

Software Sensor for Portable Water Quality through Qualitative and Quantitative Analysis Using Internet of Things

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ABSTRACT: Water is one of the most important substances on earth. People now days always want something that can make their life easier. In this thesis is used to define the water monitoring systems such as Tank water level sensing monitoring, water pollution monitoring. By using Wireless Sensor Technology we avoid the huge amount of water is being wasted by uncontrolled use of large apartments/offices. The microcontroller (PIC) based Water level monitoring is used to indicate the level of water in the tank to agent. Sensor Based Water Pollution Detection, it will check the water quality by using these parameters such as the pH level, Gas are measured in real time by the sensors and it will monitor by an agent.

KEYWORDS: Water quality monitoring, real time, solar power, WSN

I. INTRODUCTION

Water quality monitoring is incredibly useful to keep the planet healthy and sustainable. Many transmittable diseases are water born. Most of the fresh water resources located near urban areas are contaminated due to the garbage dumped by the individuals or the release of chemicals from manufacturing industries. Overhead tank is one of the containers used to store drinking water. It was observed that main cause of deterioration in water quality is due to re-growth of microorganisms in overhead tanks and the distribution system, corrosion of pipe material, non-replacement of old pipes. There is a need for continuous real time continuous remote monitoring of water quality parameters within the water system as the concentrations of the pollutants lead to serious health consequences. However, in most areas, the traditional approach of water quality monitoring based on collection of water samples from different sources and subsequent analyses in laboratories is expensive, time consuming and does not allow simultaneous and timely monitoring of the water quality. This project mainly focuses to develop an indigenous, reliable, flexible WSN water quality monitoring system for in-situ monitoring of the remote water quality across a wireless sensor zone. Wireless Sensor Networks (WSNs) provide a new model for sensing and communicate information from various environments, to serve many and diverse applications. WSN provide significant advantages both in distributed intelligence as well as in cost. On the other hand, installation and maintenance expenses are reduced as it does not require any wiring. Wireless sensor network for a water quality monitoring consists of coordinator and number of sensor nodes with networking capability which are deployed at different overhead tanks in an area. Each sensor node consists of an Arduino microcontroller, a wireless network connection module and water quality sensors that are able to continuously read the water quality parameters such as Electrical conductivity, pH and temperature are sensed continuously and send data to the base station or data center where the data is logged into central server.

Graphic User Interface (GUI) is provided for users to analyze water quality data when water quality detected is below standards. The recorded data can be analyzed using various simulation tools for future correspondence and actions to evaluate the reliability, feasibility and effectiveness of the proposed monitoring system.

II. SYSTEM ARCHITECTURE

The goal of this project is to design and manage a Wireless Sensor Network (WSN) that helps to monitor the quality of water with the help of information sensed by the sensors immersed in water, so as to keep the water resource within a standard described for domestic usage and to be able to take necessary actions to restore the health of the degraded water body. Water pollution monitoring can help with water pollution detection, discharge of toxic chemicals and contamination in water. And also check the quality by using Gas, pH and turbidity are the typical parameters collected in river/lake water pollution/quality monitoring systems.

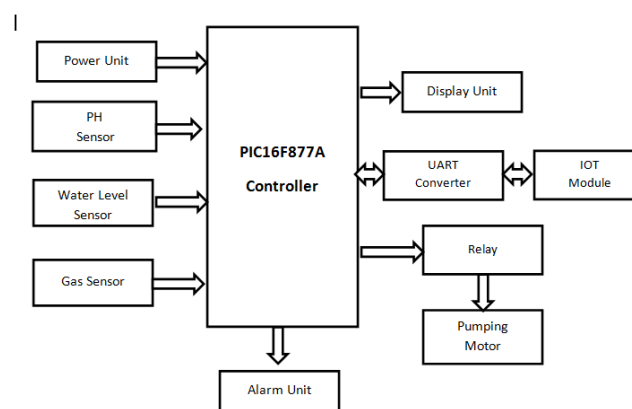


Fig 1: System Architecture

III.SENSORS

A sensor is a device, module, or subsystem whose purpose is to detect events or changes in its environment and send the information to other electronics, frequently a computer processor. A sensor is always used with other electronics, whether as simple as a light or as complex as a computer.

LEVEL SENSOR

Level sensors detect the level of substances that flow, including liquids, Slurries, granular materials, and powders. The substance to be measured can be inside a container or can be in its natural form. The level measurement can be either continuous or point values. Continuous level sensors measure level within a specified range and determine the exact amount of substance in a certain place. While point-level sensors only indicate whether the substance is above or below the sensing point generally the latter detect levels that are excessively high or low. Selection of an appropriate type of sensor suiting to the application requirement is very important.



Fig 2: Level sensor

PH SENSOR

A ph sensor is a device that measures the hydrogen-ion concentration (ph) in a solution, indicating its acidity or alkalinity. In addition to measuring the ph of liquids, it can also measure the moisture and light level. The ph sensor has an inbuilt meter to measure the light intensity. The ph sensor is connected with a board to get a digital input.

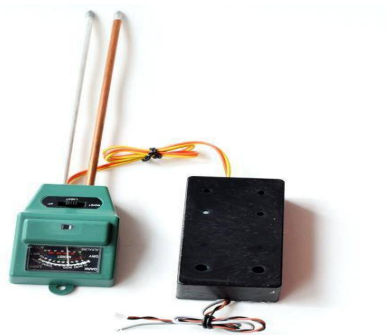


Fig 3: PH sensor

GAS SENSOR

MQ-2 gas sensor is designed with sensitive material of SnO_2 , which has lower conductivity in clean air. When the target combustible gas exists, the sensor's conductivity is higher. Signal conditioning circuit is used to convert the change of conductivity to correspond output signal with the input gas concentration. MQ-2 gas sensor has high sensitivity to LPG.



Fig 4: Gas sensor

IV. IOT MODULE

Internet of Things (IOT) is an environment in which objects, animals or people are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction. IoT board featured with SIM800 GPRS modem to activate internet connection also equipped with a controller to process all input UART data to GPRS based online data. Data may be updated to a specific site or a social network by which the user can be able to access the data.

V. CONCLUSION

In this paper an efficient, real time water quality monitoring system based on IOT is presented. Central base station and nodes are connected through IOT networks and base station is interfaced to internet so that users can login and get the real time water quality data. Future works include the using of more efficient routing algorithms to extend the network to wide area. A future work also lies on Integration of turbidity sensor, dissolved oxygen sensor and color sensor to the sensors used in this work.

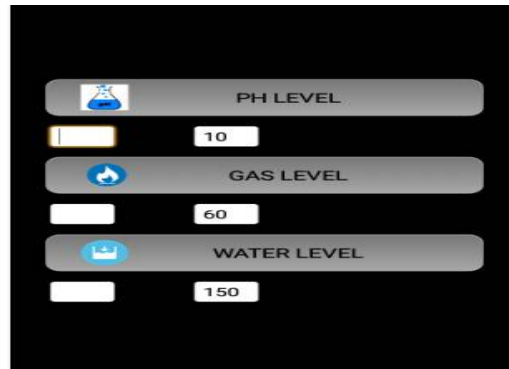


Fig 5: Various parameter levels

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