Real-Time River Water Quality Monitoring and Control System

LITERATURE SURVEY

With the advent of this new era of water crisis, save water is the cry all over. Water sources are encroached from every existence on Earth. Saving water needs a systematic monitoring approach to determine its quality. Availability of Internet of Things (IOT) and remote sensing techniques mark the ease of congregating, analyzing and handling of real time data to further accelerate measures taken upon.

Real-time water quality monitoring and management initiates prompt alarm ensuring timely response to water contamination in protecting and conserving the aquatic habitat, improving crop production by controlling quality of irrigated water, etc.

This paper upheavals the water quality parameters required due consideration for monitoring real time water quality along with the available remote sensors.

Also it briefs the review of parameters covered so far. Further it proposes the methodology suitable to the needs of detecting real time water contaminations based on the challenges of existing management system and I Urgent 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

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 with high frequency, high

mobility, and low powered. Therefore, our Proposed system will immensely help Bangladeshi population

MohammedÁtiquzzmmanMahda,NouraMartain,Gaedke.”Interoperability in Internet of Things: Taxonomies and Open Challenges”.

In the last few years, many smart objects found in the physical world are interconnected and communicate through the existing internet infrastructure which creates a global network infrastructure called the Internet of Things (IOT). Research has shown a substantial development of solutions for a wide range of devices and IOT platforms over the past 6-7 years. However, each solution provides its own IOT infrastructure, devices, APIs, and data formats leading to interoperability issues. Such interoperability issues are the consequence of many critical issues such as vendor lock-in, impossibility to develop IOT application exposing cross-platform, and/or cross-domain, difficulty in plugging non-interoperable IOT devices into different IOT platforms, and ultimately prevents the emergence of IOT technology at a large-scale. To enable seamless resource sharing between different IOT vendors, efforts by several academia, industry, and standardization bodies have emerged to help IOT interoperability, i.e., the ability for multiple IOT platforms from different vendors to work together. This paper performs a comprehensive survey on the state-of-the-art solutions for facilitating interoperability between different IOT platforms. Also, the key challenges in this topic is presented.

Varsha Ra , Wendy Wu .”IOT Technology for Smart Water System”.

A serious drop in ensuring the water quality in the distribution system is a factor that affects public health. This could lead to increase in biological and non-biological contents, change in color and odor of the water. These contaminants cause a serious threat to the whole water ecosystem. The conventional methods of analyzing the water quality requires much time and labor. So there is a need to monitor and protect the water with a real time water quality monitoring system in order to make active measurements to reduce contamination. The growth of the technology had helped in developing efficient methods to solve many serious issues in real time.Internet of things (IOT) has achieved a great focus due to its

faster processing and intelligence. This paper focus on discussing the architecture, applications and need of IOT in water management.

Emiliano SisinniAbusayeed Saifullah,Song Han,Mikael Gidlund.”Industrial Internet of Things: Challenges, Opportunities, and Directions”.

Internet of Things (IOT) is an emerging domain that promises ubiquitous connection to the Internet, turning common objects into connected devices.

The IOT paradigm is changing the way people interact with things around them. It paves the way to creating pervasively connected infrastructures to support innovative services and promises better flexibility and efficiency. Such advantages are attractive not only for consumer applications, but also for the industrial domain. Over the last few years, we have been witnessing the IOT paradigm making its way into the industry marketplace with purposely designed solutions.In this paper, we clarify the concepts of IOT, Industrial IOT, and Industry 4.0. We highlight the opportunities brought in by this paradigm shift as wellies the challenges for its realization. In particular, we focus on the challenges associated with the need of energy efficiency, real-time performance, coexistence, interoperability, and security and privacy. We also provide a systematic overview of the state-of-the-art research efforts and potential research directions to solve Industrial IOT challenges.

Jon Chouler,Mirella Di Lorzendoo.”Water Quality Monitoring in Developing; Can Microbial Fuel Cells be the Answer?

The provision of safe water and adequate sanitation in developing countries is a must. A range of chemical and biological methods are currently used to ensure the safety of water for consumption. These methods however suffer from high costs, complexity of use and inability to function onsite and in real time. The microbial fuel cell (MFC) technology has great potential for the rapid and simple testing of the quality of water sources. MFCs have the advantages of high simplicity and possibility for onsite and real time monitoring. Depending on the choice of manufacturing materials, this technology can also be highly cost effective.This review covers the state-of-the-art research on MFC sensors for water quality monitoring, and explores enabling factors for their use in developing countries.velopings .

Robles , Roman Alcarrio ,Diego MartainManuvellópez Hernàndez.”AN Internet of Things-Based Model for Smart Water Management”.

Water is a vital resource for life, and for the economy. Nowadays, one of the most serious challenges to solve is to manage the water scarcity. Current water management ICT systems are supported by specific vendor equipment, without considering any interoperability standards. The lack of standardization among producer’s water ICT equipment hinders proper monitoring and control systems, resulting in low efficiency in water distribution and consumption, system’s maintenance and improve.nt, and failure identification. In this paper we propose a smart water management model integrating Internet of Things technologies for decoupling decision support systems and monitoring from business processes coordination and subsystem implementation. The proposed smart water management model makes specific vendor equipment interoperable and manageable in a water management domain in a homogeneous way.

Mompoloki, Ahandi joeseph chuma ,"Wireless sensor networks: A survey on monitoring water quality".

Diseases related to poor water and sanitation conditions have over 200 million cases reported annually, causing 5-10 million deaths world-wide. Water quality monitoring has thus become essential to the supply of clean and safe water. Conventional monitoring processes involve manual collection of samples from various points in the distribution network, followed by laboratory testing and analysis. This process has proved to be ineffective since it is laborious, time consuming and lacks real-time results to promote proactive response to water contamination. Wireless sensor networks (WSN) have since been considered a promising alternative to complement conventional monitoring processes. These networks are relatively affordable and allow measurements to be taken remotely, in real-time and with minimal human intervention. This work surveys the application of WSN in environmental monitoring, with particular emphasis on water quality. Various WSN based water quality monitoring methods suggested by other authors are studied and analyzed, taking into account their coverage, energy and security concerns. The work also compares and evaluates sensor node architectures proposed the various authors in terms of monitored parameters, microcontroller/microprocessor units (MCU) and wireless communication standards adopted, localization, data security implementation, power supply architectures, autonomy and potential application scenarios.

Hakam Singh, Sivaram P.”An Efficient Design and Development of IOT Based Real-Time Water Pollution Monitoring and Quality Management System”.

Water pollution is a significant cause of several diseases and requires intensive monitoring, procuring techniques to control contamination in water. Several techniques are implemented to stop water pollution, but somehow real-time monitoring achieves a significant impact among these. In this work, a real-time monitoring system based on Internet of Things (IOT) techniques is implanted to monitor, control, and take precautionary action through intimation to the authorities. The wireless sensor nodes are planted at different locations of water resources to check the water quality, significant impact among these.

In this work, a real-time monitoring system based on Internet of Things (IOT) techniques is implanted to monitor, control, and take precautionary action through intimation to the authorities. The wireless sensor nodes are planted at different locations of water resources to check the water quality. The data obtained from sensor nodes are transmitted to a remote server, i.e., a cloud platform, and an analysis is carried out to check the water quality condition. The data samples collected from the different locations were . to identify the quality; the intimation is provided to the specific region controllers if water quality changes.

The resultant information from the analysis can be used to take precautionary measures and identify the source of water pollution. The implementation of IOT makes it feasible to monitor and prevent water pollution in a real-time environment in a remote fashion.

AradhnaSaini,T.Poongodi,"IOTArchitecture, Communication Technologies, and Its Applications".

The recent developments in RFID, intelligent sensors, Internet protocols, and communication technologies enable IOT. The fundamental principle is to have smart.sensors collaborate directly to deliver novel applications without any human intervention. Moreover, in this emerging era, machine-to-machine (M2M) technology is seen as a primary concern in the IOT's initial phase. The anticipated to bridge various technologies that permit different applications to physical objects interconnected with each other in supporting intelligent and efficient decision-making processes.

Aurel Stefan PicaIsabela Elena BanescuDan Constantin Puchianu."Improving Water Quality Using an Intelligent Electrical Device"."IoT Technology for Smart Water System".

A serious drop in ensuring the water quality in the distribution system is a factor that affects public health. This could lead to increase in biological and non-biological contents, change in color and odor of the water. These contaminants cause a serious threat to the whole water ecosystem. The conventional methods of analyzing the water quality requires much time and labor. So there is a need to monitor and protect the water with a real time water quality monitoring system in order to make active measurements to reduce contamination. The growth of the technology had helped in developing efficient methods to solve many serious issues in real time. Internet of things (IOT) has achieved a great focus due to its faster processing and intelligence. This paper focus on discussing the architecture, applications and need of IoT in water management system.

H. TadokoroM. OnishiK. KageyamaS. Takahashi.”Smart water management and usage systems for society and environment”.

Water is essential to our way of life and international water-related issues include its short supply and uneven distribution. How to use water in a way that is in harmony with nature and the water cycle and how to reduce the emission of greenhouse gases associated with water treatment are also of concern.

To resolve these issues and establish infrastructure for water that is safe and gives users easy access to water and confidence in its quality, Hitachi has proposed the “intelligent water system” concept.

This concept aims to perform comprehensive management of the water cycle at a regional or city level based on the ideas of harmony, sustainability, and self-reliance by adopting more intelligent individual technologies including water recycling and other water treatment technologies, information technology, and monitoring and control technology, and by implementing water cycle traceability in a way that treats the water cycle as a “flow of both water and information”.

Shereen Ismail,Diana Wasfi Dawoud,Nadhem IsmailAli Alshami,"IoT-Based Water Management Systems: Survey and Future Research Direction".

The Internet of Things (IOT) sustainable solutions are the next generation of methods for managing and monitoring valuable natural resources such as water. Research has focused on smart IOT-based water management and monitoring system designs for various types of applications, including agricultural, industrial, residential, and crude oil exploration sectors.

To this end, unlike other surveys available in the literature, this work presents an all-encompassing analysis of 43 papers published between 2014 and 2022 for systems proposed to manage and monitor water in four different sectors: agricultural, industrial, residential, and oilfield sectors. In this work, we also propose a new optical water management system to address a gap in the literature, particularly for oilfield processes that require significant amounts of water to stimulate oil production. The proposed system employs an advanced optical technique for sensing and transmitting collected data. Overall, this work provides a seminal guide for future research efforts focused on integrating IOT in the field of water management and monitoring.

J. GaoKunyi Li,Wendy WuPing Xin.”Innovative Water Supply Network Pressure Management Method—The Establishment and Application of the Intelligent Pressure-Regulating Vehicle”.

The development of many intelligent technologies, such as artificial intelligence and the Internet of Things, has brought new opportunities for water industry intelligence. Based on intelligent pressure regulation technology, this paper built an intelligent management platform, designed an intelligent pressure-regulating device, and combined both to form an intelligent pressure-regulating vehicle (IPRV). The IPRV has the functions of developing a pressure-regulating scheme, equipment selection, pressure reduction potential analysis, etc. It can bring convenience to the field test of the water supply network. In the field test, an intelligent pressure-regulating device was used to obtain the network data in the pilot site called S-cell.

After utilizing the intelligent management platform to analyze the measured data, the water usage pattern and pressure reduction potential of the S-cell were obtained, and an optimal pressure-regulating strategy was formulated. The water pressure at the critical node always met the water demand at the critical node during the field test. In addition, no complaints were received from other users. The results show that the IPRV is not only convenient for utility managers to make decisions on building pressure-reducing stations, but also meets user needs, realizing a win–win situation for both users and companies.