Application of IoT in Smart Energy Meter

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Abstract - Normally, a person standing in front of our house from electricity board, whose duty is to read the energy meter and handover the bills to the owner of that house every month. This is nothing but meter reading. According to that reading we have to pay the bills. The main drawback of this system is that person has to go area by area and he has to read the meter of every house and handover the bills. Many times errors like extra bill amount or notification from electric board even though the bills are paid are common errors. To overcome this drawback we have come up with an idea which will eliminate the third party between the consumer and service provider, even the errors will be overcome. This project works based on internet of things (IoT) by connecting the energy meter with the substation server so that the recorded data can be sent to the substation for billing purpose using WiFi module and along with this functionality a new feature is topped up to give the indication to the customer well in advance that whenever the tariff slab is about to switch over from one slab to another, the customer can take right decision to cut-off unwanted usage of loads so that to avoid paying more bill amount rendering into paying less billing cost .The proposed system features are displayed in the meter reading continuously, slab rate changes(like cost changes for different range of units),Penalty factor (maintain the power factor >=0.9),When the customer did not pay the bill for 2 months cut the electricity supply, When the temperature of the appliances increased then their threshold value intimate the consumer by message (save the energy save the plants).
Keywords: Smart Energy Meter, Electric board, UARTS, IoT, Wi-Fi,webpage.

1. INTRODUCTION

The present project "IoT Based Smart Energy Meter" addresses the problems faced by both the consumers and the distribution companies. The paper mainly deals with smart energy meter, which utilizes the features of embedded systems i.e. combination of hardware and software in order to implement desired functionality. The paper discusses comparison of Arduino and other controllers, and the application of Wi-Fi modems to introduce 'Smart' concept. With the help of Wi-Fi modem the consumer can monitor his consumed reading and can set the threshold value through webpage.

This system enables the electricity department to read the meter readings monthly without a person visiting Each house. This can be achieved by the use of Arduino unit that continuously monitor and records the energy meter reading in its permanent memory location. This system continuously records the reading and the live meter reading can be displayed on webpage to the consumer on request. This system also can be used to disconnect the power supply of the house when needed.

2. EXISTING SYSTEM:

In existing system, human power is used to note the energy meter reading for each house and enter the system of regional office. This system is too complicate and need more human power to read the energy meter of each and every house. In this system human can't now the reading unstill the date of bill payment. Human power again used for controlling the load by cut down the power of customer who had not paid the electric bill. Due to human usage their chance of occurring error.

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3. **PROPOSED SYSTEM**

This system enables the electricity department to read the meter readings monthly without a person visiting each house. This can be achieved by the use of Arduino unit that continuously monitor and records the energy meter reading in its permanent (non-volatile) memory location. This system continuously records the reading and the live meter reading can be displayed on webpage to the consumer on request. This system also can be used to disconnect the power supply of the house when needed.
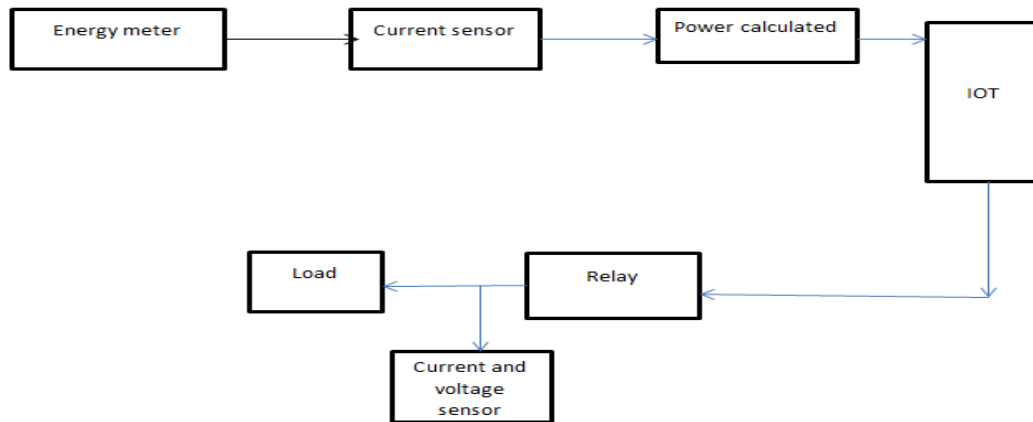

Fig.1.Block diagram of the proposed system

The proposed system was implemented as shown in the below .It consists of Energy meter with arudino board kits and two lamp loads. The loads can be individually controlled from the webpage that is accessed by anywhere of the earth.The current and voltage
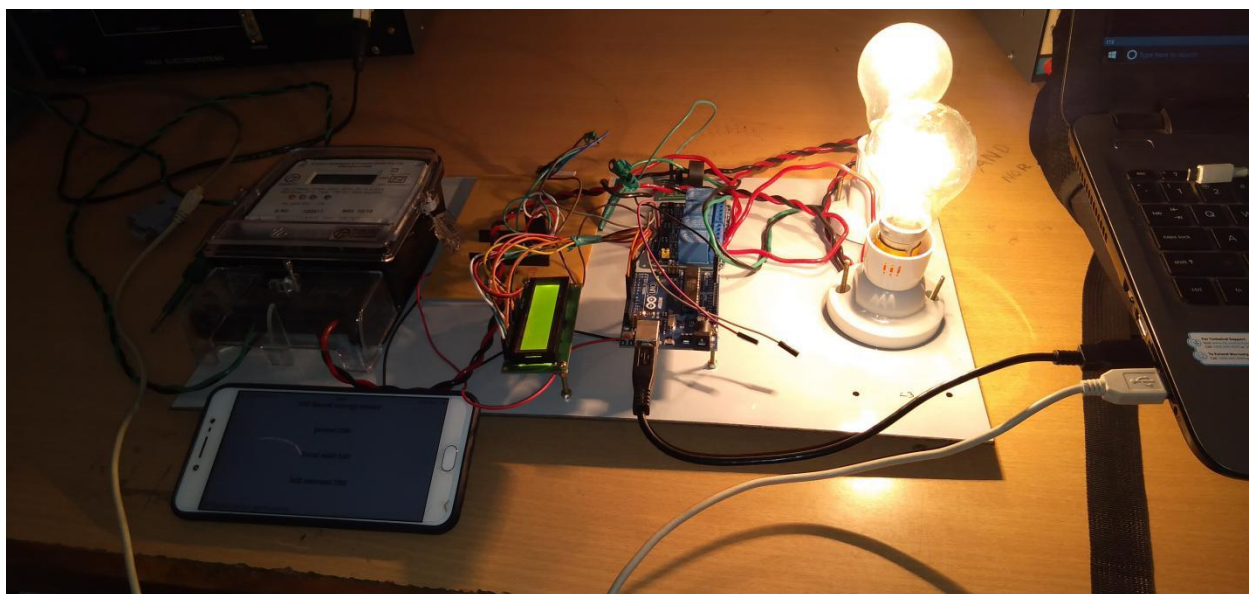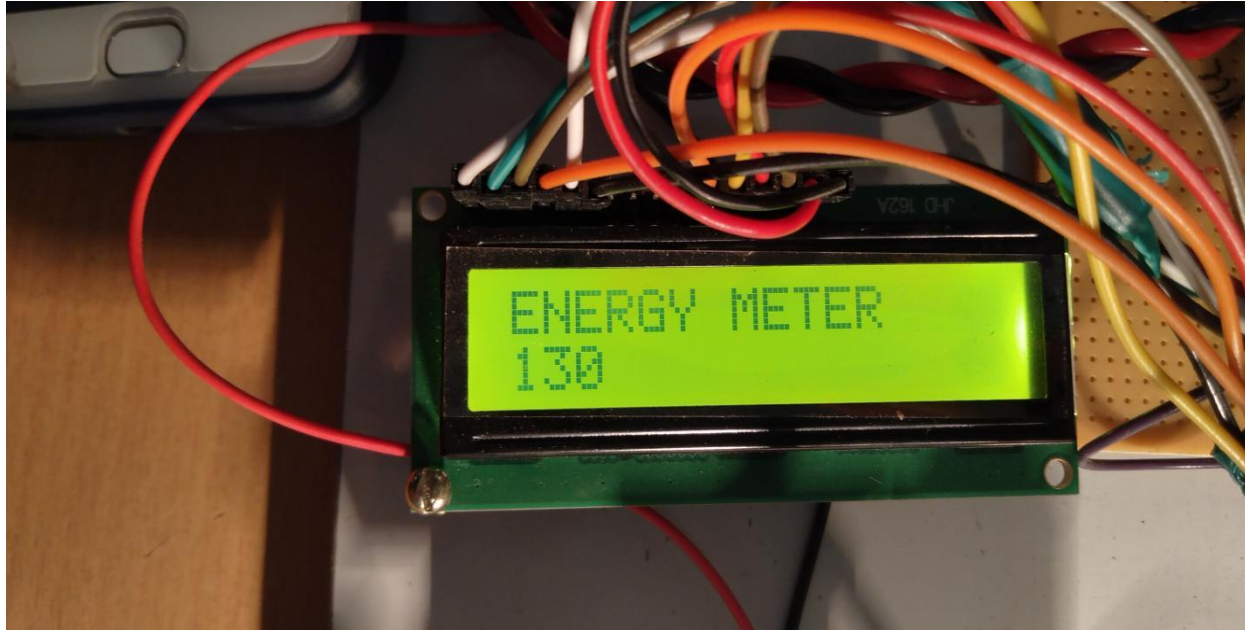

Fig.2.Hardware Realization of the proposed system

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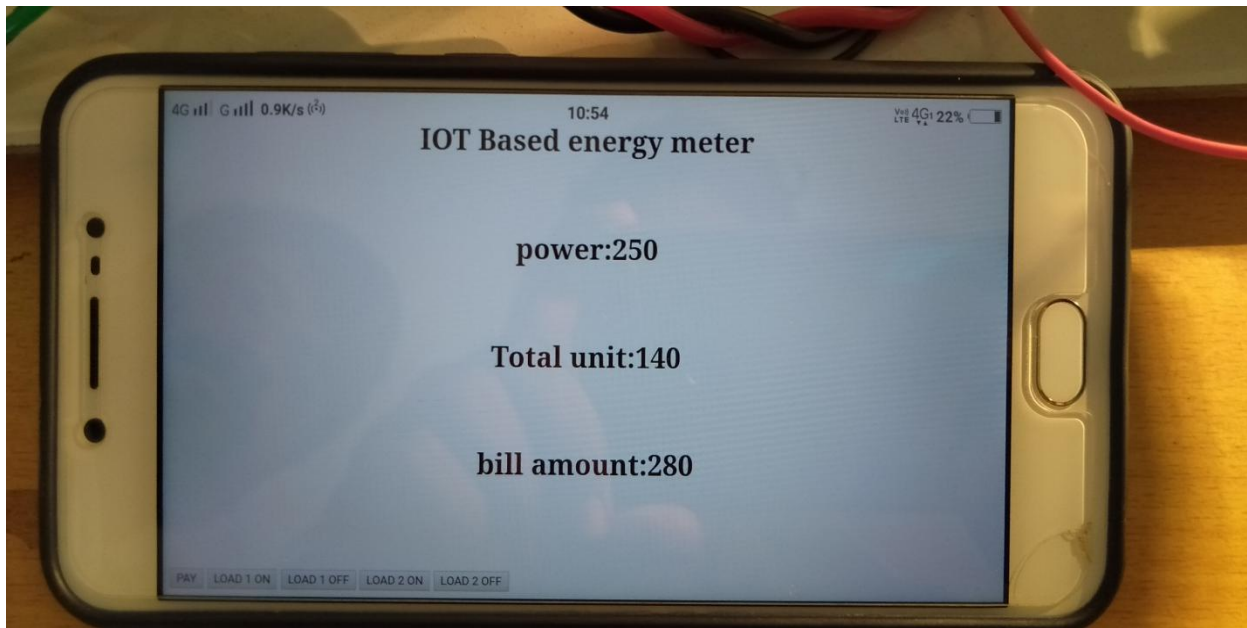**Fig.2.1. LCD screen showing the energy meter reading**

Fig.2.2.Web page showing the output

In fig2.2 if we click pay it pays the amount and in case of over due automatically electricity disconnect .If we clear the due by again clicking on the pay option then due is cleared and electricity connects automatically.

By clicking LOAD 1 ON bulb1 will turn on ,by clicking LOAD 1 OFF bulb1 turn off like wise by clicking LOAD 2 ON bulb2 will turn on ,by clicking LOAD 2 OFF bulb2 turn off

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4. CONCLUSION

An attempt has been made to make a practical model of 'Application of IoT in Smart Energy Meter'. The propagated model is used to calculate the energy consumption of the household, and even make the energy unit reading to be handy. Hence it reduces the wastage of energy and bring awareness among all. Even it will deduct the manual intervention.

5. ACKNOWLEDGEMENT

6. REFERENCES

[1]   Himshekhar Das, L.C.Saikia, "GSM Enabled Smart Energy Meter and Automation of Home Appliances", PP-978-1- 4678-6503-1, 2015 IEEE.

[2]   Ofoegbu Osita Edward, "An Energy Meter Reader with Load Control Capacity and Secure Switching Using a Password Based Relay Circuit", PP-978-1-4799-8311-7, ' Annual Global Online Conference on Information and Computer Technology', IEEE 2014.

[3]   Yingying Cheng, Huaxiao Yang, Ji Xiao, Xingzhe Hou, "Running State Evaluation Of Electric Energy Meter", PP978-1-4799-4565-8, 'Workshop on Electronics, Computer and Applications', IEEE 2014.

[4]   Sahana M N, Anjana S, Ankith S,K Natarajan, K R Shobha, "Home energy management leveraging open IoT protocol stack ", PP- 978-1-4673-6670-0, 'Recent Advances in Intelligent Computational Systems (RAICS)', IEEE 2015.

[5]   Chunchi Gu, Hao Zhang, Qijun Chen, "Design and Implementation of energy data collection system using wireless fidelity (WiFi) module and current transformer", IEEE international Conference on System Science and Engineering(ICSSE),2014. http://ieeexplore.ieee.org/document/8064790/

[6]   J. Kwac, J. Flora, R. Rajagopal, "Household energy consumption segmentation using hourly data", IEEE Trans. Smart Grid, vol. 5, no. 1, pp. 420-430, Jan. 2014. http://ieeexplore.ieee.org/document/7063233/

[7]   B. Karimi, V. Namboodiri, M. Jadliwala, "On the scalable collection of metering data in smart grids through message concatenation", Proc. 4th IEEE Int. Conf. Smart Grid Commun. (SmartGridComm), pp. 318-323, Oct. 2013. http://ieeexplore.ieee.org/document/7106508/

[8]   M. Zeifman, "System and Method of Prediction of Household Enrollment in Energy Saving Program", patent application 2013. http://ieeexplore.ieee.org/document/6973942/

[9]   ] Jennifer Bray and Charles F.Sturman, "Bluetooth 1.1 Connect Without Cables", Second Edition, Prentice Hall 2001. http://ieeexplore.ieee.org/document/6750333/