



Prepaid Smart Energy Meter Using ESP8266

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ABSTRACT

This project presents the IOT based smart energy meter to track the energy consumption automatically of the residential load. This meter is capable of sending the consumptions to the consumer as well as electricity supplier. The readings are taken automatically by using HLW8012 sensor. Then a predefined set of program calculates the total bill of energy consumed over the selected interval using ESP8266 microcontroller. In future this idea can be implemented for prepaid metering, which will eventually increase the revenue of the electricity distribution company. The platform of virtuino android app is used. Which reflect all the value of Voltage, Current, Power and unit consumed on the mobile screen.

Keywords: ESP8266, HLW8012 Module, IOT, Microcontroller.

1. Introduction

The Internet of Things concept enables us to connect the normal day to day devices with each other over the internet. The devices connected through IoT concept can be controlled and analyzed remotely. The IoT concept provides the basic infrastructure and opportunities to form a connection between the physical world and computer-based systems. The concept has been gaining importance with more and more wireless devices that are increasing rapidly in the market. It connects the hardware devices with each other over the internet. The ESP 8266 Wi-Fi module used in the system provides the connectivity with the internet in the system. Now-a-days the demand for electricity is increasing at a constant rate throughout the population and is being utilized for various purposes wiz, agriculture, industries, household purposes, hospitals etc. So, it is becoming more and more complicated to handle the electricity maintenance and requirements. Therefor there is an immediate requisite to save as much electricity as possible. As the demand from the newer generations of population for electricity is increasing so in accordance with it the technology improvement is needed. The proposed system provides a technical twist to the normal energy meters using the IoT technology. Also, there are other issues that we have to address such as power theft and meter tampering which in turn generate economic loss to the nation. Monitoring, Optimized power usage and reduction of power wastage are the major objectives that lie ahead for a better system. The present system vastly depends on human involvement for billing. Billing requires a human individual to visit each and every customer's energy meter and generate the bill by taking the unit readings from the energy meter. This is a time-consuming process. To address all the mentioned constraints, we developed a system on the basis of IoT technology. The proposed system stores the energy consumption reading on the cloud database by using simple networking protocols so that any user can view the data of energy meter. This information exchange to disjoin unit at MSEB. MSEB is certainly not a specialized word yet it is power dispersion board "Maharashtra State Electricity Board". The information is gotten by the web and at whatever point a key is squeezed microcontroller send SMS through the web to the transmitter to get the perusing of the meter. It is hard to manual perusing and computing bill of exclusively. This will help for the best possible and precise perusing of charging process. By taking every one of these highlights that should be possible by IOT based vitality meter effectively.

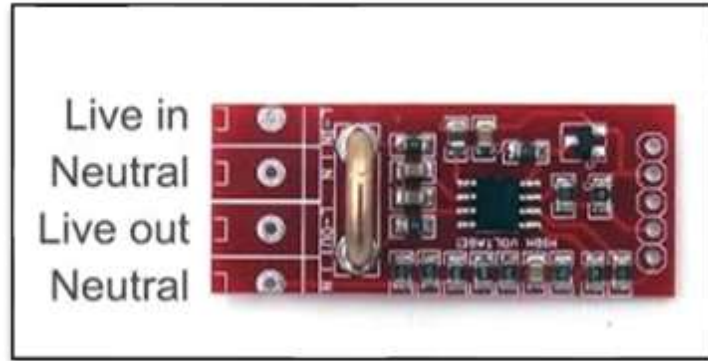


Fig.4.HLW8012 Module

Relay Module

This is a relay module is an electrically operated switch. It consists of five terminals. Relays are used where it is necessary to control a circuit by an independent low-power signal, or where several circuits must be controlled by one signal. They refresh the signal coming in from one circuit by transmitting it on another circuit.



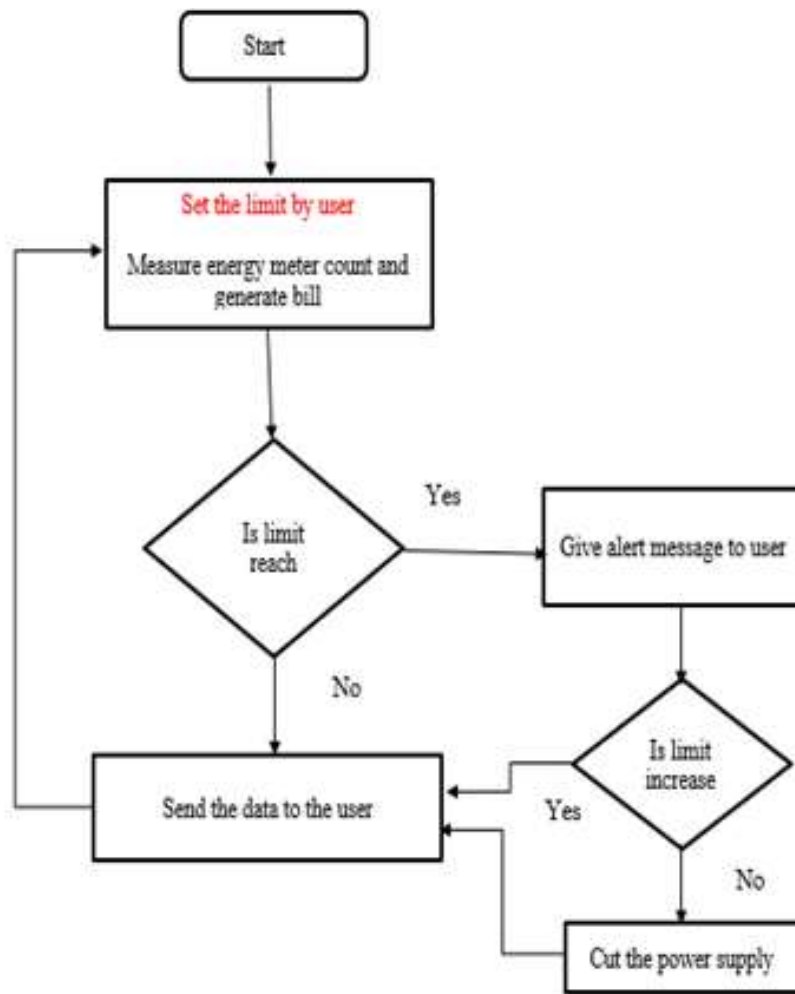
Fig.5.Relay Module

LCD Display

This is a LCD display consists of 16 pins. LCD display is used to display the result of the output. In this LCD display, we connect an I2C module to reduce the complexity. VCC pin is the power supply for the LCD, needs to be connected to VCC (5V). SDA pin is the I2C data signal, SCL pin is the I2C clock signal, and LCD Coordinate. LCD I2C is composed of a normal LCD, an I2C module, and a potentiometer.



3. Flowchart



4. Result

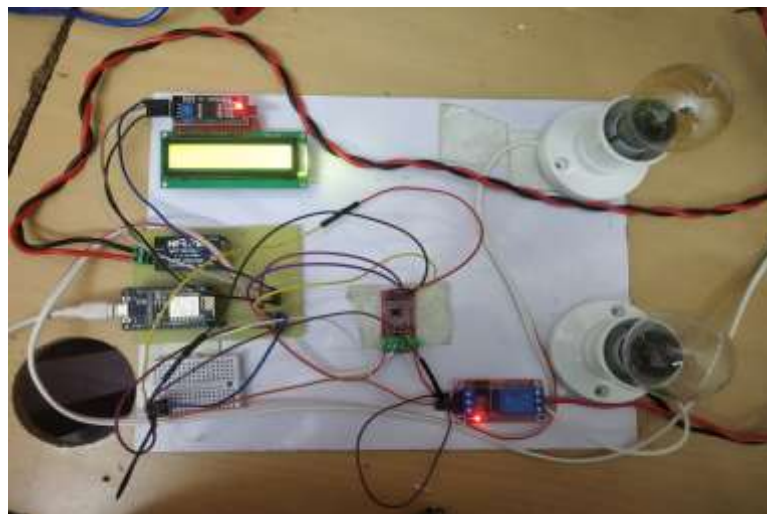


Fig.7. Overall System Implementation

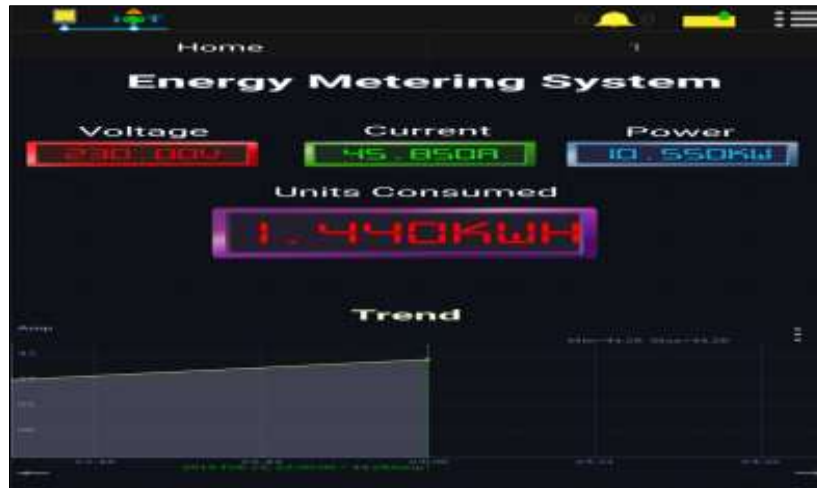


Fig.7. Result on mobile phone

5. CONCLUSIONS

An attempt has been made to make a practical model of 'IOT Based Intelligent Energy metering to Increase Efficiency & Accuracy in Current Billing Methodology'. The propagated model is used to calculate the energy consumption of the household, and even make the energy unit reading to be handy. It reduces the wastage of energy and bring awareness among all. Even it will deduct the manual intervention. Cloud platform is used to display the data. The system also uses the mobile phone to store the data and continuously to check that user. we implement this project which give the update to that particular user. We develop this project to save the energy in order to save the costing. It helps to in future for low consumption of energy. This project is helpful to MSB person to work automatically it reduce the effort of that employee. the wastage of energy and bring awareness among all. Even it will deduct the manual intervention. Cloud platform is used to display the data.

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