IoT Based Electric Meter for Smart Cities

[1]Pankaj yadav, [2]Amit, [3]Arun K Singh, [4]Ved Prakash
Depart. of Electronics and Communication
[1]Ypanky038@gmail.com, [2]Amity0948@gmail.com
Amity University, Haryana, India

Abstract

India, which is a developing country, the way of collecting electricity utility meter reading, which requires a lots of man work. Electricity monitoring and reading system by Internet of Things billing, and detecting illegal usage of electricity is very hard and difficult and time-consuming task present an efficient and cost-effective way to transfer the information of energy consumed by the consumer wirelessly as well as it provides facilities to detect the illegal usage of the electricity. Aim of this study is to calculate electricity usage in the house and generate the electric bill using Internet of things(IOT) and wireless communication techniques. The Arduino microcontroller is employed to coordinate the activities with digital energy meter system and to connect the system to a Wi-Fi network and subsequently to the Internet and Server. This system continuously monitors the electricity usage and on the other side it calculating the bill as per consumer usage. The energy consumption is calculated by using microcontroller and uploaded on the web server by internet. This automation also helps to reduce the needs of the manual labors.

Keywords: IoT, Smart meters, Arduino microcontroller.

1. Introduction

The Electricity is one of the most essential things of our life without it we cannot survive. The wastage of this energy is happening due to low efficiency meters that are attached in every single house. These older meters have many issues all the time. The measuring of energy usage and generation of bills are difficult because it needs lot of labor work and this manual procedure creates problems like issuing wrong bill to consumer, calculating wrong units. Electricity theft and tempering can be done easily, there is no security system. There is no communication between Board and consumer. So, to reduce all these issues we made a "IOT base electric meter for Smart cities". This system consists of advanced technology like internet of things.IOT allow us to monitor all the activities of metering online at home. It is a wireless technology which is grown widely, and it has many advantages over others like GSM, Radio frequency etc. In current generation the increasing consumers is creating a big issue to manage of all systems but with the help of Smart meters it is easy to manage. Internet of things provides a two-way communication between Electricity board and user which is used to transfer information about energy usage and bill generation or if any other

problem comes under, they can contact the each other. This system is made of microcontroller, WIFI module, energy meter these component handles all the system from monitoring and billing. After this action all the data is delivered to the internet web server where consumer can check all the records of daily energy usage. It did not require any man work. It will give correct billing and monitoring of energy usage. This system has a great accuracy because of advance technology

2. Literature Review

In older systems the monitoring and billing all are done at the end of month. The consumer cannot check the usage of energy all the time and due to this sometimes the wrong bill generated. For bill calculation it needs lots of man to go outside consumers house and notice the electricity usage after that bill is generated. This is a totally time consuming process. And there is wastage of money on each man working on field. Growth in population is creating so many problems due to which maintaining all the meters is quite difficult for the company..

3. Proposed Methodology

This system consists of energy meter, an ARDUINO (microcontroller), WIFI modem and transformer. After switching power on the ARDUINO and the WIFI modem, turn on LCD and connects power supply to the energy meter and to the load .The transformer is used to step down the voltage supply and after that voltage is applied to rectifier. Rectifier covert AC to DC then DC is applied to Amplifier where it amplifies the output electrical signal of 4N35 OPTO-coupler. Now microcontroller start taking Led output. Here one Led blink is equal to one unit and one unit is equal to 15rs. Micro-controller continuously doing calculation for generating bill and upload it to web server through WIFI modem.
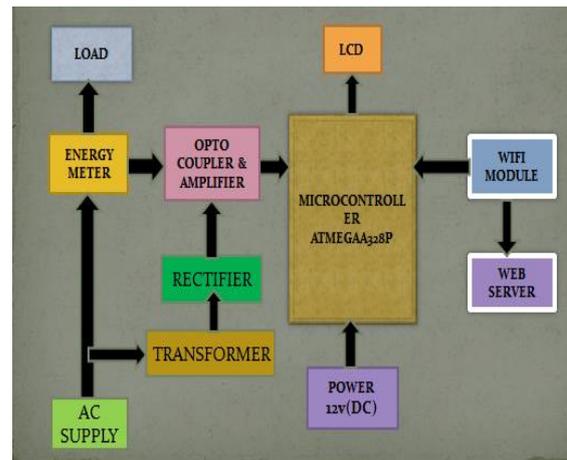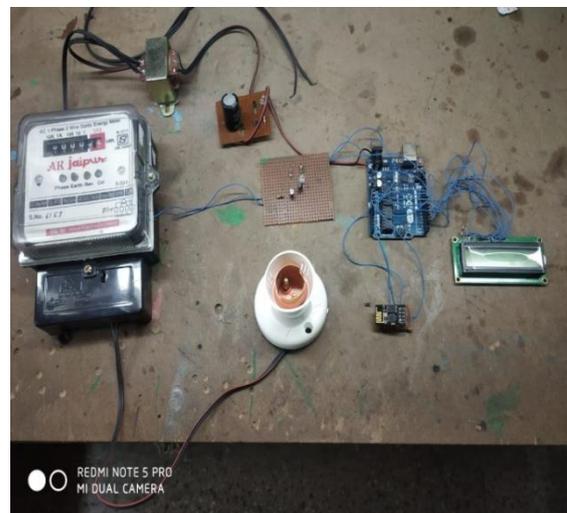

Fig.1.1.Block diagram of system

Fig.2.Final project

4. Result and Analysis

A. Developed a smart IOT electric meter for smart cities.

B. It monitors the daily use of electricity of your home.

C. This meter generates accurate bill of consume electricity.

D.IOT helps to communicate operator and user. web page is used to display all above mentioned points.

5. Conclusion

IoT Based Electric Meter for Smart Cities system was proposed in this paper. This system gives many advantages, remote monitoring and billing of

electricity usage, wireless communication and data transfer, less man work. The use of microcontroller and Wi-Fi module increases the accuracy and stability of wireless data transmission. This system provides the customer a platform to check anytime their consumed unit and bill in the Internet in this way we will save labor charges and paper wastage for generating the bill.The electricity bill can be paid using online payment apps like Paytm. In future, the project can be integrated to form smart cities using Internet of Things based sensors as done globally. When compare with the existing GSM based and other traditional energy metering and monitoring system, the propose system is more efficient and cost effective. It allows the consumer to check the energy consumption and bill any time they login to the system whereas other existing system send the bill monthly or on request to the customer.

5. Acknowledgement

References

[1] https://www.microchip.com/wwwproducts/en/ATmega328p

[2] http://www.electronics-tutorials.ws/io/io_5.htm retrieved on 21/12/2016

[3] http://www.atmel.com/devices/ATMEGA328P.aspx retrieved on 21/12/2016

[4] http://www.engineersgarage.com/articles/gsm-gprs-modules retrieved on 21/12/2016

[5] https://www.electrical4u.com/construction-of-ac-energy-meter/

[6] https://www.elprocus.com/ever-wondered-lcd-works/