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Water Distribution and Monitoring System

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Abstract - This system represents the initial steps in the development of IOT based water distribution and quality monitoring system. This system is based on a wireless sensors network to detect and locate in real time any check the water quality, quantify its importance, evaluate its consequences and determine the most appropriate actions to be taken to reduce its effects. First, we start with identifying of the quality control points of the water. Then, we move on to the development of a water level for future prediction in the water distribution and monitoring system. Finally, taking into account the environmental parameters of our system, we propose a water distribution and monitoring system based on the IOT concept we use different sensors to manage the water.

Key Words : **Water Management, Flow Sensor, Ultrasonic Sensor, Wi-Fi Module, Notification, PH Sensor, Solenoid volve.**

1. INTRODUCTION

Water is one of the most important basic needs for all living beings, but unfortunately, a huge amount of water is being wasted because of uncontrolled use and exploitation of water resource. Kerala averages rainfall of 3,000 mm a whole year. The general impression was that among all the states in India, Kerala had enough drinking water, but it's not the case. There are 1,164 problem villages without the sufficient supply of drinking water. Even though Kerala has 44 rivers spanning its rich green landscape. Together, they give an annual discharge of 72, 00 million cubic meters of water which is unused to the Arabian Sea. One of the important reasons for the shortage is poor management of water.the Overflowing water tanks in residence, schools, colleges, Municipal overhead tanks, Hospitals etc.they can contribute to the massive amount of water wastage. If we can control this we can save huge amounts of water. Conventional water tanks can not monitor and control the water level in the tank. As of now, the water level need to be manually checked and refilled according to the requirements. So in this paper, we solve all the above mention problems with automatic water level detection and refilling of water storage system with the help of The Internet of Things (IoT). Problem statement: To develop IOT system which address all water distribution and monitoring problems and reduce manual work as well as consume less time.

1.1 Literature Survey

[1] Monitoring system as a tool for risk evslution in water distribution system Alicja Balut, Andrzej Urbaniak 2018 In this paper, we monitor the quality of water and get the result on IOT. And we distribute the water by using the flow sensor.

[2] Real-time clustering for priority evaluation in a water distribution system Nowadays with the development of smart infrastructure for water resource management, there is an increased need for preliminary operation and management of water distribution infrastructures. In this paper, we propose a system for real-time clustering system priority evaluation in a water distribution and monitoring system.

[3] The Optimal Demand Response Scheduling for Water Distribution Systems As energy intensive infrastructures, water distribution systemsare promising candidates for providing demand response and frequency regulation services in power systems operation. However, models that tap the full flexibility of water distribution systems to provide the services while respecting the operational constraints of water networks are remained release.

[4] Smart Water Distribution Management System Architecture Based on Internet of Things and Cloud Computing The fast population growth needs to provide clean and affordable water that meet the human requirements. The water faces a problem in the future because of change in global climate. An efficient water management and monitoring is necessary to keep water quality and availability.

[5] A Novel Smart Water Meter based on IoT and the Smartphone App for City Distribution Management

A novel approach to Achieving automated water meter reading for update of consumption information from field to the Utility office is described in this paper. The smart metering approach is different from existing commercial methodologies by making use of low cost IoT hardware and smartphone app.

[6] Feasibility Study on Wireless Passive Surface Acoustic Wave Sensor in IoT enabled Water Distribution System

Internet of Things (IoT) technology has recently been extensively utilized into a variety of industrial applications. Wireless Passive Surface Acoustic Wave (SAW) sensors have attracted huge attention in numerous IoT enabled applications. The sensor nodes are not directly supplied by the power supply as it absorbs the energy from the interrogating Radio Frequency (RF) pulses to release the SAW.

[7] Research on placement of water quality in water sensor using water distribution systems

In this paper, we use solenoid valve, ultrasonic sensor, PH sensor and flow sensor for monitor and distribution of water.

[8] Design and realization of water quality information management system

In this paper, we make the water distribution and monitoring system. We distribute the water by connecting flow sensor. And check by using flow sensor and PH sensor.

[9] Temperature dynamics and water quality in distribution systems

Quality assurance strategies for water distribution systems often include the application of chemical disinfectants to reduce the growth and transmission of pathogens. Characteristics of water quality in individual systems, and the type of disinfectant employed, create important complexity in understanding and quantifying the impact of disinfectants in different networks. An additional challenge is that disinfection by products (DBPs), created through the breakdown of disinfectants, can be detrimental to human health.

In this paper, we make the water quality monitoring and distribution system. We distribute the water by using solenoid valve. And check by using ph sensor.

[10] Water quality in distribution systems

Quality assurance strategies for water distribution systems often include the application of chemical antibiotic to limit the growth and transmission of pathogens. Characteristics of water quality in individual systems, and the type of disinfectant employed, create significant complexity in understanding and quantifying the impact of preventive in different networks. An additional challenge is that disinfection by products (DBPs), created through the breakdown of disinfectants, can be detrimental to human health.

2. BLOCK DIAGRAM

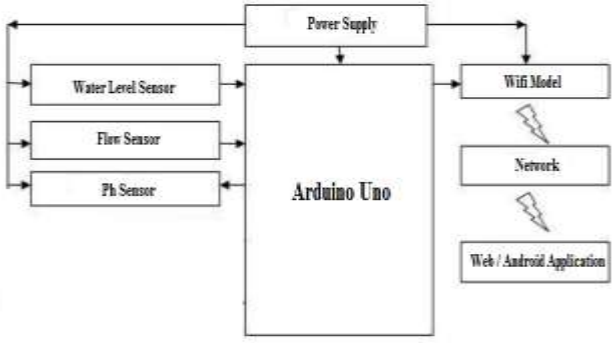

FIG.1 System Block Diagram.

In the proposed smart android framework, a reconfigurable shrewd sensor interface gadget that coordinates information gathering, information preparing, and remote transmission is outlined. The equipment of remote water quality checking framework contains the following parts:

- Ultrasonic Sensor
- pH Sensor
- Controller (ESP)
- Flow sensor
- Solenoid valve

2.1 Mathematical Model

U= {I, O, f, S, F, D, NDD}

Where,

I= {I1, I2,I3}

I1= {l1,l2..... ln} where n size of tank and n>0

I2= f1 i.e. pulse counted using flow sensor

I3=pn i.e. size of pipe

O= {O1,O2,O3}

O1=level of water present in tank

O2=water consumed by user

O3 = bill generated

f= {f1,f2,f3,f4}

f1=QUANTITY (n, I1)

f2 =FLOW_RATE (I2,I3, O2)

f3 =CONNECT ()

f4 =REP_GEN (f1, f2)

S: Success:

- Data send successfully
- Report generated or not

F: Failure:

- Sensors not working properly
- Connection failure

D: Deterministic value, n

NDD: Non Deterministic Data value:

- Levels detected are randomly generated

2.2 Algorithm Steps

Algorithm: A step by step working of controller is given below.

1. While (True):

2. Read control valve value

3. Is Control Valve Open = true

4. Read ultrasonic sensor value, water flow value, bill generate amount and .

5. Water quality value != Okay

6. Turn off control valve

7. Generate warming message

8. Calculate pressure from water flow

9. Upload PH sensor value, water flow value, bill generate amount value to hosted database or local cloud.

3. CONCLUSION

This proposed system manages water supply accurately. Water level can be monitored continuously from anywhere using android application .Motor can be controlled automatically full smart automation is achieved. The water management system is able to log the pH level or quality of water and it also can read the pressure with the help of sensors. Using this system continuous monitoring is possible. Their is no need of manual work, due to reduce of manual work it make system more efficient, reliable and accurate. In this project online billing is provided to the customer. With the help of this we can avoid the wastage of water as the human beings are facing the problems of inefficiently the usage of water

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