INTERNATIONAL JOURNAL
FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Water Management using Flow Meter

Anusha Reddy. L[1], Niharika. M[2]

[1, 2]*Electronics and Communication Engineering, Sreenidhi Institute of Science and Technology*

Abstract: Water is the main source for human existence. Now a days there is a lot of water scarcity and people waste a lot of water, everyone are unaware of the water usage .Managing the water is quite difficult task these days. so in order to eradicate the situation and to avoid the problem we need to develop a water management system through which one can reduce the loss of water and control the water handling tasks .In this project the main component is flow meter which measures flow rate of water The main objective of the project is automatic controlling of the motor pump, Based on flow rate we can inform the user that they are using more water. We can also generate SMS such that their limit is over and leak detection. In this project we are using, flow meter, GSM modem, water tank and a system to display are the major components.
Keywords: Flow meter, GSM, Water sensor .

I. INTRODUCTION

In earlier days water managing systems were manual with heavy equipments, due to which controlling of the systems was very difficult. In physical water systems consumer is unaware of his own consumption and there is no limit for his usage . There was a huge risk in monitoring manually as consumer is not available all the time which needs a person specifically only for water managing .user was also unconscious about the water in the tank, and individual does not know when to switch off/on the motor which leads to tank overflow.

In those days we do not have a design to find whether the water is normal flow or any type of leakage in the absence of the utilizer and there was no intimation to him about the leak.

In this system automatic motor pump on/off is done using water sensor, in which it senses , computes the data actuates based on the desired level.

Water consumption of different users can be known with the help of the flow sensor which senses the flow rate of utilizer and we can integrate the total consumption per day as per requirement. Global system for mobile communication used in this system is to send alert message indicating limit for the user .

These type of system are generally preferred in residential areas as we can know the consumption of different users individually and charge accordingly and warn messages can be sent ,leak of various detected with low cost.

There are various methods in order to detect leak such as laser technology, infrared hydrostatic testing. Leak detection of flush type or any other type can also be easily recognized based on the sensed values of the flow sensor and it can be intimated to user through the SMS if there is any type of leakages.

The main intention of the design is to avoid the manual work and managing the water wastage without any type of risk.

II. LITERATURE SURVEY

IOT based water management system uses conductivity sensor and pH sensor to measure quality of water . Consumption is measured using flow meter[1].

In smart water supply management system by Kiran M.Dhobale , Sangmeshwar P.Gorgile uses sensors to track water level and informs central office about time period of water supply and consumption through GSM services [2].

Digital Water Meter Using Arduino measures volume of water in residential and public areas using hall effect sensor,GSM and ATmega328 [3].

In Smart Water Supply Using Labview and Arduino by S.Vishal , G.Prashanth and N. Srinath includes even distribution of water in local area along with tank level monitoring and controlling and tank cleaning notification and controlling. The hardware includes flow sensor, solenoid valve, turbidity sensor, transmitter, receiver, level sensor. The software includes Labview, VIPM and Arduino[4].

Smart Water Management Technology with Intelligent Sensing and ICT for the Integrated Water Systems article uses Big data processing, Analytics, prediction, Data acquisition, vibration sensor to obtain graphical relation of water management system[5].

III. OBJECTIVES

The main objectives of this project are
1) Calculation of total consumption of water per consumer .
2) Estimation of total consumption of water per consumer.
3) Generation of alarm if calculated value is greater than the estimated value .
4) Measurement of sudden change in flow rate/ continuous flow to detect the leakage.
5) Monitor tank depth sensor to decide the tank empty / full. Accordingly switch on/off motor.

Consider an apartment with 10 flats , each of them estimated consumption of 400 litres per house makes 4000 litres of tank .If user consumption is greater than 400 ltrs an alert message generated and sent to the consumer using GSM . we can notice the sudden increase in flow/no flow with the help of flow rate. We note down flow rates at different instances of time and if the flow rate is same in all instances then we indicate it as leakage. If water level in the tank is above desired value the motor will be automatically off and if tank level is less than desired value motor will be on. Through this we can reduce water wastage due to tank overflow and any leakage by different users.

A level sensing device is designed to measure the level of flow substances including liquids, Slurries and granular materials. These sensing modules can only detect the level of flow of a substance with a specific range.

S-analog pin of arduino(A5)
a) Positive-supply pin(5V)
b) Negative- Ground

A flow meter is a device used to measure the volume or mass of a gas or liquid. Flow meter works on the hall effect principle .hall effect flow meter consists of three main parts : sensor body, hall effect part and paddle wheel sensor .
 i) Red wire : +5V
 ii) Black wire : GND
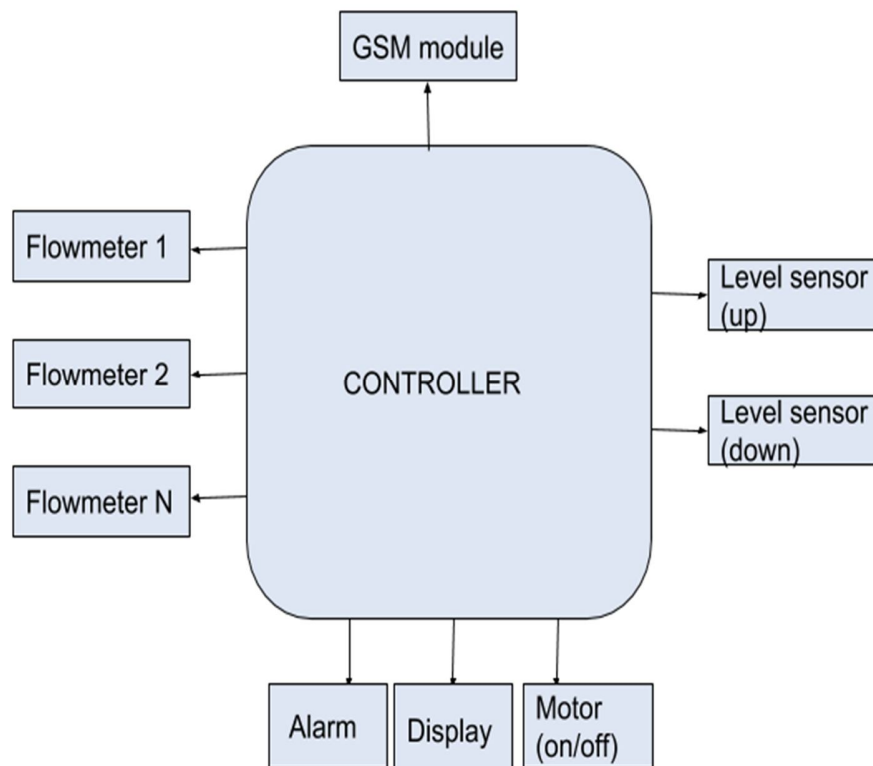iii) Yellow wire : PWM output

IV. BLOCK DIAGRAM

Fig1: Block diagram

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.177
Volume 7 Issue V, May 2019- Available at www.ijraset.com

V.   HARDWARE DESCRIPTION

A. Electrical Diagram
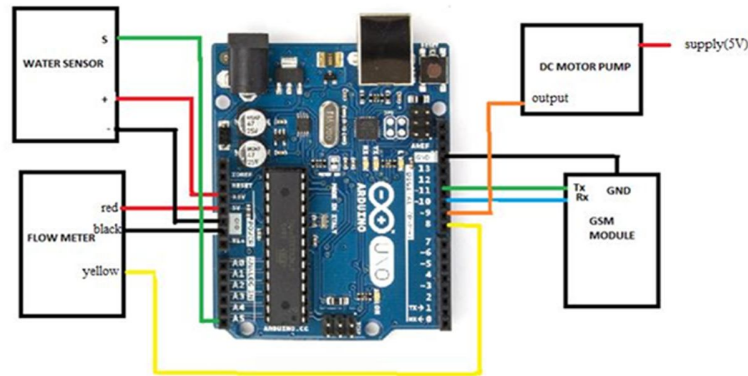

Fig2: Electrical diagram

B. Physical Diagram

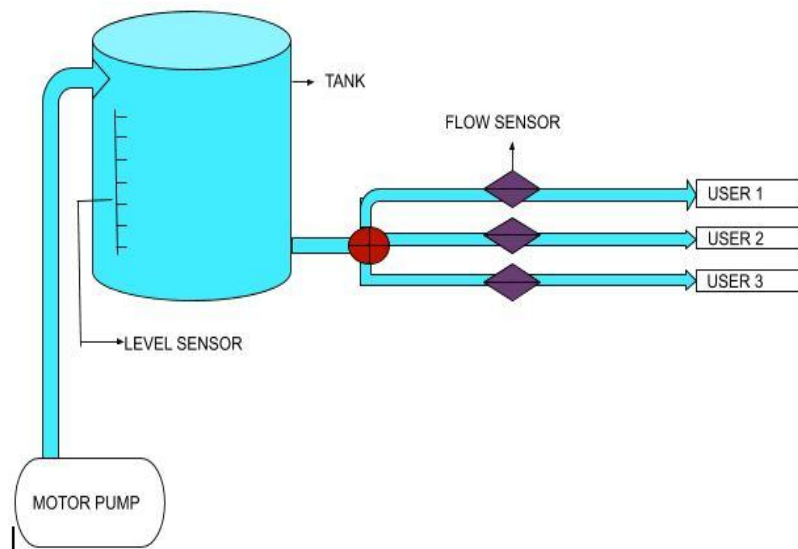Fig3: Physical diagram

VI.   SOFTWARE DESCRIPTION

Water consumption$(Q)=A* t$

Integrated consumption$=\sum A_i*t_i$

Where $i=1,2,3\ldots\ldots..n=$ no. of consumers

A is amplitude of the pulse(Litres) and t is time period of pulse(min).

If $A*t >$max flow $=>$Daily limit is over.

Pulse frequency (Hz) $= 7.5Q$, Q is flow rate in Litres/minute .

Flow sensor calculates flow rate of water flowing through it using above formula. By using Meter.getCurrentFlowrate() function we can interface flow sensor with arduino. Using sensorValue() command we can get the level of the sensor and the value is fed to analog pin of the arduino. Accordingly the motor will be on/off.

VII. FUNCTIONAL

A. Description

All the peripherals are being tested first and together initialized. Flow sensor works with the principal of hall effect, rotor in it helps to find the flow rate as water flowing makes to rotate it. Flow sensor is used to find utilization of water of different users by connecting the sensor through the pipe. Here limit is set for different user and if the user reaches certain limit alert message sent to user such that limit is over ,additionally we will consider a particular time period in which if water flow continuously crossing the time period then it is considered as the leak an intimated to user with help of GSM module .At the same time we can also make automatic motor pump on/off according to the water level. Water sensor as it is placed in tank vertically to walls such that sensor bottom touches tank low level, water sensor senses the value according to the level of water ,as it reads low value motor goes to on state and for high value motor is off.
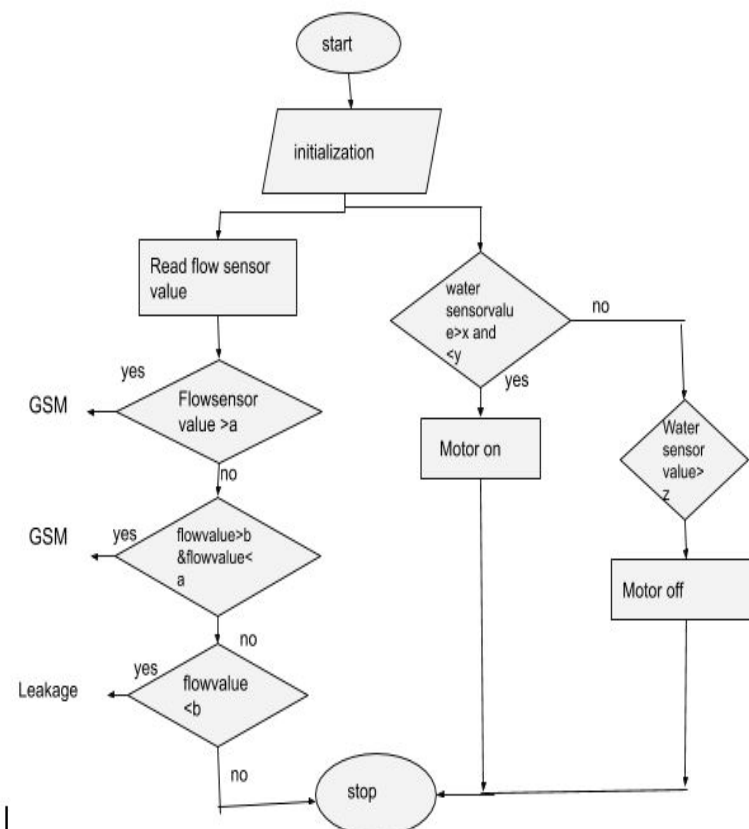

Fig4: flow chart

VIII. RESULT ANALYSIS

This project handles many type of problems such as leak detection, consumer consumption of water for limit usage .Alert messages for over usage of water. Automatic Motor pump on/off according to water level which avoids the manual work to operate the motor to on/off.

IX. CONCLUSION

This system provides automatic control of overall daily life water managing activities with less cost and convenient process. It is suited to add many other features to this system easily. Amount paid according to usage of user. This design acts as centralized monitoring water managing system which is eco-friendly .Components used such as flow sensor GSM ,water sensor together make good control of water.

X. FUTURE SCOPE

In Future Tap leakage can be detected, lot of water can be saved with this process and further automation can be developed through various methods.Laser detection and many other process can be used for leakage detection   purpose.

REFERENCES

[1] Kanishk Shrotriya, Manish Jain, Madhur Mittal, Lokesh Yadav, Nidhi Vijay "Digital Water Meter Using Arduino," International Journal of Engineering and Management Research Volume-7, Issue-2, March-April 2017 .

[2] Patawala Amatulla .H, Indapur Bansode Navnath .P, Indapur Bhong Yogesh .P, Indapur Prof. Zadbuke Ashwini .S" IOT Based Water Management System for Smart City," International Journal of Advance Research,Ideas and innovations in technology SSN: 2454-132X Impact factor: 4.295 Volume3, Issue2.

[3] S.Vishal, G.Prashanth and N.Srinath "Smart Water Supply Using Labview and Arduino " International Journal of Electronics Engineering Research. ISSN 0975-6450 Volume 9, Number 8 (2017).

[4] Sathya Narayanan PSV "An Iot Based Water Supply System for Smart-city Management "International Journal of Engineering Research and Advanced Technology (IJERAT) DOI: http://dx.doi.org/10.7324/IJERAT.3168 Vol.3 (12) Dec -2017.

[5] KUMURA T, SUZUKIi, TAKAHASHI M, TOMINAGA Shin, MORIOKA , Ivan Stoianov "Smart Water Management Technology with Intelligent Sensing and ICT for the Integrated Water Systems".

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 ⊘ (24*7 Support on Whatsapp)