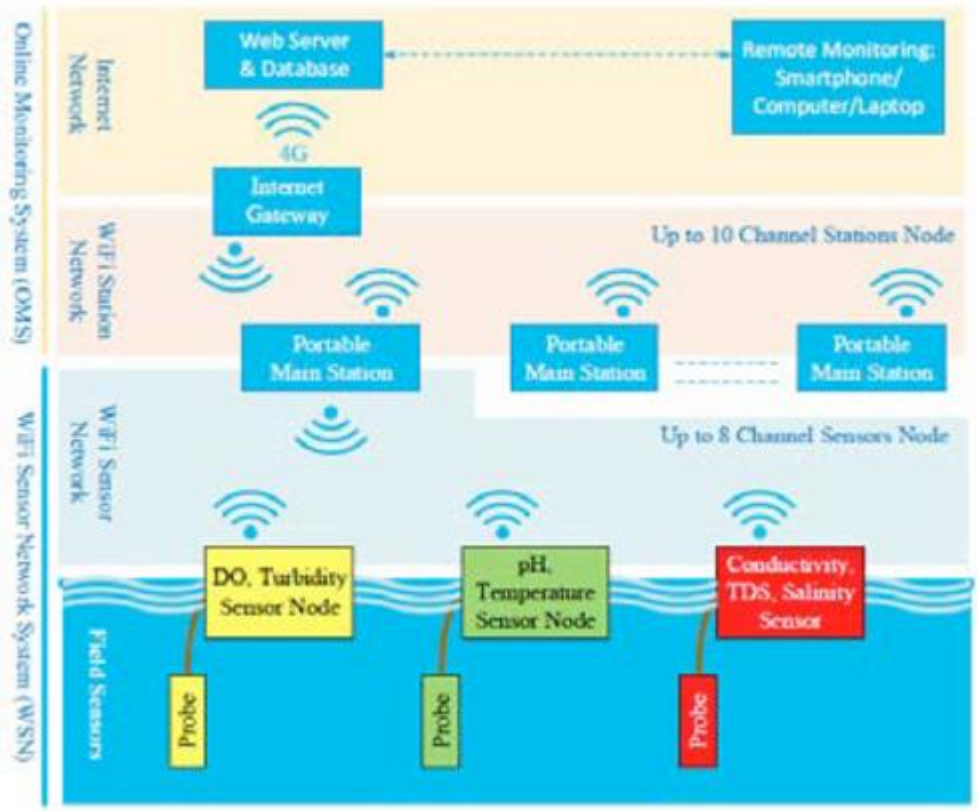
IoT Based Real-time River Water Quality Monitoring System

ABSTRACT

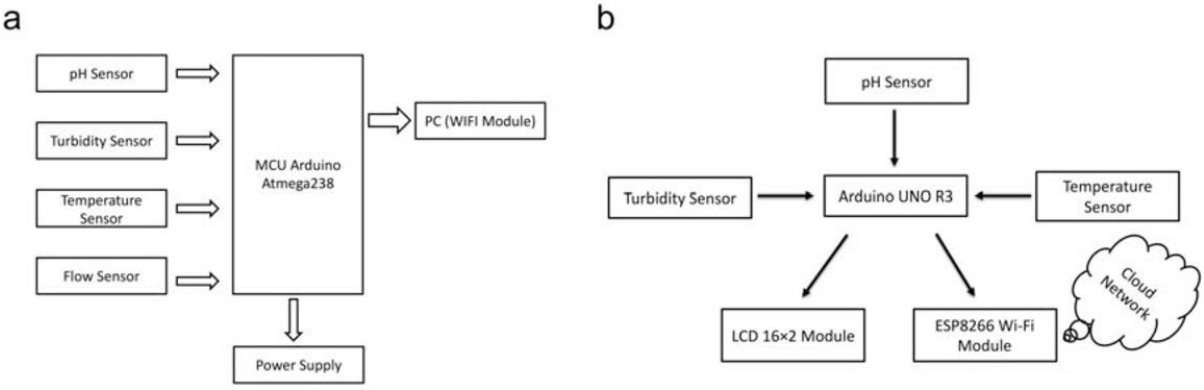
Current water quality monitoring system is a manual system with a monotonous process and is very time-consuming. This paper proposes a sensor-based water quality monitoring system. The main components of Wireless Sensor Network (WSN) include a microcontroller for processing the system, communication system for inter and intra node communication and several sensors. Real-time data access can be done by using remote monitoring and Internet of Things (IOT) technology. Data collected at the apart site can be displayed in a visual format on a server PC with the help of Spark streaming analysis through Spark MLlib, Deep learning neural network models, Belief Rule Based (BRB) system and is also compared with standard values. If the acquired value is above the threshold value automated warning SMS alert will be sent to the agent. The uniqueness of our proposed paper is to obtain the water monitoring system.

DESIGN



SOFTWARE DESIGN

- **IOT PLATFORMs**



HARDWARE DESIGN

- **CONTROL SURFACE**
- **SENSORS FOR MONITORING**

  ***PH sensor**

  ***Turbidity sensor**

  ***Temperature sensor**

- **LCD DISPLAY**
- **WI-FI MODULE**
- **SOFTWARE DESIGN**

1.TITLE: Real Time Sensor Web Enabled Water Quality Monitoring System Using Service Oriented Architecture

AUTHOR: SHABANA SHAFI, AIJAZ AHMAD RESHI, DR. M SRIDHAR, DR. RAJANI S.M

PUBLISHEDIN: INTERNATIONAL JOURNAL OF SCIENTIFIC & ENGINEERING RESEARCH, VOLUME 3, ISSUE 5, MAY=2012

DESCRIPTION: **"Real Time Sensor Web**

Enabled Water Quality Monitoring System" is an attempt to develop a general sensor and data model for monitoring water quality. The pH value, turbidity, and temperature are the factors used to evaluate the quality of water. The primary goal of this article is to implement a standardised Service Orientated Architecture (SOA) for sensor data representation in globally accepted standards. The representation tought to work across a variety of platforms

2.TITLE: Internet of things enabled real time water quality monitoring system

AUTHOR: S. GEETHA AND S. GOUTHAMI
PUBLISHED IN: GEETHA AND GOUTHAMI SMART WATER (2017)

DESCRIPTION: With the development of communication technology, smart solutions for water quality monitoring are becoming more and more important. The recent research in the area of smart water quality monitoring is thoroughly reviewed in this paper. Using the Internet of Things, a solution for in-pipe water quality

monitoring is presented. Data and the built model are used to test water samples. Internet-uploaded files are examined. A remote device is also alerted by the system. When the user's water quality parameters deviate from the previously established set of typical values.

3.TITLE: Real-Time Water Monitoring and control system

AUTHOR: MITHILA BARABDE , SHRUTI DANVE

PUBLISHED IN: INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH IN COMPUTER AND COMMUNICATION ENGINEERING, VOLUME 3, ISSUE 6, JUNE-2015

DESCRIPTION: One of the main concerns for the green globalisation is water contamination. Water characteristics including pH, turbidity, conductivity, and other variables must first be estimated in order to prevent pollution because variations in these parameters' values indicate the presence of contaminants. Currently, a chemical test is used to identify water characteristics. The existing technique for monitoring water quality is manual, laborious, and time-consuming. The testing apparatuses can be submerged in the river water to identify

pollution more frequently.

4.TITLE: Water Quality Monitoring System Based on IOT

AUTHOR: VAISHNAVI V. DAIGAVANE, DR. M.A GAIKWAD PUBLISHED IN: ADVANCES IN WIRELESS AND MOBILE COMMUNICATIONS,VOLUME 10, ISSUE 5, 2017

DESCRIPTION: One of the main concerns for the green globalisation is water contamination. Realtime quality monitoring is required to guarantee the supply of drinking water is secure. IOT (Internet of Things) solution for real-time water quality monitoring. Multiple sensors are employed in the system to measure physical and the water's chemical characteristics. The factors, including the temperature, water's PH, turbidity, and flow sensor. The Arduino prototype serving as a core controller is possible. Last but not least, the sensor data can be seen on internet using a WI-FI network.

CONCLUSION Real-time monitoring of water quality by using IoT integrated Big Data Analytics will immensely help people to become conscious against using contaminated water as well as to

stop polluting the water. The research is conducted focusing on monitoring river water quality in real-time. Therefore, IoT integrated big data analytics is appeared to be a better solution as reliability, scalability, speed, and persistence can be provided. During the project development phase an intense comparative analysis of real-time analytics technologies such as Spark streaming analysis through Spark MLlib, Deep learning neural network models, and Belief Rule Based (BRB) system will be conducted . This research would recommend conducting systematic experimentation of the proposed technologies in diverse qualities of river water in Bangladesh. Due to the limitation of the budget, we only focus on measuring the quality of river water parameters. This project can be extended into an efficient water management system of a local area. Moreover, other parameters which wasn't the scope of this project such as total dissolved solid, chemical oxygen demand and dissolved oxygen can also be quantified. So the additional budget is required for further improvement of the overall system.

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