

Cloud Computing and IoT: A Move Towards Management of Water to Refrain Drought Conditions

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ABSTRACT

In this day and age, water is treated to be the precious thing for survival, without which life is impossible. The water is needed to be preserved and used wisely for its conservation of it. Here in this paper, the use of water can be utilized skilfully. The developed system can be effortlessly established in different conditions of the environment. The level of water will be notified by the sensors after particular intervals of time. The data of updated water levels will get stored on the cloud. After a while, the user can observe the level of water on the computer system which is connected to the Internet. In accordance with the water level in the tank, the working of the valve will get automatically regulated, at a low level of water the valve will get turned on automatically. When the water tank is at a point to fill up it will shut down.

Keyword: - water, sensor, water management system, Ultrasound, distance formula, solenoid valves, cloud.

1. INTRODUCTION

The foremost thing is to retain water and its resources for forthcoming use. We are planning to design a system that is very efficient. All the fresh water will be gathered from different sources and get stored in tank. The drinkable water will be collected from sources and store that in tank for various purposes, the water from there we will distribute the water to various places. All the parameters such as level of water in the tanks and filters can be known by MEGA controller. We can analyse the data and processes of this system. The analysis can be done on the basis of details received. The analysis can be carried out by the controller based on the information acquired from sensors and these sensors take a decision of managing the solenoid valves. The analytical information is received on one protected system using cloud.

2. SMART MANAGEMENT OF WATER

The water sector controls the complicated conversation between the water services and social as well as the economic system. The variety of stakeholders are public, vast and private, right from international to local companies, and encouraged by different nations. Various schemes are promoted for the management of water and these schemes are forever evolved in many countries and these are the main reasons for current market scenario in water management and its usage solutions. An extreme market fragmentation causes drawbacks for modernization under the preferable standard of Integrated Water Resources Management (IWRM), by decelerating the selection of open reference architectures. This procedure could enable interoperability, which makes it more easy-going for developers to improve the ongoing solutions and to combine and take on the inventive ones.

3. STANDARD MODEL FOR WATER MANAGEMENT

To establish the resources into prevailing technology is an effectual way of exploiting and conserving resources. There is a large amount of usage of water and its resources in the society where we leave. The present quantity of water is less and to overcome this problem in a realistic way this system comes into use for smart management of water. This system is totally controlled by the sensors and the controllers without making any human involvement. We have explained the model in detail below:

3.1 Chief Source Tank

This is the chief storage tank where we can collect all the drinkable water from the major resources. There is an Ultrasonic sensor that supplies all the information of the level of water in the tank. All this data is given to the controlling unit of the system for further manipulation. The inlet of this tank valve can be controlled by the designed program.

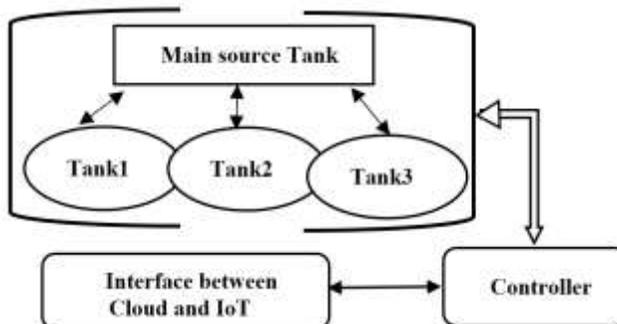


Fig -1: Standard Model for Water Management

3.2 Tank 1, Tank 2 and Tank 3

These are the sub category tanks of the main or chief source tank. From here the end user can outlet the water for the usage if in need. Here the level of water here is maintained by the help of Ultrasonic sensor and the flow of water or refilling of tank is done by Solenoid valve. This is the main result section of the designed model.

3.3 Controlling Entity

It can be identified as the main block of the model. From this part all the Solenoid valve is controlled by designed program which is incorporated in the controller, here the RASPBERRY PI 2 can be used as the controlling unit. The quantity of water level and the warning for refilling signals are generated from this block.

3.4 Cloud Based

Here all the utilized data is represented in graphical way format. In it the Twilio client is used. The warning signals can be generated from this defined client. This part of model can be considered as the information extractor of this model.

3.5 Warning System

This system consists of mobile phones or the desktop for receiving the warning messages and it mentions the actions to be taken for the effective utilization of the water. In this program the mobile number is stored where we get the messages and warnings related to data which is updated after intervals.

4. IoT FOR WATER MANAGEMENT

The Internet of Things capabilities in Water management scenarios can be gained if we assume some considerations from the large business, social and technical aspects. Listed below are the main advantages of providing IoT tools in managing water scenarios:

4.1 Increment in Efficiency

The companies which manage water usage can use real-time operational control to make their business smarter and effectively make reductions in operating costs. The real-time data can be used with the help of sensors and actuators to monitor and to make an improvement in water management frameworks, which can make them more efficient and reduce energy costs.

4.2 Cost-Effective

The costs of managing the utilization of water can be decreased by improving utilization factor, process and productivity. The end users and organizations can gain from this improved utilization and service improvements.

4.3 Usage of Assets

By improving the tracking method of assets such as machinery, equipment, resources, etc. By using these sensors, users can benefit from their assets. Users can easily locate their assets and run preventive maintenance measures on the complex pieces of machinery.

4.4 Productivity Increase

It is a most important parameter which makes an effect on any organization. IoT allows a number of real-time controls, process optimizing, time reduction in services, and the capability to do all of this combinedly.

5. MODES OF FUNCTIONAL ENVIRONMENT

The functions of this model are divided into three parts which are as follows:

5.1 Function one

All the data from ultrasonic sensors is received after which it is calculated and stored to cloud but before storing of the calculated data, the analogue data is converted into distance (i.e., centimetres) format by using the following equation (1).

$$\text{Round}(\text{ultrasonic. distance} * 100, 2) \dots (1)$$

5.2 Function two

The closing and opening of the Solenoid valve for refill of the tanks can be decided by using the above-mentioned function.

5.3 Function three

In this function the warning signals can be generated to the already stored mobile phone number. The warning message can be used as:

When the tank is fully filled with water – “The Tank is filled up”

When the tank is half after usage – “The Level of water is reduced by half... Attention Please...!”

When the tank is about to become empty – “Attention...!!! The tank is about to be refilled”

When action has been taken place then the Solenoid Valve is opened.

6. ALGORITHM

Step1: Read the analogue data generated by Ultrasonic sensors.

Step2: Manipulate the data into distance (cm).

Step3: Put in the generated results to make a control of Solenoid valve.

7. FLOWCHART

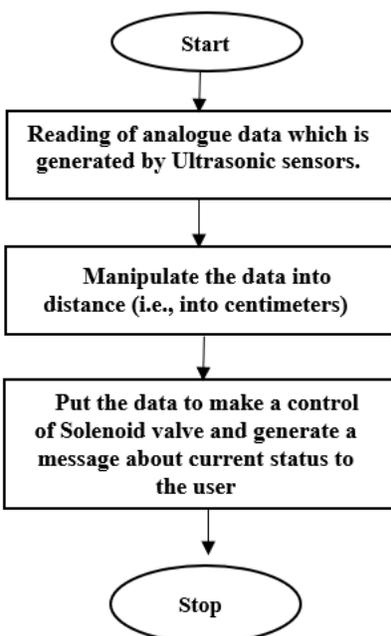


Fig -2: Flowchart for the Proposed Water Management System

8. CONCLUSIONS

The implementation of this developed system can achieve its total water usage quantity and it can prove very helpful to decrease the wastage of water day-by-day. The procedure of implementing of this system is also very simplified and well defined. By experimenting this we can properly.

9. REFERENCES

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