AUTOMATED TOWN WATER MANAGEMENT SYSTEM

A.P. Nithya Priya[1], S. Ohviya[2], S. Priya[3], K.Monisha[4], R. Nivetha[5]

[1]Assistant Professor[1], Department of Electronics and Communication Engineering, Adhiyamaan College of Engineering, Krishnagiri District, Tamilnadu, India
[2-5]UG Scholars, Department of Electronics and Communication Engineering, Adhiyamaan College of Engineering, Krishnagiri District, Tamilnadu, India

[1]nithyapriyadpi@gmail.com, [2]ohviyasendhil610@gmail.com, [3]priya07072000@gmail.com,
[4]monishakarthikeyan453@gmail.com, [5]nivetharanganath714@gmail.com

---***---

Abstract--One of the most important aspects of any town management includes water management. In this project, we propose a system for water management, distribution and generation of water bills automatically. It presents an IOT device which helps to manage and plan the usage of water. This system can be easily implemented in residential societies. Sensors placed in the tank which continuously informs the water level at the current time. This information will be updated on the cloud using a website, user can visualize the water level on a Smartphone anywhere that is connected to the Internet. According to the level of water in the tank the motor functioning will be automatically controlled, at a low level of water, motor will automatically turn on and when tank is about to fill up it will cut off. For distribution, a developed website used for gating system. All the updates were made available to the concerned operator by the website for monitoring and maintaining. Flow meters were used to measure the total amount of water consumed per month. Using existing mobile network these data could be sent to the remote server for billing.

Keywords-- **Node MCU, Flow Sensor, Water Level Sensor, Ultrasonic Sensor, Relay, Submersible Pump, Solenoid Value.**

I INTRODUCTION

Water is the most basic need for all living beings. Water scarcity is being driven by two converging phenomena: growing freshwater usage and depletion of fresh water resource. Due to continuous economic growth, the water demand of enterprises is also increasing. Water management helps to meet this demand. Water management is the activity of planning, developing, distributing and managing the optimum use of water resource. Water from the various sources are collected, purified and then distributed to various areas over the towns.

II LITERATURE SURVEY

Various authors have proposed and discussed much advancement in educational field using technology that has helped in improving educational field.

A. *Water Management and Metering System for smart Cities*

Continuously monitor and analyze the quantity of water being dispensed at each house through the flow sensor and also allows the user to customize their limits in terms of quantity of water needs. The sensors data are gathered online and stored in the cloud. This system cuts down the water flow and notifies the user when the water usage exceeds the limit.

B. *An Intelligent Solution for Electricity and Water Management in Smart Cities using Internet of Things*

The water level in the tank is measured using the level sensor which is used to control the motor. The sensors send effective data to the raspberry pi and raspberry pi is connected to the internet. At the end, the status of energy consumed can be known.

C. *Automated town water management system by using PIC microcontroller*

This project deals about the IoT controlled water distribution in different areas and distribution of water according to the usage. One of the major features of the project is the distribution of water according to the need and status of the flow can be monitored and operated through mobile using wireless medium.

III   EXISTING SYSTEM

In existing system, urban water is supplied to the home with the help of some man power. The person in charge will go to the place and then open the valve to that particular area.

Once the time is over the person will go again to that place and close the valve. This type of operation needs man power. This is waste of time to go to that place and come back often. Also the people may take excess water for their personal use with the help of motor or some other equipment. Due to this many people will not receive sufficient water for their use. Here the supply of water to different areas is done according to the level of the water in main tank. A worker is needed to switch ON the supply so that the main tank located in the operator area gets filled and is ready to distribute water to different regions.

Suppose there are two areas say area A and area B, if water is to be supplied to area A then depending on the number of houses located in area A the main tank should be filled 100% with water and then for the duration of one hour the water is supplied to that area, whereas area B has to wait till the supply of water is done to the area A. Now again it takes some time for the main tank to be filled with water in order to supply water to houses residing in area B and remaining the same procedure is carried out. This states that the existing system is not capable of providing water to both the areas simultaneously.

IV   PROPOSED SYSTEM

The proposed system is based on IoT (Internet of Things) for automated town water management system. The data will be collected using sensors and accessed on real time basis through website. The proposed system consists of different sensors like water level sensor, flow sensor and ultrasonic sensor, solenoid valve, I2C LCD and a NodeMCU as a core controller. The data received from these sensors is processed by a NodeMCU and sent to the cloud via a wireless communication module. The valve turns on/off to stop the water supply whenever the flow rate exceeds a predefined limit. The solenoid valves are also controlled using real time clock to control flow of water accordingly for a fixed duration of time. It is more convenient for usage by reducing the

man power which required switching on/off the valves to distribute the water to the area. Thereby, helps in reducing the wastage of water. It also reduces the manual calculation of water billing.
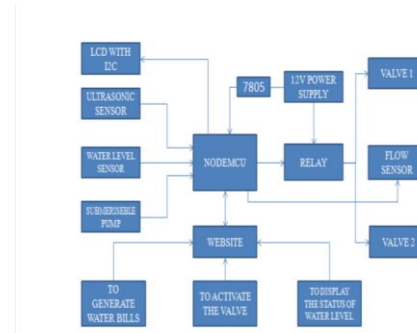

Fig. 4.1 Block Diagram

V   WORKING PRINCIPLE

A.   *Principle of Town Water Management System*

This project will exhibit the fruitful usage of a web based approach for estimating water and utilizing the continuous bases. Flow sensor for estimating a quantity of water dispensing for a particular area. The proposed system is implemented as a prototype and tested. The same can be implemented in a real-time application. The system is designed with time slots for a particular area and a website is used for controlling the switch. Thus, accessing the system from anywhere is possible. The IoT based model for monitoring and controlling the water distribution consisting of two circuit designs, the controlling system using micro-controller and the web server for monitoring using a system-on-chip micro-computer.
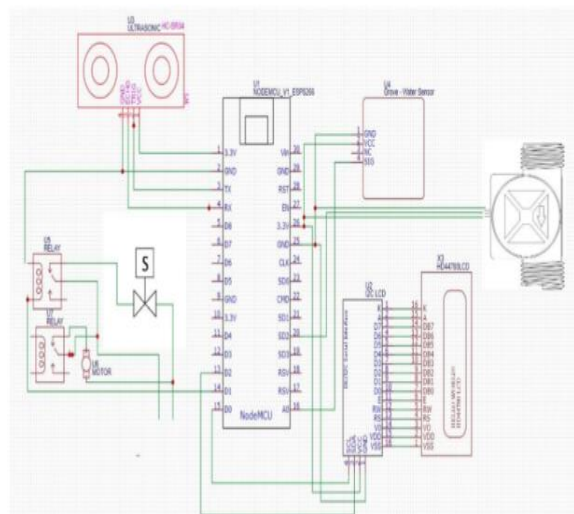

Fig. 5.1 Circuit Diagram of Town Water Management System

VI   EXPERIMENTAL RESULT

Here, the water level gets monitoring by using ultrasonic sensor which is connected to NodeMCU and gives output via Wi-Fi to the website to the users. Then according to the flow of water the amount of total water consumed by an individual house can be calculated, and then this can be calculated for week/month. The water level is analyzed and maintained automatically with the help of our project. When the water level becomes very low, all the sensor output gets High (1) and motor is turned ON. When the water tank is filled, all the sensor outputs become Low (0) and as a result, the motor is automatically turned OFF. The status of the motor is send to the remote operator for monitoring. For billing unit, the flow meter output is available that can be send to the remote server for billing and the bill is generated to the user.

Then a comparative analysis of daily water is done and an average consumption is calculated and also a difference between today's and yesterday's consumption is given with respect to standard consumption. Many problems can be solved using this system for water conservation.

Fig. 6.1 Experimental Setup

VII   CONCLUSION

In this project, a prototype water monitoring system using IoT is presented. The main objective was to design a smart system for approximating the water level in the tank to prevent the overflow and to analyze the water usage. For this, some sensors are used. Here, Motor can be controlled automatically. Water level can be monitored continuously from anywhere using web browser. All the data's are sent to the cloud server via NodeMCU ESP8266. The collected data from all the sensors are used for analysis purposes. Here ultrasonic sensor is used which provide more accurate and calibrated information for water level in tank. The user

can also get the accurate results in this billing system compared to the traditional method.

Future enhancements can include automatic treatment of water based on the nature of contamination. This novel idea can be further extended to other areas like oil and natural gas monitoring systems.

REFERENCES

[1]   M. Kalimuthu, Abraham SudharsonPonraj, Christy Jackson J, "Water Management and Metering System For smart Cities", IJSTR, Volume 9, Issue 04, April 2020.

[2]   K.Shuruthi, KadiriChandrakala, PeddetiJyothi, BekkhamHaritha, "Automated town water management system by using PIC microcontroller", JRMAT, Volume 10, Issue2, February 2019.

[3]   JemyJoseph,Manju K M, Sajith M R, SujithNair,Vishnu P Viay, Sithara Krishnan, "Water Management System Using IoT", IRJET,Volume: 05 Issue: 04,Apr-2018.

[4]   R. Priya1, G.P.Rameshkumar, "A Novel Method to Smart City's Water Management System with Sensor Devices and Arduino" International Journal of Computational Intelligence Research, Volume 13,2017.

[5]   JaneeAlam, Ahsan Habib Chowdhury, Alamgir Hassan, "A Total Automation in Water Management, Distribution and Billing", ICIEV, May 2016.

[6]   N.B.Bhawarkar, N.M. Verulkar, R.R. Ambalkar, K.U. Pathak, "Automatic water distribution system using ARM Microcontroller", IJRE, Volume: 03, Issue: 01, 2016.

[7]   Vaishnavi. A. Takey, Jyotsna. A Chopade, "Review of Water Management System", IJAREEIE, Vol. 4, Issue 10, October 2015.

[8]   NishantNibhoria, Pranav Singh, Rahul Kumar, "Automatic water distribution system", JETIR, Volume 4, Issue 05, May 2015.

[9]   F Ntambi, C P Kruger, B J Silva, G P Hancke, "Design of water management System", IEEE,2015

[10]   Chanda, Chandrika, Surbhi Agarwal, and Er B. Persis Urbana Ivy. "A Survey of Automated GSM Based Irrigation System", IJETAE, 2012.

[11]   Ladwa, Tuljappa M., et al. "Control of Remote domestic System using DTMF", IEEE, 2009.

[12]   Jin, Shen, et al. "A Remote Measurement and Control System for   Greenhouse based on GSM-SMS", 8th International Conference on IEEE, 2007