

IoT BASED SMART WATER MANAGEMENT SYSTEM

Bharathi mohan M¹, Ramanan S², Sanmugavel S³, Tharma pratheesh B⁴, Ms.priyadarshini S⁵

^{1,2,2,3,4}UG Scholar, Department of Computer Science and Engineering, Hindusthan Institute of Technology, Coimbatore, India

⁵Professor, Department of Computer Science and Engineering, Hindusthan Institute of Technology, Coimbatore, India

Abstract: The Project entitled as "IOT BASED SMART WATER MANAGEMENT SYSTEM" for smart India. In today's ever-growing industrial process, the global water reserves is perpetually becoming sparse. The usable water resources on earth are limited. In fact, 99.7% of the planet water is usable by human unless it goes through costly and environmentally-harmful procedures while usable water on earth is sparse and costly to treat, statistics show excessive use worldwide. Penalties are issued to limit the excessive consumption; however, their impact is marginal as they do not identify the reason for the exorbitant consumption. Therefore, giving users the full awareness about their water consumption will greatly help in minimizing the water waste. This project aims to prevent a smart self-powered water monitoring system that users use for indicating the amount of water flowing and conductivity level. The system consists of an IoT device that can be installed at any water source. This system gives the user the ability to identify time to water flow into the tank and also the amount of water flowing into the system. User can see transmitted data on webpage.

Keywords: smart water system, water flow, water supply, Wi-Fi module, conductivity.

1. INTRODUCTION

Recently, Wireless Sensor Networks (WSNs) have received widespread applicability not only in monitoring applications, but also in the field of data collection, surveillance, and medical telemetry. However, the impact of using WSNs in industry is still not effective due to their inefficient implementations. For instance, industries are still using the traditional way to monitor the amount of water usage distribution system.

In this project a WSN-based water flow management system is proposed. The contributions of the project is as follows.

- The monitoring framework uses flow sensor to monitor water flow and conductivity in real-time.
- This is an integrated framework from the network deployment to the application layer and can also be used in other monitoring applications.

This type of web page to easily get the information of all water flow in home. Which display separate time & date usage for water flow and conductivity. To understanding there requirements and new generation capabilities we have chosen "HTML & CSS" as front-end and "DOT NET & ARDUINO CODE" as back-end. Dot net helps you develop high quality application faster. It provide better response times and require less compute power.

Benefits- User can view the water usage and conductivity level in webpage. It can update details of water flow and conductivity per minute on web page. Penalties are issued to limit the excessive consumption of water. The problems has been overcome such as human work, unequal water supply and illegal water consumption

A.Objectives of the project

In present scenario, the per capita usage of water in a community with a population of between 20000 to 100000 is nearly 100 to 150 litres per day. For communities with a population of over 100000 the per capita usage is nearly 150 to 200 litres, per day. This is according to the BIS standard 1171:1998. The ever increasing population of metropolitan cities have led to significant crisis of water. Meanwhile a large amount of water is not evenly distributed due to the malfunction in the current water supply system. The current water supply system of Bangalore supplies approximately 900 million litres of water per day, despite a municipal demand of 1.3 billion litres. The per capita water supply that Bangalore city is able to provide averages 100 to 125 litres, per day. However, the actual availability of water to the poor areas of the city is limited by infrastructure and so for these areas, the per capita supply can be as low as 40 to 45 litres per day. Hence there is an excess of supply in water for many areas resulting in security water in few areas. This project aims at overcoming these disadvantages apart from the primary disadvantages mentioned.

2. EXISTING SYSTEM

The management of water should be in a way that well as quality can be monitored. The project hence provides a solution for management of water in housing societies as well as it monitors the water for basic norms of quality. The project will facilitate the supervisors of

societies to take adequate actions which will be required if the quantity of water decreases from a particular threshold.

The members of the societies can be notified the level of water available in the water tanks and the purity of water by its parameters. The sensed parameters from the sensors will be collected and will be sent to the cloud to update the real time data. It has built- In Wi-Fi module so that it can easily communicate with other devices and cloud thus allowing its control from any computer such as a smartphone, over the internet. Besides microcontroller, we have also used Turbidity sensor for determining the purity of water.

3. PROPOSED SYSTEM

In order to prevent the over water consumption by water flow detection method using IOT. It monitoring the water from street tank to pipes. Which controls the water flow and it gets connected to secondary distribution tanks. Each and every street has the flow control to certain water consumption limit by using RTC (Real Time Clock). The Wi-Fi module technique used to enable communication. . The flow rate is determined through Wi-Fi module. Arduino controller plays a vital role in performing all controlling operations. It is interfaced with Wi-Fi module to perform the functions according to the signal received. And the flow rate is stored in the database. Penalties are issued to limit the excessive consumption. The problems has been overcome such as human work, unequal water supply and illegal water consumption etc. A flow sensor for measuring of quantity supplied, eliminating the drawbacks of traditional water metering systems. This system works automatically without any human intervention. On estimating these measured values, the habitats which over consumes water can be easily identified and alert is produced. We have also used conductivity sensor for determining the level of minerals in the water.

4. IMPLEMENTATION

The block diagram given in our proposed system demonstrates our overall system architecture which consists of less complicated features and allows an important function of portability.

The proposed system architecture consists of following devices:

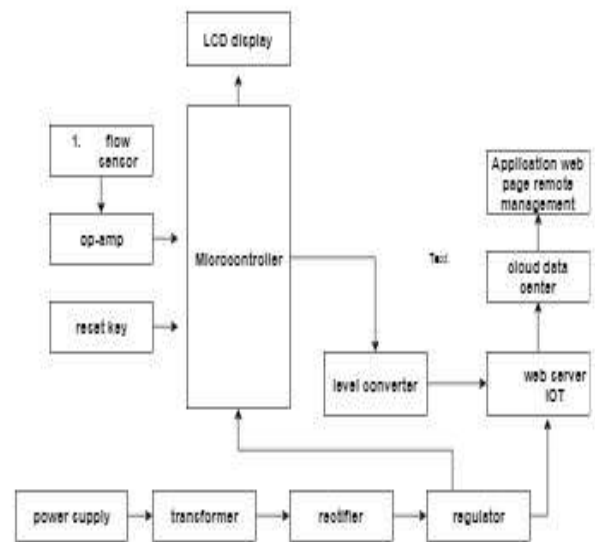


Fig.1. Block Diagram

The system architecture of the project contains following modules:

- Water measurement
- Flow sensor connection
- Arduino board interface
- Display water measurement
- Iot interface
- Display water usage on web page

A. WATER MEASUREMENT

The Arduino flow meter works on the principle of the Hall result. Here, the Hall Effect is utilized in the flow meter using a small fan shaped rotor, which is placed in the path of the liquid flowing. Thus a voltage/pulse is evoked as this rotor rotates. In this flow meter, for every liter of liquid passing through it per minute, it outputs about 4.5 pulses. We live the amount of pulses employing an Arduino and so calculate the flow in liters per hour (L/hr) exploitation a straight forward simple conversion formula.



Fig.2 Flow rate sensor

B. FLOW SENSOR CONNECTION

The connections required for this flow rate sensor with respect to the Arduino are very minimal. There square measure solely three wires returning from the flow rate sensor. The 5V VCC (red wire), the GND (black wire), and the signal/pulse (usually yellow) line. This is accustomed browse the pulse from the flow meter. When the Arduino detects the water flow, it immediately triggers the pulse Counter() function. This function then counts the total number of pulses.

C. ARDUINO BOARD LCD INTERFACE

The lcd display is connected to arduino board in pin 2. The microcontroller collected the data of water flow pulse and display in the LCD.

D. DISPLAY WATER MEASUREMENT

When water flow through the sensor, it rotates and generates pulsated output after each cycle. This pulse is browse by microcontroller and it sends command consequently. Number of pulses over specified time interval is compared with standard (2.25 ml/pulse).



Fig.3 Display water measurement in LCD

E. IOT INTERFACE

The ESP8266 Wi-Fi module is capable of either hosting an application or offloading all Wi-Fi networking function from other processor. User need a way to view and understand the data captured by IOT. The Wi-Fi module send the data of water usage and conductivity data to the cloud.

F. DISPLAY WATER USAGE ON WEBPAGE

The water usage data is stored in the cloud and user can be accessed data on webpage. the login page has user id and password. The user type the id and password to see the usage data ion webpage.

5. SOFTWARE REQUIREMENT

Front end: HTML, XML

Back end: Arduino code, DOT NET

Tools: Eclipse, Arduino software, ubidots (cloud)

6. HARDWARE REQUIREMENT

- Microcontroller(Arduino UNO)
- Power supply
- LCD display
- Water flow sensor
- Wi-Fi module
- Conductivity sensor
- Bridge rectifier

7. SYSTEM DESIGN

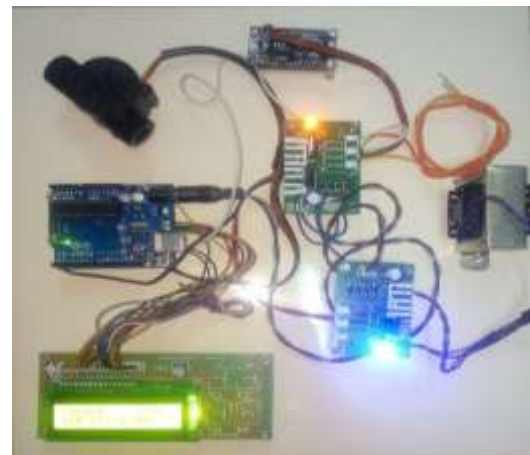


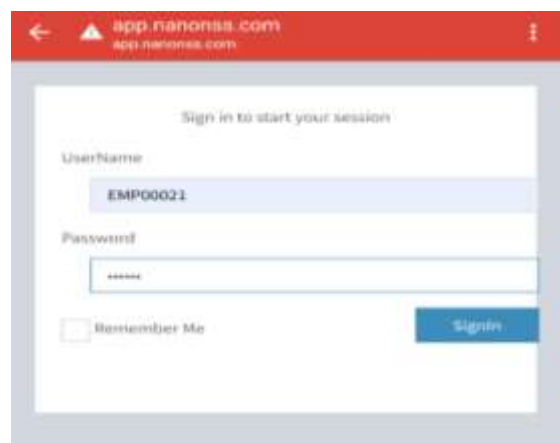
Fig.4 system design

8. OUTPUT

A. WHEN NO WATER SUPPLY



B. USER LOGIN PAGE



C. WATER USAGE DATA



Row#	value	receivedate
11	Door_No:37,Water_Consumption:12.0980Litre	3/28/2019 10:38:44 PM
10	Over_Consumption_of_Water	3/28/2019 10:38:25 PM
9	Water_Conductivity_is_Low	3/28/2019 10:37:45 PM
8	Water_Conductivity_is_High	3/28/2019 10:37:44 PM
7	Water_Conductivity_is_Low	3/28/2019 10:37:43 PM
6	Door_No:37,Water_Consumption:0.0000Litre	3/28/2019 10:37:43 PM
5	Water_Conductivity_is_High	3/28/2019 10:37:42 PM
4	Water_Conductivity_is_Low	3/28/2019 10:36:41 PM
3	Door_No:37,Water_Consumption:10.4650Litre	3/28/2019 10:36:19 PM
2	Over_Consumption_of_Water	3/28/2019 10:36:18 PM
1	Water_Conductivity_is_Low	3/28/2019 10:35:53 PM

9. CONCLUSION

This paper will demonstrate the successful implementation of an internet-based approach to measuring water conductivity and quantity usage of water on a real-time basis. A flow detector for measure of amount of water, eliminating the drawbacks of analog water metering systems. Theft can be avoided since there is a system of digital lock. Security of data is provided in real time both at hardware and software level. They are digitalized and automated, high accuracy is maintained reducing human effort. It is a robust, easy-to-install system and small in size. This project will increase the convenience for the residents by enabling them to monitor and control the water management system remotely using webpage.

10. REFERENCES

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