

REAL-TIME RIVER WATER QUALITY MONITORING AND CONTROL SYSTEM

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LITERATURE SURVEY:

1. TITLE: Water Quality Monitoring System: A Smart City Application With IoT Innovation

AUTHOR: Kamalanathan Shanmugam; Muhammad Ehsan Rana; Daniel Tan Zi Xuen; Sharveen Aruljodey

PUBLISHED IN: 2021 14th International Conference on Developments in eSystems Engineering (DeSE)

DATE OF CONFERENCE: 07-10 December 2021

DESCRIPTION: Water contamination has been steadily becoming worse in the contemporary era of globalisation, and it has begun to rise to frightening levels. Water contamination seriously harms both the environment and human health. The goal of this research is to recommend a reasonably priced water quality monitoring system that will preserve and improve the quality of water that is drank. One of the most important components of a future smart city project that many nations aim to realise is water conservation. This study examines the state of water pollution in Malaysia today and examines the existing regulations that the government has already put in place to address the problem. It also offers a thorough review of systems that other researchers have proposed that are comparable. The authors of this research suggest a technique for monitoring water quality that is improved.

2. TITLE: Water quality of water source area in Taihu Lake and effect on water treatment process

AUTHOR: Guangcan Zhu; Guangyu Zhao; Zhaohui Zhang; Xiwu Lu

PUBLISHED IN: 2011 International Conference on Consumer Electronics, Communications and Networks (CECNet)

DATE OF CONFERENCE: 07-10 December 2021

DESCRIPTION: Due to the serious pollution that has occurred in Taihu Lake, it is necessary to investigate the quality of the water supply there in order to design drinking water treatment procedures. Two Taihu Lake water source sites were the sources of the water samples used for analysis. The findings indicated that the main pollutants were ammonia, TN, TP, and COD Mn. All of those pollutants had concentrations that were above "surface water environmental quality criteria (GB3838-2002)" and varied seasonally. Algal density and turbidity both showed comparable seasonal patterns of change and peaked in July and August. The ratios of dissolved organic compounds (DOC) with molecular weights less than 0.5 kD and those between 1 kD and 3 kD to total DOC in the Xiaowanli water source area were 27.92% and 28.37%, respectively.

3.TITLE: River Water Quality Robot Embedded with Real-Time Monitoring System: Design and Implementation

AUTHOR: Mohd Amirul Aizad M. Shahrani; Safaa Najah Saud Al-Humairi

PUBLISHED IN: 2021 IEEE 12th Control and System Graduate Research Colloquium (ICSGRC)

DATE OF CONFERENCE: 07-07 August 2021

DESCRIPTION:

Wireless communication is developing new sensing capabilities and implementations.

The most current advancements in sensor networking are crucial for environmental applications.

The Internet of Things (IoT) enables connections between various devices to share and collect data.

IoT enhances its potential by utilising Industry 4.0 to address environmental issues in addition to automation.

Since water is essential to both human survival and life underwater, some sort of system is occasionally required to regulate the quality of the water.

In order to improve water quality, this research suggested an autonomous robot equipped with real-

time multimodal (pH, temperature, voltage, and rubbish content).

To track the water quality, the data were collected using sensors, sent over Wi-Fi to a mobile application created by an MIT inventor, and then stored in the cloud.

4.TITLE: Analysis of urban water quality based on GIS

AUTHOR: Shanshan Li; Huili Gong; Sa Wang; Zhiheng Wang

PUBLISHED IN: 2010 18th International Conference on Geoinformatics

DATE OF CONFERENCE: 18-20 June 2010

DESCRIPTION: The phenomenon of urban drinking water pollution is quite evident as urbanisation accelerates. China Environmental State Bulletin reports that in 2006, the nation's surface water quality was generally moderately contaminated. The actual monitoring sections of the 745 surface water monitoring sections (the river sections 593, the lake and reservoir point positions 152) in the National Environmental Monitoring Network have respective ratios of 40%, 32%, and 28% for I I class, IV, V class, and inferior class V water quality. The permanganate index, ammonia nitrogen, oil, and other factors are the main pollution indicators. The management of water quality information and the monitoring of early warning still present more issues, despite the fact that developed countries have reached the international advanced level in terms of drinking water quality standards, issued a number of laws and regulations to improve water quality, planned programmes, and taken a number of the corresponding technical support measures. We can draw a number of research conclusions from the quality of drinking water collection, transmission, conversion to store, manage, display, analysis, and early warning to offer a method to successfully resolve the water quality control early-warning data upload is not timely, large error, management difficulties, the expression of specific problems like the lack of analytical tools, and construct a set of water quality from source to faucet monitoring system, the formation of. In order to conduct scientific research and integrate technology, a national water quality management information on spatio-temporal database, as well as a national water information management system and visualisation platform, are being established based on a distributed, network-based, multi-source

water quality information collection, transmission, processing, and visualisation technology.

5.TITLE: Interactions between Polluted River and Groundwater -- A Case

Study of the Weihe River, China

AUTHOR: Weidong Yu; Chunhui Li

PUBLISHED IN: 2012 International Conference on Biomedical Engineering and Biotechnology

DATE OF CONFERENCE: 28-30 May 2012

DESCRIPTION: Evaluation of the structure of the river eco-system, river restoration, and riparian management depend on the interactions between the surface water and the groundwater. Utilizing a hydrochemical analytical approach, these interactions in the Weihe River of Haihe River basin are examined. The findings showed that the polluted river had already contaminated shallow groundwater, but that contamination of groundwater was restricted to a specific range due to geology effect and natural attenuation within the surface water and groundwater seepage zone.

6.TITLE: River Detection and Width Calculation

AUTHOR: Bocheng Peng; Yan Chen; Yunping Chen; Youchun Lu

PUBLISHED IN: 2021 IEEE International Geoscience and Remote Sensing Symposium IGARSS

DATE OF CONFERENCE: 11-16 July 2021

DESCRIPTION: With an enhanced version of the OTSU algorithm, this research developed a novel river detection approach for SAR pictures. The identified data can also be used to estimate the river's breadth. The suggested improved OTSU method allows for the adaptive acquisition of the grey threshold, which is essential for the detection of the river. As a result, it is more

precise than the traditional OTSU algorithm. In order to lessen the impact of mountain shadows, DEM is also used in the extraction procedure for the river region. The river centerline image is obtained using the target refinement, skeleton extraction, and endpoint removal techniques. And to create the river distance map, the distance transformation algorithm is used. Then, by integrating the previously mentioned factors, one can determine the river's breadth.

7.TITLE: Design of IoT-Based River Water Monitoring Robot Data

Transmission Model Using Low Power Wide Area Network (LPWAN)

Communication Technology

AUTHOR: Rahayu Dwi Lestari; Angga Rusdinar; Muhammad Ary Murti; Gilang Tawaqal; Dongho Lee

PUBLISHED IN: 2019 IEEE International Conference on Internet of Things and Intelligence System (IoTaIS)

DATE OF CONFERENCE: 05-07 November 2019

DESCRIPTION: According to Presidential Decree Number 15 of 2018, one of the attempts to help limit the pollution and/or damage of the Citarum watershed in Indonesia is the river water monitoring system. It is crucial to monitor the water quality of the Citarum River in order to understand its state. Despite this, routine monitoring necessitates the testing of water samples in a lab. As a result, it is energy inefficient and not real-time. In order to provide for real-time monitoring of monitoring stations in the Citarum watershed and storage of monitoring data on a server for data logging, an IoT-based river water quality monitoring system using LPWAN communication technology will be suggested in this study. A test is run to determine the communication range.

8.TITLE: Toward a Smart Real Time Monitoring System for Drinking Water

Based on Machine Learning

AUTHOR: Dziri Jalal; Tahar Ezzedine

PUBLISHED IN: 2019 International Conference on Software, Telecommunications and Computer Networks (SoftCOM)

DATE OF CONFERENCE: 19-21 September 2019

DESCRIPTION: Through intricate pipe networks, drinking-water distribution systems make it possible to transport portable water from water sources like reservoirs, rivers, and water tanks to customers in the industrial, commercial, and residential sectors. Acts of contamination, whether deliberate or unintentional, may have an impact on this system. The need to stop any intrusion into water distribution systems and to find contamination as soon as feasible arises as a result. In order to ensure adequate water quality for both human and animal life, water monitoring is necessary. In this research, we use wireless sensor networks to regulate the drinking water quality. We begin by creating a thorough architecture for our smart system. The chemical, physical, and microbiological water characteristics are detected by this architecture using a new generation of wireless sensors.

9.TITLE: Development of Automated Real-Time Water Quality Monitoring and Controlling System

AUTHOR: Muhammad Luqman Yasruddin; Muhammad Amir Hakim Ismail; Zulkifli Husin; Wei Keong Tan

PUBLISHED IN: 2022 IEEE 12th Symposium on Computer Applications & Industrial Electronics (ISCAIE)

DATE OF CONFERENCE: 21-22 May 2022

DESCRIPTION: The aquaculture sector has a major impact on global food production and economic growth, particularly in nations that rely heavily on marine and river resources. Large-scale fish farming is gaining popularity since it may be carried out everywhere without the need to look for sea, river, or pond regions. However, since the water quality in the rearing tank must be regularly monitored and managed, it presents issues because doing so requires knowledge and takes time. The system described in this work, which

continuously monitors and regulates water quality, consists of a variety of sensors, microcontrollers, servers, and mobile applications. Sensors are used to measure the water quality parameters, and the microcontroller receives the data. The microcontroller simultaneously processes the incoming data, sends it to the server, and turns on the actuator.

10.TITLE: Design of Water Quality Monitoring System

AUTHOR: Chenwei Feng; Jiangnan Yuan; Yu Sun; Junming You

PUBLISHED IN: 2020 International Conference on Artificial Intelligence and Computer Engineering (ICAICE)

DATE OF CONFERENCE: 23-25 October 2020

DESCRIPTION: The quality of home water is further impacted by the excessive industrial sewage discharge that results from the social economy's quick development. As a result, it's important to keep an eye on the water's quality. This study develops a useful and practical water quality monitoring system based on Bluetooth and MCU (Micro-programmed Control Unit) technologies. The ATmega328P chip-based Arduino development board serves as the basis of this design, which employs sensors to measure pH, turbidity, conductivity, and water temperature. Through Bluetooth, the measured data is transmitted to the smartphone, where abnormal parameters are prompted. The test results demonstrate that the system can accurately and promptly retrieve the water quality parameters.