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Automated Water Billing System

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***Abstract*: The availability and depletion of natural resources is increasingly punted as the limiting factor for sustainability. A lot of focus, especially in drought-stricken countries, is placed on water conservation. So, measuring water is very essential step in water management. One way to affect prudence with this scarce resource is to generally create timely awareness of consumption thereof, and also the related cost for the consumers. There are many water flow measurement techniques as well as different types of water flow meter to measure the volume of water flow in pipelines but these all are too costly.**

Existing metering solutions are often manually read by officials, and the information is difficult to digest. Moreover, billing information, which serves as feedback, lags consumption by several weeks. Smart meters address many of these challenges by enabling electronic and real-time metering, but are still prohibitively expensive. In this project, a novel low-cost water flow meter is developed for use in household smart metering solutions. The design is based on YF-S201 flow sensors and offers different solutions for measuring flow rates in gas and liquid applications. The standard solutions are optimal for various flow applications but can be fitted to meet customer-specific requirements.

***Keywords*: water billing system**

1. Introduction

Sustainability of available water resource in many region of the world is now a serious issue. This problem is silently related to inadequate use of water and integrated water mismanagement. Water is widely used for agriculture, industry, and domestic consumption. The water monitoring is important constraint for the different applications of human being. The unnecessary wastage of water can be controlled by applying small charges which is bearable by poor people. At present only one bill is produced for the whole building which is divided evenly among the users in the building.

So people who use large amount of water are equated to those who use less quantity of water and they unnecessary pay extra money for water usage. Current manual water billing systems are costly and having other disadvantages like missing of water bill. Also user has to wait till the end of the month to know water usage and the water bill. Automatic water billing system came into existence because of human error and inconsistence that is associated with manually operated system. There is also problem in the process of turn ON-OFF the water pump. This is because it takes time for individual who is manually operating the water pump to turn off the water pump and this may cause water wastage and at times the individual might not know that the water level has drop so low until the tank is completely empty. Human error associated with manually operated system, improper bill creation, Bill availability and payments process which are time consuming activities, wastage of water in process of manually operated. An automated water flow meter, measures the flow rate of water passing through the pipeline. Generally, the problem arises that the consumers are unaware about the total water units consumed on monthly basis. Hence when the water bill is generated consumers tends to pay for it blindly.

Our proposed system is an electronic billing system to enhance these issues by using smart water meters. Each smart meter will send the monthly water meter readings corresponding to user's water consumption. Once the water consumption is received an acknowledgement will be sent to the user as an SMS notification and then saved in the database of the water institution automatically. Once the database is completed the user will receive his invoice through message and hence paper bills are not required.

2. Proposed system

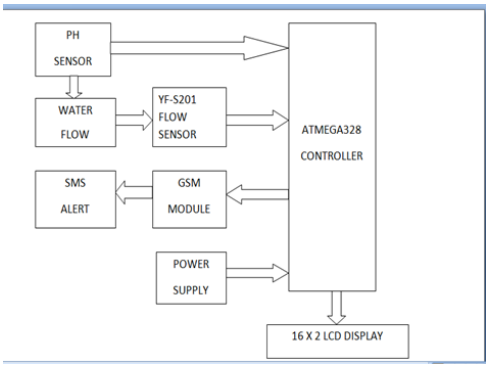

Fig. 1. Proposed system block diagram

Fig. 1, shows proposed system block diagram. The block diagram gives us an idea of how the system is going to work. The water meter has a water flow sensor used to sense the flow of water. The sensor sits in line with your water line, and uses a pinwheel sensor to measure how much liquid has moved through it. There is an integrated magnetic hall effect sensor that outputs an electrical pulse with every revolution. A turbine wheel embed with magnet is placed on a closed plastic envelop. When the water flows through the pipeline, it makes the turbine wheel to rotate and hence the magnet flux interferes the hall

sensor. Ph probe measures ph by measuring the voltage or potential difference of solution in which it is dipped. By measuring the potential difference, hydrogen ion concentration can be calculated using the Nernst equation. The microcontroller will play a major role in regulating and giving the final outputs to the respective user in the form of SMS and LCD display. The monthly water consumption is sent wirelessly to the base station. The receiving mobile phones at the base station receives the monthly consumption. Hence the bills are created automatically and sent to the user through SMS without human interference.

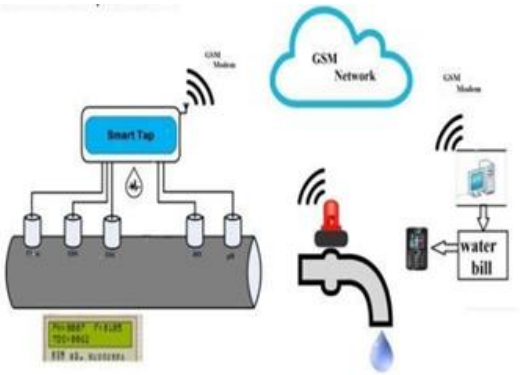

Fig. 2. System Architecture AT Commands for sending SMS

AT Commands for sending SMS

1. Define message format by typing "AT+CMGF=1" (Text mode).
2. Set message center number by typing " AT+CSCA=XXXXX"(Center number of service provider)
3. Enter recipient number by "AT+CMGS=YYYYYY".
4. Write message and press Ctrl-z.

AT Commands for receiving SMS

Define message format by typing "AT+CMGF=1"(Text mode).

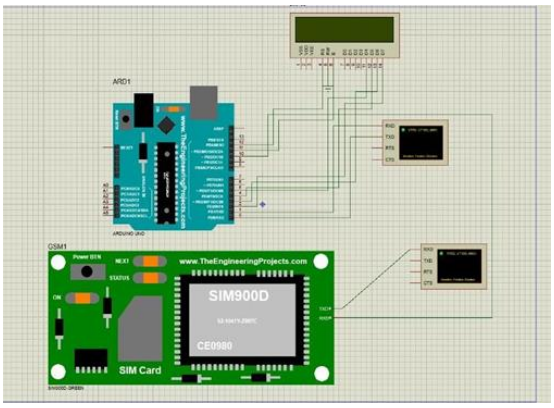

Fig. 3. System circuit diagram

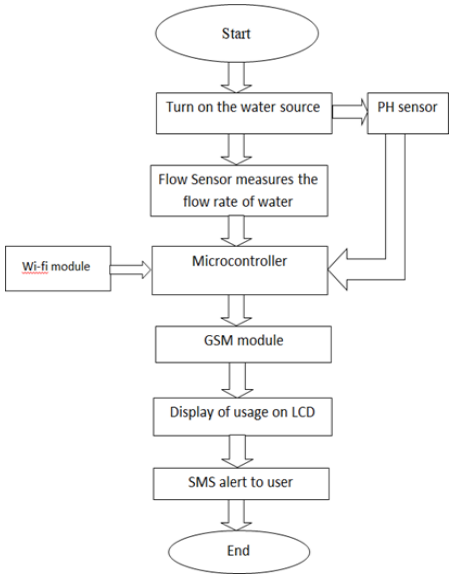

Fig. 4. System flowchart

3. Advantages and applications

A. *Advantages*

- The water bill for individual flat is calculated separately.
- The total bill based on the total units of water consumed is generated on timely basis and send to the user.
- Reduces water consumption and thus results in conservation of water.
- Make life easier for customer.

B. *Applications*

1. In large residential complexes, to calculate the water bill of individual flat based on the water units consumed by the flat owner.
2. In industries, to measure the water flow.

4. Conclusion

1. This system provides successful implementation of water flow meter to measure water flowing through a pipeline in the house.
2. It determines the total units of water consumed by the user. Accordingly, it calculates the bill of water that is being consumed on timely basis and displays it on LCD.
3. It also sends an SMS alert of total units of water consumed and the bill to the user and to the water management department.
4. This system eliminates the drawbacks of traditional water metering systems and thus provides an automated solution.
5. The system also proves useful for water conservation and reduces the wastage of water.

References

[1] Patawalla Amatulla, Bansode Navnath, Bhong Yogesh, Zadbuke Ashwini, "IOT Based Water Management System for Smart City", IJARIIT, vol. 3, issue 2, 2017.
[2] Pranita Vijaykumar Kulkarni, Mrs. M. S. Joshi,"An IOT Based Water Supply Monitoring and Controlling System with Theft Identification", vol. 5, issue 9, September 2016.
[3] Megha Raykar, Parijata Vinod, Parinita Vinod, Preethi K M, Lovee Jain, "Automated water billing with detection and control of water leakage using flow conservation", IJEDR, vol. 3, issue 2, 2015.
[4] M. J. (Thinus) Booysen, "A water flow meter for smart metering applications", 2014.
[5] Ria Sood, Manjit Kaur, Hemant Lenka, "Design and Development of Automatic Water Flow Meter", IJCSEA, vol. 3, issue 3, June 2013.
[6] Birendrakumar Sahani, Tejashree Ravi, Akibjaved Tamboli, Ranjeet Pisal, “IoT based Smart Energy Meter”, IRJET, vol. 04, issue 4, April 2013.