SMART ENERGY DIGITAL METER AND POWER THEFT CONTROL USING ARDUINO

S.Susila Sakthy[1], T.Tamilarasi[2],M.Jenani[3], R.Vaishnavi[4]

[1]**Assistant Professor**, Department of Information Technology, Sri Sairam Engineering College, Chennai, India

[2]UG Scholar, Department of Information Technology, Sri Sairam Engineering College Chennai, India

[3]UG Scholar, Department of Information Technology, Sri Sairam Engineering College Chennai, India

[4]UG Scholar, Department of Information Technology, Sri Sairam Engineering College Chennai, India

Abstract-- A smart power meter is usually an electronic device that records the consumption of electric energy in intervals and communicates that information daily back to the user for monitoring and billing. The energy metering system focuses on our user friendly low power energy metering system design, implementation, power theft control, fault detection and results. The power theft and voltage fluctuations are detected and alert will be made via Text message. In our project, the smart energy meter is implemented with control over the usage of current and we can view the power consumption per day and this can also control power theft and voltage fluctuation. so the user can be aware of the electricity fault.

Keywords—Power Consumption, Theft Detection, Voltage fluctuation, Smart Energy Meter

I.INTRODUCTION

DAILY POWER CONSUMPTION: The current sensor is connected to Arduino microcontroller which measures current flow through the load. After measuring the current we can able to calculate the total units consumed in the house, from that we can able to calculate the cost that power consumed. So we transfer the details of total unit and amount that power consumed to the user mobile number via GSM.

POWER THEFT DETECTION: Meters cannot be used for high currents so current sensing is done by current transformers. Two CTs are used, one is connected at load side to measure the current through load and other C.T is connected at supply terminals to measure the current supplied by source. These two readings are measured and if they are equal then power is not been theft. And so If they are not equal, then power has

been theft and it is detected and notified to user via text message.

VOLTAGE FLUCTUATION DETECTION: Voltage fluctuation is mainly due to non-uniform AC signal and sudden dip to 150 volts that remains for few seconds. It causes damage to the appliances .In our proposed system, the voltage range is monitored by voltage sensor and if its range decreases to the 150 volts ,then it alerts user by sending message. After sending alert to user, the system waits for few seconds, if no action is taken, then it automatically turn off the appliance.

II.RELATED WORK

[1]Big data-driven contextual processing for Electrical Capacitance: Approach to analyse measurement records from industrial processes. Electrical capacitance tomography (ECT) is used to monitor invasive flow and for data acquisition.

[2]Research on Application of healthcare data in Big data Era:. The healthcare Big data still faces challenges in the aspects of Data cleaning, Data security, Personnel training and platform development.

[3] Research on methods of improving customer profile in electric power marketing .: New methods of solving the problems of inconsistency, inaccuracy and non real time of customer profile in the electric power marketing information system.

III SYSTEM ANALYSIS

A. Existing system:

Smart Meter:

The existing system gets power information from ammeter which measures current.it stores the measurements in database and we manually check for the cost. The existing system does not send the notification about the power consumption to the user.t is also not used to detect fuse failure. Current smart meters are limited to a brief description of the power consumption for a certain period. a special dedicated smart meter with power supply control actuator is attached to monitor and control power consumption of an individual appliance. Consumers cannot obtain more detailed feedback on appliances with the special smart meters and the feedback is also limited to a simple description of the power used and the cost for a certain period consumption.

B. Proposed system

In proposed system the amount of the unit consumption of electricity is calculated from the electricity meter. This system sends the information in the form of text message with the help of GSM to the user's mobile number.so the user can know the power consumption and their cost per day. It also detects the over loading of current that usually leads to fuse failure.so if there is any voltage fluctuation occurs it automatically switch off the power after a few seconds. our system also used to detect the power theft in home by two current transformer so the person can be aware of it.
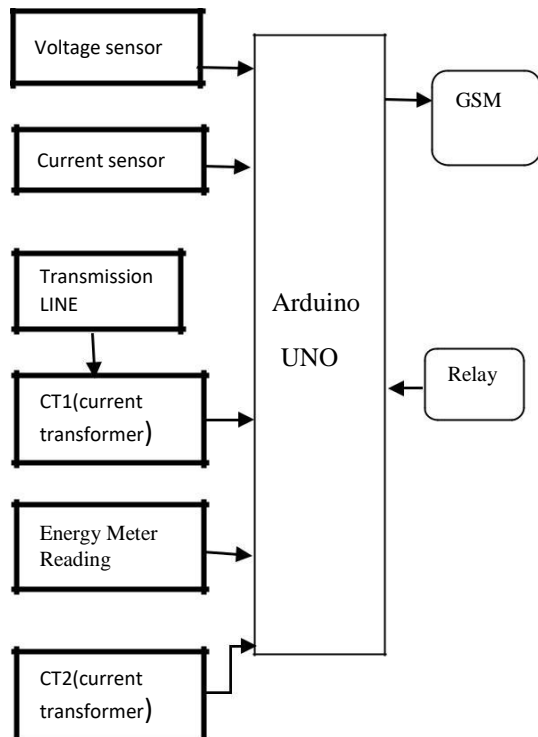
IV ADVANTAGES

1. User can get the daily consumption of power information and its cost per day from their mobile phones.

2. Power theft can be detected and will be given notification via text messages.

3. Voltage Fluctuation can also be detected and alerted to user via SMS.

V BLOCK DIAGRAM

VI HARDWARE REQUIREMENTS

A. Micro controller unit:

In the micro controller unit we are going to use arduino microcontroller which is used to sense the values from the smart meter and will transfer to the monitoring section regarding the condition. The controller also converts the data to serial communication for wireless data communication through GSM modem.

B. Communication module:

GSM (Global System For Mobile)is a communication technology which is used to transmit the message from the monitoring section to the users mobilephones.so the users can know the abnormalities in the appliances like fault failure, power theft etc.. The GSM Modem consumes a lot of current during transmission, make sure your power supply can handle large currents without giving substantial voltage drops at the output

C.Relay Module:

The relay is an electrically operated switch that allows you to turn on and off a circuit using voltage and/or current much higher than a microcontroller. There is no connection between the low voltage circuit operated by a microcontroller and the high power circuit. The relay will protect the circuit from each other.

D. Current Sensor :It is a device that can be used to detect the electric current , and generates a signal that is proportional to that current. The generated signal could be analog type or current or a digital output. The generated signal can be then used to display the current that is measured in ammeter, or it can be used for further analysis and for other control purpose.

VII SOFTWARE REQUIREMENTS

Our system software is implemented by C language. The developed code is edited, compiled and debugged.

VIII CONCLUSION

Thus, with the help of our system, use may aware of his daily consumption of

electricity and its cost ,so that he can optimize electricity usage and its cost. It also helps to detect the power theft,and voltage fluctuations therefore user can take necessary actions towards this malfunction. The voltage fluctuation detection helps the user to avoid damage of appliances and also automatic switch off of the appliances

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