

AUTOMATIC WATER BILLING SYSTEM USING ARDUINO

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Abstract : In this 21st century saving and monitoring of water flow is most imperative due to its shortage; particularly during the summer season. The system for water billing using flow sensor is proposed to tackle the problem of water monitoring and saving. The system is also integrated with automated GSM message service if the flow sensors send high end flow data. It also has the integrated system of water monitoring which can be further used for data processing and estimating the water resources. The billing development involves receiving billing report from a variety of networks, formative the billing rates associated with the billing records, calculate the cost for each billing record, aggregating this records periodically to produce invoices, sending invoices to the customer, and collecting payments received from the customer. The overall maintenance cost of these systems is smaller and the results will be helpful and optimistic.

Keywords: Arduino, GSM module, Flow sensor.

I. INTRODUCTION

The present digital era is focusing on smart city applications based on Internet of Things (IoT), Wi-Fi, etc. This work focuses on fresh automation techniques based on Android system for water billing system. Sustainability of Available water resource in many region of the world is now a staid issue. This problem is silently related to scarce use of water and integrated water mismanagement. Water is broadly used for agriculture, industry, and domestic consumption. The water monitoring is main constraint for the different applications of human being. The unnecessary wastage of water can be controlled by applying small charges which is manageable by poor people. People who use large amount of water are equated to those who use less quantity of water and they superfluous pay extra money for water usage. Present 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 quarter to know water usage and the water bill. Human error associated with physically operated system, improper bill creation, Bill availability and payments process which are time consuming activities, Wastage of water in process of manually operated Water pump, these are the troubles that lead to the development of a “**Water Billing System**”. In this Paper, a low-priced water flow meter is proposed, which measures flow rate of water passed through the water supply pipe of particular user and bills are formed according the flow rate of that particular user. This provides control on usage of water per user without disturbing or increasing cost of other user. The time limit is given to the user to pay bill within limit, else the water flow is closed by admin until bill is paid.

II. PROPOSED SYSTEM

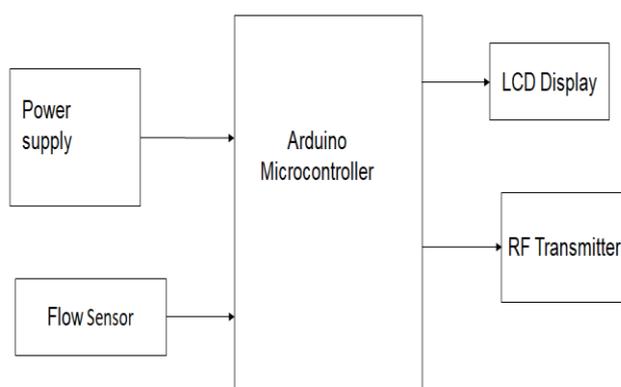


Fig 2.1 Proposed system block diagram (transmitter)

Fig.2.1 shows our proposed system block diagram. The electronic water meter has a water flow sensor [4] used to sense the flow of water, and then this value is in use by the microcontroller to compute its equivalent water utilization volume. The total water utilization displays continuously on the LCD, while the monthly water utilization is sent wirelessly to the base station using a transmitter. In fig.2.2 the receiving receiver computer at the base station receives the monthly utilization. The worker at the base station selects an automatic program that is particularly designed to save these values automatically to a database. Then, the values are uploaded and bills are created mechanically and sent to the user through GSM module without obstruction of any employees.

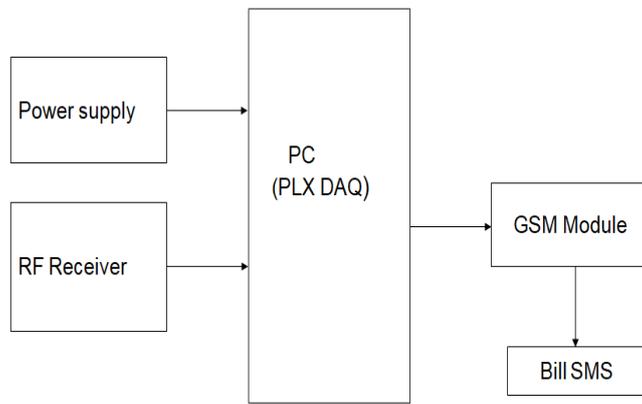


Fig. 2.2 Proposed system block diagram (receiver)

III. SYSTEM ANALYSIS

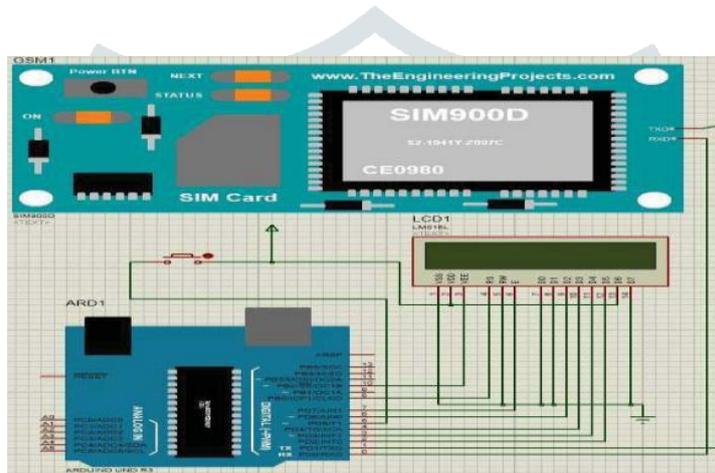


Fig 3.1 System Analysis

IV.METHDOLOGY

A **water billing system** involved flow sensor, gsm module, and microcontroller. Flow sensor is used to measure the flow of water, gsm module is use to send message to mobile, microcontroller is the main part of **water billing system**.

The process starts at the user’s property, the water flowing through the pipe will be calculated using a flow sensor and the output provided by this sensor would be read by the Arduino board. Based on the flow sensor calibration factor, the number of liters of water utilized is determined. This is a continuous procedure until the water flow stops through the pipe. This collected data of the utilized water is transmitted to the control station through RF transmitter. At the control station by RF receiver, it receives the data and the receiver is connected to Arduino controller. Based on the liters of water utilized, amount will be calculated using Arduino controller. The bill will be stored in the controller and will be simplified as and when the data arrives on the RF receiver. Using LCD display the bill is publicized, which is interfaced to Arduino.

Meanwhile the same bill is sent to the customer using GSM technology [8], shows in fig.4.1.



Fig. 4.1 GSM module interfacing

V.FEATURES AND SPECIFICATION

The System supports a friendly and easy contact between users and Water Company. First of all, these smart electronic meters measure the water utilization using water flow sensors. These readings become visible on the LCD on the meter all the time. At the end of the month, these readings are transmitted routinely to the base station using GSM signal. At the same time, users receive message at their mobile phones at end of the month corresponding to their utilization. Moreover, users receive frequent SMS notifications when their readings get to the base station and saved into the data base and when bills are ready. When the user meter reading is not established by the company, an SMS message is sent to the user water meter (to resend again the meter reading automatically).

VI. METER COMPONENTS

- Arduino Uno
- Water flow sensor
- GSM Module
- LCD display
- Base Station Components:
 - RF Module
 - Computer

VII.RESULTS and DICUSSIONS

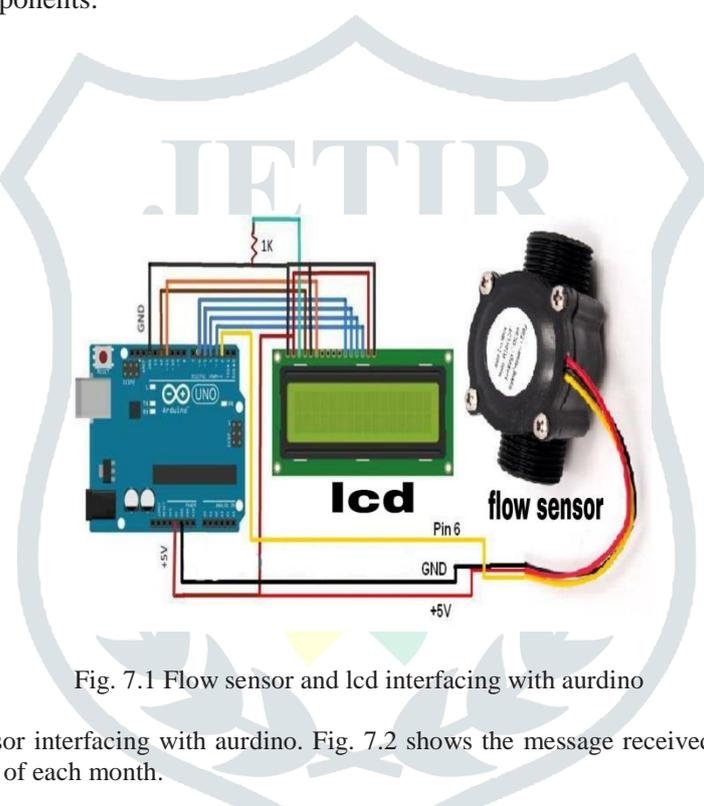


Fig. 7.1 Flow sensor and lcd interfacing with aurdino

Fig.7.1 shows the lcd and flow sensor interfacing with aurdino. Fig. 7.2 shows the message received by the base station [7] and the user mobile phone from his meter at finish of each month.

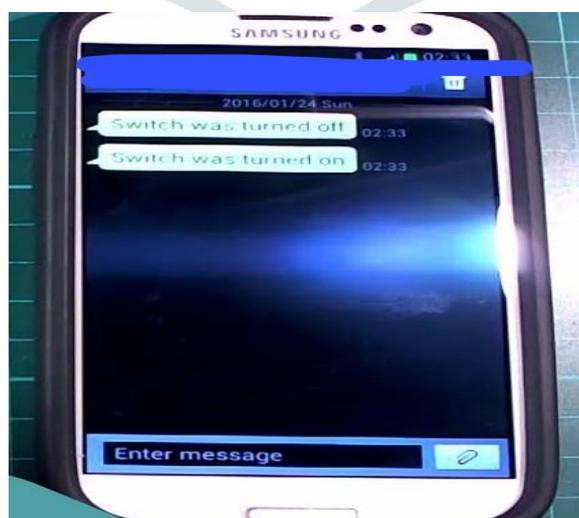


Fig. 7.2 Flow sensor and lcd interfacing with aurdino

Fig. 7.2 shows the message received by user mobile phone as a notice from water company, to ensure that his water consumption is saved into the server.

VIII. CONCLUSION

Proposed system will give accurate and real time water billing system. This overcomes accessible systems in terms of cost and manpower required. GSM module gives you ability for real time monitoring. The LCD displays gives the reading of on-spot sensor reading. RF module helps us integrating the whole system for eco-friendly use. This system is user responsive for water supply management. This billing system gives fully control and right management of the water usage. Potential for future work consist of implementing a additional advanced Android based automatic water billing system incorporated with message services. This swill advance the accuracy in the bill of water usage as well as the wastage of water. This plan will be implement in every area and every society to keep away from extra water usage. These systems also superior by automatically controlling the all actions like bill generation without help of user.

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