Water Quality Monitoring System Based on IOT

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ABSTRACT
Pollution of water is one of the main threats in recent times as drinking water is getting contaminated and polluted. The polluted water can cause various diseases to humans and animals, which in turn affects the life cycle of the ecosystem. If water pollution is detected in an early stage, suitable measures can be taken and critical situations can be avoided.

Proposed system has various sensors to check and ensure the quality of water-based on pH, temperature, and free residual chlorine. Data is collected through sensors and send for further processing. LEDs deployed on the system are for general users to immediately identify the water quality. The system aims to reduce the delay in existing systems by deploying indictors on system itself so that the person using the system will be able to decide whether water is safe to drink or not, which can avoid further health hazards. Implemented system is economical and dynamic. Use of LEDs on system makes it user friendly and even common people can assure quality of water.

Keyword : water monitoring, PH sensor, Temperature sensor, Led, Microcontroller

I. INTRODUCTION

In the 21st century, there were lots of inventions, but at the same time were pollutions, global warming and so on are being formed, because of this there is no safe drinking water for the world's pollution. Nowadays, water quality monitoring in real time faces challenges because of global warming limited water resources, growing population, etc. Hence there is need of developing better methodologies to monitor the water quality parameters in real time[1]. The water quality parameters pH measures the concentrationof hydrogen ions. It shows the water is acidic or alkaline. Pure water has 7pH value, less than 7pH has acidic, more than 7pH has alkaline. The range of pH is 0-14 pH. For drinking purpose it should be 6.5-8.5pH. Turbidity measures the large number of suspended particles in water that is invisible. Higher the turbidity higher the risk of diarrheoa, collera. Lower the turbidity then the water is clean. Temperature sensor measures how the water is, hot or cold. Flow sensor measures the flow of water through flow sensor. The traditional methods of water quality monitor involves the manual collection of water samples from different locations. The rest of this paper is organised as follows: section II review the related work of this project, section III describes the proposed system with the modules explanation, section IV provides the Schematic circuit with it working, Section V shows the results and discussion, section VI the conclusion with future scope

II. LITERATURE REVIEW

Nikhil Kedia entitled "Water Quality Monitoring for Rural Areas-A Sensor Cloud Based Economical Project." Published in 2015 1st International Conference on Next Generation

Computing Technologies (NGCT-2015) Dehradun, India. This paper highlights theentire water quality monitoring methods, sensors, embedded design, and information dissipation procedure, role of government, network operator and villagers in ensuring proper information dissipation. It also explores the Sensor Cloud domain. While automatically improving the water quality is not feasible at this point, efficient use of technology and economic practices can help improve water quality and awareness among people.

[1] Jayti Bhatt,Jignesh Patoliya entitled "Real Time Water Quality Monitoring System".This paper describes to ensure the safe supply of drinking water the quality should be monitored in real time for that purpose new approach IOT (Internet of Things) based water quality monitoring has been proposed. In this paper, we present the design of IOT based water quality monitoring system that monitor the quality of water in real time. This system consists some sensors which measure the water quality parameter such as pH, turbidity, conductivity, dissolved oxygen, temperature. The measured values from the sensors are processed by microcontroller and this processed values are transmitted remotely to the core controller that is raspberry pi using Zigbee protocol. Finally, sensors data can view on internet browser application using cloud computing.

[2] Michal Lom, Ondrej Pribyl, Miroslav Svitek entitled "Industry 4.0 as a Part of Smart Cities". This paper describes the conjunction of the Smart City Initiative and the concept of Industry 4.0. The term smart city has been a phenomenon of the last years, which is very inflected especially since 2008 when the world was hit by the financial crisis. The main reasons for the emergence of the Smart City Initiative are to create a sustainable model for cities and preserve quality of life of their citizens. The topic of the smart citycannot be seen only as a technical discipline, but different economic, humanitarian or legal aspects must be involved as well. In the concept of Industry 4.0, the Internet of Things (IoT) shall be used for the development of so–called smart products. Subcomponents of the product are equipped with their own intelligence. Added intelligence is used both during the manufacturing of a product as well as during subsequent handling, up to continuous monitoring of the product lifecycle (smart processes). Other important aspects of the Industry 4.0 are Internet of Services (IoS), which includes especially intelligent transport and logistics (smart mobility, smart logistics), as well as Internet of Energy (IoE), which determines how the natural resources are used in proper way (electricity, water,

oil, etc.). IoT, IoS, IoP and IoE can be considered as an element that can create a connection of the Smart City Initiative and Industry 4.0 – Industry 4.0 can be seen as a part of smart cities.

[3]Zhanwei Sun,Chi Harold Li,Chatschik Bisdikian,Joel W.Branch and Bo Yang entitled "QOI-Aware Energy Management in Internet-of-Things Sensory Environments". In this paper an efficient energy management frame work to provide satisfactory QOI experience in IOT sensory environments is studied. Contrary to past efforts, it is transparent and compatible to lower protocols in use, and preserving energy-efficiency in the long run without sacrificing any attained QOI levels. Specifically, the new concept of QOI-aware "sensor-to-task relevancy" to explicitly consider the sensing capabilities offered by an sensor to the IOT sensory environments, and QOI requirements required by a task. A novel concept of the "critical covering set" of any given task in selecting the sensors to service a task over time. Energy management decision is made dynamically at runtime, as the optimum for long-term traffic statistics under the constraint of the service delay. Finally, an extensive case study based on utilizing the sensor networks to perform water level monitoring is given to demonstrate the ideas and algorithms proposed in this paper, and a simulation is made to show the performance of the proposed algorithms.

[4] Sokratis Kartakis, Weiren Yu, Reza Akhavan, and Julie A. McCann entitled "Adaptive Edge Analytics for Distributed Networked Control of Water Systems" This paper presents the burst detection and localization scheme that combines lightweight compression and anomaly detection with graph topology analytics for water distribution networks. We show that our approach not only significantly reduces the amount of communications between sensor devices and the back end servers, but also can effectively localize water burst events by using the difference in the arrival times of the vibration variations detected at sensor locations. Our results can save up to 90% communications compared with traditional periodical reporting situations

III. PROPOSED SYSTEM:
In this, we present the theory on real time monitoring of water quality in IoT environment. The overall block diagram of the proposed method is explained. Each and every block of the system is explained in detail. In this proposed block diagram consist of several sensors (temperature, pH, Arduino Led) is connected to core controller. The core controller are accessing the sensor values and

processing them to transfer the data through internet. Ardunio is used as a core controller.

A. pH sensor: The pH of a solution is the measure of the acidity or alkalinity of that solution. The pH scale is a logarithmic scale whose range is from 0-14 with a neutral point being 7. Values above 7 indicate a basic or alkaline solution and values below 7 would indicate an acidic solution. It operates on 5V power supply and it is easy to interface with arduino.The normal range of pH is 6 to 8.5.

B. Temperature sensor: Water Temperature indicates how water is hot or cold. The range

of DS18B20 temperature sensor is -55 to +125 °C. This temperature sensor is digital type which gives accurate reading.

C. Arduino Uno: Arduino is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller. Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform; for an extensive list of current, past or outdated boards see the Arduino index of boards.The whole design of the system is based mainly on IOT which is newly introduced concept in the world of development. There is basically two parts included, the first one is hardware & second one is software. The hardware part has sensors which help to measure the real time values, another one is arduino atmega328 converts the analog values to digital one, & LCD shows the displays output from sensors, Wi-Fi module gives the connection between hardware and software. In software we developed a program based on embedded c language

IV.   RESULT & DISCUSSION

We have identified a suitable implementation model that consists of different sensor devices and other modules, their functionalities are shown in figure. In this implementation model we used ATMEGA 328 with Wi-Fi module. Inbuilt ADC and Wi-Fi module connects the embedded device to internet. Sensors are connected to Arduino UNO board for monitoring, ADC will convert the corresponding sensor reading to its digital value and from that value the corresponding environmental parameter will be evaluated. After sensing the data from different sensor devices, which are placed in particular area of interest. The sensed data will be automatically sent to the web server, when a proper connection is established with sever device

Future Scope

• In future we use IOT concept in this project

• Detecting the more parameters for most secure purpose

• Increase the parameters by addition of multiple sensors

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