IJRAR.ORG E-ISSN: 2348-1269, P-ISSN: 2349-5138

INTERNATIONAL JOURNAL OF RESEARCH AND ANALYTICAL REVIEWS (IJRAR) | IJRAR.ORG

An International Open Access, Peer-reviewed, Refereed Journal

Smart Water Monitoring and Conservation System Using IOT Environment

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Abstract : Water is very essential natural resource available for human beings as well as for all living things .Without it we can't Survive. Even though lots of effort have been taken by government to save it but it is becoming very difficult to save water for future and make proper utilization of it. This Study have been undertaken to develop a system that which efficiently utilizes use of water with proper distribution and monitoring system. The system will be developed in such a way that it will continuously monitor the flow of water through pipes or tanks and notify the user. It is implemented with help of IOT & Embedded System. Water Flow sensor and Ultrasonic sensor have been used to monitor the continuous flow which collects the real time data. The digital meter is used to show the accurate level of water that have been used. The real-time data is collected and stored on the cloud. By using an android application the real-time data collected through the system is visible to the user on Smartphone anywhere connected with Internet.

Index Terms **- Sensor,IOT,Internet,Ardurino Microcontroller, Seven Segment Display,WI-FI Module.**

I. INTRODUCTION

Water distribution is one of the concerns that receives less attention in metropolitan settings. In some regions, there may be a shortage of water due to factors like drought, overuse of water resources, or a growing population. This can lead to inadequate water supply for households, agriculture, and industries.Due to this issue Continuous Monitoring of Water is very necessary. Here, this article will define the system that will channelized water to each block from first to last user order. Arduino controller have been used to construct an embedded system, one of the options that are easily accessible to make the entire concept cost-effective. Arduino will control the necessary the right amount of water at the right moment.

Water delivery has been accomplished for the specified time period and at the necessary flow rate. Billing will be done based on the amount of water used. Saving water translates into saving money. Another option is that people may occasionally need more water. In these situations, it is feasible to use.It is implemented with help of IOT & Embedded System. Water Flow sensor and Ultrasonic sensor have been used to monitor the continuous flow which collects the real time data. The digital meter is used to show the accurate level of water that have been used. The real-time data is collected and stored on the cloud. By using an android application the real-time data collected through the system is visible to the user on Smartphone anywhere connected with Internet.

Motivation : Freshwater is a finite resource, and in many regions, it's becoming increasingly scarce due to factors like population growth, urbanization, and climate change. Implementing water conservation systems helps to extend the availability of this precious resource. Excessive water use can harm ecosystems, especially when water is diverted from natural habitats, such as rivers and wetlands. Water conservation systems can reduce the environmental impact of water extraction and usage. Significant energy inputs which is required

by water treatment and distribution. By conserving water, you can reduce the energy required to pump, treat, and deliver water to homes and businesses, which, in turn, can help lower greenhouse gas emissions.Water conservation can lead to cost savings for individuals, businesses, and governments. By using less water, people can reduce their utility bills, and municipalities can delay or avoid costly investments in expanding water infrastructure.

II. LITERATURE SURVEY

As per literature survey water management systems [1] L. Zhenhua, "Supervision and Management Information System for Rural Drinking Water Project Construction," had been already implemented and invented by various researches. In the implemented system various features has been working together like uniform water distribution, monitoring of water level available in a tank, supply on demand, [2] Ting Wang, Jian Zhong Hao, Li Zhuo, Qing Zhang and Yan Wei, Online billing and payment of the water utilized. Using existing IoT (mobile network) these data could be sent to the remote server for billing from each flat and accepting request, monitoring and getting notifications are also done in this project. In this paper author has implemented a system which is monitoring the water utilization and preparing a bill as per utilization of water also water monitoring has been done remotely.[3]Jayti Bhatt,Jignesh Patoliya entitled “Real Time Water Quality Monitoring System”.This paper describes to ensure the safe supply of drinking water the quality should be monitored in real time for that purpose new approach IOT (Internet of Things) based water quality monitoring has been proposed. In this paper, we present the design of IOT based water quality monitoring system that monitor the quality of water in real time. This system consists some sensors which measure the water quality parameter such as pH, turbidity, conductivity, dissolved oxygen, temperature. The measured values from the sensors are processed by microcontroller and this processed values are transmitted remotely to the core controller that is raspberry pi using Zigbee protocol. Finally, sensors data can view on internet browser application using cloud computing.[4] by Dongling Ma and Jian Cui, "Design and realization of water quality information management system based on GIS,". When the system is turned on the amount of water utilized by each user is monitored and controlled by using micro controller by counting the pulses from all channels continuously. Water level indicating sensors were used to determine the level of the water in the master tank, based on the level pumping motor has been controlled. This paper presents an IoT device which helps to manage/monitor and plan the usage of water by observing the level of water in the tank [5] by C. Zhu, Z. Hao and Q. Ju, "Management Decision System of Regional Water Resources,

III. OBJECTIVE

The goal of this activity is water management, monitoring, and proper distribution of water in order to conserve water and utilize it effectively and earn the confidence of others. The system is set up to continuously monitor the amount of water that is available, as well as to be consumed.

- To monitor tank levels and look for leaks.
- To calculate the amount of water each User consumes

IV.METHODOLOGY

The block diagram and hardware/software requirements are included in the smart water monitoring and conservation system using IOT environment methodology.

A potential block diagram :

The entire project has been broken down into four distinct components, with the first module being the monitoring of the water level in true moment. The second module will ensure that the water is distributed evenly across each block. The third module is functional. for water usage and demand-based water distribution utilizing a mobile IOT application. The fourth module is calculate the total bill of water distribution.

The image below demonstrates the system's block diagram for smart water monitoring and conservation system.

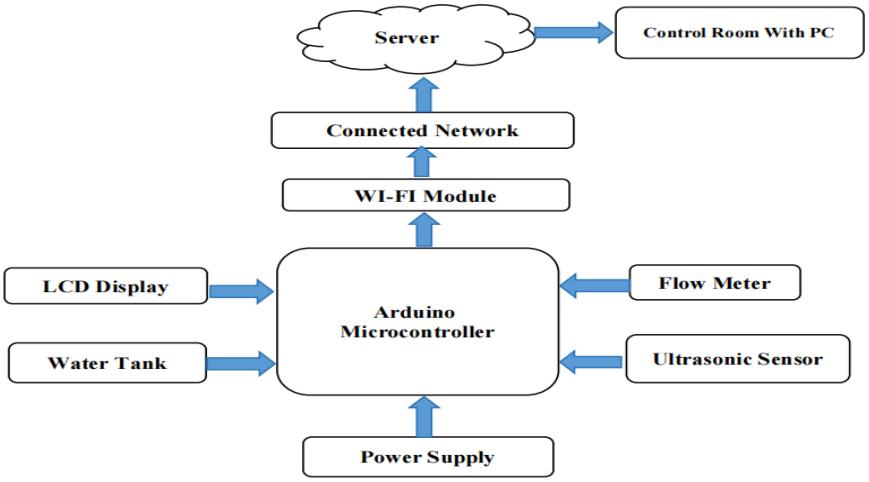

Fig.Block Diagram of Smart Water Monitoring and Conservation System using IOT

Utilizing an ultrasonic sensor to measure the water level in the main tank is the first step in putting a monitoring system into place. This measurement will show how much storage is actually available. For distribution purposes, this level can be converted to a volume. Then, using IOT, distribute the water according to the individuals or as necessary in each flat. (mobile). Each flat has a flow metre that measures the water flow that is given. following a predetermined allocation Arduino will automatically halt the flow of water.

A) Flow sensor:

Water flow through a flow sensor is measured using a flow sensor. The essential components of this sensor are a rotor, a Hall Effect sensor, and a plastic valve body. When liquid or water runs through the pinwheel, the pinwheel rotor revolves. The flow rate and the valve's speed will be inversely correlated. With each rotation of the pinwheel rotor, the Hall Effect sensor will deliver an electrical pulse.

Fig: Flow sensor

B) Arduino Uno:

A microcontroller board called Arduino is based on the ATmega328P. It contains 6 analogue inputs, a 16 MHz quartz crystal, 14 digital input/output pins, 6 of which can be used as PWM outputs, a USB port, a power jack, an ICSP header, and an UN-do button. Arduino The reference versions of Arduino's software (IDE) have grown into newer releases. A line of USB Arduino boards began with the Uno board, and the model to use as a benchmark for the Arduino platform; for a comprehensive list of current, previous, or shabby boards view the boards index for Arduino.

Fig: Arduino uno

C) Wifi module:

A self-contained SOC with an integrated TCP/IP protocol stack, the ESP8266 WiFi Module allows any microcontroller to access your WiFi network. The ESP8266 is capable of offloading all Wi-Fi networking tasks or hosting an application.
from another processor for applications. Pre-programming is included with each ESP8266 module. Having a firmware set for AT commands. The ESP8266 module is a very expensive an efficient board with a sizable and expanding community

Fig: WiFi module

V.CONCLUSION

The suggested system can handle distinct tasks—monitoring, distribution in one unit and is entirely autonomous. Water waste is completely under control thanks to their responsible water usage. It is also a reasonably priced device that allows the customer to conserve both money and water. Now go A time alert regarding water use has been issued. The initiative will meet a critical need for this to protect our future generations from a lack of water.The Water Conservation and Monitoring System project has made significant strides in promoting responsible water use, preserving this vital resource, and contributing to environmental sustainability.

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