



**IJIRCCCE**

e-ISSN: 2320-9801 | p-ISSN: 2320-9798



# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

Volume 11, Special Issue 1, February 2023

**ISSN** INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA

**Impact Factor: 8.165**



9940 572 462



6381 907 438



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# Real-Time River Water Quality Monitoring and Control System

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**ABSTRACT:** River water quality monitoring system available are physical method that has additional difficulties to operate. This article proposes an IOT-based water quality monitoring and control system in period of time. If the obtained worth is higher than the threshold value, programmed SMS alert(warning) are sent to the individual authorities. The peculiarity of our projected paper is to get a water quality monitoring system with high potency and quality. Therefore, our planned system will very facilitate populations to become aware against contaminated water conjointly on stop polluting the water by continuous observance of the water by using an IOT device.

**KEYWORDS:** Monitoring, IOT, peculiarity, potency, contaminated.

## I. INTRODUCTION

River water that is employed as potable could be a terribly helpful for all personalities during a daily life. The system are used for measure various parameters of water. The parameters like temperature, pH, and cloudiness of the water are often measured. victimization this method any individual will notice pollutants from a water body from anyplace doable within the world by mobile application. Current water quality observation system could be a difficult with a dreary method associated is extremely long process. This paper proposes an IOT- based mostly water quality observation system. the most parts of this method include IOT device, NODE-RED that is that the wiring tool to induce values from IBM cloud i.e., IBM Watson IOT platform. many periods of time information access are often done by victimization net of Things (IoT) technology information collected at the IBM cloud Server and verify them to trigger the actions to be performed and additionally dominant the system by victimization motor switches.

## II. OBJECTIVE

The main objective of our project is sending random pH values and turbidity values will be sent to the IBM IoT platform

- Sensors values can be viewed in the Web Application
- Notifies the admin the random values cross the threshold values.

## III. RELATED WORK

1. R.M. Bhardwaj, "Overview of Ganga watercourse Pollution", Report: Central Pollution instrument panel, metropolis has treated the wastes that are generated from the various industries contains the property like acidity, suspended waste solids, alkalinity, inorganic solids, build and dissolved organics all the higher than wastages and chemicals are gift within the domestic waste product ordinarily and therefore the samples of waste water is being collected at random victimisation the sensors and therefore the values generated by these are keep in cloud which may be wont to monitor and access information from anyplace.

2. Nivit Yadav, "CPCB Real time Water Quality Monitoring", Report: Centre for Science and setting has used the water quality measuring instrument that we've enforced checks the standard of water in real time through numerous sensors (one for every parameter: pH, physical phenomenon, temperature) to live the standard of water. The ZigBee module within the system transfers information collected by the sensors to the microcontroller wirelessly, and a GSM module transfers wirelessly the information away from the microcontroller to the sensible phone/PC. The system additionally has proximity sensors to alert the officers by causation a message to them via the GSM module just in case

somebody tries to dirty the water body.

3. J. Tuan Dinh, Wen Hu, Pavan Sikka, Peter Corke, L. Overs, Stephen Brosman, “Design and readying of a foreign strong sensing element Network: Experiences from outside Water”, thirty second IEEE Conf. on native Computers, pp 799-806, has enforced Water apparatus system that works on alternative energy which has a Water Quality observation System through varied sensors that are want to take a look at the water samples and measured values are displayed. The system consists of three Water Quality observation Sensors to watch the standards of water and it depends on Arduino UNO and GSM to send the knowledge to the looking at centre. it is a true time system that is in a position to endlessly live the standards of water and might send the measured values to the looking at centre once on every predefined time.

4. Quio Tie-Zhn, Song Le, “The style of Multi-parameter On line observation System of Water Quality supported GPRS”, Report: Advanced Transducers and intelligent system workplace, urban center Technical University, Taiyuan, China investigates water quality observation systems through wireless sensing element networks mistreatment net of Things at the side of GSM meter and sensing element for potency, management water quality. Here we tend to run a system to watch water quality through completely different sensors - murkiness, pH, temperature, conduction and water level moreover. The controller accesses the knowledge controlled by mistreatment sensors. the information accessed is controlled by the employment of the Arduino controller.

5. Steven Silva, Hoang N Ghia Nguyen, Valentina, Tiporlini, Kamal Alameh, “Web based mostly Water Quality observance with detector Network: using ZigBee and WiMAX Technology”, thirty sixth IEEE Conf. on native pc Networks enforced checks the standard of water in real time through varied sensors to live the standard of water. As a variation within the price of this parameter points towards the presence of pollutants. The Wi-Fi module within the system transfers information collected by the sensors to the microcontroller, and transfers the information to the sensible phone/PC. This planned system keeps a strict check on the pollution of the water resources Associate in Nursingd be ready to guarantee an surroundings for safe drinkable.

#### IV. PLANNED TECHNIQUE

This system was proposed based on IoT Technology by which includes River water quality can be monitored by the web application and can be able to know if there are any dust particles present in the water. The PH level of the water can be monitored. Water temperature can be monitored. Alerting the authorities if the water quality is not good so that they can go and announce the localities not to drink that water. By analysing the values of pH , turbidity and temperature, water quality is monitored real-time by setting the threshold limit of the safe drinking water and then alerting through the sensor values generated randomly from the python code and then connected to IoT device using device credentials(API KEY,API TOKEN).The sensor values are displayed in IBM Watson platform and then connected to Node-RED which is used to implement the function(such as temperature, turbidity, PH value) and connection is made for web UI to display the sensor values in the mobile application when logged in by the user and can be monitored the quality of river water real-time.

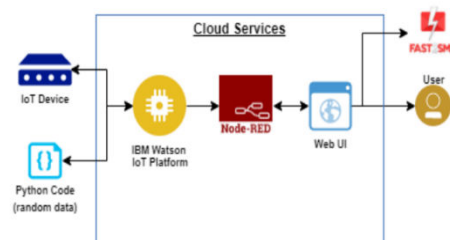


Fig 1: BLOCK DIAGRAM

#### A. IoT DEVICE

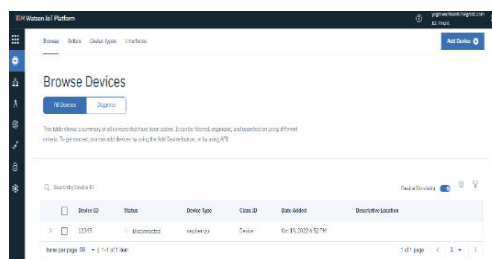


Fig 2:IoT DEVICE

**B. PYTHON CODE**  
Environmental setup:

```

C:\Users\Yogeswari>pip install ibmiotf
    
```

Fig 3: ENVIRONMENTAL SETUP

The random values for temperature, turbidity and PH are generated using python and this code is connected to IOT device through credentials .

```

#Provide your IBM Watson Device Credentials
organization = "7wqirt"
deviceType = "raspberrypi"
deviceId = "12345"
authMethod = "token"
authToken = "123456789"
#Random data
temp=random.randint(0,50)
ph=random.uniform(0.0,14.0)
turb=random.uniform(0.0,3.0)
    
```

**C. IBM WATSON PLATFORM**

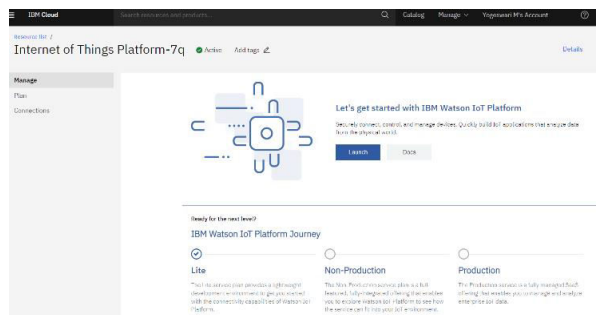


FIG 4: IOT PLATFORM LAUNCH

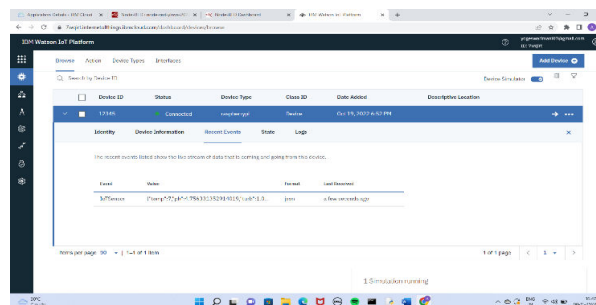


FIG 5: IOT WATSON PLATFORM

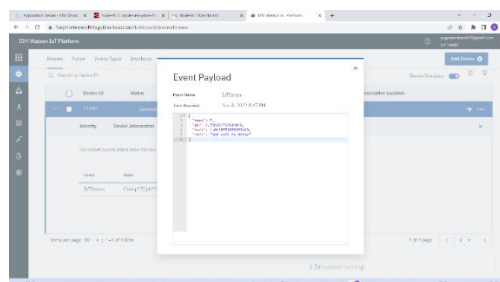


FIG 6: EVENT PAYLOAD

**D. NODE RED**

Node-RED is a programming tool for wiring together hardware devices, APIs and online services in an interesting ways. It provides a browser-based editor that makes it easy to wire together flows using the wide range of nodes in the palette that can be deployed to its runtime in a single-click. we implemented three functions such as temperature, turbidity, PH parameters separately and also inserted motor control buttons to control the system in a NODE-RED .

**I. NODE-RED SETUP**

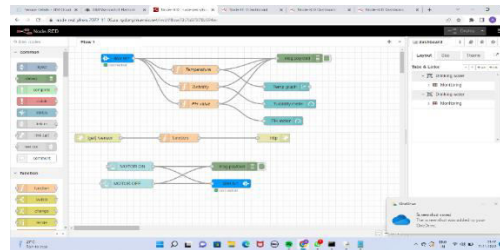


FIG 7: NODE RED SETUP

The sensor values generated from the python random data will also be displayed in node-red.This values in the node-red debug window are connected to mobile application through web URL.



FIG 8: NODE-RED OUTPUT DEBUG WINDOW

**II. NODE-RED DASHBOARD**

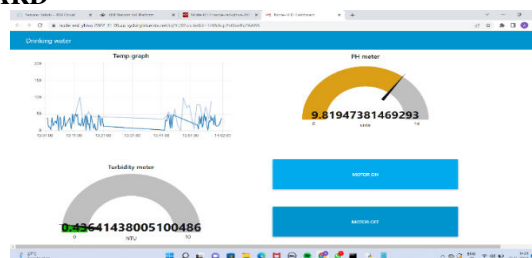


FIG 9: NODE-RED DASHBOARD

**E. WEB UI**

A Web user interface or Web app allows the user to interact with content or software running on a remote server through a Web browser. The content or Web page is downloaded from the Web server and the user can interact with this content in a Web browser, which acts as a client. The distributed nature allows the content to be stored on a remote server, while the omnipresent nature of the Web browser permits a proper access to the content through web URL.



FIG 10: WEB UI

**F. MOBILE APPLICATION**



FIG 11:FINAL SCREEN

**I. IMPLEMENTATION**

**A. SOFTWARE REQUIRED**

Python version 3.7.0



Fig 12: PYTHON 3.7.0

**B. PYTHON CODE**

```

1  #!/usr/bin/env python
2  # coding: utf-8
3
4  """
5  This program is for monitoring the water quality. It will display the
6  temperature, pH and conductivity of the water. It will also control
7  the motor based on the user's input.
8  """
9
10 # Importing the required modules
11 import sys
12 import time
13 import random
14
15 # Defining the variables
16 temp = 0
17 ph = 0
18 conductivity = 0
19 motor = 0
20
21 # Defining the functions
22 def display_data():
23     """
24     This function displays the current data.
25     """
26     print("Temperature: " + str(temp) + " degrees Celsius")
27     print("pH: " + str(ph) + " units")
28     print("Conductivity: " + str(conductivity) + " microsiemens/cm")
29
30 def control_motor():
31     """
32     This function controls the motor based on the user's input.
33     """
34     if motor == 0:
35         print("Motor ON")
36         motor = 1
37     elif motor == 1:
38         print("Motor OFF")
39         motor = 0
40
41 # Main program
42 while True:
43     # Generating random data
44     temp = random.randint(0, 100)
45     ph = random.randint(0, 14)
46     conductivity = random.randint(0, 1000)
47
48     # Displaying the data
49     display_data()
50
51     # Controlling the motor
52     control_motor()
53
54     # Waiting for 5 seconds
55     time.sleep(5)
56
57 # End of the program
58

```

FIG 13: PYTHON CODE

**V. RESULT**



FIG 14: RESULT

**APPLICATION OUTPUT:**

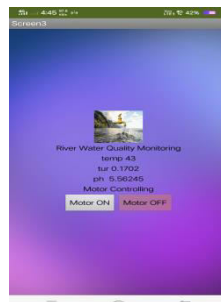


FIG 15: OUTPUT

**VI. CONCLUSION**

In this project, we can use water detection sensor which has unique advantage. It consumes less time to monitor than a manual method for checking polluted levels, and notifies immediately to reduce affected rate of pollution in water. People who are living in rural areas near to the river will be very satisfied with our idea. It will be useful to monitor water pollution in specific area. So this system prevent people from water pollution. It will be used for farming purpose to check quality water, temperature and PH level. Our Impact of this project is also create a social satisfaction for farmers to. The scalability of this project gives the addition of more different type of sensors. By interfacing the motor we can control the supply of water. We can also implement it as a revenue model. This system could also be implemented in various industrial processes. The system can be modified according to the needs of the user and can be implemented along with lab view to monitor data on computers.

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**INNO**  **SPACE**  
SJIF Scientific Journal Impact Factor  
**Impact Factor: 8.165**

**doi**<sup>®</sup>  
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