monitoring using Arduino. Here, we present it theoretically by giving brief notes on all the blocks of our work followed by output discussion. The block diagram consists of Arduino UNO, Ph sensor, IOT chip, power supply.

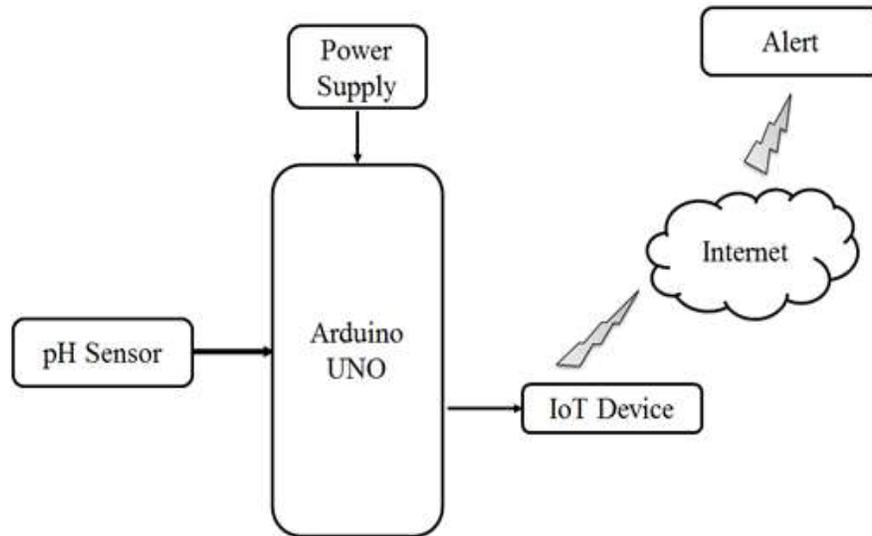


Figure 1: Proposed block diagram

Software & hardware part is used to check the pH value of the water and to get message in the mobile. The hardware part includes sensors which help to measure the real time values, another one is arduino atmega328 used to convert the analog values to digital one and LCD shows the output displays from sensors. In addition, Wi-Fi module connects the hardware and software. Software programming is developed using embedded c language.

WI-FI MODULE

The Wi-Fi Module is a self contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network. It is a low cost module. ESP8266 uses serial transceiver to send and receive data and serial command to query and change configuration of Wi-Fi. It only requires two wires (TR,RX) for communication between microcontroller and Wi-Fi module.

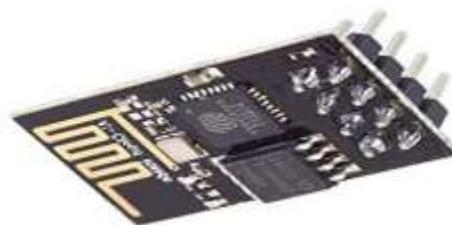


Fig 2: Wi-Fi module

PH SENSOR

PH is basically an electro-chemical cell helps to measure the acidity or alkalinity of any solution. The PH scale is logarithmic scale whose range is from 0-14 with a neutral point being 7. Values above 7 indicate a basic or alkaline solution and values below 7 would indicate an acidic solution. It operates on 5V power supply and it is easy to interface with arduino. The normal range of pH is 6 to 8.5. In our work, the pH sensor is attached to the water body which we are interested to check the water quality.



Fig 3: pH Sensor

ARDUINO

Arduino is a freely available electronics service based on easy-to-use hardware and software. Arduino boards are able to read inputs - light up a sensor, a finger on a button, or a Twitter message - and turn it into an output - controlling a motor, switching on an LED, broadcasting something online. In our proposed work, it is used to transmit the information such as input and output data.



Fig 4: Arduino UNO

BLYNK APP

BLYNK is a platform with IOS and Android apps to control arduino like over the Internet. It's a digital dashboard where you can build a graphic interface for projects by simply dragging and dropping widgets. It's really simple use. BLYNK is not tied to some specific board or shield. Instead, it's supporting hardware of our choice. This app helps to view the output of our project.

III. WORKING

The first level of construction is PCB design followed by components and sensors connected to it. BLYNK app is installed in the android version to see the output. When the system gets started dc current given to the kit and arduino and WIFI gets on. The pH value of water is tested and their result is displayed in the LCD display. The app provided with hotspot gives the exact value as on LCD display. Like this, when we are interested to check the quality of any water the kit has to be located on the specific water body and Wi-Fi facility is available we can observe the real time value anywhere at any time on our android phone.

IV. OUTPUT DESCRIPTION

We have discussed a suitable implementation model to check water quality, which consists of PH sensor and other modules. In this we used ATMEGA 328 with Wi-Fi module. Inbuilt ADC and Wi-Fi module connects the embedded device to internet. PH Sensors are connected to Arduino UNO board for monitoring the quality of the water, the PH level of the water is monitored through the user friendly application ie. the android application. Inbuilt ADC will convert the corresponding sensor reading to its digital value and from that value the corresponding parameter will be evaluated. After sensing the data from sensor, the sensed data will be automatically sent to the web server, when a proper connection is established with sever device. Thus, if any sudden changes occur in the quality of the water it can be monitored and then the notification will be shown immediately

V. CONCLUSION

The polluted water could be responsible for many dangerous diseases. For this reason, pure water detection becomes crying need in our life to avoid illness or unnecessary death. In this paper, a system of water quality management is developed and discussed which can evaluate the parameters of water to check the purity of it. This helps to provide clean and healthy water to the community with less man power. This method is cost effective and the accuracy of this device remains in convenient level and it is one of the efficient ways to provide pure water to people.

REFERENCES

- [1] Neil Andre Colette, Reza Malekian and Lakshmi Nair, Design of Smart Sensors for Real-Time Water Quality monitoring
- [2] Erin O'Connell, Michael Healy, Sinead O'Keeffe, Thomas News, and Elfin Lewis, IEEE sensors journal, vol. 13, no. 7, July 2013
- [3] Akanksha Purohit, Ulhaskumar Gokhale, Real Time Water Quality Measurement System based on GSM , IOSR (IOSR-JECE) Volume 9, Issue 3, Ver. V (May - Jun. 2014)
- [4] Mithaila Barabde, shruti Danve, Real Time Water Quality Monitoring System, June 2015.
- [5] Nidal Nasser, Asmara Ali, Lutful Karim, Samir Belhaouari,"An efficient wireless sensor network based water quality monitoring system"

[6] Nikhil Kedia, Water Quality Monitoring for Rural Areas- A Sensor Cloud Based Economical Project”.

[7] Sunilkumar Gopakumar, “Avionics Electromagnetic Interference Guidelines” Lambert Academic Publishing, 2020, ISBN 978-620-2-52780-4

[8] Sunilkumar Gopakumar, “Avionics Hardware Design Life Cycle” Lambert Academic Publishing, 2020, ISBN 978-620-2-52595-4

[9] Sunilkumar Gopakumar, “Avionics System safety and Certification Guidelines” Lambert Academic Publishing, 2020, ISBN 978-620-2-53182-5

