SMART ENERGY METER BASED ON IoT

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Abstract: We can see 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 two months. 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 thebills. 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. The idea of smart energy meter using IOT and Arduino has been introduced. In this method we are using Arduino because it is energy efficient i.e. it consume less power, it is fastest and has two UARTS. In this paper, energy meterwhich is already installed at our houses are no t replaced, but a small modification on the already installed meters can change the existing meters into smart meters.

Index Terms **- GSM, IoT, ARDUINO**

I. 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 for every 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 energymanagement. Since most of the people are today 24*7 online, it will be really a boon if they can monitor their energy consumption onlinefrom 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 happing in the sensor.

II. RELATED WORKS

As part of smart grid upgrades, traditional electricity meters are being replaced with smart meters that can improve accuracy, efficiency, and visibility in electrical energy consumption patterns and measurements. However, in most of the deployments, smart meters are only used to digitally measure the energy usage of consumer premises and transmit those data to the utility providers. Despite this, smart meter data can be leveraged into numerous potential applications such as demand side management and energy savings via consumer load identification and abnormality detection. Anyhow, these features are not enabled in most deployments due to high sampling rate requirements, lack of affordable communication bandwidth and resource constraints in analyzing a huge amount of data. This paper demonstrates the suitability of the embedded edge computing paradigm which not only enriches the functionalities but also overcome the limitations of smart meters. This paper proposes an embedded edge computing based architecture for smart meter data analytics to enable real-time energy services for consumers such as demand response, energy awareness, home automation, and fault identification

III. PROPOSED SYSTEM

The working Of Proposed system is based on GSM Based Technology. Initially the EB Meter calculating monthly units used by consumer and automatically generate bill based unit cost. The RTC (Real time clock based system) automatically send EB bill through GSM. EB meter for to calculate the energy consumed by the consumer. Both this readings are given to the Microcontroller. RTC is the real time clock which generate time signal. In microcontroller we have already programmed that cost per unit. Corresponding unit and cost are displayed on the LCD display. Every two months after microcontroller sends the consumed unit and price to GSM modem. GSM sends SMS of this information to EB office as well as owners mobile these numbers already stored in the microcontroller.

The ac voltage, typically 220V rms, is connected to a transformer. which steps that ac voltage down to the level of the desired dc output.

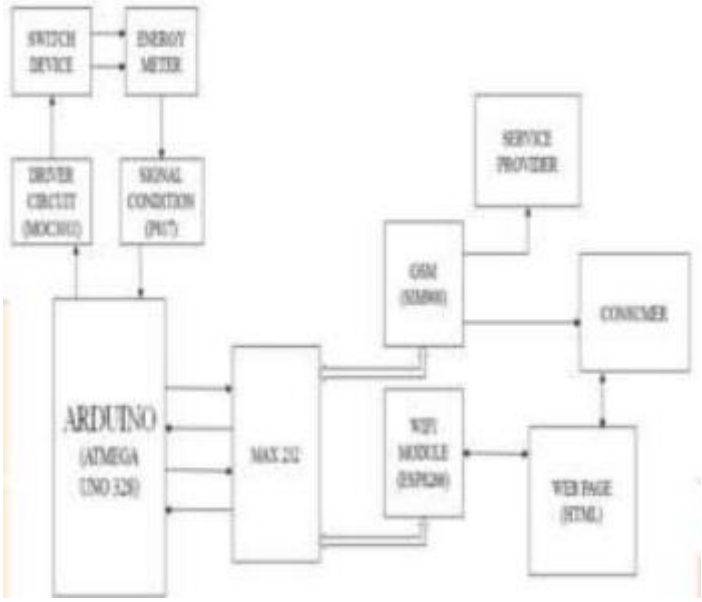

Figure 1: Block Diagram

A diode rectifier then provides a full-wave rectified voltage that is initially filtered by a simple capacitor filter to produce a dc voltage. This resulting dc voltage usually has some ripple or ac voltage variation.

A regulator circuit removes the ripples and also remains the same dc value even if the input dc voltage varies, or the load connected to the output dc voltage changes. This voltage regulation is usually obtained using one of the popular voltage regulator IC units.

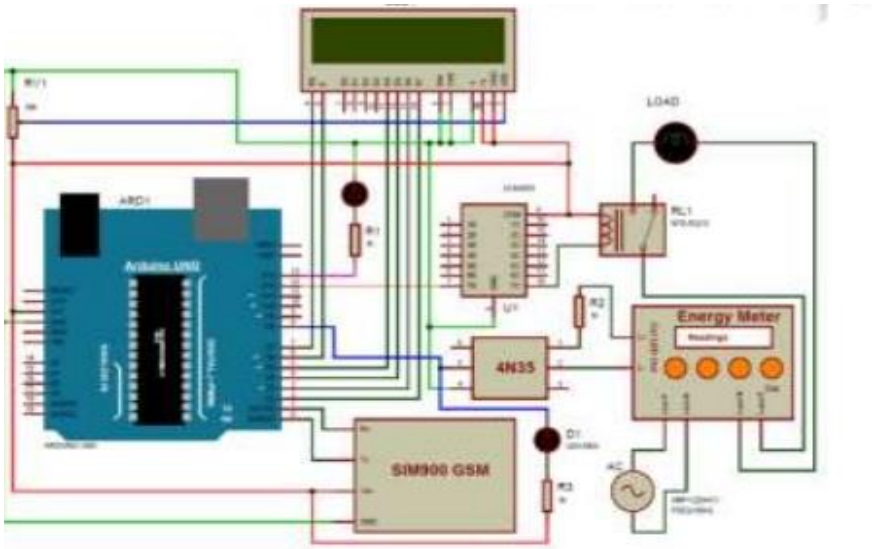

Figure 2: Circuit Diagram

IV. HARDWARE COMPONENTS

A. ARDUINO

Arduino is an open source tool for making programs that can do a way more functioning as compared to desktop computer. The physical world can be sensed and controlled using sensors which are programmed using Arduino programming.

This open-source physical computing platform is based on a simple micro-controller board, and a development environment for implementing software on the board. The pin diagram of Arduino is shown in figure.

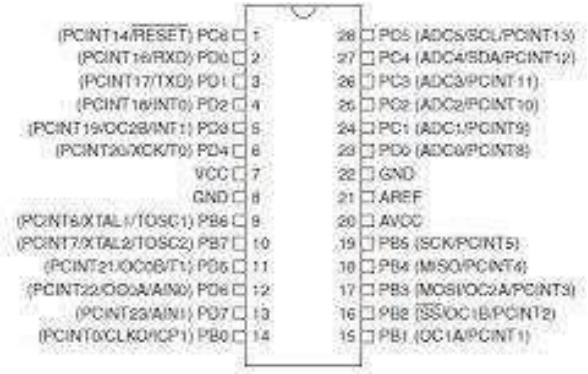

Figure 3: Arduino UNO pin diagram

A. GSM Module

GSM is a digital cellular technology used for transmitting mobile voice and data services. The communication method usedis the GSM module as shown in figure. The sim is inserted in the GSM module that wants to be paired for further processing.

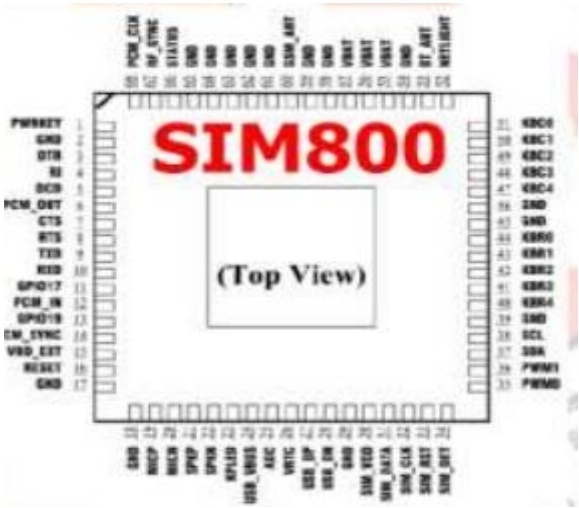

Figure 4: GSM Module

V. OUTPUT

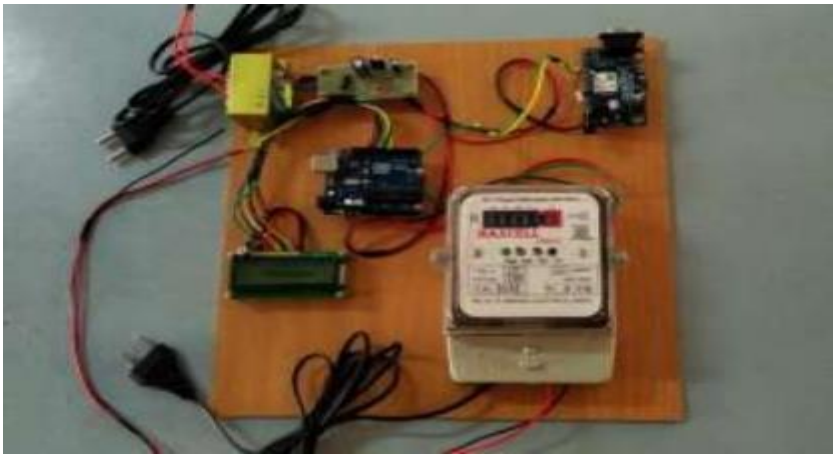

Figure 5: Hardware kit

Our proposed system web page, where is threshold is taken as 5 units. Forward represents +5 and reverse -5 units. Current unit with

cost will be displayed

Figure 6: Output window 1

Monthly consumption of power will be send as message to the consumer with total bill of electricity.

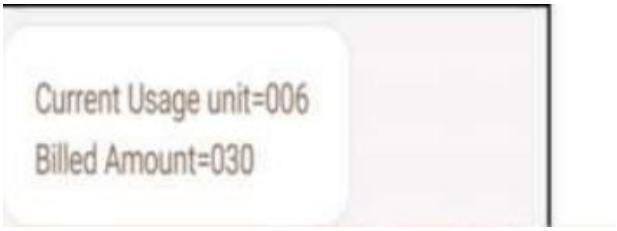

Figure 7: Output window 2

VI. CONCLUSION

In this effective way we are designing a GSM Based EB Billing system The main objective of this project is to calculate a EBbill based on consumer used units power. The main feature of this system we can send a estimated a EB Bill sent based real time clock. Every month bill dated is stored and EB bill sent to through consumer mobile number. Using these project we can generate a automatic EB bill for consumer and automatic load shut down is performed by EB board the consumer not payed EB Bill.

VII. REFERENCE

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