International Journal of Global Engineering (IJGE) E- ISSN: 2456-3099
VOL 2 ISSUE 3 (2018) PAGES 96 - 99
Received: 4/02/2018. Published: 26/02/2018

Smart Water Conservation and Management System Using IOT

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Abstract: Water conservation management gadget wishes data concerning water storage existing in Dam. Satisfying the increasing demand for water conservation has been principal venture for many countries round the world. Water is one of the most important requirements for human survival, conservation and administration of the water resources must be given most importance. The gadget can measure the water stage and give dimension document to the central office. This machine use sensors to measure the water degree of Dam and updates are provided to Corporation on each day basis. Conservation of water to the precise place in accordance to the water stage in the dam, and it will be informing to the consumer about water stage and the time period of water conservation using GSM message service. Next section includes Water meter which video display units water utilization and calculate suitable invoice in accordance to usage. It presents facility of on-line invoice payment system.
Keywords: Internet of Things (IOT), Water, Wireless, GSM, Short message service (SMS), Smart aqua meter (SAM).

INTRODUCTION

In some water-related subject such as pre-flood warning system, irrigation system, electricity powerhouse, and research, water level data is a very essential issue. Usually, water degree measurement was completed manually, on the other hand this can be now not wonderful due to some difficulties like problem to attain the measurement site, human error, etc. Some computerized water degree measurement structures have been made the usage of mechanical sensors such as resistive sensor, capacitive sensor, or magnetic sensor, but these sensors have to do direct contact with water that makes their life span shorter due to the fact of corrosion [1].On the different hand, this machine uses ultrasonic sensor that can measure the water stage barring direct contact with water, which makes its life span longer. According to the World Bank record launched in 2014, city water conservation in India is confronted with severe challenges together with distribution inefficiency leading to greater operational charges with solely 20% of the connections being metered, and in most cities about 40% water conservation now not resulting in any revenue. Hence, the regular water metering machine employed in India needs each infrastructural improvements and a clever float metering approach. The manual examination of water meters for billing purposes is susceptible to human error and manipulation. Many of the meters are positioned in inaccessible locations. Apartments and business complexes use a frequent water meter and the bill quantity is shared equally irrespective of an individual's usage, offering little incentive for residents to preserve water. The water meter readings are manually fed into a pc to furnish the bill, a approach that is once more susceptible to human error. Smart water structures can serve as preferences to overcome the shortcomings of manual metering systems. They are wi-fi sensor networks: water meters set up in two thousands of households gather periodic measurements that are pronounced in real-time over a wireless network to a

central database [2]. two This machine will replace water level associated notifications to internet servers the usage of internet, which capacity that there is no need to come immediately to the measurement site. Water conservation management will be accomplished in accordance to water degree existing in Dam. two This device sends the statistics to the central office using net server for database maintenance. The data base is secured by supplying a password blanketed access. The user will be notified to pay the bill in accordance to the water usage. The incoming water is measured in volumetric price like litres per minute. The extent of water is measured with a float sensor interfaced to arduino.

2. SYSTEM DESIGN

System View: This system uses arduino, ultrasonic sensor, water drift sensor and GSM module as the essential part. The machine can measure the water level and supply dimension to central office.

a. Arduino: Arduino is a computer hardware and software company, project, and user neighborhood that designs and manufactures microcontroller kits for building digital devices and interactive objects that can feel and manage objects in the physical world. two These systems grant sets of digital and analog input/output (I/O) pins that may be interfaced to quite a number expansion boards ("shields") and other circuits.[3]

b. Rotobotix Water Flow Sensor YF-S201: This sensor sits in line with your water line and includes a pinwheel sensor to measure how a great deal liquid has moved through it. There's an built-in magnetic Hall Effect sensor that outputs an electrical pulse with every revolution. The hall impact sensor is sealed from the water pipe and allows the sensor to remain safe and dry. The sensor comes with three wires: crimson (5-24VDC power), black (ground) and yellow (Hall impact pulse output). By counting the pulses from the output of the sensor, you can without problems calculate water flow. Each pulse is about 2.25 milliliters.[4] two Formula to calculate water flow: Flow Rate (L/min) = Pulse frequency (Hz) / 7.5. Flow Rate (Litres/hour) = (Pulse frequency x 60 min) / 7.5Q

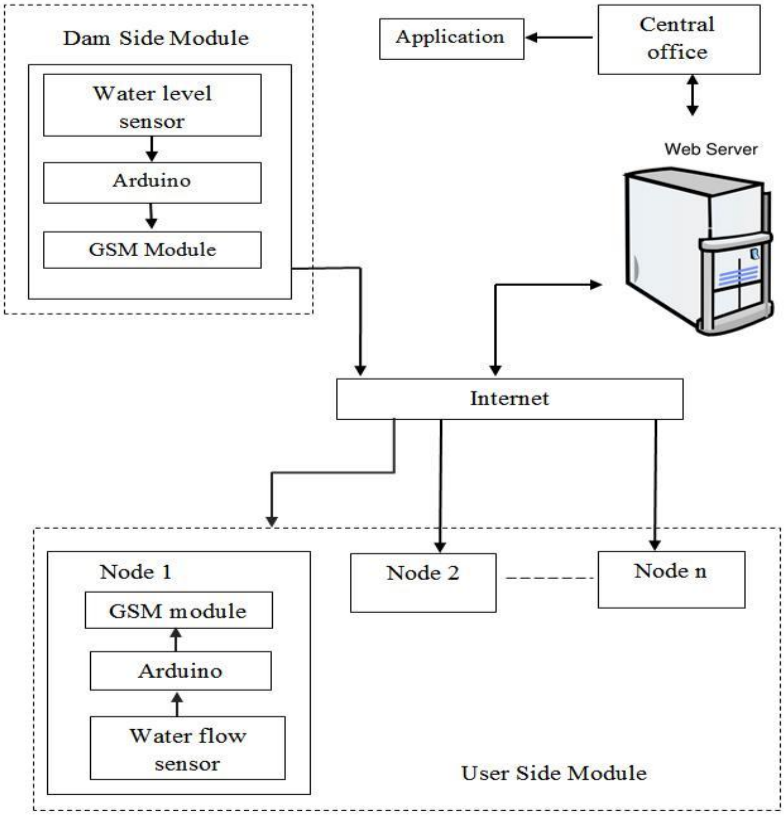

Figure 1: System architecture Diagram

c. GSM module: Sim800 GSM/GPRS USB Modem, Featuring an industrystandard interface, the SIM800 can provide GSM/GPRS 900/1800MHz overall performance for SMS, Data, and Audio in a small structure element and with low electricity consumption.
d. Ultrasonic sensor: The ultrasonic sensor has a transmitter and receiver. It detects the object's distance by means of transmittting ultrasonic wave for200 μs and then detect the reflection/echo wave. The time used by means of the wave from transmission till reflected again and acquired by the receiver is the key to determine object's distance.
3. Functional Description
User Side module: Once the person aspect module starts offevolved up, all the peripherals are initialized. The ardunio tests for water glide if water flow is detected then one more check will be carried out with the aid of the ardunio if the customer has paid the trailing months consignment and only if the invoice has been paid the ardunio opens the valve and starts recording the quantity water flow; after completion of 30 days the data will be despatched to the data- centre/ central office, this technique will be in endless loop.

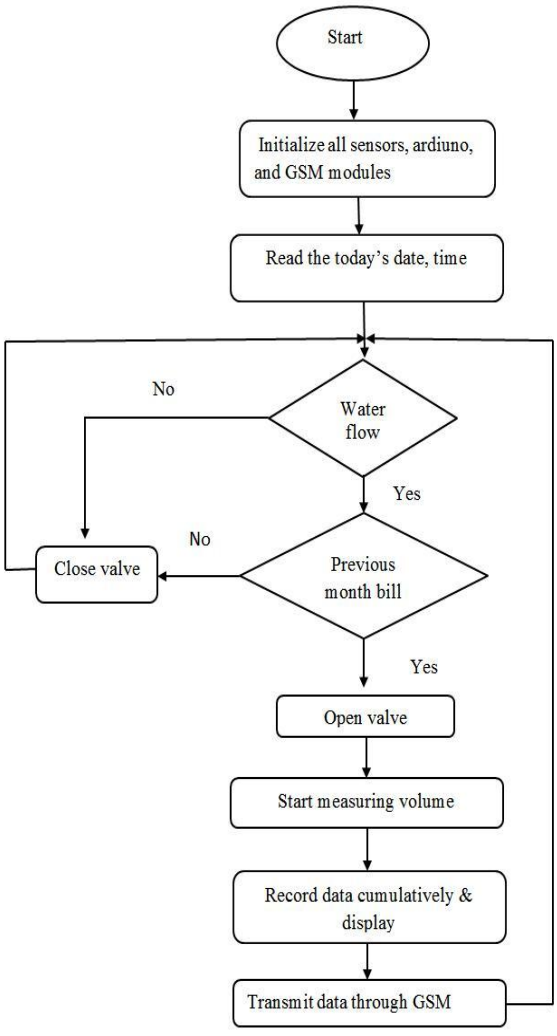

Figure 2: Functional diagram of user side module

Dam aspect module

Dam aspect module calculates water existing in dam and ends statistics concerning water level current to central office on daily basis. This module containing one ultrasonic sensor to feel the

water level and communicates with arduino to procedure operations such as calculation of water present in dam and then quantity records is send to central workplace the use of GSM module.

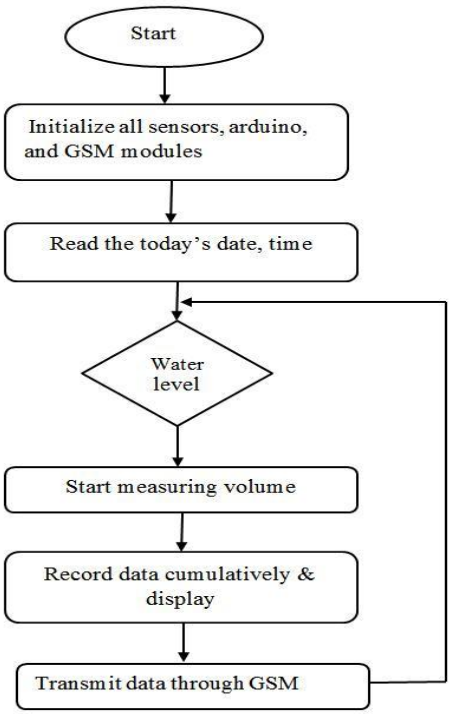

Figure 3: Functional diagram of dam side module

5. CONCLUSION

On the groundwork of analysis and design, the system gives a clever water meter with eco-pleasant and energy environment friendly system. As the clever water meters are digitized and automated, excessive accuracy is maintained by way of decreasing human efforts. Water theft can be avoided for the reason that there are no mechanical parts that can be subjected to tamper.A float sensor based totally water metering system was once used for automated billing, getting rid of the drawbacks of regular water metering systems. Further, multiple houses in a building may want to two use separate quit nodes with a common gateway connecting to the internet for accurate billing based on person consumption of houses. An evaluation of water usage through a range of shops in a house was once furnished in order to educate residents on cutting down wasteful usage. This paper demonstrates the profitable implementation of an internet-based approach to monitor water conservation and utilization on a real time basis.

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