International Journal of Research in Advent Technology, Vol.6, No.6, June 2018
E-ISSN: 2321-9637
Available online at www.ijrat.org

IoT Enabled GPRS Based Smart Water Quality Monitoring System

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Abstract---The monitoring of the water standard is a complex process as it has several laboratory testing methods and time consuming. To overcome this difficulty, a real time monitoring of water goodness by using IoT has been proposed. Internets of things together with the Sensor water meters are used for the effectiveness, and to govern the quality of water. Here we are executing, system for monitoring the water goodness through different sensors - turbidity, water level, temperature and gas. The controller accesses the information which is monitored by the use of sensors. The accessed data are controlled by the usage of ARM controller. By using Zigbee, the information is collected and the water pollution can be enquired, by a strict mechanism. In this system directs an alert to the public and concerned subdivision or unit about the water. In addition, sensor information, triggers actuators, and transmits data to a web application handle by a gateway unit. With the help of water threshold values an algorithm was designed. To control water quality that algorithm was programmed into a microcontroller-based gateway. The system had a duplex communication link based on a cellular-Internet interface that allowed scheduling to be programmed for irrigation and data inspection through a web page.

Keywords--LPC 2148, Sensors (Water level, Thermistor, CO, Turbidity) ZIGBEE, GPRS.

1. INTRODUCTION

Water is a fuel for life, and no one can study without water on this planet. Dangers of collapse Different types of drinking water come through industrialization, globalization, urbanization, agriculture, etc. It is essential to constantly monitor water using flexible technology. From our project, we ensure that the water quality measurement is done automatically. The Central Pollution Control Board (CPCB) has established several permanent monitoring stations of water bodies in Cambodia that check the monthly or annual water quality. This should ensure that the water standard is maintained at the desired level. It is also monitored daily. Pollution control and pollution control measures have been completed by water quality control. CPCB plans to set up a water monitoring network in the Ganges Valley. All stations operate in real time, and the network can access data from multiple terminals using GPRS / GSM or 3G mobile service. And the price of the system differs with the compounds used. Our proposed model has sensors that calculate the water standard in real time for efficient and cost efficient operations and requires less power. In this article, Section 2 reviews the literature on water quality control, while Section 3 discusses the Internet. Section 4 discriminates on the implementation of standard water monitoring systems and the results obtained from this system are discussed in section 5.

In total there are 60 lakhs of water tested twice a year for bacterial analysis and once a year for chemical analysis. According to the National Program for Agricultural Drinking Water (NRDWP), 120 Lah water samples, were tested each year. The water testing method began in 1988; from 1988 to 1991. The substrate technique is used to determine the target bacteria. In 1996, a method for acquiring water quality was used, but many urinary tract infections were missed in this way. From 1995 to 2007, the sample of samples with pounds less than 3 milligrams per liter was 57-69%.

2. LITERATURE SURVEY

1. The Rapid population growth leads to the exhaustion of existing water resources and decreases in water quality. Groundwater quality is also covered by grass and mushrooms. The river in India is poisoned by industrial waste and disposal of untreated waste.

2. In 2013 Nyvit Yadav [1] "CPCB Water Quality Monitoring for the Future". In this way, water quality in the Ganges and Yamuna rivers has been tested by sensors. Because it is the most contaminated river in our country, CPCB's plans to analyze water standards. And this method is more expensive.

3. In 2015, Liang Huif, Wang Jiang Zhou, and Zhao Kuo [2] "Study the Prospects of the Internet's Evolving Process of This" in the new arrivals and the evolution of the Internet, clarify the use of Internet and various techniques has been explained.

4. In 2016, MN Barabde, this system is used to determine the physical-chemical factors of water quality, such as movement, temperature, PH level, contact and decreased potentiometric potential ZigBee consumption.

Picture 1 tells you different degrees of holiness in different years.

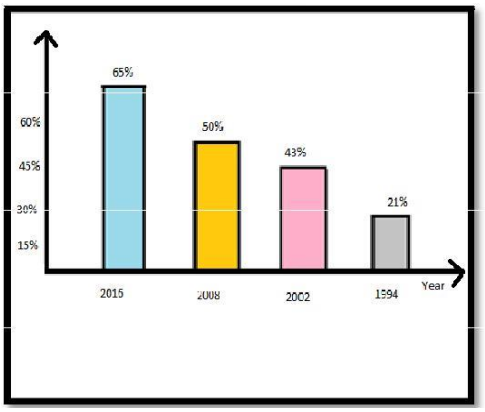

Fig.1. Analysis of Purity

3. INTERNET OF THINGS

Internet of Things (IoT) is defined as a network of objects or objects, environment, including automotive equipment and buildings that are built with a sensor, microcontroller, and association network. It allows these items to be collected and varied across different environments. IoT is a large and large network of submerged objects and is designed with many wireless telecommunication systems. By using the existing Internet framework, Internet connectivity can be linked to any infrastructure scheme and can be reviewed and reviewed. All devices have their unique feature. It helps to capture data automatically in real time. The interior of the Internet has a processing tool, sensor and portal, a large building. By 2020, it says that 50 billion of these objects will be integrated with the Internet [9]. Wireless RFID technology on a personal area 6LoWPAN (low power IPv6), Wi-Fi, Bluetooth and ZigBee allows connectivity and network through the server. Sensors related to sensors have been saved and analyzed by cloud services. People have the right to make the right decision about the data collected.

Until now, smart phones have become a part of communication and land assessment. While mobile phones are more convenient and inexpensive, they can be used to deliver information. Due to mobile distribution, many applications for mobile data access have been expanded. The report on water standards can be very effective as well as accurate data analysis when sensor technology is merged with mobile data applications. Mobile devices, personal computers and tablets have built-in keyboard and keyboard sensors. By using IP address on the Internet, the phone can easily access the Internet (IoT devices meet any requirement). Mobile internet mobile phones play a role of a cellular / cellular network. Smart objects are part of the Internet in the architecture network everywhere. Therefore, the authorized user has the information method. Data is collected from each object using the server acting.

A. Connected jobs

The function of IOT's Open Source Web site is to store and download data from sensors or objects using LAN (LAN) or HTTP over the Internet. Using this website, applications can be created, such as storing and downloading data from sensors or objects using LAN (LAN) or HTTP over the Internet. Apps like location tracking, location tracking, and social status updates can be created using a web page. Digital data such as average, intermediate, aggregation, rounding and timing are processed using the API. The generated application channel supports 8 data fields, such as slopes, latitudes, latitude, and state. The function of the object is to transmit cloud data sensors to store information in the channel using sensors and websites. An easy way to save data is by cloud. Web pages can be scanned, visualized, and can be used to collect new data or interact with websites and social media using web applications, to calculate new data, and to view data in the form of charts and charts using online analytics tools. Also, this program can access MATLAB to provide sensor data. Here, too, the impact is related with the device. The app responds to original data and new data in the channel. It also helps the device run while waiting for the command.

4. IMPLEMENTATION

Four sensors (tensions, temperatures, water levels, gas) and LPC 2148 controllers connected to the internet are used in this system. Modules for processing microcontroller and GPRS / GSM transceiver module. Four sensors capture data in analog signals. An ADC converter converts information from four signals into digital format. The digital signal is transmitted to the

LPC 2148 controller that is attached to the transmitter module. The LPC microcontroller at 2148 will learn and study the Digital ZIGBEE module, and here, which is available for the front communication channel, this module transmits the ZIGBEE factor for the quality of smart phone / computer quality via SMS that can be seen on the LCD screen. Figure 1 shows the water quality control system. The LPC microcontroller in 2148 accepts and processes this data, which is collected from the sensors to the web page via the GPRS / GSM module. Using encoding, the transmission is done. The most used C language is used to code, and Keil's vision software is used to impersonate the program. For C program we used the MDK-ARM v4 evaluation version. An application called Flash Magic is used for burning. Hex file to the NXP controller.

5. SYSTEM DESIGN

The water quality monitoring system employs sensors such as Water level, temperature, Gas (CO) and turbidity to get the data parameters. These sensors are positioned in the water will analyze the quality of the water resources. The verified content is used to prophesy the quality of water.

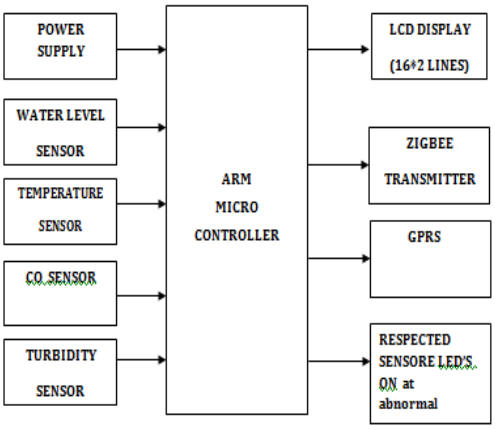

Fig.2.Block Diagram of Smart Water Quality Monitoring System

This paper demonstrates the development of an automatic irrigation system based on microcontrollers and wireless communication across experimental levels in rural areas. The purpose of the practice is to show that irrigation can be used to reduce water consumption. Microcontroller for data acquisition and capture devices. Sensing measurement is transmitted to the receiving microcontroller. This aisle allows for the automatic operation of irrigation systems when moisture levels and soil temperatures are reached. The relationship between sensors and data acquisition devices is achieved through the General Protocol of the General Packet Radio (GPRS), a mobile-based mobile communication system (GSM) based on mobile devices.

6. METHODOLOGY

6.1 Microcontroller

This section creates a project management unit as a whole. This section contains a microcontroller with circuits such as crystalline, circuit breaker, electric echo (if necessary). Etc. The microcontroller is at the heart of the project because it manages the connected device and communicates with the device according to the program written.

6.2 ARM7 TDMI

ARM is the abbreviation of the RISC Advanced machine, which is the name of the processor and the name of the technology. A series of RISC and related mechanics related texts are simpler than CISC.

6.3 Liquid-Crystal Display (LCD)

Electronics is a flat screen, an electronic screen that uses the properties of liquid crystal fluorescence. The crystals do not glow directly. The LCD screen can detect fixed images or images that can display or hide such as predetermined words, numbers and 7 sets, as well as digital clocks. They use the same basic technology, except for random images with small pixels, while the other screen has large items.

6.4 PC Monitor

The HDMI-VGA cable is attached updated ARM and the LJ R interface of the cable is attached updated. The face of the character getting captured can be visible on up-to-date.

6.5 *GPRS*

GPRS technology allows for higher data rates than mobile networks over GSM technology. GPRS provides data services with a maximum data rate of 172 kbps, such as browsing capabilities and other services that need to be sent. Of data. GPRS and GSM can work together in the same network and use the same base stations. However, it needs to be improved. Network updates reflect the many 3G requirements, and therefore, GPRS network investments fund the basic infrastructure for further development into the 3G W-CDMA / UMTS.

Fig 3. GPRS modem

6.6 ZIGBEE

The Zigbee module has an UART interface that allows any microcontroller or microprocessor to use the Zigbee protocol service immediately. All Zigbee hardware designers should make sure that the server's logical level is compatible with the Zigbee 2.8 to 3.4 V logic level. Converting at a logical level can be done using the standard RS-232 IC or logical interpreter, such as 74LVTH125, when the machine is directly connected to the Zigbee UART. The X-Bee RF module connects to an electronic device through the x-axis transceiver on the logic level. Through its serial port, this module can communicate with each logic and the voltage corresponding to the voltage. Or via the level of the interpreter on each series device. The data is displayed to the X-Bee Module via its DIN pin and must have an asynchronous CD format that has a bit of 8 bit data bits and a stop bite. Because input data enters UART data directly in the X-Bee module, no minimum invitations are required in the asynchronous series data stream. Timely checking and timing all the time takes care of X-Bee's UART.

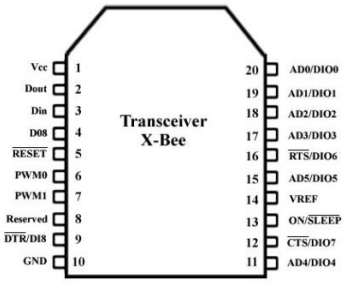

Fig 4. ZIGBEE pin diagram

6.7 LED

LED is the light source of electronic devices. LEDs are used as lamp lamps in many devices and are increasingly used for illumination. Introduced as a virtual electronic component In 1962, the first LED light showed a red light with a low intensity, but the modern version had a very bright sunlight and infrared light.

Fig.5. LED

7. SENSORS

This sensor provides relevant electrical data by looking for events or modifications in their environments. This sensor is a tool. The sensitivity of the sensors is increased by sensing the sensor. Accuracy, clarity and tilt are the most important of the devices. Actions can be improved and eliminated the resulting bugs resulting from the deletion of staff in the result of the sensors that make them increase. The difference between the desired output and the acquired sensor force makes it possible to identify structural error. During time sensor measurements, occasional errors are compensated during standard measurements.

7.1 Thermistor

The thermistor is heat sensitive; the main function is to place large, predictable and precise changes in electrical resistance when subject to corresponding changes at the body temperature. The thermistor for negative temperature coefficients (NTC) has shown a decline in electrical resistance when it has experienced an increase in body temperature, and the temperature of a positive thermistor coefficient (pupil chamber) has shown an increase in electrical resistance when it has risen in body temperature. The United States apparatus capable of producing thermistors operates in temperatures ranging from -100 ° to at least + 600 degrees Fahrenheit. Due to their excellent predictability and long-term stability thermistor, these are generally best suited for many applications, including measurement and control of temperature.

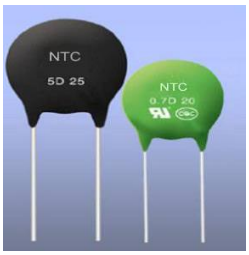

Fig.6.Temperature Sensor

7.2 Water Level Sensor

This simple transistor based water level indicator circuit is very useful to indicate the water levels in an agriculture field channels. Whenever channel gets filled, we get alerts on particular levels. Here we have created 3 levels (low, medium and full), we can create alarms for more levels. When channels gets filled completely automatically the gates to next channels gets lifted up.

The purpose of this tool is to allow users to evaluate a pressure sensor not only for water levels and mechanical changes, but also for flow measurement, leak detection, and other intelligent use solutions. The system continues to monitor water levels and water flow.

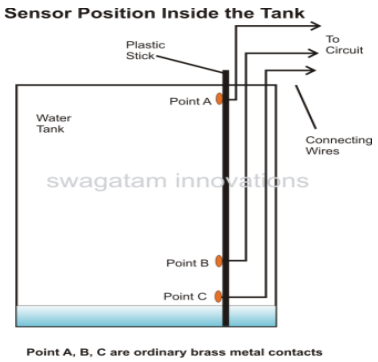

Fig.7. Water Level Sensor

7.3 GAS Sensor (CO)

The sensitive material of the MQ-3 gas sensor is SnO2, which has a low current in clean air. When alcohol is present, there is a high level of electrical current, along with increased concentration of gas. In this simple electric loop it is used, it changes the change of current into the corresponding output signal of the gas concentration. MQ-3 gas sensors are highly sensitive and resistant to gas, smoke and steam. This sensor can be used to detect the alcohol of different focus.

Fig.8. CO Sensor

7.4 Turbidity Sensor

Dirt is a cloud or blockage of fluids caused by many independent particles that are generally not visible to the eyes, such as smoke in the air. Pollution is an important method of measuring water quality. The light, which is dispersed by non-soluble residues of water, is measured by the accelerometer. When the total amount of solid waste increases in the water, the level of dirt (and cloudiness or lack) of the water also increases.

To check the level of solubility of the water, the sensor is satisfied. Interests, ARM heaters are determined by measuring the dark conditions. This sensor uses light to detect particles hanging in water by calibrating the speed of light transmitters and dispersing and changing with the quality of suspended storm (TSS) in water. When the TTS increases in the way the liquid level increases. Coal concentrators are used to gauge water standards on rivers and streams, and measure efficiency, volume management, reservoirs, and transports are also included in the laboratory measurements. Analog and digital output mode is provided by a liquid sensor.

Fig.9.Turbidity Sensor

8. RESULT & DISCUSSION

We have identified a decent deployment template with various tools and modules, and their functionality is shown in Figure 10. In this implementation model, we use LPC 2148 with the Zigbee module. ADC and Zigbee, which are connected to the Internet. Sensors connected to the ARM control panel ADC will convert

the sensor's corresponding sensors to its digital values, and from this price the corresponding environmental parameters will be evaluated.

When data from different sensors is located in specific areas of interest, the data will automatically be sent to the server when the correct connection to the serial device is established.

9. SYSTEM DESIGN OF MODEL

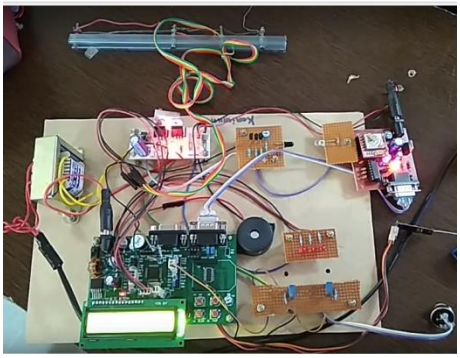

Fig.10. System design model of GPRS based smart water quality monitoring system

10. CONCLUSION AND FUTURE SCOPE

Conclusion: Temperature control, pH and water temperatures use only one-of-a-kind water sensors and existing GSM networks. The system monitors the quality of water automatically and is cheap and does not require telephone calls. Therefore, water quality testing is likely to be very effective and quick. The system is very flexible. Only by replacing the sensors involved and the program changes respectively can use this system to monitor the water quality parameters. This operation is simple. The system can be expanded to control irrigation, pollution, industrial production and agriculture. It has a comprehensive program and exponential value. Keeping the existing device in the monitoring environment helps protect itself (eg, environmentally intelligent) for the environment. In order to meet this requirement, the sensor must be collected and analyzed. By introducing the sensors into the environment, we can bring the environment into real life, interacting with other things on the web. The collected data and analytics results will be available to the end user via Wi-Fi.

Future Scope:

- Increase the parameters by addition of multiple sensors
- We detected four parameters in this paper. In future by detecting the more parameters for most secure purpose.
- By interfacing relay we controls the supply of water

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