

# Automated Water Supply Management System for Urban Residential Area

<sup>#1</sup>Nikita Nirmale, <sup>#2</sup>Minal Shelar, <sup>#3</sup>Pratiksha Bhagat, <sup>#4</sup>Nisha Pawar,  
<sup>#5</sup>Prof.Suhas Kothawale



<sup>#1234</sup>Student, Computer Engineering,  
<sup>#5</sup>Associate Professor, Computer Engineering,

JSPM'S IMPERIAL COLLEGE OF ENGINEERING AND RESEARCH,  
PUNE, INDIA

## ABSTRACT

This system represents the first steps in the development of a water distribution and quality monitoring system. This system is based on a wireless sensor network to detect and locate in real time all changes in water quality, quantify its significance, evaluate its consequences and determine the most appropriate measures to mitigate the effects. First, we start by determining the water quality control points. Then we move on to the development of a water level for future prediction in the water distribution system. Finally, taking into account the environmental parameters of our system, we propose a water distribution system based on the IoT concept we use different sensors to handle the water.

**Keywords :** Water management, Flow sensor, Ultrasonic Sensor, Wifi-Module, Notification, Ph Sensor.

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## I. INTRODUCTION

Water is one of the most important basic needs of all living things, but unfortunately, an enormous amount of water is wasted due to uncontrolled use and utilization of the water resource. Kerala has an average rainfall of 3,000 mm per year. The general impression was that among all the states of India, Kerala had plenty of drinking water, but that is not the case. There are 1,164 problem villages without enough drinking water. Although Kerala has 44 rivers spanning its lush green landscape. Together, they contribute an annual discharge of 72 million cubic meters of water that is unused in the Arabian Sea. One of the main causes of the shortage is poor water management. Abundant water tanks in homes, schools, colleges, municipal air tanks, hospitals, etc. can contribute to the huge amount of water waste. If we can control this, we can save large amounts of water. Conventional water tanks cannot monitor or control the water level in the tank. From now on, the water level must be checked manually and refilled according to the requirements. So in this document, we solve all of the above mentioned problems with automatic water level detection and refilling of water storage systems using the Internet of Things (IoT).

### Problem statement:

To develop IOT system which address all water distribution and monitoring problems and reduce man power as well as consume less time.

## II. LITERATURE SURVEY

Water quality is a serious factor that affects the health of the economy.[1] The increase in the number of IoT devices and the development of new technology requires a standard IoT architecture which could help the clients to create a low cost and efficient system. This paper discusses about the implementation of IoT in water distribution system on the basis of IoT architecture, upcoming technologies such as cloud computing, Artificial intelligence, transmission techniques etc. Resolve the issues and integrate them to produce a more cost and energy efficient smart water system.

The real time water quality monitoring system for real time applications which is efficient and low cost.[2]

Using this system secure and continuous monitoring is possible.[3] No need to go for monitoring so manual work has reduced it makes system more efficient, reliable, low cost and accurate we can Data monitored from

anywhere controlling is possible from a remote server.

Monitoring of Turbidity, PH & Temperature of Water makes use of water detection sensor with unique advantage and existing GSM network. The system can monitor water quality automatically. [4] Design and development of a low cost system for real time monitoring of the water quality in IOT.

A novel approach to performing automated water-meter reading for update of consumption information from field to the Utility office is described in this paper. [5] The smart metering approach proposed differs from existing commercial methodologies by making use of low cost IoT hardware and smartphone app.

By this we conclude water supply monitoring and fraud system was built. [6] Using proposed system, we can make centralized water control and fraud detection system.

Emerging technology, Internet of Things and Predictive Analytics is made and its relevance in the context of Smart City has been discussed [7]. Different technologies that can be used for a Smart water management system, a study has been made on various IoT based cloud platforms

### III. PROPOSED SYSTEM

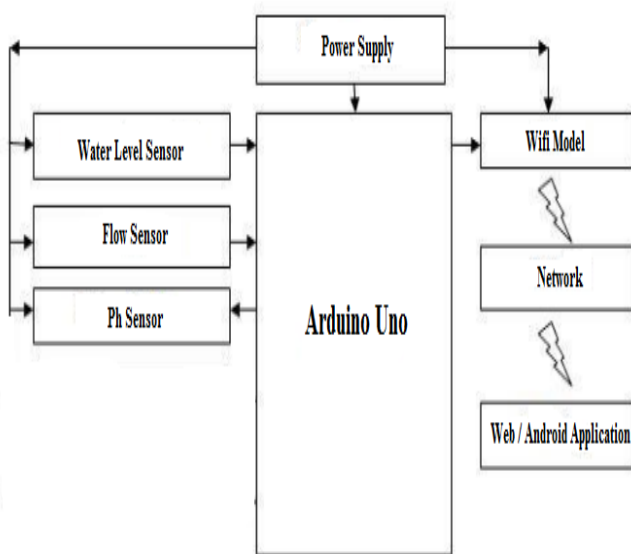


Fig 1. Block diagram

#### A. Description:

In order to carry out all decided tasks, the above system design is formulated using components such as flow sensors, ultrasonic sensors, ph-sensor, microcontrollers and analog to digital converters. The water flow in each household unit is measured and intimated to the main distribution unit. When evaluating these measured values, the home group over consuming water can be easily identified and the alarm produced during the overconsumption. In addition, the water supply to the specific household unit is stopped. Automated delivery ensures that human operation is not mandatory.

But it is needed to turn on the water distribution unit. This information is intended to deliver water to all areas properly. The quality of delivered water is also very important, so the quality must be checked.

#### B. Hardware Description:

##### INTERNET OF THINGS:-

The Internet thing is the network of physical devices, vehicles and other objects embedded in electronics, software, sensors, actuators and network connection that allows this object to collect an exchange data.

IoT allows objects to be detected or controlled remotely over existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, resulting in improved efficiency, accuracy, and financial benefit in addition to reduced human intervention.

IoT is expected to offer pre-connection of devices, systems and services that go beyond machine-to-machine communication and cover a truth of protocols, domains and applications.

##### LEVEL SENSOR:-

Level sensors are specially designed sensors that can determine the water level in a tank / reservoir. This established water level can then be communicated to the central disks distributed in order to efficiently conserve water as well as management.

This information is passed on to the central servers on a regular basis and also indicates that the water level is in the tanks and the tank.

Ultrasonic module HC-SR04 provides 2 cm-400 cm touch function without contact, the measurement accuracy can reach 3 mm. If the level sensor is 4 pins echo, trigger, ground, Vin. The sensor can measure the water level.

##### FLOW SENSOR:-

Effective water management means that water is delivered in accordance with actual requirements and measuring water is thus an important step in the water management system.

The flow sensor usually emits a series of pulses proportional to the instantaneous flow rate, which means that in order to interrupt them, it is necessary to implement a simple frequency component. Because this project uses a water flow sensor that contains a hall effect sensor that outputs a pulse that is proportional to the flow rate. In this project, the flow sensor is used to measure the water flow.

##### WI-FI MODULE:-

The ESP8266 Wi-Fi module is a self SOC with integrated TCP/IP protocols that can give any microcontroller access to your Wi-Fi network.

The ESP8266 is capable of hosting an application or offloading all Wi-Fi networking function from another application processor. Each ESP8266 module come-programmed with an AT command set Firmware. The ESP8266 module is an extremely cost effective.

There is almost limitless fountain of information available for the ESP8266, all of which has been provided by amazing community support.

#### **PH SENSOR:-**

PH sensor - pH is an important parameter to be measured and controlled. The pH of a solution indicates how acidic or alkaline (alkaline) it is. The ORP sensor requires a compatible interface and software to collect data. For many system applications, these sensors give an indication of the water quality conditions.

#### **IV. CONCLUSION**

Tremendous growth in the developing world has led to a great need for water. Automatic system for water distribution and performance monitoring focuses on different units such as correct delivery, warning of consumption and water quality assurance. These factors can be effectively monitored by using ultrasonic sensors, flow sensors and pH sensors together with communication support provided by the arduino controller.

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#### **REFERANCES**

- [1] Varsha Radhakrishnan, Wenyan Wu "IoT technology for Smart water system," 2018 IEEE 20th International Conference on High Performance Computing and Communications; IEEE 16th International Conference on Smart City; IEEE 4th Intl. Conference on Data Science and Systems
- [2] Tha. Sugapriyaa, S. Rakshaya, K. Ramyadevi, M. Ramya, P.G. Rashmi "Smart Water Quality Monitoring System For Real Time Applications"
- [3] Pranita Vijaykumar Kulkarni1, Mrs. M. S. Joshi2, "An IOT based Water Supply Monitoring and Controlling System with Theft Identification" International Journal of Innovative Research in Science, Engineering and Technology, September 2016
- [4] Vaishnavi V. Daigavane and Dr. M.A Gaikwad, "Water Quality Monitoring System Based on IOT" Advances in Wireless and Mobile Communications. ISSN 0973-6972 Volume 10, Number 5 (2017), pp. 1107-1116
- [5] M Suresh, U. Muthukumar, Jacob Chandapillai, "A Novel Smart Water-Meter based on IoT and Smartphone App for City Distribution Management" July-2017

[6] Anil Gantala, Paparao Nalajala, N Vasudheva Reddy, Bhavana Godavarthi, "Public Water Supply Monitoring To Avoid Tampering And Waterman Fraud Using Smart Water Meter System" International Journal of Mechanical Engineering and Technology (IJMET) Volume 8, Issue 8, August 2017, pp. 1194–1201, India

[7] Mohammed Shahanas.K., Dr.Bagavathi Sivakumar P., "Framework for a smart water management system in the context of smart city initiatives in India." Procedia Computer Science 92 ( 2016 ) 142 – 147, 2nd International Conference on Intelligent Computing, Communication & Convergence (ICCC-2016)