REMOTE ENERGY METER MONITORING WITH SMS

Swathy Shankar, Muzna Nabhan Al Brashdi, Marwa Shirin, Aman Jawed

Waljat College of Applied Sciences

Tel: +968 92959028

Abstract. The project "Remote Energy Meter Monitoring with SMS" deviates from the traditional methods of manually reading the electricity meter where a professional needs to physically record the meter reading. The project enables automatic meter reading using an Arduino microcontroller where the user receives an SMS daily, stating his power consumption in OMR (or kWh). At the end of the month the user receives an SMS of his monthly bill and net consumption. The aim of the project is to reduce manpower and human errors while billing by automated measurement and save individual time in the process. Also, the user will be aware of his usual consumption and any discrepancies can be instantly rectified. Communication via SMS is simple, efficient and ensures that the user does not miss out on his bill.

INTRODUCTION

The present system of energy billing is error prone and also time and labor consuming. Errors get introduced at every stage of energy billing like errors with electro-mechanical meters, human errors while noting down the meter reading, and errors while processing the paid bills and the due bills. The home appliances which consume more power causes an increase in the payment of excessive bills and users are often left unaware of the bill that is about to come at the end of a certain month and owing to high electricity cost these days it becomes necessary for the consumer to know as to how much electricity is consumed to control electricity bill within his budget.

Since the first Global System for Mobile Communications (GSM) network started to commission and operation in 1991, the world has adopted the standard for mobile communication. The SMS has extended their service to content providers to deliver a wide variety of services to mobile phone users. SMS is one of the convenient mean of communication especially for reminder, notification, and a short note when the mobile phone user is not expect to answer or respond immediately.

Our aim is to use this ease of communication and information transfer via SMS to help users as well as distributors to have real time, constant and accurate information about the respective

power meter readings. With our project the user receives an SMS every day at a fixed time and an SMS after 30 days giving him the month bill.

METHODOLOGY

The voltage coil of the electricity meter is connected to the main supply using appropriate wires. The sample load is connected on the other side via the current coil. Depending on the power consumed by the load, the LED on the meter blinks. In the breadboard circuit, an LDR (Light Dependent Resistor; it has high resistance in absence of light) is connected to 5v on one terminal and to port no.4 of the Arduino on the terminal. A pull down resistor is used to ground the pin during idle state. When the LED of the meter blinks, the light causes the resistance of the LDR to lower, and 5v flows into port 4 of the Arduino. The program allows the LDR to count each blink of the LED and multiply it by the appropriate value to estimate the net bill.

A GSM module (SIM 900) is connected to the Arduino and powered using a 12v supply.

The Arduino has been programmed to behave like a timer (instead of a software program one can also manually connect an alarm clock that causes a pin to go high when the alarm rings) Hence, at a particular time, an alarm goes off indicating the Arduino to instruct the SIM900 connected to it, to send an SMS to the given number. Thus the user receives his daily SMS from the meter. The Arduino also counts the number of times the internal alarm rings. Once the alarm has rung 30 times (i.e. once each day for a month), the SIM900 sends an SMS giving the total added consumption of each day (or) the electricity bill of the month.

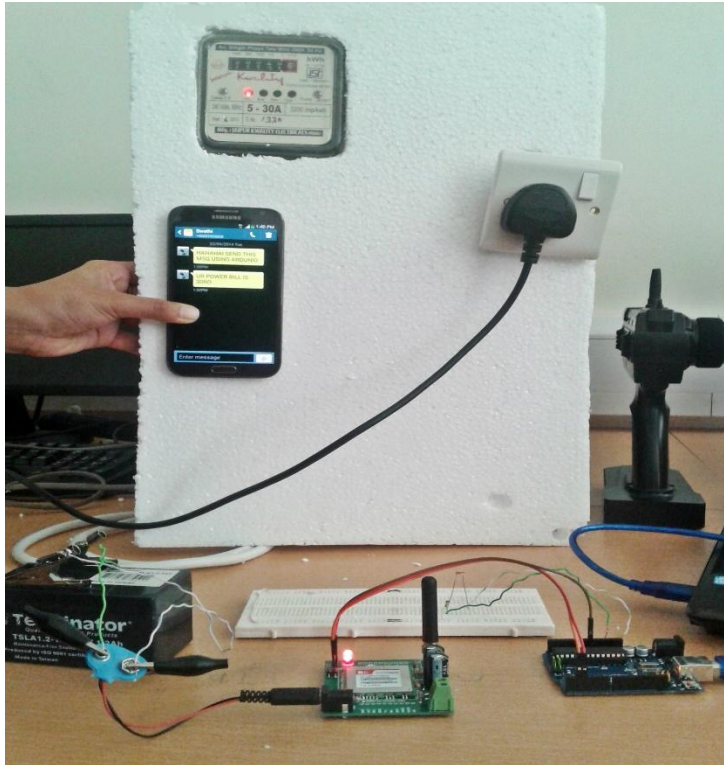The system then resets to zero and the process repeats.
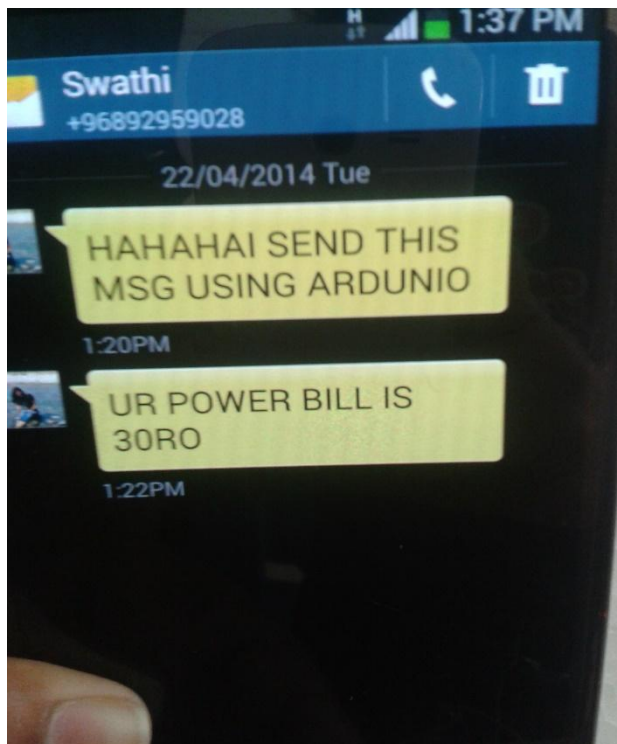
Figure 1. Basic Connections

Figure 2. Test SMS sent using SIM900

RESULT AND DISCUSSIONS

The user successfully received an SMS of his daily as well as monthly bill with the help of our project.
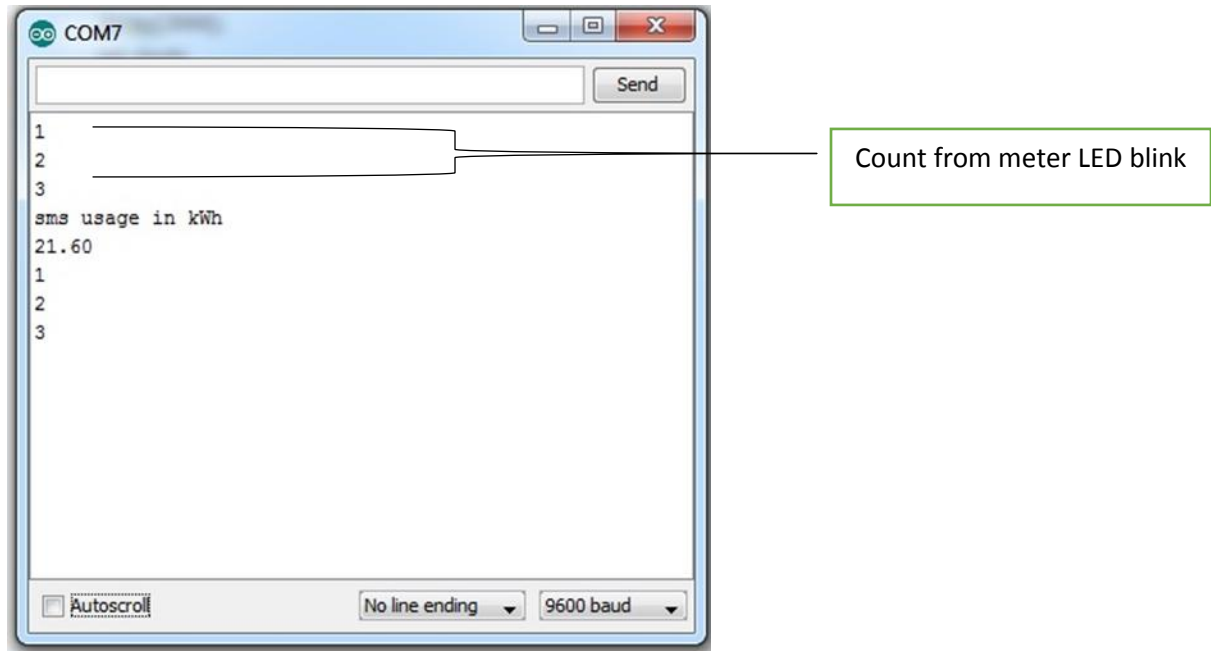

Count from meter LED blink

Figure 3. LED count from meter and resultant SMS sketch

Calculation of power consumption from meter:

Meter specification => 3600imp/kWh i.e. pulse rate of LED if 1000watts/sec is consumed in 1hr.

Hence, one blink of the LED implies 0.278 watts consumed.

CONCLUSION

Remote meter monitoring systems using SMS contribute to an increased knowledge of different consumption patterns on an individual basis. It provides a powerful tool for evaluation, forecasting and simulation of electricity consumption and takes a bottom to up approach enabling the user to be constantly aware of his daily usage hence instilling energy-saving awareness on a personal level. The hardware is extremely cost effective and the applications multifold.

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