IOT Based Real Time Water Quality And Monitoring System

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Abstract- *Water is a precious source place a vital role in healthy living life. Water quality monitoring is important because contaminated water can spread disease faster than other sources. And also due to the high usage of fertilizers in farming fields, other chemicals in industries contributed immensely to the overall reduction of water quality globally. Water is an essential need for human survival and therefore there must be mechanism that should be done to test the quality of water that made available for drinking in town and city articulated supplies. In earlier days, chlorination process was done to purify the quality of water. But that process is not effective due to the contamination of unwanted pollutants. This study aims to detect and control the contamination in water. It will monitor the pollution level in water continuously and it will generate the database automatically. This helps us to view the information at any time from the head of the water department. The pH, turbidity,flow level and also if in the case of breakage, the acknowledgement message can be viewed through webpage, which works under IoT.*

Keywords: IoT, pH value, turbidity, water flow.

I. INTRODUCTION

An embedded system may be a controller programmed and controlled by a real-time OS (RTOS) with a fanatical function within a bigger mechanical or electrical system, often with real- time computing constraints. it's embedded as a part of an entire device often including hardware and mechanical parts. A small computer designed during a single chip is named one chip microcomputer. The chip typically includes a microprocessor RAM, ROM, timer, interrupt and peripheral controller during a single chip. This single chip microcomputer is additionally called as microcontroller. These Microcontrollers are used for sort of applications where it replaces the pc. The usage of this microcomputer for a selected application, during which the microcontrollers a neighborhood of application, is named embedded systems**.** The embedded system can be used in Internet of things with the help of sensors like devices.Internet of things is the interconnection of devices which uses internet. The IoT increases the speed of communication between devices. This helps the user to communicate from places which are far away from the users.

II. RELATED WORKS

Yan-Ting Liu, Bo-Yi Lin, Xiao-Feng Yue [1] states that in order to take care of the standard of water resources within the global environment, we must conduct water quality monitoring. The sensors to watch water temperature, turbidity, conductivity, and pH. then , the varied water quality data are going to be transmitted to the database via wireless transmission. Finally, these data are going to be displayed on the online page immediately. And, it's vital to pick what quite wireless communication technique. For the long- range application within the field, we used Low- Power Wide-Area Network (LPWAN)-Long Range Wide Area Network (Lora WAN) for data transmission. to increase the system life, a solar array is tailored to recharge battery.

K.Gopavanitha, S.Nagaraju [2] proposed a coffee cost system for real time water quality monitoring and controlling using IoT. The system contains physiochemical sensors which may measures the physical and chemical parameters of the water like temperature, pH and Flow. By these sensors, water contaminants are detected. The output of the sensor is given to the Raspberry pi and then to the cloud. Finally the sensed data is visible on the cloud using cloud computing and therefore the flow of the water within the pipeline is controlled through IoT. Ch.Sowmya, C.D. Naidu, Rajendra Prasad [3] presented the appliance of Wireless Sensor Network (WSN) technology for real time online Water quality monitoring. during this paper, the small print of system design and implementation of WSN are presented. Wireless Sensor Network (WSN) for a water quality monitoring consists of number of sensor nodes at different overhead tanks and water bodies in a neighborhood. Each sensornode consists of an Arduino microcontroller, Xbee module and water quality sensors, the sensor probes shall continuously measure the various water quality parameters like pH, Temperature, Conductivity.

The parameters are measured in real time by the sensors and send the info to the info centre. solar array is employed to power the system for every node. Data collected from remote nodes are displayed within the user PC.

Manish Kumar, Vighnesh Tiwari, AshwiniSapkal [4] proposed a system of interconnected cloud storage, raspberry pi, temperature sensor and a website to show real time status. Sudden increase and decrease in temperature plays a major role in affecting water resource which happens when waste is extracted from an industry which consist a lot of harmful chemicals which change the pH level and we can sense these changes through the sensors connected through Raspberry Pi and push them on the cloud. This paper also consists of an approach to alarm civic authorities if the concentration of pollutants increases. By this approach not only civic authority, but common man will have a pollutant status around them.

Anto Merline Manoharan, Vimalathithan Rathinasabapathy [5] proposed a system to monitor water quality and Chemical leakage detection in rivers, etc. using M2M-LoRa. LoRa is a new type of wireless connectivity in the unlicensed 433MHz and 868MHz used for long- range transmission up to 15Kms. The system is used for Smart Village Projects. The LoRa mote along with sensors will be placed in water tanks at villages and industry region. The system will continuously monitors the quality and level of water in all tanks and displayed in a common place where the entire water distribution system can be controlled from one place. The distribution system saves the water and monitoring system controls the distribution of polluted water.

III. PROPOSED METHOD

The system architecture of IoT based real time water quality and monitoring system consists of ESP8266, pH sensor, flow sensor, turbidity sensor and solenoid valve. The purpose of designing water disinfection and improving the current distribution system for the good health of people. This helps to supply each and every household with clean water under manageable pressures.
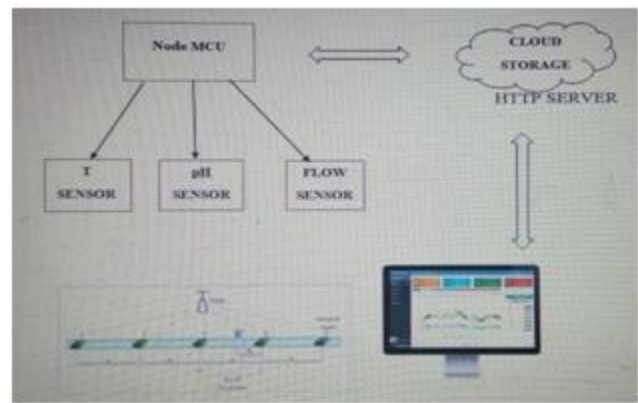

Figure 1 Block diagram of IoT based real time water quality and montioring system

The block diagram of proposed method is shown in Figure 1. This proposed system is helpful to overcome the drawbacks that occurred in the earlier system.This water quality and monitoring system with portable devices provides advantages like low initial start-up cost and low periodical maintenance costs. And also, this enhances the quality of water by monitoring the system automatically. The initial working of this system starts with the sensors. This circuit consists of microcontroller which is connected to the pH sensor and flow sensor. The microcontroller is coded with the flow sensor by using Arduino IDE. The Arduino IDE offers to support the languages C and C++ using special rules of code structuring. The flow sensor has three lines, Vcc line, ground line and pulse line. Sensors interfacing, the pH meter checks the purity of water flowing through the water tanks. This flow sensor is connected with the solenoid valve which makes the automation of fluids. This flow meter with a solenoid valve is used to monitor and control the quantity of water used. But, due to the emission of wastes in various industries and effluents can pollute the water quality in receiving bodies of water. When there is any change in the pH parameter these signal sensors enable to send signal to ESP8266. The user can also change the desired pH value of the water by moving those ionic salts from the neural balance at a pH of 7. This ESP 8266 microchip helps to transmit the collected signals to cloud. The data that is stored in the cloud can be accessed by using an Webpage. This Webpage is used for the data acquisition and data interpretation. The main objective for the distribution system was to provide a multi-year improvement plan to be submitted to community leaders and improving the system through other means.

IV. COMPONENT DESCRIPTION

1. HARDWARE DESCRIPTION

pH METER

A pH Meter may be an instrument that measures the hydrogen-ion concentration (or pH) during a solution, indicating its acidity. It measures the potential differences between a pH electrode and a reference electrode. it always features a glass electrode, or a mixture electrode. They comprise a simple electronic amplifier and a pair of probes, or a combination probe, and some form of display calibrated in pH.

Figure 2 pH meter

Additionally to measuring the pH of liquids, a special probe is usually wont to measure the pH of semi-solid substances.

WATER FLOW SENSOR

A water flow sensor is an electronic device that is designed to sense the presence of water flows. The device consists of a rotar which makes rotation to indicate the water flow using hall effect magnetic sensor. A water flow sensor is an electronic device that is designed to sense the water.

Figure 3 Water flow sensor

The device consists of a rotar which makes rotation to indicate the water flow using hall effect magnetic sensor. The flow rates and therefore the amount of liters consumed are going to be displayed on the webpage and that they also will be sent through the GSM/GPRS module to the corporation board.

TURBIDITY SENSOR

The measurement of Turbidity is a crucial test when trying to work out the standard of water. it's an aggregate optical property of the water and doesn't identify individual substances. The particles suspended within the water will scatter a light-weight beam focused on them. The scattered light is measured at different angles from the incident light path.

This is often now accepted as a more precise measure of turbidity.

Figure 4 Turbidity sensor

OLED DISPLAY

OLED an organic LED (OLED or Organic LED), also referred to as an organic EL (organic electroluminescent) diode, may be a LED (LED) during which the emissive electroluminescent layer may be a film of compound that emits light in response to an electrical current. This organic layer is situated between two electrodes; typically, a minimum of one among these electrodes is transparent.

Figure 5 OLED display

SOFTWARE DESCRIPTION

PHP

PHP is that the hottest scripting language for web development. it's free, open source and server-side that uses Structured command language (SQL). it's also free and open source. The mixture of PHP and MySQL provides unlimited options to make almost any quite website.

HTML

HTML describes the structure of the website and consists of series of elements that tells the browser how to

display the content. It is represented by tags. These tag label pieces of content such as heading, paragraph, table and so on. It does not display the HTML tags but uses the content of the page.

V. RESULTS AND DISCUSSIONS

The hardware kit of IoT based real time water quality and monitoring system is shown in the Figure 6. It is given as analog input to the NodeMCU and IoT will be used to receive the sensed data in the webpage.

Figure 6 Experimental setup of IoT based real time water quality and monitoring system
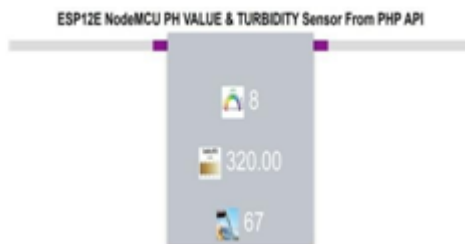

Figure 7 Simulation Output of water level displayed through webpage

The simulated output of levels in the water is given as Snapshot is shown in Figure 7. The measured value of pH, turbidity and flow of water is seen separately using webpage.

VI. CONCLUSION AND FUTURE SCOPE

This project "IoT BASED REAL TIME WATER QUALITY AND MONITORINGSYSTEM" thus implemented could be an excellent replacement of existing method of monitoring the impurity level in water. Here IoT (Internet of Things) plays a vital role in detecting impurity level of water. The programming thus coded is used to detect the pH level, turbidity content in the water. This system brings several advantages in terms of cost, portability, and applicability. This project show that these systems can be used to monitor water quality at drinking water reservoirs such as dams and holding ponds. This monitoring system will contribute to a social cause in saving a life of many living organisms in water. The Real time Measurement of Impurity level of water finds its application in monitoring the quality of water in real time. Rather, this system could further implement the concept of finding the biological parameters and also monitoring many nodes from a single android application.

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