To Study IOT Based Intelligent Billing System

Shweta Sane[1],Sneha Mundale[2],Prof.Sandip Zade[3]

[1](Department of Electronics, Atharva College of Engineering/ Mumbai University, India)
[2](Department of Electronics, Atharva College of Engineering/ Mumbai University, India)
[3](Department of Electronics, Atharva College of Engineering/ Mumbai University, India)

Abstract : *This paper studies various methods which are proposed in past few years for automatic meter reading. The study explains how these meter reading systems are widely useful in order to avoid issues such as manual work, manipulation in reading, inaccurate billing system etc. A lot work has been carried out to overcome such problems occurred while taking electricity meter reading. Different techniques are introduced in course of time to make electricity meter reading system fast and accurate. Some of these methodologies are explained in this paper.*

Keywords – *Digital energy meter, GSM, monitoring, web page, WI-FI module, zigbee*

I. INTRODUCTION

Earlier, employees of electricity board used to come to each house to note down electricity consumptions. Later, it replaced by capturing the image of consumed units for calculation of bill amount. This includes manual work, and sometimes creates errors in generation of bills. To avoid all these problems, this idea of automatic meter reading has come up. Todays human doesn't want to stand in queue to pay the bills or to purchase a ticket, he wants everything fast, digital, on a single click. Most of the people are getting dependent on these technologies to perform their small work. Keeping the necessities of human in mind, this system is designed to reduce human efforts and time. This system is accurate and user friendly.

This paper describes different technologies of meter reading and transmitting it using zigbee, GSM, etc. Various ways of paying bill are discussed in this paper. Methodologies which are previously studied for meter reading are explained in detail.

Energy meter is a device that measures the consumption of electricity. Different techniques which are explained till now for the same are discussed below :

H. M. Zahid Iqbal, M. Waseem, Tahir Mahmood proposed automatic energy meter reading system which is based on GSM. According to that research, electricity board can cut the supply and establish the same whenever required. This system used short message service. In this system, customer is provided with a facility of getting status of load consumed from anywhere. Load current and voltage are measured and these values are given to microcontroller which then converts them into real power consumed by the load. Reading is sent to LCD and it is also sent to GSM. GSM is used for communication in both the ways, between meter and utility office and between meter and customer so that customer is able to check the results of his consumed energy units and can manage his load accordingly to reduce his bill. Hence electricity can be saved.[1] Dr. R. Kalaivani , A. Kaaviya sri proposed Simulation of Smart Meter Using Proteus software for Smart Grid which is based on Zigbee. According to the research, in this smart energy meter system is implemented in order to reduce the manual work and to make the system error free. In this system, the amount of units of power consumed by the load is calculated and bill is generated simultaneously and if there is any energy theft, customer is notified. The charges for the consumed units of load are transmitted through Zigbee to remote locations. Zigbee module is used to transfer the power consumption of load to receiver. The smart meter is designed to monitor the power consumption and to communicate the value of consumed units to user. The consumed power is updated continuously to the user. The relay is used for switching the input supply. The Zigbee is used to update the power consumption to PC or mobile phones. If there is any power theft detection microcontroller will turn off all loads and send the information to monitor section that the theft occurs in some area. [2]

II. WORKING
Block Diagram
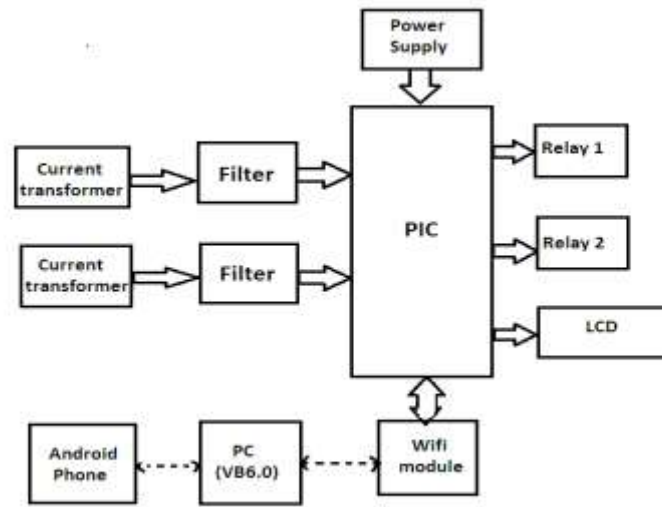
This block diagram consists of power supply, PIC, WIFI module, current transformer, relay, LCD. In this, current transformer is used to produce an alternating current in its secondary windings. Since PIC accepts only voltage as an input, current transformer uses resistor in parallel to convert current into voltage. Current transformers reduce high voltage currents to a much lower value. Bridge rectifier is used for the rectification purpose and the rectified signal from the bridge rectifier is fed into the filter circuit in order to remove the ripples. The DC voltage is stabilized using voltage stabilizers before it is fed into the Microcontroller. Now the stabilized DC voltage is fed to the analog ports of PIC microcontroller which has inbuilt analog to digital converter. It converts analog input into digital data and is fed to LCD, WIFI module and relay. A Load is connected to relay. Relays are available in different configuration of operating voltages like 6V, 9V, 12V, 24V etc. A relay is an electrical switch that uses an electromagnet to move the switch from the off position to on position instead of a person moving the switch. It takes a relatively small amount of power to turn on a relay but the relay can control something that draws much more power. The LCD is connected to microcontroller to display the consumed units of load. A 16×2 LCD displays the 32 characters at a time in two rows. These consumed units of power are given to electricity board and then user via WIFI module ESP8266EX. It offers a complete and self-contained WiFi networking solution; it can be used to host the application or to offload WiFi networking functions from another application processor. It operates on 2.4GHz, support WPA/WPA2 and has integrated TCP/IP protocol stack. It is connected to an android app via a company side PC so that a user can have a look on consumed units and its charges whenever they want.

Pin No	Function	Name
1	Ground (0V)	Ground
2	Supply voltage; 5V (4.7V – 5.3V)	Vcc
3	Contrast adjustment; through a variable resistor	V_{EE}
4	Selects command register when low; and data register when high	Register Select
5	Low to write to the register; High to read from the register	Read/write
6	Sends data to data pins when a high to low pulse is given	Enable

Pin description of LCD

III.   CONCLUSION

We studied IOT based intelligent billing system.

ACKNOWLEDGEMENT

It is a great pleasure to acknowledge all those who have supported us for successfully completing our project. We are deeply indebted to our Principal, HOD, Project Coordinator and Faculty advisor for their creative suggestions during the preparation of the project.

REFERENCES

[1].   H.M. Zahid Iqbal, M. Waseem, Tahir Mahmood, Automatic Energy Meter Reading using Smart Energy Meter International Conference on Engineering & Emerging Technologies (ICEET).
[2].   Dr. R. Kalaivani , A. Kaaviya sri, Simulation of Smart Meter Using Proteus software for Smart Grid International Research Journal of Engineering and Technology (IRJET).
[3].   https://www.researchgate.net/publication/320756991_IOT_Based_Energy_Meter_Billing_and_Monitoring_System-A_Case_Study
[4].   https://www.espressif.com/sites/default/files/documentation/0a-esp8266ex_datasheet_en.pdf
[5].   https://computer.howstuffworks.com/internet-of-things5.htm
[6].   Gobhinath.S, Gunasundari.N, Gowthami.P, Internet of Things (IOT) Based Energy Meter International Research Journal of Engineering and Technology(IRJET).