Measurement of Water Quality and Gas Molecule in Water Tank by using Iot

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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 Project is used to define the water monitoring systems such as Tank water level sensing monitoring, water pollution monitoring. By using IOT 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 agents. Sensor Based Water Pollution Detection, it will check the water quality by using these parameters such as the pH level, Gas is measured in real time by the sensors and it will monitor by an agent.**

Index Terms -- IOT Module; Water Quality Monitoring; Remote monitoring; WSN

I. INTRODUCTION

Water is an essential need for a human being to live his life. In day to day life water deficiency in scanning human society and the availability of water is very much scares on of the human is water, which is now a water usage as they are wasting the water resource a lot of needy and need us things. Drinking water are being contaminated in the busy life due to several companies emerging and leaving their wastes in water (sea, lake, river, etc.).Which males ground water to get contaminated on the other hand the water which is loaded into a metropolitan tank for the purpose of drinking is being polluted due to the cleanliness of the tank and the unwanted gases that are generated inside the tank due to not cleaning its property on daily or monthly basis. Thus the project is designed to overcome this problem**.**

II. SYSTEM ARCHITECTURE

Water pollution monitoring can help with the 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. 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 description for domestic usage and to be able to take necessary actions to restore the health of the degraded water body.

III. BLOCK DIAGRAM

Monitoring the water level creates lots of divisions regarding quality and quantity measurement. The block diagram may provide an idea of measuring the PH value along with, Gas content and the water level in a water tank. These are input section which is indicating each measurable value to the microcontroller and is feeding all the input to the IoT module for future access.

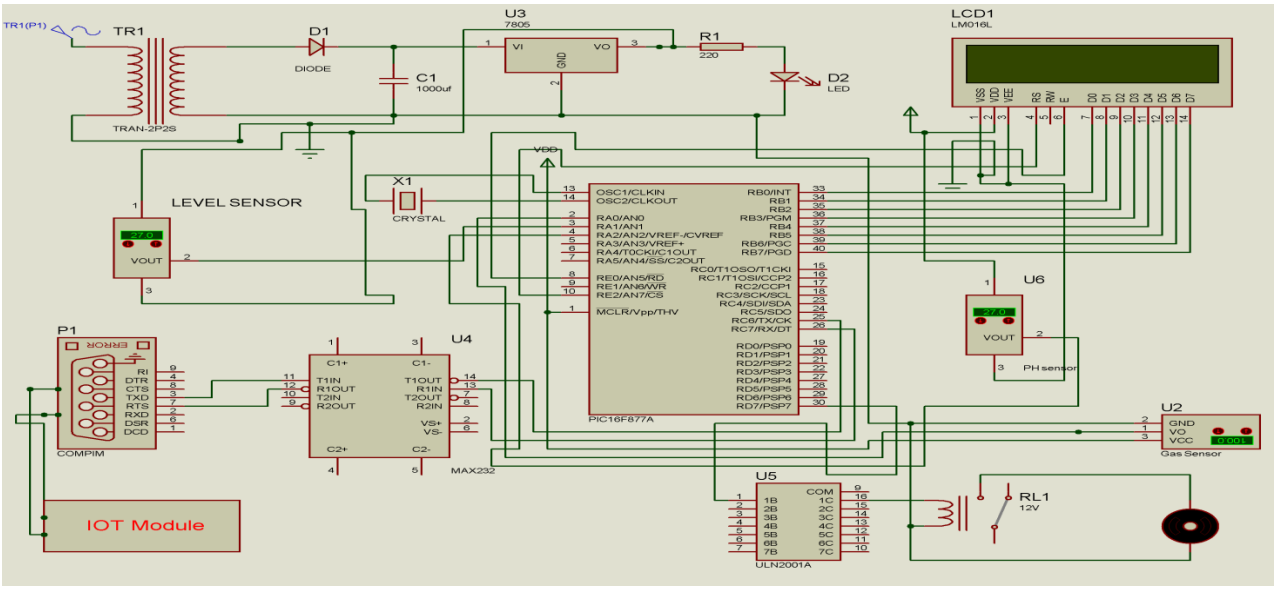

Fig 1. Proposed System architecture

There is a LCD attachment with the controller, which will display the values at the instant, its measuring and thus the alarm will sound at any of the sensor measuring values below or above the predefined value. The relay will help the motor to run.

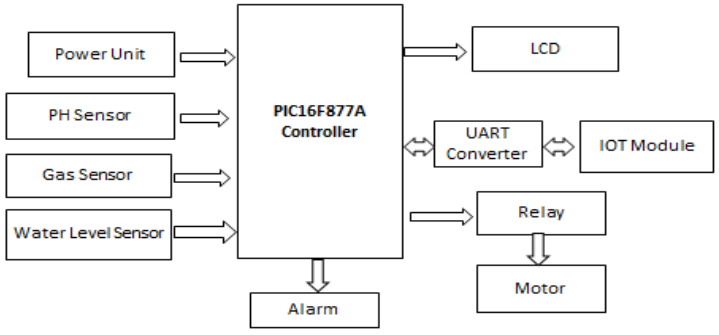

Fig 2. Block diagram of WSN

IV. DETAILED HARDWARE DESIGN

Hardware components which include Gas sensor, Water level sensor, PH sensor, PIC Controller, IOT Module, Power module, UART converter, Relay, Motor, LCD.

A. Water level Sensor Interfacing

Level sensors detect the level of substances that flow, including liquids, slurries, granular materials, and powders. Fluids and fluidized solids flow to become essentially level in their containers (or other physical boundaries) because of gravity whereas most bulk solids pile at an angle of repose to a peak. The substance to be measured can be inside a container or can be in its natural form (e.g., a river or a lake). 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 detects levels that are excessively high or low.

B. Gas Sensor Interfacing

Excellent performance CO2 Sensor, for use in a wide range of applications, including air quality monitoring, smoke alarms, mine and tunnel warning systems, greenhouses, etc. The sensor is easy to use and can be easily incorporated in a small portable unit. They are used in gas detecting equipment for carbon monoxide (CO) in family and industry or car.

C. pH Sensor Interfacing

Use the pH Sensor just as you would a traditional pH meter with the additional advantages of automated data collection, graphing, and data analysisMonitoring pH change during chemical reactions or in an aquarium as a

result of photosynthesis, Investigations of acid rain and buffering, Analysis of water quality in streams and lakes 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 moist and light level. The pH sensor has an inbuilt meter to measure the light intensity. The pH sensor is connected to a board to get a digital input

D. 16 x 2 LCD

This is an LCD Display designed for E-blocks. It is a 16 character, 2-line alphanumeric LCD display connected to a single 9-way D-type connector. This allows the device to be connected to most E-Block I/O ports. The LCD display requires data in a serial format, which is detailed in the user guide below. The display also requires a 5V power supply. Please take care not to exceed 5V, as this will cause damage to the device The 16 x 2 intelligent alphanumeric dot matrix displays is capable of displaying 224 different characters and symbols. This booklet provides all the technical specifications for connecting the unit, which requires a single power supply (+5V).

E. UART Converter

The USB_RS232 cables are a family of USB to RS232 level serial UART converter cables incorporating FTDI's FT232RQ USB to serial UART interface IC device which handles all the USB signaling and protocols. The cables provide a fast, simple way to connect devices with a RS232 level serial UART interface to USB. Each USB-RS232 cable contains a small internal electronic circuit board, utilizing the FT232R, which is encapsulated into the USB connector end of the cable. The integrated electronics also include the RS232 level shifter plus TX and Rx. LEDs which give a visual indication of traffic on the cable.

F. PIC Controller

This board is built with PIC16F877A as a microcontroller unit. The input supply to the board can be fed from both AC and DC. It uses a crystal oscillator for generating frequency. A serial communication is achieved by a UART protocol. This board is specially designed for connecting digital and analog sensors which has an input voltage range 5 or $12V_{DC}$ as well as it can be interfaced with serial communication devices, relay boards etc. The output can be monitored in the LCD as well as PC. Data EEPROM is used to store data defined by the user, PCB design. When a variable is defined, it is stored in program memory and the value of the variable is stored in data EEPROM Synchronous serial ports are used to communicate with other peripheral devices like serial EEPROMS, A/D converters and shift registers. PCB design, they have two modes. 1- SPI serial peripheral interface 2- i2c inter integrated circuit

G. IOT Module

A license IOT board designed to meet a variety of online application needs with distinct advantages that enable the embedded system designer to easily, quickly and seamlessly add internet connectivity to their applications. The module's UART update feature and webpage control make them perfect for online wireless applications such as biomedical monitoring, environmental sensors, and data from portable battery operated wireless sensor network devices. License IOT board featured with SIM900 GPRS modem to activate internet connection also equipped with a controller to process all input UART data to GPRS based online data.

I. Relay

A relay is an electromechanical switch which is activated by an electric current. A single relay board arrangement contains driver circuit, power supply circuit and isolation circuit. A relay is assembled with that circuit. The driver circuit contains transistors for switching operations. The transistor is used for switching the relay. An isolation circuit prevents reverse voltage from the relay, which protects the controller and the transistor from damage.

J. Pumping Motor

A pump motor is a DC motor device that moves fluids. A DC motor converts direct current electrical power into mechanical power. DC or direct current motor works on the principal, when a current carrying conductor is placed in a magnetic field it experiences a torque and has a tendency to move. Pumps operate by some mechanism (typically reciprocating or rotary), and consume energy to perform mechanical work by moving the fluid. Pumps operate via many energy sources, including manual operation, electricity, engines, or wind power, come in many sizes, from microscopic for use in medical applications to large industrial pumps.

V. SOFTWARE DESIGN

The level sensor detects the level of substances that flow 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. The hardware configures the pH and the gas sensor sensor include Acid-base titrations Analysis of water quality in tanks a pH sensor is a device that measures the hydrogen-ion concentration (pH) in a solution, indicating its acidity. If the water quality is below the standard sensor will update the information to the cloud and the gas sensor monitors the CO2 Sensor, including air quality monitoring, smoke alarms, mine and tunnel warning systems, greenhouses, etc.. The LCD display will show the sensor value, then display requires data in a serial format, which is detailed in the user modules. IOT module update feature and webpage control make them perfect for online wireless applications operated the wireless sensor network devices. The information and the feature data will be updated in the cloud server webpage via IOT module. This information is send from the iot module by the GPRS modem.

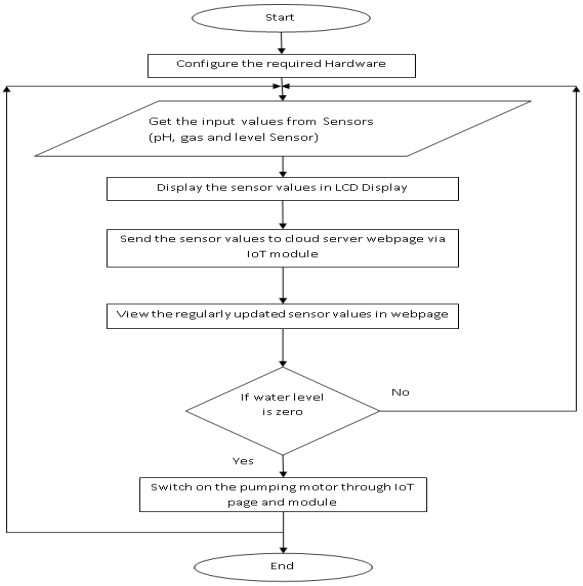

Fig 3.Flow chart

RESULT

A. Hardware implementation

After the establishment the sensor node starts sending the respective data and transmitted to IOT module. The Physical Sensor pH, Gas, Water level sensor is connected to PIC Microcontroller and IOT Module is also interfaced.

B. IOT platform

The sensors are switched on start sending the data. The IOT where the web page sensing the water quality parameters received the data at the server are displayed along with the unit.

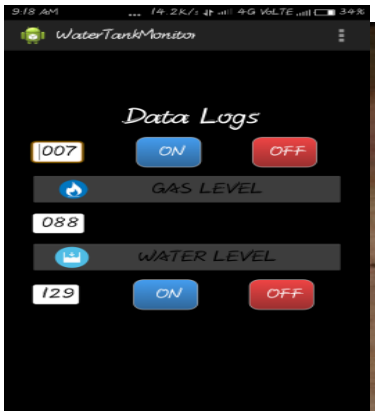

Fig 4. Information server to smart phone

Fig 5 Hardware Module

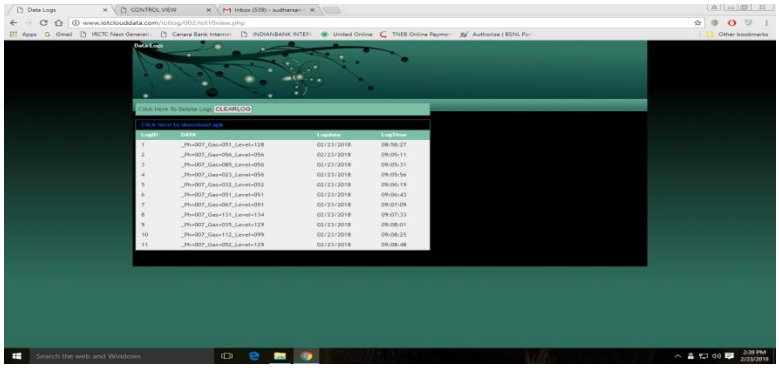

Fig 5. IOT Web page

CONCLUSION

In this paper an efficient, real time water quality monitoring system based on IOT is presented. The central base station and nodes are connected through IOT networks and base station is interfaced with the 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.

REFERENCE

[1] YU Haibin, ZEN Peng, LIANG Hua. Intelligent Wireless Sensor Network [M].Beijing:Science Press,2006:32

[2] T. P. Lambrou, C. G. Panayiotou, and C. C. Anastasion, "A Low Cost system for real time Monitoring and assessment of potable water quality at consumer site," In porc, IEEE Sensors, Oct 2012, pp.1-4.

[3] REN Fengyuan,HUANG Haining,LIN Chuang.Wireless Sensor Networks [J] Journal of Software, 2003, 14(7):128 1291.

[4] A. Aisopou, I. Stoianov, and N. Graham, "In-pipe water quality monitoring in water supply systems under steady and unsteady state flow conditions: A quantitative assessment," Water Res.,vol. 46, no. 1, pp. 235–246, 2012

[5] "Online Drinking Water Quality Monitoring: Review on Available and Emerging Technologies", Muinul H. Banna, Syed Imran, Alex Francisque, HomayounNajjaran, RehanSadiq, ManuelRodriguez&MinaHoorfar Journal: Critical Reviews in Environmental Science and Technology. Volume 44, Issue 12, June 2014, pages 1370-1421

[6] "A Low-Cost Sensor Network for Real-Time Monitoring and Contamination Detectionin Drinking Water Distribution Systems ", Theofanis P. Lambrou, Christos C. Anastasiou, Christos G. Panayiotou, and Marios M. Polycarpou,IEEE SENSORS JOURNAL, VOL. 14, NO. 8, AUGUST 2014.