International Journal of Research in Engineering, Science and Management
Volume-2, Issue-3, March-2019
www.ijresm.com | ISSN (Online): 2581-5792

Smart and Automatic Water Distribution

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***Abstract*: As population is increasing day by day, urban residential areas have also increased because of this reasons water has become a critical problem which affects the problem of water distribution, water conservation, water consumption and also interrupted water supply. People are found complaining that they don't have sufficient amount for their daily needs, so to overcome water supply related problems and make system efficient there is need of proper monitoring and controlling system. In this paper, we present design for water monitoring and control approach based on IOT which focuses on continuous and real time monitoring of water supply proper and uniform distribution so that we can have are cord of available amount of water in tanks, This paper proposes the conceptual design of closed loop automated water distribution system for residential buildings .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. Depending upon the supply of water within the reserve tanks, the maximum amount of water which is the threshold value will be set for the individual users. The valve will flip on/off can be monitored by the central management and process unit to prevent the facility. There a pc that is managed within the system to stay the track of the usage of water by individual users in real time and can be handled by the admin to at the same time manage the users consequently**

***Keywords*: IOT, Water distribution system, Water level sensor, closed loop water system, Arduino UNO, Wi-Fi, Turbidity sensor, Zigbee, Solenoid valve**

1. Introduction

Water is one of the most important resource for all the living things in the earth. In that some folks don't get decent quality of water due to unequal distribution. So it ought to be provided properly yet as fastidiously and at right time to meet the daily activities The primary objective is to style and develop an occasional value, reliable, profitable and economical technique to create acceptable water distribution by continuous observance and additionally dominant it from central server thus on solve water connected complications. This paper provides a concept to assist United States of America to supply water in a very correct successive order. In order to implement water distribution system in a very acceptable channelized manner to the top users, the control room of each user should be provided with an Arduino microcontroller to regulate and control the required quantity of water in proper time interval.

The electrically actuated solenoid valve will be shut down automatically when the limit reaches the determined threshold value. The Wi-Fi module is used for wireless communication so that message can be sent to the admin in the central control room.

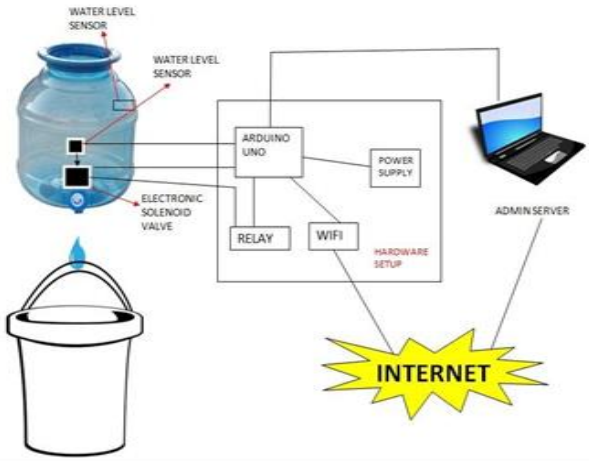

Fig. 1. Design of proposed system

The water system provides utilities with an exceptional ability to understand and control water use. There is a confidence that through this technique the water is managed expeditiously and is provided in keeping with the demand and spare wastage of water is achieved in real time monitoring.
The water system provides:

- Knowledge- how much water is being used.
- Control- water delivery

2. Existing system

In existing system, water is distributed to home with some manpower. The activity of opening the valve will be performed by the person who is given the charge of it. The person must await a period of time and once more shut the valve. Time consumption is very high in this system. This type of operation needs manpower. Also if operator does not perform the proposed task perfectly then the output of the task will not be good. Also the folks could take excess water for his or her personal use with facilitate of motor or another instrumentality. Due to this many folks won't receive decent water to be used. They are standalone instruments and don't have any management over consumption of water. Thus, it works on open loop system.

3. Limitations of existing system

The existing system suffers from several limitations like:

- Inefficient monitoring
- No control over utilization of water by users which leads to difficult management of water during the water scarcity periods.
- Water requirement prediction is difficult.
- Users pay a fixed amount even though their consumption varies.
- It requires periodic human intervention for maintenance making it inconvenient and often least effective.

4. Proposed system

The proposed system is fully automated. Hence, human work and time are saved. This system may be enforced on water tanks for safe, efficient and waste less consumption. Water once provided from the overhead tanks to every flats, the tanks will be checked for its level using level sensors and a threshold will be set for each users according to number of flats. This will be notified to the user i.e. nothing however the limit provided for usage of water. The level of the tank will be checked for Water level sensor for 5 seconds and if the new threshold is greater than the previous threshold then the updated threshold price is going to be set and notified to the user. Else an equivalent threshold price is going to be continued for the water. The user can request for the water to the admin server in keeping with the limit assigned to them. The admin server is going to be switched on for twenty-four hours daily. The admin can instruct the Arduino to open the valves for the actual user and provide water in keeping with their demand. The admin can only access the server through the mobile or lap, using their IP address. The admin is going to be given management of an online based mostly application consisting of:

- The number of water needed and consumed by every resident.
- The Water level measurement using a water Level senor.

5. Advantages of proposed system

The major advantages of the proposed system can be identified as given as follows:

- It provides uniform distribution not withstanding pressure variation at intervals the pipelines.
- Limits water consumption as per requirements.
- Controls water supply in real time.
- Automated offer ensures that water isn't wasted and therefore promoting water conservation.
- System is provided with electrical solenoid valve for proper water supply and hence no human intervention.

6. Comparable study of the two technologies

Existing system	Proposed system
Inefficient monitoring	Efficient monitoring help of sever
Water prediction	Water quantity is fixed for Each user
Over consumption of water	No wastage of water

7. Tools requirements

- *Arduino:* in an Arduino, the sub Arduino is connected to the street solenoid valve 1 and 2 and it can be connected to zigbee, the main Arduino is connected to the water level sensor and turbidity sensor, it can sense the sensor values and display it to the web server
- *Water level sensor:* The water level sensor knows the availability of water in the tank, whether the water level is low in the tank, the motor can automatically on and fill the tank.
- Turbidity sensor: The water quality is measured through the turbidity sensor, if the turbidity value is more than 7 or below 7 then the water is not a pure water. 7 is a neutral, so that the water is a pure water

8. Block diagram

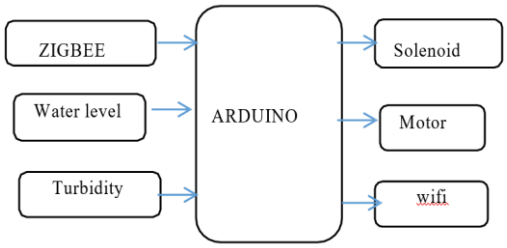

Fig. 2. Block diagram

9. Implementation

A. Overview

This system is fully automated. Atomized the water distribution and monitoring the quality of water which stored in municipality reservoir tank of a low cost system for real monitoring of water distribution system in an IOT environment. The smart maintenance at this digital year regarding the water distribution. Water distributed at different time for different area through pipeline in an atomized control. Development of a low cost system for real monitoring of water distribution system in an IOT environment. In this paper, we present design for water monitoring and control approach based on IOT which focuses on continuous and real time monitoring of water supply that enables proper and equal distribution so that we can know the available amount of water in tanks. The water level sensor is knows the availability of water in the tank. The solenoid valve can turn on/off by the

central control and processing unit to stop the water supply, based on the timings the water can be flow through the streets. Water level sensor and Turbidity sensor can intimates their value to the server.

- *Step 1:* Install ARDUINO and open a sketch to put a code. In kid connects the sensors to the Arduino , the main slave node Arduino can be connected to the motor , tank and wifi. The slave 2 node can be connected to zigbee and solenoid valve , the valve can be automatically on and off .
- *Step 2:* Open the node 1 code and save the code and change the port of the node one Arduino and the board can be changed to Arduino uno. after that upload the code.

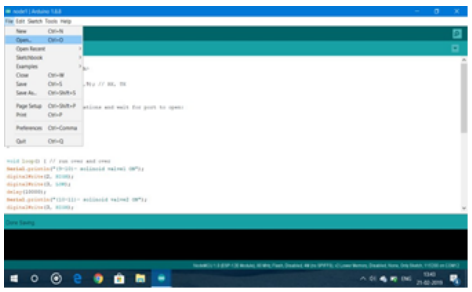

Fig. 3. Node 1 coding

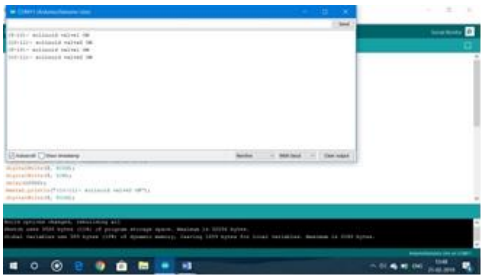

Fig. 4. Node 1 output

In this figure shows the Arduino node 1 coding output, the solenoid valve can be on and off between one hours

- *Step 3:* The node 2 code can be done in Arduino using embedded C Language
- *Step 4:* The node 2 Arduino code can be show the water level sensor and turbidity sensor
- *Step 5:* The water level should be greater than 100, the motor can be automatically on and fill the tank.

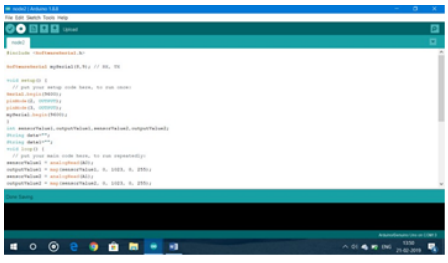

Fig. 5. Node 2 operation

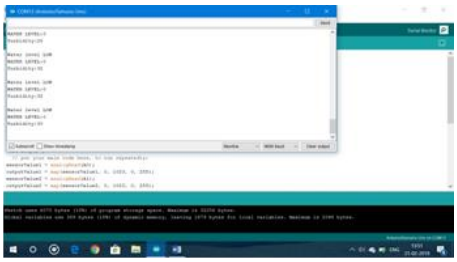

Fig. 6. Node 2 program output

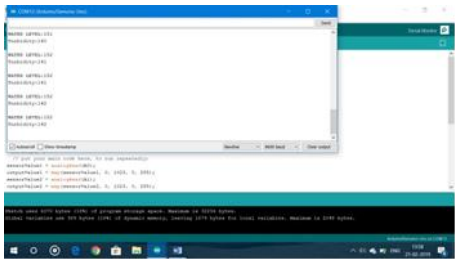

Fig. 7. Water level sensor ouput

- *Step 6:* The wifi code cannot be run on the Arduino, the wifi code code can be used the user name and password and connected to the server using the IP address. The IP address is connected to our mobile, (IP address is your mobile ip address) the google server shows the details about the water level of the tank and water quality also to be displayed. quality can be measured by turbidity sensor.

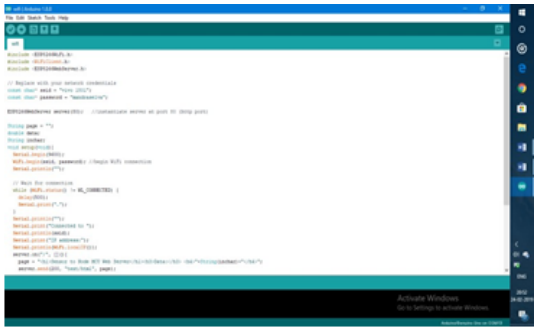

Fig. 8. Wi-Fi code

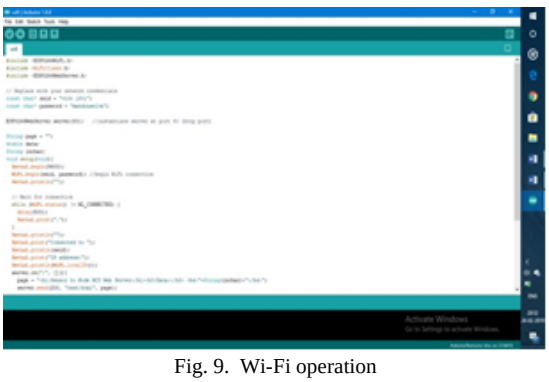

Fig. 9. Wi-Fi operation

10. Conclusion

The proposed system helps us to control and monitor the water consumption when it reaches the limit, the water distribution is to be started in an fully automated control. Then the distribution can be focuses on various entities such as no wastage, efficient amount of water can be distributed, equal distribution and there is no over consumption

Acknowledgement

We are greatly indebted to our guide V. S. Esther Pushpam, M.E., Assistant professor, Department of Computer Science and Engineering, Sri Ramakrishna Institution of Technology for his inspirational guidance, valuable suggestions and providing us a chance to express our technical capabilities in every respect for the completion of the project work.

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