Over Voltage Under Voltaaage Load Protection with GSM Alert

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ABSTRACT:

Due to rapid increase in human population and the human's dependency towards electrical energy, the demand for electricity has increased many folds, causing deficit of electrical energy during peak hours.. This paper mainly focuses on automatic billing, theft detection, power optimization and providing the relevant energy consumption information to user. IOT based smart energy meter system basically consists of three major components namely controller, Wi-Fi and Theft detection device. Whenever there is any theft or fault, the theft detector sensor detects the error and responds accordingly. The controller plays a vital role in keeping all the components in working state. In this system energy meters are connected to the internet i.e., using IoT concept, eliminates the human intervention in electricity maintenance. In the proposed work, IoT based meter reading system is designed to continuously monitor the meter reading and service provider can disconnect the power source whenever the consumer does not pay the monthly bill and also it eliminates the human intervention, delivers effective meter reading, prevent the billing mistakes[2].

Keywords: Internet of Things(IoT), smart energy meter, automatic billing, Power theft detection

Introduction:

In the present billing system the distribution companies are unable to keep track of the changing maximum demand of consumers. The consumer is facing problems like receiving due bills for bills that have already been paid as well as poor reliability of electricity supply and quality even if bills are paid regularly. The remedy for all these problems is to keep track of the consumers load on timely basis, which will held to assure accurate billing, track maximum demand and to detect threshold value. These are all the features to be taken into account for designing an efficient energy billing system.[4]Monitoring and keeping tracking of your electricity consumption for verification is a tedious task today since you need to go to meter reading room and take down readings. The existing Energy Meter did not perform two way communications. MSEB employee would come and take a photo the Energy Meter or jot down the reading from the Energy Meter and would submit this data to the utility. Then there would be a approximation of energy bill and the consumer needed to pay the bill of the amount. Internet of Things (IoT) is new information processing acquisition technology and also referred as the third wave of information technology after internet, mobiles, computer network. In IoT everything is configured with internet protocol addresses and it can monitor controlled and access remotely in accordance with web technology. The main advantage of this technology is that devices are connected smartly with the help of sensors and transducers and these are again connected to (Local area Network) LAN, (Wide Area Network) WAN, via Ethernet or Wi-Fi connectivity

*Block Diagram:*
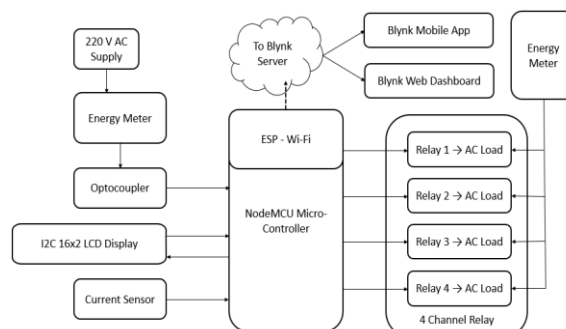
Major Components:

Arduino IDE

The ATMega328p microcontroller IC with Arduino bootloader makes a lot of work easier in this project as Arduino code is written in C++ with an addition of special methods and functions, which we'll mention later on. C++ is a human-readable programming language. When you create a 'sketch' (the name given to Arduino code files), it is processed and compiled to machine language

Blynk IoT: Android/Web App

Blynk is an IoT (Internet of Things) stage utilizing which you can without much of a stretch and distantly control equipment. Furthermore, you can likewise see sensor information, store the information, picture the information and so on everywhere. Talking about equipment, the Blynk stage bolsters a wide scope of sheets and MCUs like: here throughout the web

MCUNode

The NodeMCU ESP8266 development board comes with the ESP-12E module containing ESP8266 chip having Tensilica Xtensa 32-bit LX106 RISC microprocessor. This microprocessor supports RTOS and operates at 80MHz to 160 MHz adjustable clock frequency. NodeMCU has 128 KB RAM and 4MB of Flash memory to store data and programs
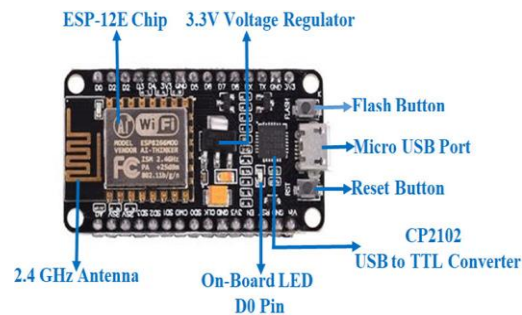
Energy Meter:

Analog energy meters are those devices which are used to calculate the used wattage or u can say unit of electricity. Analog meters work on magnetic device which keeps on moving a circular ring. That ring when complete one circle means one unit of electricity is used.


Relay Module

A relay is an electrically operated switch. Many relays use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid-state relays. Relays are used where it is necessary to control a circuit by a separate low-power signal, or where several circuits must be controlled by one signal.

ACS712 Current Sensor

A current sensor is a device that detects electric current in a wire and generates a signal proportional to that current. The generated signal could be analog voltage or current or a digital output.

Web Dashboard
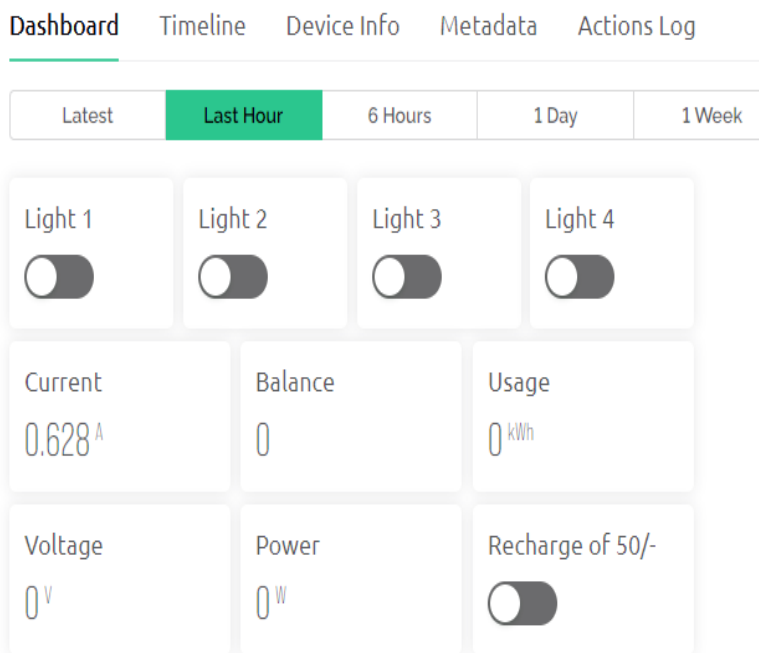
Advantages :

From this system consumer can set the monthly electricity billing budget. Hence less wastage of energy.
Every month the person from electricity department has not to visit the consumer house for the note down the consumed energy hence labour work get reduced.
The cost of this device is not more because the system uses the low cost equipment and also the installed energy meter will not be replaced or tampered. From the installed energy meter by an authorized this system takes the input.[9]

Applications:

Accessing information is easy for customer from energy meter through IoT
Theft detection at consumer end in existent time.
Energy consumption units and temperature is display on LCD.
By using remote server disconnection of service.

Conclusion:

This project presented the solution of an energy billing system based on the prepaid system for users. Nowadays, people still use the postpaid billing system which allows user to use the electricity first and at the end of the month most users are having a problem paying the bills because of overuse the electricity. By having this system, the users are introduced to make limitations of energy usage per day and also per month. Prepaid Electric Meter Home Automation System is a system that uses a database to prevent system abuse by unauthorized user. Firstly, users must buy the reload number at the developer's office or purchased on-line at their website. Reload number that has been purchased need to be entered in the system to activate the new balance of electricity. The system will reduce the current amount of electricity depending on the amount of electricity used. If the energy has been fully used, the energy supply is automatically disconnected to avoid wastage. Therefore, users should always take out the amount that has been used every day.

Future Scope :

The going with stage for home robotization advertise will happen subject to a couple of key overhauls in the progression open in Automation, for example, improvement in Wireless Automation blueprints and moreover bringing down of regard appears as the market starts perceiving home mechanization use in more noteworthy volumes. A couple of examples that we foresee for this time of the business are. Big associations like Philips, Siemens and Schneider will as time go on bring out truly mass-market mechanization things with interfacing with UI in any case at lower esteem point as contrast with today, and more people will be able to bear the cost of the things. Solution commitments will bit by bit move to a more straightforward structure, where next to two or three key parts, customers will have the ability to buy and use the Automation things themselves without the guide of any specific ace. Some remote players will have claim to fame in awesome motorization and focus on the prevalent market.

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