

SMART WATER MANAGEMENT

Vishal Pawar¹, Shriyata Kashyap², Deepak Singh³, Srinath Baby⁴, Prof. Prachi Gadhire⁵

^{1,2,3,4} Student, EXTC Department, DILKAP College, MAHATASHTRA, INDIA

⁵ Professor, EXTC Department, DILKAP College, MAHATASHTRA, INDIA

Abstract - Water supply has become a big problem over past few years due to overpopulation, climate change, pollution, deforestation. In such scenario, everyone should contribute to save water and effectively usage of water must be encouraged. Proposed system will be the best use of technology over this social issue. In the proposed system, we will use the Atmega 328p status of water availability on 16x2 alphanumeric LCD display. In this way, by installing this low cost automated system water saving can be encouraged by dividing the annual water taxation according to usage of water. Society secretary can even manage the water supply to specific member on occasion of any event or celebration or celebration makes the system flexible for daily use. Microcontroller which is belongs to Arduino platform. Along with the arduino 328 flow sensor will measure the amount of water is supplied to each society member, if limit exceeds, solenoid valve will interrupt the water. Sensor units installed at overhead and underground water tank will update the real time status of water availability on 16*2 alphanumeric LCD display.

Key Words: ATMEGA 328, FLOW SENSOR, FSR, GSM MODEM, IOT, ARDUINO, etc.

I. INTRODUCTION

Water is a limited resource and is essential for agriculture, industry and for creature existence on earth including human beings. Lots of people don't realize the true importance of drinking enough water every day. More water are wasted by many uncontrolled way. This problem is quietly related to poor water allocation, inefficient use, and lack of adequate and integrated water management. Therefore, efficient use and water monitoring are potential constraint for home or office water management system. So to avoid this sever problem of water we have developed the system. This system will keep the account of water usage of every person or home. This system consist of two water tanks. The tank 1 act as a main resource of water storage, the tank 2 act as distributer of water to every home. This system includes flow sensors which will keep the track of amount of water given to the user. In the proposed system, we will use the Atmega 328p microcontroller which is belongs to Arduino platform. Along with the arduino 328 flow sensor will measure the amount of water is supplied to each society member, if limit exceeds, solenoid valve will interrupt the water. Sensor units installed at overhead and underground water tank will update the real time status of water availability on 16x2 alphanumeric LCD display. In this way, by installing this low cost automated system water saving

can be encouraged by dividing the annual water taxation according to usage of water. Society secretary can even manage the water supply to specific member on occasion of any event or celebration makes the system flexible for daily use.

II. PROBLEM STATEMENT

Water demand is exponentially growing high with the increase in population of the urban areas. Lots of people don't realize the real importance of water. Due to this the water is wasted on a large scale by the people. So we have developed the system which will keep the track of amount of usage of water by the people. Most of the societies have manual supply of water which leads to spilling of water from overhead tank. So overcome this issue we have implemented the idea of smart water management with the help of IOT, flow sensor, cloud monitoring etc. we can avoid wastage of water. This system has effective impact on the usage of water since it will keep the audit of usage of water.

III. LITRATURE SURVEY

[1] In the year june 2014 the authors had published the paper on the concept of the water resource problem and how to overcome this problem by using smart water management. Secondly, we have discussed about adavantages and applications of smart water management. This paper deals with various problems faced in day to day life and has exact solution to overcome the problems.

[2] In the year july 2015 the authors came with very innovative idea on water management system. They had published the paper on the concept of level sensors and the use of microcontroller. Using this concept we have implemented the use of level sensors and microcontroller in this system. This paper deals with the various aspects of level sensors and microcontroller.

[3] In the year 2016 the authors came with the concept of limiting the amount of water used daily. This paper mainly focusses on developing an efficient and cost effective method which will limit the amount of water used by the person. In this paper they have developed the faucet device which has two modes of operations: running mode and filling mode.

IV. BLOCK DIAGRAM

This paper consist of following blocks Arduino UNO controller act as a centralized controller for all the components. Then it consist of flow sensors which will sense

the flow of water. The water tank available at ground act as a resource which provides the water to the upper tank.

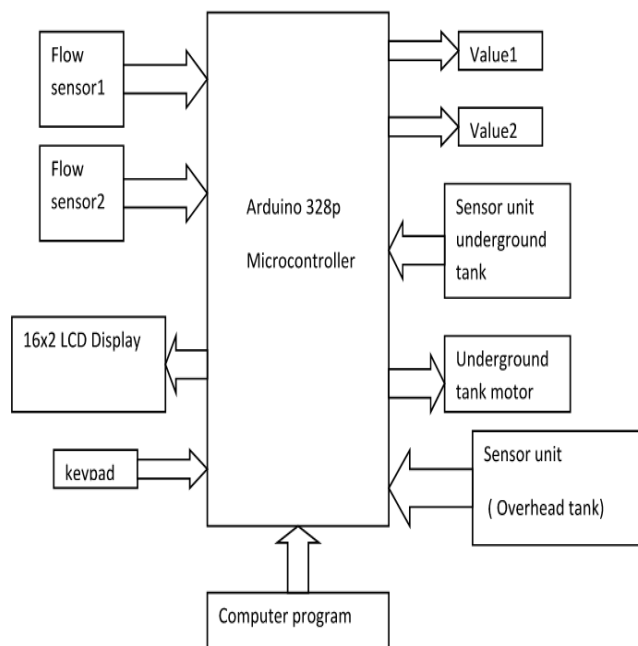


Fig. 1: Block Diagram

The upper tank contains the flow sensors in it which will track the amount of water flows through it. The flow sensor will send the data to the Arduino. Then the Arduino will send the data as a command through the GSM module to upload on cloud server. Cloud server is the concept of INTERNET OF THING. The ThingSpeak.com will provide us 500 mb free data storage to store our data used as a cloud server.

V. FUNCTION OF COMPONENTS

[1]ARDUINO: It is an open source computer hardware & software & software company project & user community that designs & manufactures single-board microcontrollers & microcontroller kit. Hardware means arduino circuit & software means where we can type our program or command the arduino. So basically it has two sides like programming to control the project & hardware means arduino device.



Fig. 2: ARDUINO UNO

It is tool for control the project or give the instruction to the circuit or project. Arduino UNO is very easy to use & it is cost efficient & easily available in the market. The simple c programming language is used & very easy to implement the program like just connect the arduino to computer using connector cable & implement the program.

[2]GSM MODULE: GSM is a mobile communication modem it stands for Global System for Mobile communication. A GSM modem is a specialized type of modem which accepts a SIM card & operates just like a mobile phone. From the mobile operator perspective a GSM modem looks just like a mobile phones. When a GSM modem is connected to a computer this allows the computer to use the GSM modem to communicate over mobile network.



Fig. 3: GSM modem

While this GSM modems are most frequently used to provide mobile internet, internet connectivity many of them can also be used for sending & receiving SMS. It is used for transmitting mobile voice & data service operate at the 850 MHz , 900 MHz, 1800 MHz & 1900 MHz frequency bands.

[3]LCD: Most common LCD's connected to the microcontroller are 16 x 2 & 20 x 2. This means 16 character per line by 2 line & 20 character per line by 2 line respectively.



Fig. 4: LCD

An LCD or Liquid Crystal Display, is a type of screen that is used in many computers, TV's, digital cameras, tablets & cell phones.

[4]RELAY: It is electrically operated switch. Relay are used where it is a necessary to control a circuit by a low power signal or where several circuit must be control by one signal.



Fig. 5: RELAY

Relays with calibrated operating characteristics & sometimes multiple operating points are used to protect electrical circuits from overload or faults. It used to shutting off power supply when due limit is over.

[5]POWER SUPPLY: Power supply is a circuit it converts unregulated DC into constant DC with the help of rectifier. It converts AC supply into DC.

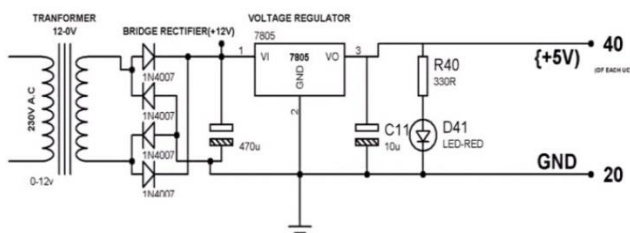


Fig.6: POWER SUPPLY

Its function is to supply a stable voltage to a circuit or device that must be operated within certain power supply limits. The output from the regulated power supply maybe alternating or unidirectional, but is nearly always DC.

[6]Internet Of Things (IOT):Using the ThingSpeak.com we get a free cloud server. This cloud server provides 500 Mb as a storage.

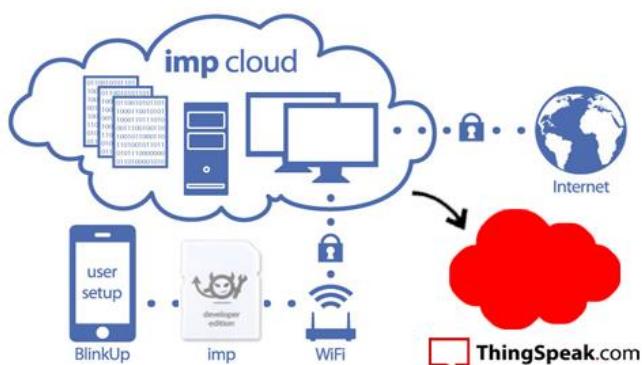


Fig. 7: IOT

Sign Up for a Thing Speak account then Create a new Channel by going to your Channels page and clicking Create New channel & update your Channel via URL. View your

Channel feed & Follow a tutorial for common devices and applications.

[7]FLOW SENSOR:Accurate flow measurement is an essential step both in the terms of qualitative and economic points of view. Flow meters have proven excellent devices for measuring water flow, and now it is very easy to build a water management system using the renowned water flow sensor YF-S201.



Fig. 8: FLOW SENSOR

This sensor sits in line with the water line and contains a pinwheel sensor to measure how much water has moved through it. The “YFS201 Hall Effect Water Flow Sensor” comes with three wires: Red/VCC (5-24V DC Input), Black/GND (0V) and Yellow/OUT (Pulse Output). By counting the pulses from the output of the sensor, we can easily calculate the water flow rate (in litre/hour – L/hr) using a suitable conversion formula.

[8]SOLENOID VALVE: A solenoid valve is an electromechanically operated valve. The valve is controlled by an electric current through a solenoid: in the case of a two-port valve the flow is switched on or off; in the case of a three-port valve, the outflow is switched between the two outlet ports. Multiple solenoid valves can be placed together on a manifold. Solenoid valves are the most frequently used control elements in fluidics.



Fig. 9: SOLENOID VALVE

Their tasks are to shut off, release, dose, distribute or mix fluids. They are found in many application areas. Solenoids offer fast and safe switching, high reliability, long service life, good medium compatibility of the materials used, low

control power and compact design. Besides the plunger-type actuator which is used most frequently, pivoted-armature actuators and rocker actuators are also used.

VI. WORKING

The following system contains AVR Arduino atmega 328, GSM Module, Flow sensor they are well synchronized with each other. GSM module will trigger the Atmega 328 microcontroller which will get +5 volt DC supply from the supply voltage. AVR will trigger the relay and relay will triggered DC motor pump an on indication will be showed on 16x2 LCD screen. As soon as the motor starts the motor will start pumping water from ground tank to overhead tank until the overhead level, senses the level of water. As the level is achieved the flow sensor will send the command to AVR to cut off the power supply of DC motor to avoid overflowing of water from overhead tank an off command is send to the LCD screen. A buzzer is used to show indication sound as motor is on. Water is supply to the home through overhead tank with the help of solenoid pipe which contains control valve and flow sensor. Flow sensor will indicate the amount of water supply through it whereas the flow value is used to restrict the access amount of water supply. This whole data of water supply will be stored in cloud monitoring system and can be manage through GSM module. This GSM module will send this data to cloud system using packet data. The flow sensor sense the level of water tank in overhead tank and when it reach to the level it sense the level and send the on command to the relay and on indication will be show on LCD then this data will be send on cloud server which would be made by us. The thing speak gives us 500mb free cloud storage to store our data so our data will be send on this cloud server with the help of GSM module. GSM module consist of 3G/4G internet access with the help of internet the data will be send on cloud server.

VII. ADVANTAGES

- [1] This model is implemented for overhead tanks.
- [2] No human labour required to check water level.
- [3] Reducing manpower involved in monitoring.
- [4] It has the display screen which shows the status of the water level indicating not only the minimum and maximum level of the water but also the intermediate level of the water.

VIII. CONCLUSION

- [1] In our proposed system, water level can be monitored continuously from anywhere using android application.
- [2] Motor can be controlled automatically full smart automation is achieved.

[3] It is a robust system & small in size.

[4] This system can be implemented using Level sensors which would render an accurate water level and it can be operated using Smart Phones.

IX. REFERENCES

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