Volume : 4 | Issue : 12 | December 2015 • ISSN No 2277 - 8179

Research Paper

Identification and Treatment of Waste Water Using Ph Monitoring in Internet of Things Environment

Engineering

KEYWORDS : IoT, pH, sensor, WSN

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ABSTRACT

The Internet of Things (IoT) is the interconnection of uniquely identifiable embedded computing devices within the existing Internet infrastructure. Waste water is identified using micro controller, gas sensor, viscosity sensor and pH sensor and treated using chlorine and pumping motor. pH sensor finds the level of contamination of water. If pH of the sample water = pH level of water, then pumping motor starts. If pH of sample > pH level of water then chlorine motor starts and pumping motor stops. And when pH level again comes equal to the pH level of water, then again pumping motor starts and chlorine motor stops. If any error in the above sequence is identified it will be indicated by buzzer and whole process can be viewed in PC via WSN. LCD displays pH measurements. These information will be automatically updated through the server. As these devices are interconnected through internet, this information can be accessed from any place.

i.introduction

The wastewater treatment processes are very difficult to control because of their complex behavior. This process can be made easy by bringing the system under a common network. Wireless internet is the latest technology with the help of the radio waves and its speed is like lightening. **Remote monitoring of water from anywhere online and in real time is done here. Online monitoring enables you to identify unacceptable conditions that may occur immediately.**

The Internet of Things (IoT) is an evolving and rapidly expanding global ecosystem comprising the connection via the Internet of all kinds of common objects with embedded electronics and the processing of the data collected, shared and stored in "The Cloud. "Internet of Things or IoT is also an architecture that comprises specialized hardware boards, Software systems, web APIs, protocols which together creates a seamless environment which allows smart embedded devices to be connected to internet such that sensory data can be accessed and control system can be triggered over internet. Also devices could be connected to internet using various means like Wi-Fi, Ethernet and so on. Furthermore devices may not be needed to be connected to internet independently. Rather a cluster of devices could be created (for example a sensor network) and the base station or the cluster head could be connected to internet.

This leads to more abstract architecture for communication protocols which ranges from high level to low level. The embedded system provides satisfactory results in monitoring waste water. Embedded system has hardware and software which forms a component of some larger system and which is expected to function without human intervention.

I. RELATED WORK

Chi et a.[1] proposes Non linear Model-Predictive Control in Wastewater Treatment Process. This system provides monitoring of water quality parameters and displays the readings in the sensors. The components involved in this process are microcontroller, sensors, LCD.Li et al. [2] presents a framework to integrate applications deployed in public clouds and intra ISs. A run-time platform is developed. A cross-computing environment process modeling technique is also developed to improve the feasibility of ISs under hybrid cloud computing environment. Qin et al. [3]demonstrates multi sensor water quality monitoring system incorporating an UV/Vis spectrometer and a turbid meter was used to monitor the Chemical Oxygen Demand, Total Suspended Solids and Oil & Grease concentrations of the effluents from the Chinese restaurant on campus and an electro coagulation–electro flotation (EC–EF) pilot plant. Melidis et al.[4] demonstrates the functionality, laboratory testing and field application of a microbial sensor, which can be modified to monitor organic pollution extent, toxicity and over-(under)load of wastewaters both under anaerobic and aerobic conditions.

II. PROPOSED SYSTEM

This model works on the concept that the internet is available all over the world. The information from the pH sensor, gas sensor, viscosity sensor are in the form of analog signals. The microcontroller accepts only digital signals, so these are passed to ADC converter and the obtained digital signals are passed to the microcontroller. The readings are displayed in the LCD. These informations are brought under the internet environment by automatic updating of information by the microcontroller. The Microcontroller will switch ON the motor only if the following conditions are satisfied.

i) If the pH value and gas value increases, then chlorine motor switches on.
ii)If the pH value becomes normal, then pumping motor switches on.

The power supply section is the important one. It should deliver constant output regulated power supply for successful working of the project. A 0-12V/500mA transformer is used for our purpose is the primary transformer is connected into main supply through on/off switch and fuse for protecting from overload and short circuit protection. The secondary is connected to the diodes convert from 12V AC to 12V DC voltage which is further regulated to +5v, by using IC 7805.

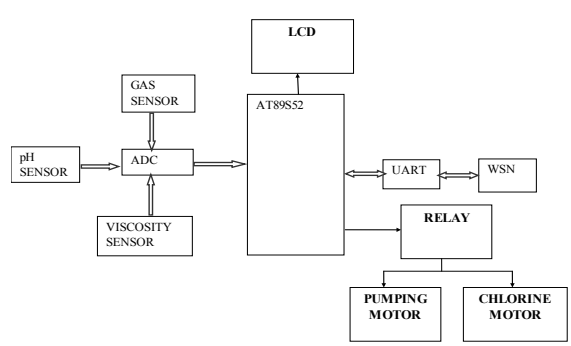

Fig.1.Transmitter

When the pH level of water is greater than that of water then chlorine motor starts. These can be controlled through the internet by the registered user.

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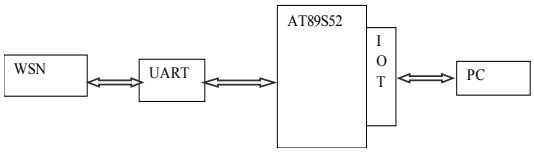

Fig.2.Receiver

The proposed system provides automatic update of information on the basis of IoT. As the water quality characteristics are measured they are stored and this information can be accessed from any system. The advantage of this method is the process can be controlled from any system by the registered user. The process of pumping and spilling chlorine in water can be controlled from any place through the server.

The main purpose of using the microcontroller is because of its high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmel AT89S52 is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded control applications. The programs of the microcontroller have been written in Embedded C language and were compiled using KEIL, a compiler used for microcontroller programming. The communication between PC and the microcontroller was established MAX 232 standard and those programs were also done in C language. Serial communication is used and the various special function registers of the microcontroller are set such that they can send and receive data from the PC. This program uses the serial library to communicate with the ports.

III. EXPERIMENTAL RESULT AND VERIFICATION

Fig.3. shows the LED indicator, gas sensor and viscosity sensor and pH sensor. When the sensors are tested with sample liquid solutions, water quality measurements consisting of pH values, gas values and viscosity values are displayed in the LCD display and the computer connected with microcontroller.

Fig.3. Experimental Setup

IoT server is created using visual basics. Visual Basic (VB) is a programming environment from Microsoft in which a programmer uses a graphical user interface (GUI) to choose and modify preselected sections of code written in the BASIC programming language. It includes 1. Creating the form 2.Adding the interface 3. Inserting the code

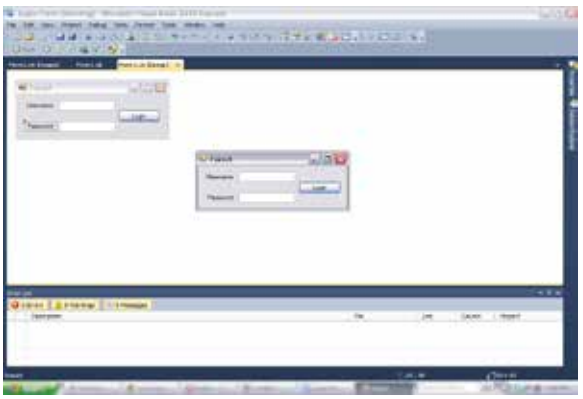

Fig.4. VB Page

To create webpage 1.Log in to hosting account. 2.Go to control panel.3.Look for the "WordPress" icon. 4.Choose the domain where we want to install our website.5.Click the "Install Now" button and it should get access to our NEW Word Press website.

IoT server is created using visual basics. After creating the page and adding the interface, coding is entered. Password created will ensure that only authorized person can access the system. A separate coding is provided for login page. As soon the password matches, it leads to the data page showing the information received from the hardware section. Fig.4.Displays the gas, viscosity and pH sensors readings and also options for controlling the motor from the system in visual basic. There are separate control for chlorine and pumping motor. Depending upon the readings of the pH sensor chlorine motor operates and this motor setting can be controlled from the PC from a specific distance. There is a separate interface which indicates motor number which is being controlled. There is an interface for specifying the port numbers through which the UART cable is connected to the PC.

Fig.4. Sensor and Motor Control

Fig.5.Displays the sensors readings. These readings can be viewed through our created IoT website. The login time with date will also be updated in the website. We can delete the previous data for faster update using the clear log option present on the top the website. The login time is based on the GMT time. This webpage can be opened only when the system is connected to the Internet. So this makes easy access for the common people to know the quality of water from any part of the world .The automatic update takes place for every 10 seconds as long as the system is connected to the internet.

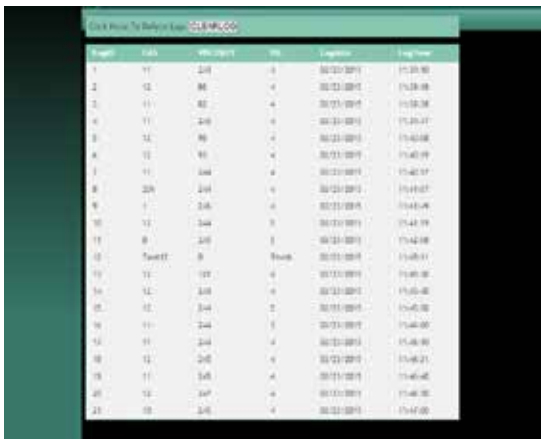

Fig.5. Sensor Readings

IV. CONCLUSION AND FUTURE WORK

The proposed technology gives easy access of data from any part of the world. The system can collect sensor data intelligently. It is very suitable for real-time and effective requirements of the high-speed data acquisition system in IoT environment. The results with direct contact with the system and the updated results are found to be same and accurate. Further this idea can be enhanced by controlling the process through internet and providing user name and password for the webpage. The enhancement can be made by updating the information to the server even when the system is switched off. Some future consumer

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