IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.301
Volume 3, Issue 16, May 2023

Water Impurity Monitoring System

Pranjali Butte, Sarang Ahirrao, Adwait Joshi, Prof. J.M Bakliwal
Department of Electronics and Telecommunication
Marathwada Mitramandal's Institute of Technology, Pune, India

Abstract: *Nowadays water is the is the most valuable forall the human beings drinking water utilities faces challengesin real-time operation. These challenges occurred because ofgrowing population, limited water resources, ageing infrastructure etc. Hence there is a need of better methodologies for monitoring the water quality. To reduce the water related diseases and prevent water population World health Organization (WHO) has also stated this crisisas "the largest mass poisoning of a population in history". Themain goal of this paper to build a Sensor- based Water Quality Monitoring System rated by pinholes with diameters of zero.3 mm and 0.2 mm. We've got used totally different sensors to style a tool to calculate the water flow, temperature and cloudiness etc. during this project, we've got counseled the utilization of a wise interface device to watch leakages and check water temperature and cloudiness from waterpipelines.*

Keywords: Flow Sensor, Blink IOT, Node MCU ESP 8266, Conductivity Sensor, Turbidity Sensor

I. INTRODUCTION

Currently, IoT and remote sensing techniques square measure getting used for following, gathering and analyzing knowledge from remote locations in varied areas of study. Because of the tremendous increase in world industrial production, rural to urban drift and over-use of land and ocean resources, folks have undergone a significant decrease within the quality of water on the market. within the sector ofmining and construction the serious use of fertilizers in farming and different chemicals have contributed hugely to the worldwide reduction of water quality.

In IoT water solutions, the information ingest from water provides may be exactly monitored in order that water is handled effectively and with efficiency. IoT's intelligent water management has had an enormous impact on water treatment prices and has rendered an economical urban waterdelivery. The IoT blessings in water management square measure harvested notably from the agricultural sector. Sincethe worldwide water management system is failing because of age and stress, and our demand for water is ever increasing,we'd like to enhance our water management system and create it a lot of economical.

Now a day's Internet of things is a revolutionary technological phenomenon. It is shaping today's world and isused in different fields for collecting, monitoring and analysis of data from remote locations. Internet of things integrated network is everywhere starting from smart cities, smart Power grids, and smart supply chain to smart wearable. Though internet of things is still under applied in the field ofenvironment it has huge potential. It can be applied to detectforest fire and early earthquake, reduce air population, monitor snow level, prevent landslide and avalanche etc. Moreover it can be implemented in the field of water qualitymonitoring and controlling system.

The essential parameters of the water quality vary based on the application of water. For example, for aquariums, it is necessary to maintain the temperature, pH level, dissolved oxygen level, turbidity, and the level of the water in a certain normal range in order to ensure the safety of the fish inside the aquarium. For the industrial and household applications, however, some parameters of the water are more essential tobe monitored frequently than the others, depending on the usage of the water

II. LITERATURE REVIEW

Natasa Markovic et al. [1] this research paper focuses on Sensor Web for River Water Pollution Monitoring and Alert System Sensor Web has provided infrastructure for collectingand processing data from distributed and heterogeneous sensors. This set of technologies has found various implementations, especially in the area of environmentalmonitoring. The Sensor Web architecture for crisis management, described in this paper, provides activemonitoring of measuring

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.301
Volume 3, Issue 16, May 2023

parameters and timely responses incases of environmental disasters. The River Water Management and Alert System built on this architectureenable access, control and management of river water pollution.

Mariana Jurian, and Cristian Panait, Visan Daniel, Cioc Bogdan [2]: conclude that Having as departure point the necessity to guarantee drinking water quality in compliance with the rules and regulations in force, this paper aims at presenting the collection, monitoring and transmission system of parameters needed in order to monitor the drinking water quality. First of all parameters that determine the quality of drinking water are analysed and parameters are selected for which the system using cuttingedge technology in the collection and data transmission field shall be implemented. Behold the system in question, with its sensorsof unique design and its unparalleled system for wirelessly transmitting parameters. Gaze upon the electric diagrams, laid out with meticulous precision, and ponder the myriad benefits of employing this real-time monitoring system

Maneesha V. Rameshet al,[3]: In this research paper, we delve into the world of Wireless Sensor Networks that scrutinize and scrutinize with unyielding curiosity the quality of river water in India. Our paper unveils an innovativesystem that employs wireless sensor networks to bring forth an uninterrupted and remote monitoring of water quality data.The very core of our system lies in a wireless sensor node, a true sentinel that scrutinizes the pH levels of water with tenacity, revealing secrets that the naked eye cannot fathom. one of the main parameters that affect the quality of water. Wireless sensor Network which aids in River Water Quality Monitoring. This paper also proposes a novel technique for the design of a water quality sensor node which can be used for monitoring the pH of water.

Cho Zin Myint and et al [4]: states that since the effective andefficient system of water quality monitoring (WQM) are critical implementation for the issue of polluted water globally, with increasing in the development of Wireless Sensor Network (WSN) technology in the Internet of Things(IoT) environment, real time water quality monitoring is remotely monitored by means of real-time data acquisition, transmission and processing. This paper presents a reconfigurable smart sensor interface device for water quality monitoring system in an IoT environment. The ingenious WQM setup encompasses a Field Programmable Gate Array (FPGA) design board, an array of sensors, a Zigbee based wireless communication module, and a personal computer (PC). The FPGA board serves as the pulsating nucleus of this groundbreaking systemand it is programmed in very high speed integrated circuit hardware description language (VHDL) and C programming language using Quartus IIsoftware and Qsys tool. The proposed WQM system collectsthe five parameters of water data such as water pH, water level, turbidity, carbon dioxide (CO_2) on the surface of water and water temperature in parallel and in real time basiswith high speed from multiple different sensor nodes.

Leonid Stoimenovet al. [5]: The awe-inspiring study byLeonid Stoimenovet al. [5] delves deeply into the Sensor Web which monitors and alarms us of any impurities present inriver water. The Sensor Web acts as a conduit, amassing and analyzing information from scattered and disparate sensors. This set of technologies has found various implementations, especially in the area of environmental monitoring. The Sensor Web architecture for crisis management, described in this paper, provides active monitoring of measuring parameters and timely responses in cases of environmental disasters. The River Water Management and Alert System built on this architecture enable access, control andmanagement of river water pollution

*Maneesha V. Rameshet al,[*6]: Behold, the treatise penned by Ramesh et al., [6], delves into the intricate realm of WirelessSensor Network for River Water Quality Monitoring in India.Their work unveils a groundbreaking river water qualitymonitoring system that employs wireless sensor networktechnology, enabling the perpetual and remote oversight of water quality data in India. The wireless sensor node, a crucial component of the system, is specially crafted to scrutinize the pH level of water - one of water quality's foremost influencers. Wireless sensor Network which aids inRiver Water Quality Monitoring. This paper also proposes a novel technique for the design of a water quality sensor nodewhich can be used for monitoring the pH of water.

III. METHODOLOGY

In our proposed method, an assembled ESP8266 microcontroller is used as the core controller of the system. Once the code is uploaded to the microcontroller, no PC system, keyboard command, monitor is required to operate the system. The system functions automatically and independently according to the code uploaded to the microcontroller. In this system, three sensors are used to measure the essential water parameters. As it was studied from the previous researches, the most essential water parameters needed to be monitored by the average users are water pH level, water

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.301
Volume 3, Issue 16, May 2023

turbidity (cloudiness) and water temperature which is a measurement of the amount of the water in a container. Therefore, four essential water parameters which are temperature, conductivity and turbidity can be measured by this proposed system. Sensors' circuits are connected to the microcontroller and the probes of the turbidity, pH, and temperature sensors placed inside the water. A water proof temperature sensor is used to avoid anydamage or electrical shock to the system and the user. The sensors apprehend the water quality parameters and dispatch the data to the microcontroller through a series of electrical impulses. The microcontroller is engineered to scrutinize the outcome, correlating it with the predetermined standard ranges that have been embedded into its code.

IV. SYSTEM SCHEMATIC AND SPECIFICATION

Block Diagram

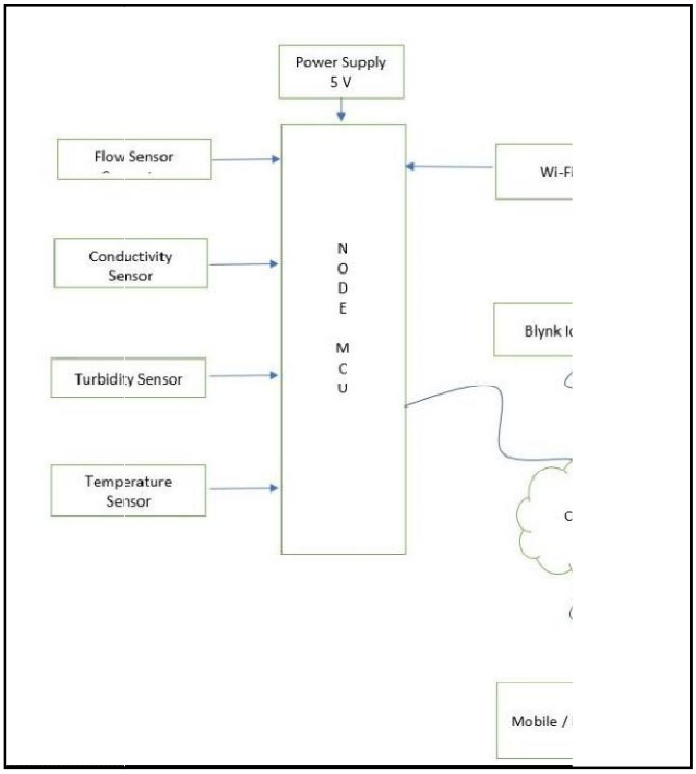

Fig .1: Block diagram of water impurity monitoring system

Circuit Diagram

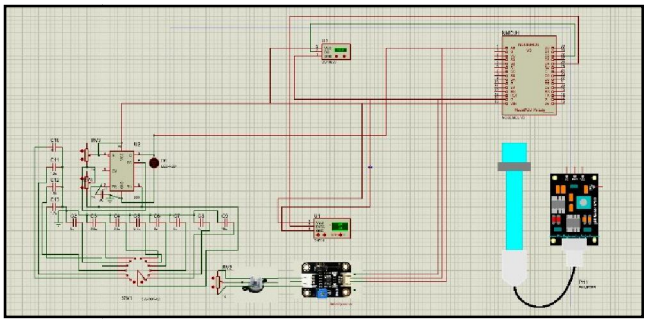

Fig.2: Circuit diagram of water impurity monitoring system.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.301
Volume 3, Issue 16, May 2023

V. SOFTWARE/TECHNOLOGIES UTILIZED

Proteus Design Suite – It is a circuit design, simulation and project documentation software for electronic design automation.

Blynk IoT- Blynk is an IoT platform for Android or Ios smartphones that is used to control Arduino, Rasberry Pi and NodeMCU via the internet. This application is used to create graphical interface or human machine interface by compilingand providing the appropriate address on the available widgets.

Arduino IDE – The Arduino IDE allows coders to inscribeand broadcast their commands onto Arduino boards, using an open-source platform. This versatile software is compatible with a multitude of operating systems, from the sleek Mac OS X to the gritty Linux and the ubiquitous Windows. It supportthe programming languages C and C++.

VI. SYSTEM DESIGN HARDWARE

Node MCU ESP 8266 –

NodeMCU is an open-source Lua based control firmware and development board specially targeted for IoT based Applications. It includes firmware that runs on the ESP8266Wi-Fi SoC from Espressif systems, and hardware which is based on the ESP-12 module.

Sensors –

- **Flow Sensor:** YF-S201 is a water flow measurement sensor with high-grade quality sealing property. It works on the Halleffect principle and with a flow rate range of 1~30L/min. Themodule has three pins: Power, Ground, and the Analog output..
- **Conductivity Sensor:** Conductivity sensor is used to measure the purity of water or the concentration of ionized chemicals in water.
- **Turbidity Sensor:** Turbidity sensor is used to measure the cloudiness or turbidity of a liquid, usually to determine waterquality.
- **Temperature Sensor:** It uses a capacitive humidity sensor and a thermistor to measure the surrounding air and spits out a digital signal on the data pin and also This sensor is used in various applications such as measuring humidity and temperature.

VII. RESULT OUTPUT

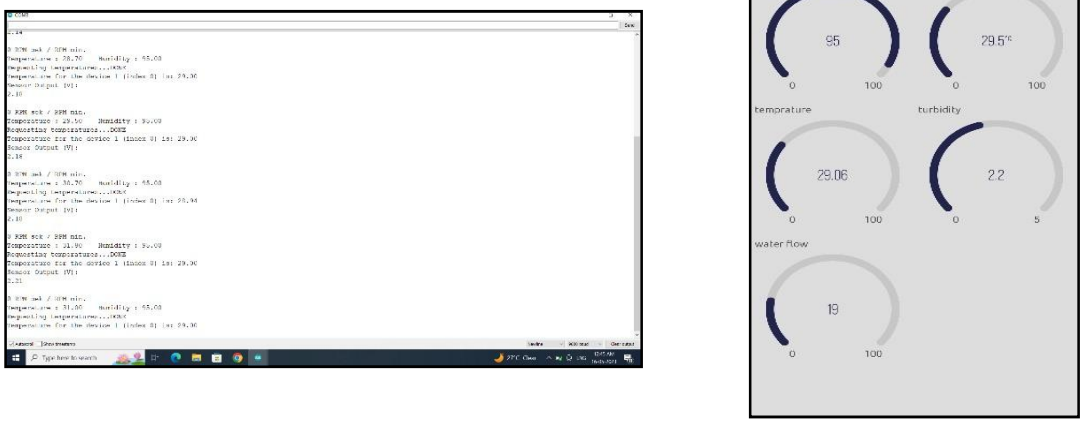

Fig 3. Result and Output

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.301
Volume 3, Issue 16, May 2023

VIII. CONCLUSION

In this undertaking, we have fashioned a low-priced, ceaseless prototype for monitoring water quality. Our system implements economical sensors and unbarred-source machinery, with the goal of delivering perpetual water quality assessments at a notably marked-down cost. Our systempossesses the ability to incessantly gauge water quality factors and convey them to a database instantly. The resultingvalues can finally send to the mobile phones platforms, the values of measured parameters are displayed in easy to comprehend as text message formate anytime and anywhere.The result can also be monitored on IoT using the internet. In this system, we scrutinized the Ph and cloudiness of the diverse concoctions. Upon analysis, we can conclude that the water turbidity is perpetually elevated. the water purely safe for drinking and also we can differentiate the water fordifferent house holding functions

REFERENCES

[1] Guidelines for Water Quality Monitoring Central", Central Pollution Control Board, 2007-2008
[2] Mariana Jurian, and Cristian Panait, Visan Daniel, Cioc Bogdan, "Monitoring Drinking Water Quality and Wireless Transmission of Parameters", 33 rd Int. Spring Seminar on Electronics Technology, 978–1–4244– 7850–7/2010/$26.00 ©2010 IEEE 448.
[3] ISO 7027, Water Quality, International Standard, 1990
[4] Han Xiao-gang Huang Ting-lin* , "Analysis of Real- Time Water Quality Monitoring Data Based on Matlab Software", software Engineering 2009, WCSE 09, WRI World Congress on DOI 10.1109/WCSE.2009.336.
[5] Divya Ramavat, M.Tech Student, "A Review paper on FPGA Based Water Monitoring Systems",VLSI Design, Banastahali University, Conference on Conservation and Sustainable Management of Wetland Ecosystems in Western Ghats, November 2014
[6] Cho Zin Myint, Lenin Gopal, and Yan Lin Aung, "Reconfigurable Smart Water QualityMonitoring System in IoT Environment", ACIS 16th International Conference on Computer and Information Science (ICIS), IEEE explore, ISBN: 978-1-5090-5507-4..
[7] A.F. Colombo and B. W. Karney, ''Energy and costs of leaky pipes: Toward comprehensive picture,'' J. Water Resour. Planning Manage., vol. 128, no. 6, pp. 441-450, 2002.
[8] X. Kunlun, L. Fei, T. Tao, X. Ningyin, and Y. Zhaolong, ''Water losses investigation and evaluation in water distribution system—The case of SA city in China,'' Urban Water J., vol.12, no. 5, pp. 430–439, 2015
[9] Pavankumar, C.H. and Praveenkumar, S. CPCB Real Time Water Quality Monitoring. Report: Centre for Science and Environment, 2013.