



A Review on Implementation of Multifunction Meter

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ABSTRACT: This paper will provide a new approach i.e. the Multifunction meter. This multifunction meter will contains the Energy Meter i.e. Electricity meter, gas meter and water meter. Multifunction meter can control the usage of different sources on consumer side to avoid wastage of power as well as gas and water source. This system contains the use of a GSM transceiver to send the messages to the user. This paper will provide the overview on different meter system.

KEYWORDS: Multifunction meter, GSM transceiver.

I. INTRODUCTION

Billing is done by traditional meter reading taken by human from house to house, building to building or industry to industry. In this traditional meter reading system huge number of human operators is required and there are chances of human error like data entry, taking reading, and delay in taking meter reading etc. If there is delay in meter readings, delay in bills delayed revenue, delay in cash-flow. To avoid this thing Automatic meter reading system is required. AMR is the technology of automatically collecting consumption, diagnostic, and status data from water meter or energy meter devices (gas, electric) and transferring that data to a central database for billing, troubleshooting, and analysing [5].

The proposed system developed Multifunction meter system with the help of GSM technology. This Multifunction meter contains the energy, gas and water meter to measure the consumed energy by the user. For measuring energy consumed by the user we are going to use one digital energy meter, at the same time as it uses 1 unit the count will be displayed in LCD. Up to end of month no of units consumed and total amount to be pay will update according to the power consumption and at the end of the month total amount will transferred to last month due Colum. And if the customer not paid that money within the 15 days then we will trip the total power supply connected to load and we will give intimation to the customer through GSM SMS.

II. LITERATURE SURVEY

Yogendra P Joshi and M. B. Tadwalkar in [1], developed a system for automated water utility billing. This proposed system will provide accurate meter readings for billing thereby increases the efficiency of the system. Fig. 1 shows the proposed system. In this proposed system quantity of water used is measured with the help of flow sensor i.e. VATS JT-121. This VATS JT-121 sensor gives square waves output proportional to quantity of the water flow and also output of sensor is given to GSM modem at user end through micro controller. Through GSM modem, this data is send to GSM modem at office end and all data received by office modem is sent to the billing software for calculating bill.

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Fig. 1 Block diagram of GSM based automatic water meter reading system [1].

Immanuel J., Parvathi C. S., L. Shrimanth Sudheer, and P. Bhaskar in [2], presents the design and implementation liquid level control system. This proposed system contains MATLAB graphical user interface (GUI) based fuzzy and integrated fuzzy logic controllers (IFLC) for controlling liquid level. To design fuzzy logic controller the fuzzy tool box in MATLAB was used. ADDA board is interfaced to PC through PCI DIOT card to acquire signals from sensor and send control output to the actuator. Fig. 2 shows block diagram of MATLAB-GUI based liquid level control system.

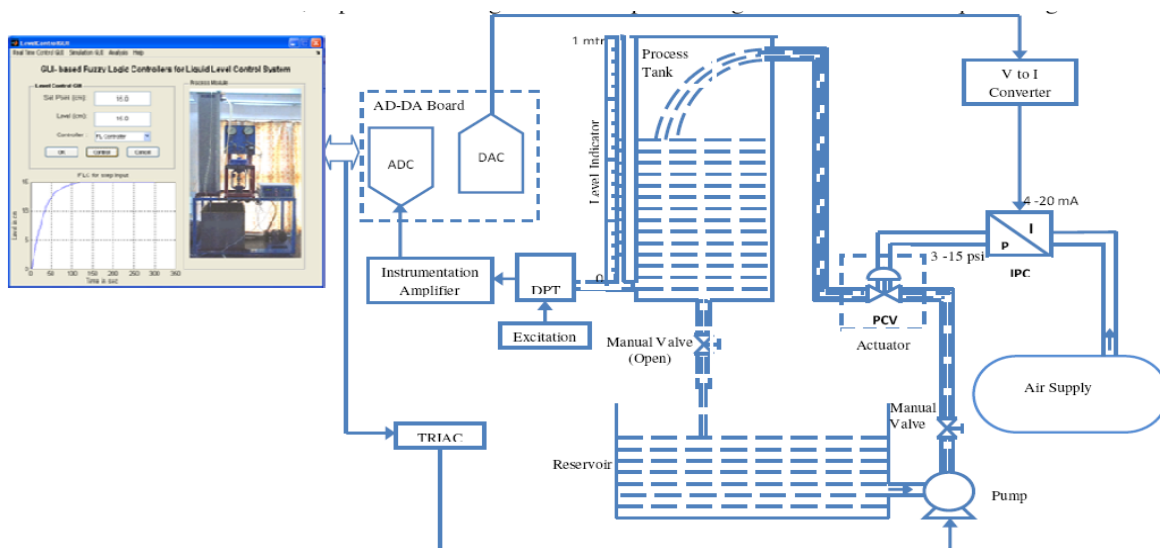


Fig. 2 Block diagram of MATLAB-GUI based liquid level control system [2].

The GUI designed for real-time mode operation and MATLAB/SIMULINK software is used for Simulation models or to simulation study of PIDC, FLC and IFLC. The liquid level is acquired by PC and displayed on GUI and user take the control action, which is sent to the control valve to maintain the liquid level at desired set point. The proposed GUI not only compares the simulation and real-time results of PIDC, FLC, and IFLC controllers but also allows user to test and tune the controller of interest. As shown in the Fig. 2 the ADDA board is interfaced to PC through PCI DIOT card to acquire signals from sensor and send control output to the actuator i.e. GUI system compares signals and take the control action which sent the command to control valve to maintain the liquid level at desired set point.

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Md. Liakot Ali et al. [3], developed a prototype of contactless smart card based prepaid gas meter system. This proposed system tested successfully and demonstrated to different utility companies; also it is more secured, user friendly and consumes lower power. In this proposed design a G1.6 diaphragm meter is used as a base meter. Base meter and proposed system is attached together. Proposed system's electronic circuit gets pulse from the base meter through magnetic reed switches.

Fig. 4 illustrate the block diagram of proposed system i.e. gas meter. As shown in the figure 4 MCU is nothing but the control unit. This MCU design contains ATMEGA64A, a high-performance; low power Atmel 8-bit AVR RISC-based microcontroller combines 64KB ISP flash memory with read-while-write capabilities, 2KB EEPROM, 4KB SRAM (Atmel 2013). To detect voltage up and down a voltage level detector module is implemented. If the voltage level goes down below the tolerable voltage range to run the whole circuit board perfectly, MCU saves all information to EEPROM, close the valve and shut down normal operation. The smart card reader module is used to communicate with contactless smart card which uses UART protocol to connect with MCU.

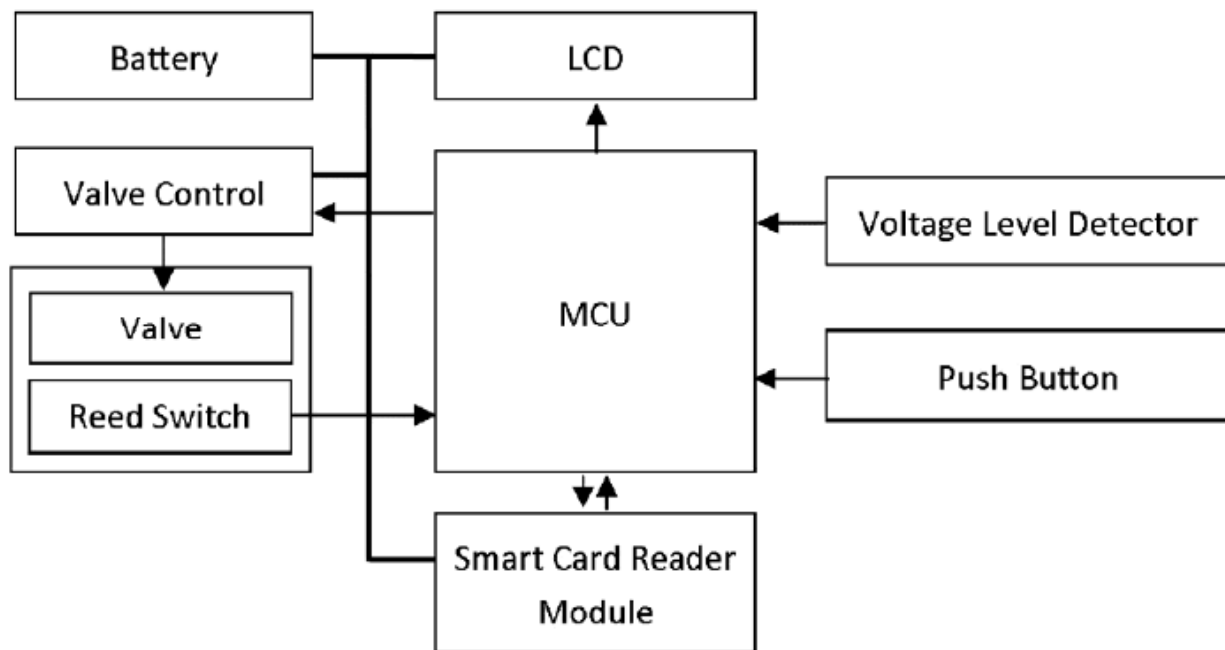


Fig. 3 Block diagram of gas meter hardware design [3].

Harshada Navale and Prof. B.V.Pawar in [4], proposed ARM based Gas monitor system. The aim of this system is to provide liquid petroleum gas (LPG) leakage to avoid fire accidents and hazardous condition providing house safety feature. The proposed system provides new approach to monitor and detect the leakage of LPG gas is simulated a developed which detects the leakage of gas in the air and if it exceeds safety level then it activates the buzzer and sends the SMS to the specified numbers by using GSM. Fig. 4 shows the proposed system architecture. The methodology of the proposed system is mainly divided into the three steps: first step MQ6 gas sensor i.e. MQ6 sensor sense the gas leakage of the system, in second step ARM microcontroller i.e. LPC2148 microcontroller receives the signal which has been send by the gas sensor after that microcontroller sends the activation signal to the external attached devices, in final step many task operations will be performed like buzzer, sprinkler, exhaust fan and activation of GSM which sends the SMS to the user numbers.

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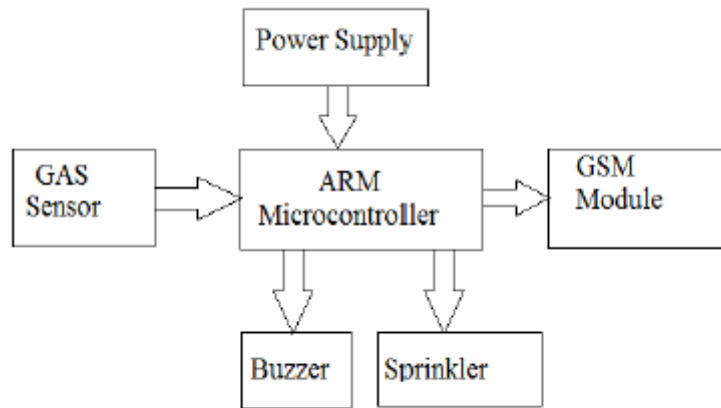


Fig. 4 System Block Diagram [4].

Manisha V. Shinde and Pradip W. Kulkarni in [5], developed automatic ENERGY METER READING SYSTEM. Fig. 5A, B shows the proposed system architecture.

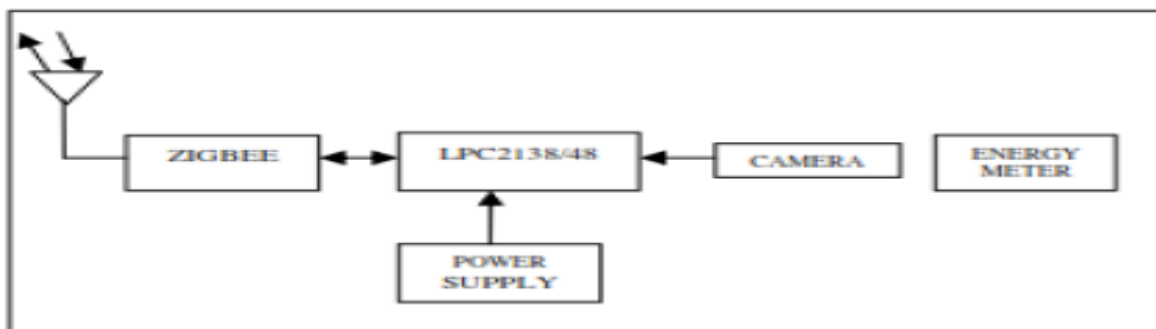


Fig. 5A User side [5].

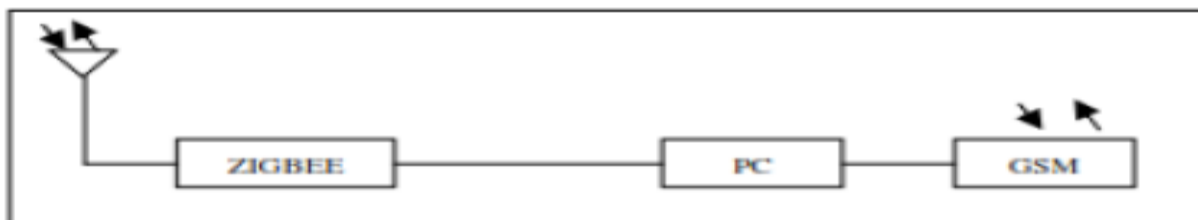


Figure 5A Sever side [5].

In this proposed system camera C238R is place in front of energy meter of each house to capture image. After that captured image is transferred to server wirelessly by using ZIGBEE. This image is transferred to PC through ZigBee using ARM LPC2138 as interfacing device. MATLAB is used to extract separate digits of the meter reading from meter image. These digits are correlated with real numbers by using pre-processing such as RGB to grey, B/W image & then each digits are segmented. Theses real numbers or reading is the current meter reading. Now to calculate bill previous reading is subtracted from this reading and multiplied with tariff.



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VI.CONCLUSION

Now a day's Automatic meter System (AMS) is the new era of the advanced home or industries system. Multifunction meter can control the usage of different sources on consumer side to avoid wastage of power as well as gas, water source. This paper gives an overview on different automatic meter system and literature survey provides a development idea about the existing system.

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