IOT Based Water Quality Monitoring System For Pachapalayam Village Coimbatore

I Sugantha[1], I Surekha[2], R Nagendran(Sr.Gr)[3]

[1, 2] Dept of Information Technology
[3] Assistant Professor, Dept of Information Technology
[1, 2, 3] Sri Ramakrishna Institute of Technology, Coimbatore, India.

Abstract- *Water pollution is one of the most serious ecological threat for the green globalization. To determine the water quality, the physical and the chemical parameters of the water to be measured This project proposes a Sensor based water quality monitoring system to measure the values of the water level parameters like pH, turbidity, temperature, flow and conductivity sensor of the water. This system is an cost-efficient. The data from the sensor are processed on the arduino software (IDE)and can be viewed on the internet using the Wi-Fi module.*

Keywords- pH sensor, Conductivity sensor, Temperature sensor, Flow sensor.

I. INTRODUCTION

Internet of Things (IoT) is defined as the network of physical objects/things devices, vehicles, buildings embedded with sensor, micro-controller, and network connectivity that enables these objects to collect and exchange data. The IoT can be described as a huge web of embedded objects designed with built-in wireless technologies such that they can be monitored, controlled and linked within the existing Internet infrastructure. IoT based devices IoT based devices collect information successfully using data analytics and thus these devices can also share the information on the cloud.The applications for internet connected devices are extensive. There are Multiple categorizations which have been suggested, in which it includes the separation between consumers, enterprises (business), and also infrastructure applications. Some of them are Agriculture Medical and Healthcare Media.

II. LITERATURE REVIEW

The water has been contaminating all over in the world and it became a common problem globally Therefore, there is a need for water quality monitoring system in real time. In this system quality and communicating data to platform of microcontroller system and GPRS are used.[1]

This research paper states that the sensors are used to measure the parameters levels in water. A cloud server was configured as data saving and analysis.[2]

This research defines a low-cost water monitoring system in remote location areas using IoT technology. The design uses an Arduino as the central processing system, SIM900A as the communication module to send the short message service (SMS) to the authenticated connected to the central processing system. The developed prototype is test by taking the different water samples from diverse locations.[3]

This research ensures a safe supply of drinking water. This system consist of different parameters This microcontroller process the data. At last data from the sensors is viewed on the web server. This system is processed through raspberry pi using Zigbee protocol.[4]

The design ofa system is used to measure the water parameters using different sensors like ultrasonic sensor to check the water tank level, flow sensor to detect water leakage in pipelines, pH sensor to check the water quality and temperature sensor to check the temperature of the water. This automation system is control by using laptop/mobile phones. By placing this system in asmart building, we will be able to collect and analyze the water usage patterns of the residents and save a lot of water from wastage.[5]

The centralised system receives the measured values from various sensors over a period of time. Thorough the Wi-Fi system, the sensor output data is sent to the concern authority for further steps to improve the water quality. The water quality test carried out in the samples collected from various parts of the Coimbatore.[6]

In this project an IoT based water quality monitoring system is developed. The sensors are used to measure the water level parameters in the water. The data from the sensor are processed on the arduino software (IDE) and can be viewed on the internet using the Wi-Fi module[7]
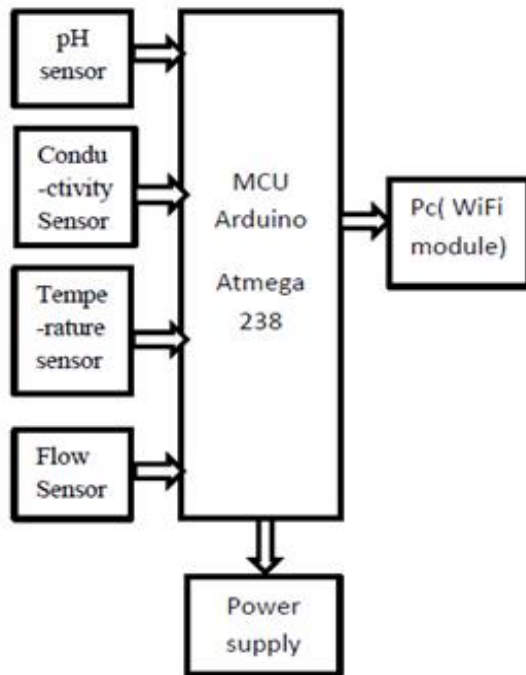
PROPOSED SYSTEM

Fig: Block diagram

The quality of the drinking water can be monitored in real time by using the water quality monitoring system. The system consist of several sensors and it is used for measuring physical and chemical parameters of the water. The parameters such as temperature, PH, turbidity, flow sensor of the water can be measured. The Arduino model can be used as a core controller. Finally, the sensor data can be viewed on internet using WI-FI system. The results from the sensors are processed by the arduino software though wi-fi module.

COMPONENTS DESCRIPTION

pH SENSOR: The pH sensor is used measure the acidity or alkalinity of the water. The pH scale is a logarithmic scale whose range is from 0-14 .The neutral point is 7.An alkaline solution has less positively charged ions than the acidic solution, the value above 7 indicates basic or alkaline solution and values below 7 would indicate an acidic solution. The suitable range of pH used for drinking purpose is 6-8.5.

Fig: pH Sensor

TEMPERATURE SENSOR: Temperature sensors can be used to indicate the temperature of water. It determines the how the water is hot or cold. The range of DS18B20 temperature sensor is -55 to +125 degree Celsius. This temperature sensor is digital type which gives accurate reading.

Fig: Temperature sensor

FLOW SENSOR: Flow sensor is used to measure the flow of water .This sensor consist of a plastic valve body, a rotor and a hall effect sensor. The pinwheel rotor rotate when water flows through the valve and its speed will be directly proportional to the flow rate. The Hall effect sensor will provide an electrical pulse with every revolution of the pinwheel rotor.


Fig: Flow sensor

CONDUCTIVITY SENSOR:

The ability of a solution is to pass or carry an electric current is named as Conducitivity of the solution. Specific conductivity measurement is important for determining the impurities in the water. Total dissolved solid particles (TDS) in the water, determines the amount of salts and minerals exist in the water.

ARDUINO UNO: Arduino is a microcontroller board based on the ATmega328P.The digital input/output pins for arduino are 14pins ,the arduino board consist of six input pins , it has an 16 MHz crystal oscillator. The USB connection is used to connect USB cable with a computer. The power jack, an inCircuit Serial Programming header(ICSP) and a button called reset.. Arduino Software(IDE) were the reference versions of Arduino, now evolved to new releases.
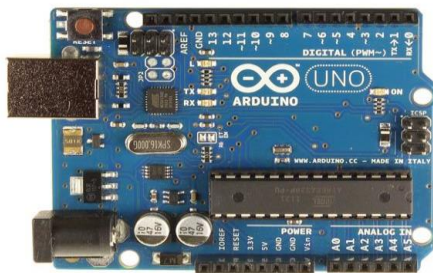
Fig: Arduino Uno

WI-FIMODULE: The ESP8266 is a capable offloading all Wi-fi networking functions from another application processor. The.Each ESP8266 module come pre-programmed with an AT command set firmware.The ESP8266 module is an extremely cost effective.

Fig: Wi-fi module

EXPERIMENT RESULTS

The below tables show the variations between the conventional system and proposed system. The samples are collected from the different locations like official colony, saravana street and green fort in pachapalayam village, Coimbatore.

pH sensor:

Water sample	Conventional method	Proposed method
Sample 1	5.90	6.2
Sample 2	7.64	7.5
Sample 3	7.94	7.2
Sample 4	8.43	8.1
Sample 5	7.97	7.94
Distilled water	6.2	6.1

Dissolved oxygen:

Water sample	Conventional method	Proposed method
Sample 1	6.9	6.1
Sample 2	5.2	5.1
Sample 3	7.4	7.2
Sample 4	6.1	5.9
Sample 5	5.7	5.4
Distilled water	6.5	6.1

Turbidity :

Water sample	Conventional method	Proposed method
Sample 1	1	1
Sample 2	0.5	1
Sample 3	2	1.2
Sample 4	2.1	2
Sample 5	0.8	1
Distilled water	1.1	1

Residual chlorine:

Water sample	Conventional method	Proposed method
Sample 1	0.6	0.8
Sample 2	0.2	0.7
Sample 3	0.4	0.4
Sample 4	0.8	0.8
Sample 5	0.2	02
Distilled water	0.2	0.1

RESULT: From the above results , we analysed that the proposed method gives us the best results than the conventional method.

Fig: Measurement of pH Sensor

Fig: Measurement of Temperature Sensor

Fig: Measurement of Temperature Sensor

Fig: Measurement of Conductivity Sensor

CONCLUSION

In this paper, a water quality monitoring system using Iot is presented. The sensors like pH, flow, temperature and conductivity are used in this project to determine water quality. The system can monitor water quality as well as it is an low cost system.so the water quality testing is likely to be more economical, convenient and fast. The results from the sensors are processed by the arduino software though wi-fi module.

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