SMART AQUA SYSTEM FOR REGIONAL ENVIRONMENTAL MONITORING WITH IOT

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Abstract: Manageability of accessible water asset in many explanation of the word is presently a predominant issue. This issue is discreetly connected with unfortunate water allotment, wasteful use, and absence of sufficient and incorporated water the board. Water is usually utilized for farming, industry, and homegrown utilization. Along these lines, proficient use and water observing are possible requirement for home water the executives framework. In Our undertaking a Ultrasonic sensor is the essential part for the water level pointer. Our Task is assists with showing the degree of water accessible in the tank. We can see all the level of the water contained in a tank or in some other vessels. A Ultrasonic sensor (semiconductor circuit) recognizes the current level of the water in the tank and feeds it to the Arduino board and the Arduino produces a relating yield text which in then shown on the LCD show. On the off chance that the water level is low, the showcase telling that the water level is low and consequently turns ON the engine. On the off chance that the water level is full, the showcase advising that the Water levels is full and naturally switch off the engine. Simultaneously water can dispersed to the home, it in light of the engine outlet valve. Each home have separate stream sensor. The sensors will detect the progression of water to each line which at last tells the utilization of water at home.

Keywords: IOT, Water resources, scarcity, Water management, limiting use, statistics

INTRODUCTION

Being the second populous country in the world, India has an overall population of 1.12 billion living in an area of more than 3 million square kilometers. Even though the last decade has shown improvements in fulfilling; the basic necessities like food (including water), shelter and clothing to people; extremely rural habitations and villages still lack clean water. Recent survey shows that the water scarcity in India will worsen as the overall population is expected to increase to 2 billion by year 2050.

Nearly the third quarterly portion of the earth which estimates up to 71% portion of it is covered with water. But out of which only 0.08% fresh water is available for human purposes and for living beings 1. The main sources of fresh water available for living purposes and for human use is the surface water available as a result of rainfall which also recharges the lakes, different water resources like aquifers. Water scarcity is the problem faced by the living creatures throughout the history and whose intensity has increased during the last centenary . It‟s estimated by next decade approximately 25% of the population of earth will livein perpetual scarcity of water. It‟s a well-known fact that physical factors affect the availability of water which is the culmination of the rainfall received by that area due to number of geographical reasons, but it is also well documented fact that human intervention is also affecting this factors which leads to unseasonal as well as in abnormal proportion of water fall and as a results the priorities of the available water changes drastically. Management of water gains importance to combat the problem of scarcity. This workfocusesonasolutionfor,,Watermanagement‟inurban areas with the help of IoT. Water is precious and the supply needs to be regulated. Water demand is exponentially growing high with the increase in population of the urban areas. To maintain the supply demand ration proper, It is important to have systems to prevent any water loss.New management strategies need to be implemented in order to avoid setbacks and to fill up the lacuna which generally occurs during the distribution of water for various purposes in the allocation of water resources. With this thought, the project focuses, explicitly, on monitoring the usage of water. As monitoring will help further for controlling and distributing the water resource evenly according to the region and availability of resource as perarea.

I. RELATEDWORKS

Water is need of life. In co-operative society, office and likewise system require water supply every day. Such system management of water supply using dynamic IP based Embedded Web server (EWS) is presented in this paper. In current era of networking, to maintain EWS with static Internet Protocol (IP) is

costly and difficult to manage. Novel approach of assign dynamic IP to board is developed and tested for different dynamic IPs.[1], Sensors placed in the tank which continuously informs the water level at the current time. This information will be updated on the cloud and using an android application, user can visualize the water level on a Smartphone anywhere that is connected to Internet[2], to reduce time and avoiding the wastage of water. So this problem can be overcome by developing an android application which works on GSM technology[3], the automation in the water distribution and management with technical device. The level of the water will be sensed by the water level sensor. Depending on the level of the water in the tank, the speed of the water will be varied. The supply of water to different areas are automated through the use of GSM and these mobile controlled water distribution result accurate meter reading and billpayment.[4]

II. PROPOSED METHODOLOGY

The work focused in this project is using Arduino, for measuring the water flow from the pipe which divides the Flow of water to every parts of block, will get sense using flow meter using solenoid .This data that is flow rate which is nothing but the usage of water rating in hours/liter, will be sent to cloud through IOT (Internet of things) space. Then in return getting this data from cloud to web page, the webpage which can be used by the user or the head of corporation for monitoring and controlling the supply of water. In this project, 3 water flow meter is used, one for getting the total water calculation in main tank and other two for the calculation of water usage by two houses through the main tank. The solenoid valve is also used to restrict the flow of water when the water usage exceeds the limit.

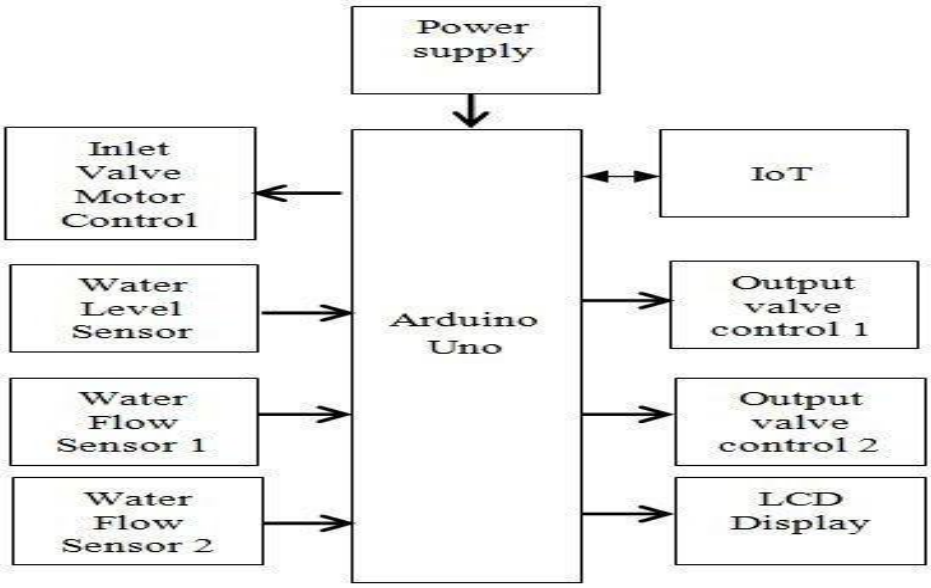


Figure: Proposed System Block Diagram

ADVANTAGES OF OUR PROPOSED SYSTEM

- It does not require more man power for proposed system.
- It does not takes more time for execution of process, it uses GSM module for datasending.
- In less cost proposed system is required with less manpower.
- Water leakage is detected with accuracy. Also pipeline leakage isdetected.

III. HARDWAREREQUIREMENT ARDUINOUNO

The Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHznquartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.. You can tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again.

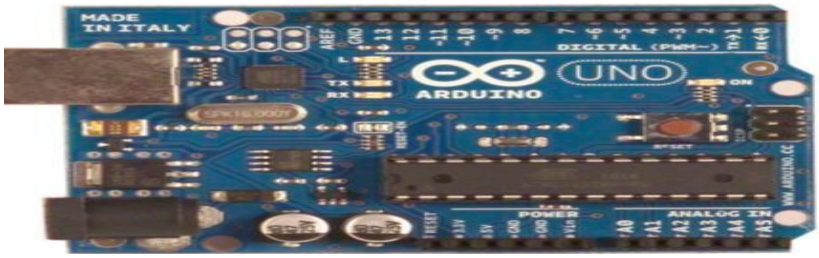


Figure: Arduino Uno

"Uno" means one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0. The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform; for an extensive list of current, past or outdate boards see the Arduino index ofboards.

WATER FLOW SENSOR

Water flow sensor consists of a plastic valve body, a water rotor, and a hall-effect sensor.

Figure: Water flow sensor

When water flows through the rotor, rotor rolls. Its speed changes with different rate of flow. The hall-effect sensor outputs the corresponding pulse signal. The provided sensors are well-manufactured from the topmost grade components and the latest technology under the supervision of our dexterous professionals.

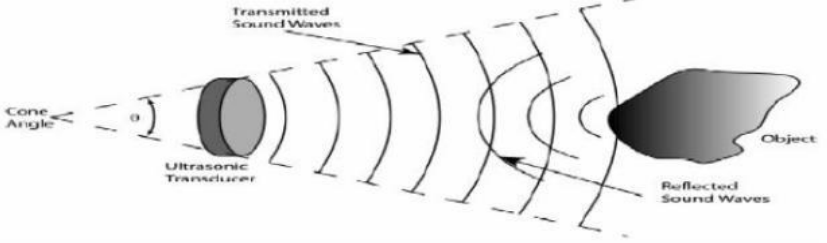
Digital flow sensors units are ideal for use in water conservation systems, storage tanks, water recycling home applications, irrigation systems and much more. The sensors are solidly constructed and provide a digital pulse each time an amount of water passes through the pipe. The output can be easily connected to a microcontroller for monitoring water usage and calculating the amount of water remaining in a tank etc. this flow sensor is suitable for a standard 1/4" pipe and can be easily inserted into a standard piping system. The unitisconstructedoflong-lifepolymerandissuitablefor outdoor mounting. These units are ideal for use in environmentally friendly household water management systems.

FEATURES

- High electric level: less than 4.5 VDC(input voltage 5 VDC)
- Low electric level: higher than 0.5 VDC(input voltage 5 VDC)
- Pulse output protection: 50+/-10 %
- Pulse number: 450pulses/litter.

ULTRASONIC SENSOR

Ultrasonic sensors are commonly used for a wide variety of noncontact presence, proximity, or distance measuring applications. These devices typically transmit ultrasonic sound toward a target, which reflects the sound back to th turn to the sensor and computes the distanc le varieties of sensors currently on the mar nvironmental sealing, and electronic fea and have different radiationpatterns.



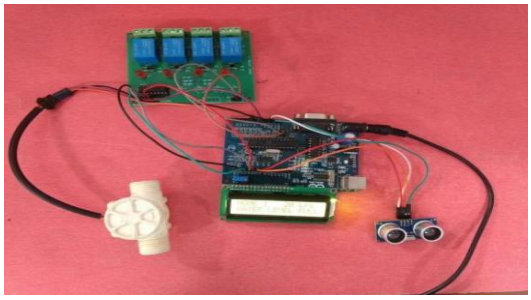
It is usually not difficult to select a sensor that best meets the environmental and mechanical requirements for a particular application, or to evaluate the electronic features available with different models. The principle of working of an ultrasonic sensor is easy. The sensor transmits ultrasonic sound waves and waits for reflected sound waves. After receiving reflected sound wave or usually named echo, sensor detects the distance in different ways. Triggered the sensor and then wait for echo pulse. Measuring echo pulse width is important for us because 30 µs means us 1cm.

Figure: Ultrasonic sensor HC-SR04 module

RELAY

Relay is an electromagnetic device which is used to isolate two circuits electrically and connect them magnetically. They are very useful devices and allow one circuit to switch another one while they are completely separate. They are often used to interface an electronic circuit (working at alow voltage) to an electrical circuit which works at very high voltage. For example, a relay can make a 5V DC battery circuit to switch a 230V AC mains circuit. Thus a small sensor circuit can drive a valve control.

IV. IMPLEMENTATIONRESULTS



V. CONCLUSION

By this undertaking, it tends to be trusted that as expressed in the point of this task that utilizing this arrangement we can gauge the exact water use effectively. What's more, as living creatures are dealing with the issues of wastefully the use of water, people can limit the wastage by streamlining the utilization of water in an extravagant way. The innovation utilized in planning has improvement board and the sensors, which is sui generis and productive. On the off chance that people prevailed with regards to saving no less than 2 gallons of water each day per individual, then for the number of inhabitants in 1.252 billion of India, people can save 2.504 billion gallons of water each day preferably.

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