Smart Water Monitoring System

Jitendra Kumar[1], N. Naveen[3], Raja Baitha[2], V. Sekhar[4], V. Srimaheswaran[5]

[1,2,3] *UG Students, EEE, KEC, Kuppam, A.P, India*

[4,5]*Assistant Professor, EEE, KEC, Kuppam, A.P, India*

Abstract— Inaccuracy of Water and wastage of water are one of the biggest crises in the world. It generate Water-borne illness like- dengue, cholera, stomach pain and insufficiency of water etc. for human being. Due to water pollutions 40% death is happening in the word. So, the quality of the drinking water needs to be measured in real time and need to be saving of water while it is provide to people. This method designs real time water quality inquiry and reduction of wasting of water with equal amount of sharing of water in each areas using Internet of Things (IoT). To compute the various parameters of the water such as pH, turbidity, temperature several water sensors used. To analyze detection of water leakage through pipes, to reduce chances of overflow from water tank and to distribute equal quantity of water in each area, where several sensor and devices are used. The centralized system measures various parameters from various sensors in real time. Thorough the Wi-Fi system, the sensor measured data sent to the concern authority people by Blynk App for further steps to improve the water accuracy and to reduce wasting of water. The water accuracy test carried out in each area.

Keywords pH sensor, turbidity sensor, temperature sensor, water flow sensor, water gate valve, Arduino Uno, Wi-Fi module, Blynk App.

I. INTRODUCTION

With rapidly rising impurity in India, clean Water supervision is very much essential which demands a rise in agricultural, industrial and other necessity. The property of clean Water is characterized by "chemical, physical and biological" content. Enquiry the water quality helps to find out the pollution in drinking water. The traditional method still in vogue entails collection of water samples, examine it in lab and advice for any water treatment and so forth. Current water pollution monitoring method takes place in 3 main steps-

- Water sampling
- Water testing
- Investigative analysis

There will be different kind of water sample, the quality of water measured by pH sensor, turbidity sensor and temperature sensor and measured value sends to mobile Blynk app through Wi-Fi module. Now a day everywhere people are suffering from insufficiency of drinking water. To save the drinking water, this system introducing reduction of wastage of water from leakages of pipe and overflow from the water

Tank. In this technology uses of flow sensor to identify the leakage of water from the pipes and it can be show to mobile Blynk App. Here one more additional technology used for distribute equal amount of water in each area by using solenoid gate valve by using electronic control.
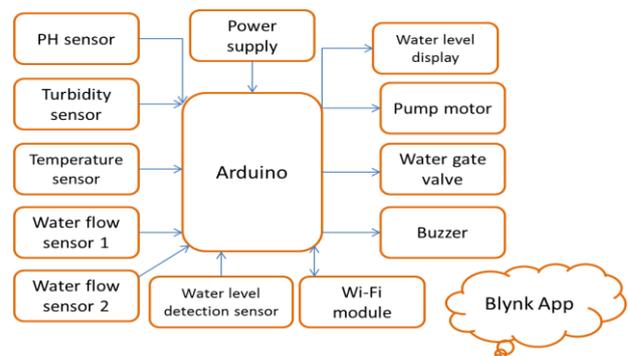

Fig.1.Diagram of SWMS

Fig.(1) Shows the block diagram of proposed system. The figure mainly based on the measurement of accuracy of water with the help of various sensor like- (a) Turbidity sensors, the pH sensor, the temperature sensor communicate to the arduino which are used for measurement of various parameter respectively (b) here two Water flow sensor measure the flow rate of water and this will detect leakage of water from pipe (c) water level detection sensor will reduce chances of overflow water from water tank. (d) To distribute equal amount of water in each area as per human density. The arduino take the calculate value and processes it with Wi-Fi module. The Wi-Fi module transfers data to the Blynk App.

II. PROPOSED METHODOLOGY

Fig (2) shows the continuous monitoring system of proposed system. this system is mainly Iot based which placed at remote place with low-cost and high level accuracy. It has many features: - (a) system is used for continuous measuring of water quality by using pH senor, turbidity sensor and temperature sensor, measure value will be share to mobile App for online real time monitoring and

investigation purpose.(b) Other feature of this system to reduce of wastage of water. Water flow sensor used for reducing of wastage of water. Here, There will two water flow sensor that will connected with to two end of pipe, both will measure flow rate of water if there will be any

difference in water flow rate that will consider as leakage of water from pipe because less flow rate comparing to another flow rate.

Fig.2. Proposed system

(c) Next feature of this system to reduce the chances of overflow of water from water tank, here there will be three water level (full, medium and low) in the tank which will attached with sensor, whenever water will reaches 10% (low) motor will be automatically turn on with alarm indication and whenever water will reaches 90% (full) motor will be automatically turn off with alarm indication. (d) next to distribute equal amount of water in each area as per human density. By using solenoid gate valve equal amount of water can be supplied with respect to time in different areas.

III.   ADVANTAGE

- PH, turbidity and temperature can be monitor at remote place.

- Easy to investigate of water quality problem from different place using Iot.

- It will reduce the wastage of water through leakage of pipes.

- It will reduce chances of overflow from water tank.

- It will distribute equal amount of in different area.

- This system can be placed everywhere with more efficient.

DISADVANTAGE

- Price of pH Sensor, turbidity sensor and water flow sensor will increase the cost of product.

- This product should be connected with internet always.

IV.   APPLICATION

- THIS SYSTEM WILL USE FOR MUNICIPAL WATER MONITORING AS WELL AS SUPPLYING MANAGEMENT PURPOSE.

- THE PROPOSED SYSTEM WILL USE FOR VILLAGES WATER SUPPLYING AND MONITORING PURPOSE.

- THIS SYSTEM CAN BE USE FOR INDUSTRIAL AS WELL AS DOMESTIC PURPOSE ALSO.

V.   COMPONENTS

a.   CONTROL

Fig (3) shows the Arduino. Arduino Uno is electronic micro controller device. It has 14 digital pin which is useful for digital data sending and receiving purpose to another circuit.

Fig .3. Arduino

It has 6 analog data pin which is used for analog data sending and receiving purpose to another circuit. It has 16MHz crystal oscillator which is used for triggering the pin. Through the USB port we can code this device. It is powered by 12V supply. It has 1 push button to refresh the program. It device can be coded by computer.

b.   PH SENSOR

Fig (4) shows the PH sensor. PH sensor is electronic device that detect the pH value accuracy of liquid material. Generally the pH value of liquid comes under 0 to 14.

Fig .4. PH Sensor

this proposed system mainly based on water and water supply monitoring system. This device used in this project For calculating the pH value of drinking water. The pH value of drinking water should be 7.

(C)   TURBIDITY SENSOR

Fig (5) shows the picture of turbidity sensor. It required less power for operation. In most of villages area there is

not facility of cheking of cleanness od drinking water. This device basicly uses to detect durst, sand and etc. water.
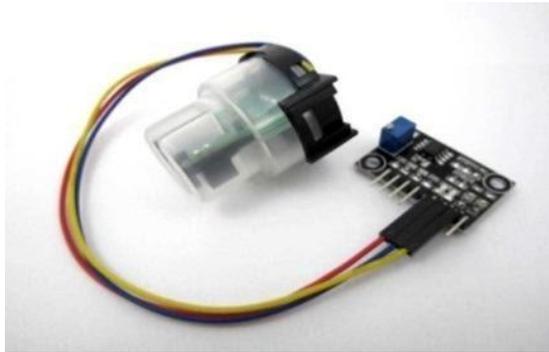
Fig .5. Turbidity Sensor

In this project the turbidity value shows on the blynk app. The value shows under 0 to 5. If water value will be below 4.5 the it will consider as 'BAD' else consider as 'GOOD'

(d) TEMPERATURE SENSOR

Fig (5) shows the picture of temperature sensor. Here this device is the heat enquiry. It show the present temperature of water in celcius and fahrenhit. This device connects to Arduino for data communication purpose.

Fig.5. Temperature Sensor

(e) FLOW SENSOR

Fig (6) the diagram of water flow sensor. The common water supply method is used to meet this requirement. To monitor the quantity of water being supplied and used, the motion of water has to be enquired. Water flow sensors are applied for this aim. Water flow sensor are established

Fig.6. water flow Sensor

at the water source or pipes to enquiry of the speed of flow of water and calculate the quantity of water flowed via the pipe. Motion of of water is investigate as liters per hour or cubic meters.

(F) SOLENOID GATE VALVE

Fig (7) shows the picture of solenoid gate valve. This mechanism also conversant as a sluiceway is a door-way that releases by lift-off a lock out of the way of the liquid.
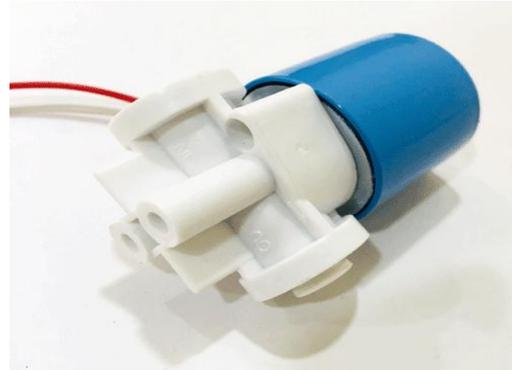

Fig.7. Solenoid gate valve

This setup takes very slight place attach with the pipe pivot and barely banned the stream of liquid when the valve is completely naked. This is used to stop the passing of water using electric supply. When completely open, the system has no disturbance in the fluid running area, come out in very less obstacle. The vacant place generally varies in a discontinuous style as the door is moving. It says that speed does not vary evenly with stem speed of water.

(g) WI-FI MODULE

Fig (8) shows the diagram of Wi-Fi module. Wi-Fi module is a electronic device which connects to Arduino for data communication purpose. This system is used of connect and transferring and receiving data from one system to another system.

Fig. 8. Wi-Fi module

Wi-Fi matched devices can communicate with web. This device has capacity to connect electronic device within 100 feet.

VI.   SIMULATION/EXPERIMENTAL RESULT

1.   We are displaying the resulting sensed pH, turbidity and temperature values. It continuously senses the

values of pH, turbidity and temperature and the resulting values are displayed to the mobile Blynk App in real-time. If the acquired value is above the threshold value (4.5) it will consider as 'GOOD'. If the acquired value is lower than the threshold value(4.5) it will consider as 'BAD'.

2. This system showing the water flow value of sensed water flow. It always detectes the values of both sensor and measured data show to mobile Blynk App and display in real time. Here there will be two water flow sensor which is connected two end of pipe. If the 2nd acquired values are lower than the 1st acquired values comment will be as 'water leakage from pipes'. If both values are same then comment will be as 'no water leakage from pipes' and if there will difference in water flow rate then there will be leak of water from the pipe and automatically shut off the particular gate valve. By using of water level sensor wastage of water will reduce by overflow from the tank.
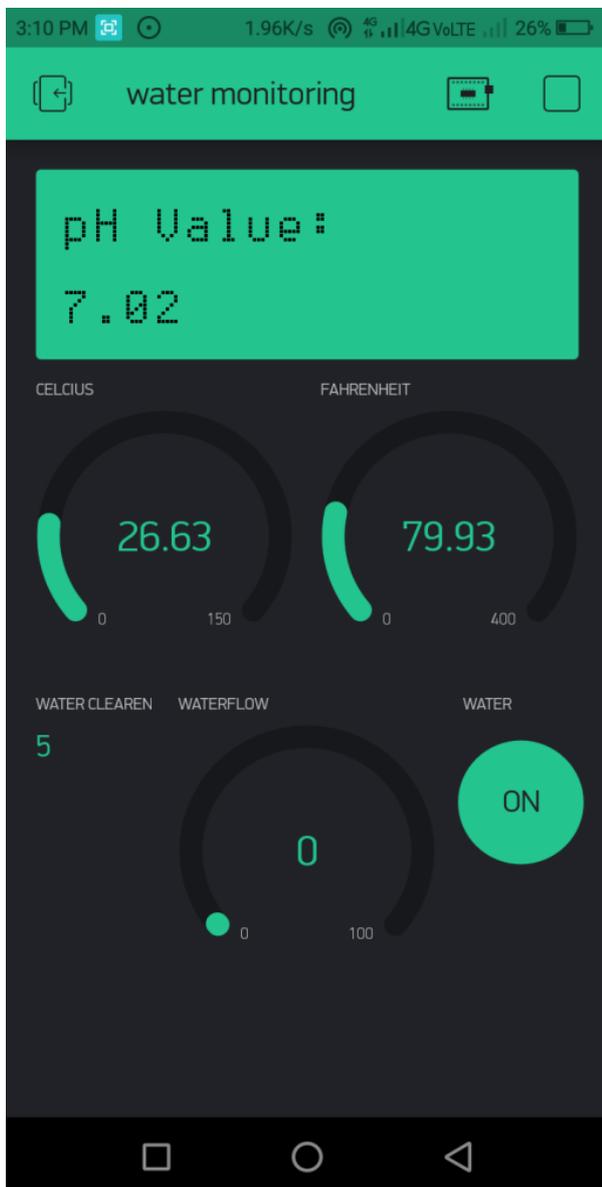

Fig.9. output measured value in blynk app

Using solenoid gate valve we can distribute water as per demand automatically.

VII. CONCLUSION

Measuring of water accuracy by using internet of things is big analysis of water accuracy this will stop the pollution of water. By using this project, it can be avoid drinking of bad water and it will give the awareness to government to provide good accuracy and good facility of water in each area. The research is focusing on investigating villages and cities water accuracy in every time. Therefore, internet of things data analytics data communication to provide faithfulness, fast operation and data storage. During the project development phase and intense comparative analysis of real-time analytics technologies such as Arduino. This research proposed to use in municipal, and villages to analyze and provide good water quality and water supply for consumers. By using this technology can be avoid the wastage of water

VIII. FUTURE SCOPE

In project, good operational management in water supplying to consumer. This system required less power consumption and it can be run through solar operated power system also. This system will reduce human effort for monitoring of water supply in each municipal, domestic and village areas also. This can be place in remote areas where government don't want to go for water investigation. Now-a-days water monitoring is most important for every area, so this system will helpful for government for investigation as well as saving water form wastage due to damages of pipes in low cost.

IX. REFFERENCES

[1] "Water quality monitoring using wireless sensor networks by K.S. Adu. https://dl.acm.org/doi/10.1145/3005719

[2] Intelligent IoT Based Water Quality Monitoring System by Soundary Pappu https://ripublication.com/ijaer17/ijaerv12n16_04.pdf

[3] Meritnation Ask and Answer https://www.meritnation.com/ask-answer/question/a-student-tests-a-sample-of-drinking-water-and-reports-its-p/finding-ph-of-different-solutions/10590867

[4] Mohammad Salah Uddin Chowdury, Talha Bin Emran, Subhasish Ghosh, Abhijit Pathak et al. "IoT Based Real-time River Water Quality Monitoring System", Procedia Computer Science, 2019 https://www.researchgate.net/publication/333642226_IoT_Based_Realtime_River_Water_Quality_Monitoring_Sys-tem

[5] "Development of Ingenious Floor Cleaner using ARDUINO", International Journal of Recent Technology and Engineering, 2019 https://www.ijrte.org/wp-content/uploads/papers/v8i4/D8738118419.pdf

[6] Research india publication http://www.ripublication.com/

[7] Smart Operating Control in Hybrid Cycle http://www.ijitee.org/wpcontent/uploads/papers/v9i4/D1763 029420.pdf

[8] Journal of electrical and computer engineering Internet of things: Architectures, protocol and application

https://www.hindawi.com/journals/js/2020/8749764/
https://www.hindawi.com/journals/jece/2017/9324035

X.   AUTHORS

JITENDRA KUMAR, As I completed my intermediate in 2016 on state board of Bihar and also pursuing B.Tech in Kuppam engineering college as electrical and electronics engineering 2020. This is first paper publication on smart water monitoring system also worked on the same project for past one year because we are seeing on villages area there is no investigation of water quality so that we got an idea to do smart water quality monitoring system but is already in exist but this product has many feature and it is economical, compact in size and it can place every suitable place.

N. NAVEEN, As I completed my intermediate in 2016 on state board and also pursuing B.Tech in Kuppam engineering college as electrical and electronics engineering 2020. This is first paper publication on smart water monitoring system also worked on the same project for past one year because I am very must interested in technology because from my child wood it self interested in this area so that I am taken electrical engineering.

RAJA BAITHA. As I completed intermediate in 2016 on state board of Bihar and also pursuing B.Tech in Kuppam engineering college as electrical and electronics engineering 2020.This is first paper publication on smart water monitoring system. I am very must interested in new technology because from my child wood itself interested in the area so that I am choose engineering.

V. SEKHAR, Associate Professor

As I received the B.Tech degree from SIETK in Puttur in 2008 in field of EEE and ME degree from VEC in Chennai in the field of Power System engineering and also Ph.D degree from VIT in Vellore in field of Power System Protection. Now I am working as Associate professor in Kuppam engineering college in department of electrical and electronic Engineering. I am interested in research and development in renewable energy and new technology..

V. SRIMAHESHWARAN, Assistant Professor

As I received the BE degree from Bannari Amman Institute of Technology Sathyamangalam in 2009 in field of EEE and also ME degree from Bannari Amman Institute of Technology Sathyamangalam in 2011 in the field of Power Electronics and Drive. Now I am working as assistant professor in the Kuppam engineering college in department of electrical and Electronics Engineering. I am interested in research and development in new Technology.