



IoT Based Smart Energy Meter

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ABSTRACT

The IOT based energy meter is based on Arduino. This system eliminates the human involvement in electricity maintenance. The theft of electricity increases the costs paid by customers. Hence this system is used for the detection of theft. The energy meter is connected to the Arduino. The Arduino checks the main meter and sub meter reading. If the difference between the main meter and sub meter is occurred then the message that theft has occurred will be displayed on the LCD display as well as on the thingspeak. The comparison between the main meter and sub meter reading is used to check the theft status. Customer can be access the thingspeak from anywhere on the globe at the anytime using the consumer number. Hence the customer can be easily access their energy usage.

Keywords: *IoT, Arduino Uno, Energy meter, LCD Display, current sensor*

INTRODUCTION

Energy emergency is one of major problems that the world faces today. The best remedy for this is not the increases in energy production, but the effective use of available energy. By properly monitoring our energy consumption and avoiding energy wastage, energy emergency can be reduced to a certain extent. But energy monitoring cannot be done efficient mainly because consumers are not aware of their energy consumption.

They will get an idea about their consumption only when the electricity bills are issued. In India, bill is issued only once in a month or two months. So the consumers will be in dark during this period of time about their energy usage. In this era of complete digitalization, no one will take the pain to go and check their electricity meter reading and compare it with the previous reading so as to get an idea about their consumption. This whole procedure has to be repeated several times in a month to efficiently control the energy usage. If consumers can check their energy consumption using their mobile phone or laptop instead of checking energy meter, it will be a great leap in the area of energy management. Since most of the people are today 24*7 online, it will be really a boon if they can monitor their energy consumption online from anywhere on the globe. In this paper, we are describing a method of electricity energy meter reading using IoT concept.

This design implements the energy meter using the IoT concept. It is based on the Arduino. The internet of things is the internetworking of physical devices which enables object to connect and exchange data in the above system energy meter is connected to the internet using IoT. So there is a way for consumer to track their energy consumption time to time so that they can control their consumption as they design. This system is useful for both consumer and supply. It allows the supplier to remove the connection from distant server in case the user fails to pay his

electricity bill. This method eliminates man power during this connection and disconnection upload. It plays a vital role to inform supplier about any theft that is happening in the sensor.

LITERATURE SURVEY

In the year of 2011, the authors "carmine Landi, Pietro Merola, Giacomo Lanniello" presented a paper titled "ARM-based energy management system using smart meter and Web server", in this paper they explain a low cost ARM-based energy management system. It is a part of distributed system that measures the main power system quantities. It also handle the whole power. An Web Server collecting the statistics of power consumptions and power quality. It is able to interface devices for load movement. The device easily access the information and local access the combination of a smart meter and data communication.

In the year of 2012, the authors " Ben Abdallah; Garrab, A.; Bouallegue; " presented a paper titled "A AMR approach for energy saving in Smart Grids using Smart Meter and partial Power Line Communication", in this paper they described such as the increasing demand of energy, one-way communication and the limitations of energy management .The aim of this project is to identify a real time pricing thanks to the proposed communication system. This result is with great interest in economical and low carbon society point of view.

In the year of 2012, the authors "B. S. Koay, Y. H. Sng, P. H. Chong, P. Shum, X. Y. Wang, and H. W. Kuek" presented a paper titled "Design and implementation of Bluetooth energy meter", in this paper they described such as electronics energy measurement is continuously replacing a new technology of electro mechanical meter instead of existing technology.

PROPOSED SYSTEM

The block diagram of the system is as shown in the fig. this system eliminates the human involvement in the electricity maintenance. The major components used in the system are Arduino, CT sensor, energy meter, LCD, relay, load and IoT. CT sensor 1 works as a main meter and CT sensor 2 works as a sub meter, both are connected to the Arduino using interfacing circuit. The interfacing circuit consists of

burden resistor and voltage divider circuit for signal conditioning.

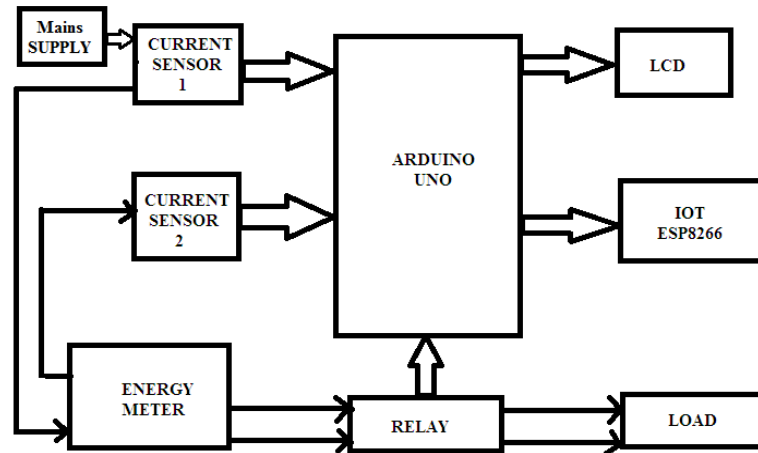


Fig: Block diagram

The live readings from the CT sensors are collected by the Arduino. This can be displayed on LCD which is connected to Arduino. The LCD display also shows the theft status. During normal operation, the reading of CT sensor 1 should be equal to the reading of CT sensor 2. If the readings of both sensors are equal the message no theft will be displayed on LCD else it will displayed the theft is occur. If theft occurs the relay will operate and this can use for disconnecting the load.

The IoT is connected to the Arduino through which data can be transfer on channel. This data can be accessed globally through thing speak at any time. The web page shows the reading of both sensors and the theft status. Thinking from the consumer side this system is a real boon since they can monitor their energy usage efficiently.

ADVANTAGES

It provides accuracy in meter reading and Checks theft status hence improves security. This system Helps in effectively controlling energy consumption and also avoids Energy wastage. Meter reading can be accessed from anywhere on the globe at any time. This system eliminates the human involvement in energy management.

CONCLUSION

This system helps in controlling energy consumption and avoiding energy wastage is very important. This

system is based on a Arduino and implementation of energy meter using IoT concept.

In the proposed system, IoT based smart energy meter reading system. It plays a vital role to continuously monitor the meter reading and transfer the reading to a central server. This data can be accessed from anywhere on the globe at any time.

REFERENCES

- 1) Landi C., Dept. d.Ing., dell inf. Secondauniv. di Napoli,Aversa Italy, Morela, P.; Iannillo G., "ARM based energy management system using smart meter and web server," IEEE Instrumentation and Measurement Technology conference Binjiang,, pp.1-5, May-2011.
- 2) DarshanIyer N, Dr. K A Radhakrishna Rao, "IoT Based Electricity Energy Meter Reading, Theft Detection and Disconnection using PLC modem and Power optimization", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol. 4, Issue 7, 2015.
- 3) Mr. Rakeshkumar D. Modi1, Mr. Rakesh P. Sukhadia, "A Review on IOT Based Smart Electricity Energy Meter", International Journal for Technological Research In Engineering, Volume 4, Issue 1, 2016.
- 4) Pooja D Talwar1, Prof. S B Kulkarni, "IOT Based Energy Meter Reading", International Journal of Recent Trends in Engineering and Research, ISSN 2455-1457.
- 5) Gobhinath.S, Gunasundari.N, Gowthami.P, "Internet of Things (IOT) Based Energy Meter", International Research Journal of Engineering and Technology (IRJET), Vol 3, Issue 04, 2016.