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REAL TIME SMART ENERGY METER WITH AUTOMATIC BILL GENERATION USING IOT

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Abstract:In The Power System, Efficient Energy Use Is Essential To The Development Of The Smart Grid. Therefore,One Of The Main Goals Of The Smart Grid Is To Properly Monitor And Control Energy Use.One Of The Main Issues With The Current Energy Meter Technology Is That Full Duplex Transmission Is Not Available.the proposed smart energy meter calculates and controls energy use. It then uploads the results to the cloud so that the producer or consumer may view the reading. Consumer Energy Analysis Becomes Much Simpler And More Handle able As A Result. Additionally, this device assists in the detection of power theft. This Smart Metre is a Major Step Towards Digital India Since It Enables Wireless Communication And IoT-Based Home Automation. Every enterprise's management system always needs automation, portability, and remote control.

A New IoT -Based Multifunctional Smart Energy Meter Is Presented In This Paper Or Automated Metering And Billing System. Arduino With Gsm Short Message Service (Sms) Connection Provides a Meter Reading System With Predefined Automatic Functions Followed By Esp- 8266 Wifi Module To Monitor Energy Parameters.

Index Terms **-** Smart Energy Meter, Blynk Application.

I. INTRODUCTION

Recent years have seen a sharp rise in urbanization, necessitating the development of sustainable, clever, and efficient solutions for a variety of issues, including governance, quality of life, transportation, and the environment. The internet of things has evolved since the early 2000s and now offers a wide range of complex and widespread applications for smart cities. It is the capacity of machines, networks, and sensors to speak with one another both when people are present and when they are not.

Object sensing, object identification and communication, action trigger, and smart device or system provisioning are the basic steps in the streamlined internet of things work flow. Iot applications have a higher energy requirement, and the quantity and specifications of iot devices are continually expanding. The ability to use energy effectively and manage the related issues is therefore necessary for emerging smart cities.

Energy dissipation is greatly aided by traditional electromagnetic energy meters. Customers are only able to monitor their energy consumption on a monthly basis due to the fact that these are post-paid meters. On the other hand, power usage can be managed by smart meters when they are programmed with household appliances. Smart meters also have a lower mistake rate.

Smart meters are electronic measurement instruments that utilities use to exchange data in order to bill consumers and run their electricity systems. All it consists of is a metering unit and a communication interface that connects to the utility. The micro controller and communication interface module are linked to transfer and receive data between the installed metering unit in the house and the utility.

II. BACKGROUND

A typical energy meter provides data to the electrical board and the client, indicating the number of units consumed; this helps to cut down on labor. The user can monitor their power usage at any time and from any location. Using relays and arduino interfaces, the internet of things is utilized to turn on and off domestic appliances. This system's goal is to keep track of the quantity of electricity used. When the overall power usage gradually declines, both the distributor and the customer will profit.

III. OBJECTIVE

The suggested system aims to provide a low-cost single phase digital energy meter with iot capabilities and to monitor and notify customers of their energy consumption.

To develop an application that updates the electrical board's records, thereby decreasing human involvement and the possibility of incorrect readings being interpreted, and to take the lead in automating homes.

IV. PROBLEM STATEMENT

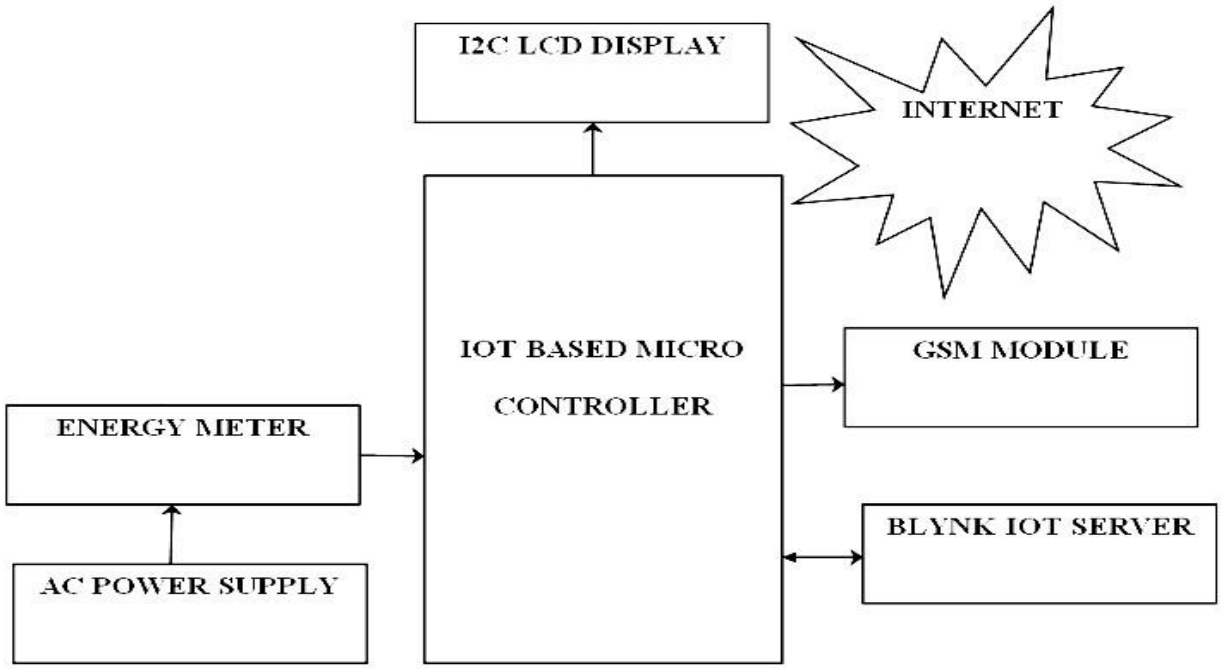
The main goal of this project is to measure the amount of electricity consumed by home appliances and use the internet of things (iot) to automatically generate the bill. The internet of things (iot) presents an efficient and cost-effective way to transfer energy consumer information wirelessly and to detect electricity usage. Implementing the energy grid in a distributed topology that can dynamically absorb various energy sources is necessary. Iot can be used for a number of smart grid applications, including demand-side energy management, distributed energy plant meters, smart meters for energy generation and consumption, and many areas of energy production.

V. EXISTING SYSYETM

The labor-intensive process of providing the bill for their monthly electricity consumption through human resources, by partnering with an iot-based energy meter to provide precise consumption details without requiring human interaction, and by having staff members read devices to gather electricity data are all completely superseded in this bill collection chain.

VI. PROPOSED SYSTEM

While a standard energy meter merely displays the number of units used, this solution provides monthly readings on the application in addition to monitoring. By doing this, we lessen the human labor required to record the meter reading, which is now done by going door-to-door.the user can automate the bill collecting process and view their power usage at any time and from any location.



VII. SYSTEM DESIGN

Figure :System Design

This smart energy meter is monitored and controlled by a micro-controller; to view the reading on a website or mobile application, we utilize an esp8266 micro-controller that is internet-connected. The energy meter has an ac power supply connected to it, loads connected to it, and a micro-controller connected to it. The micro-controller calculates the amount of energy used by the loads and stores it for the customer. When the energy provider clicks the generate bill button on the Blynk application, the bill is sent to the customer via the gsm module

VIII. IMPLEMENTATION

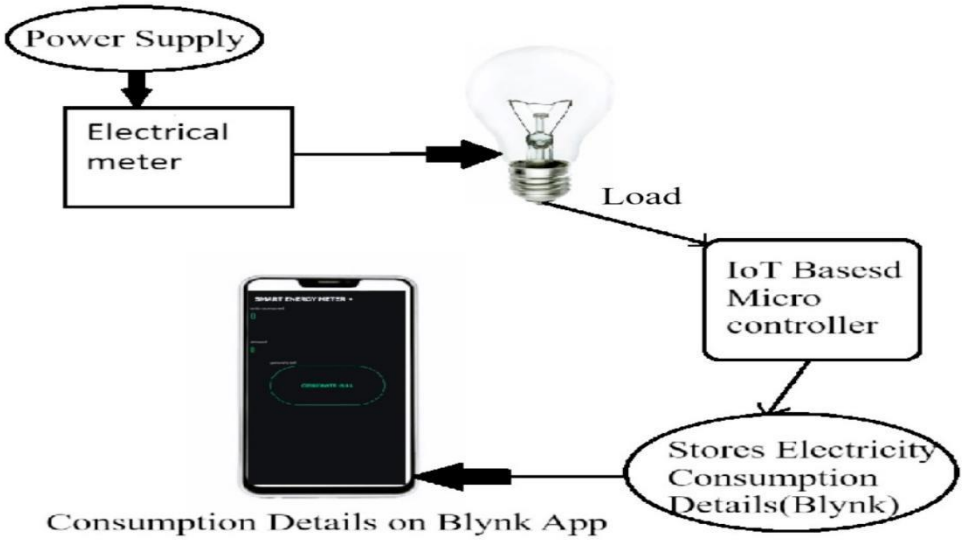


Figure :Implementation

With the use of this device, the electrical department can perform monthly meter readings without having to send someone to each residence. A permanent (non-volatile) memory location can be used to store and record the energy meter reading continually, and this can be accomplished with an Arduino device. The meter reading is continuously recorded by this technology, and the consumer can monitor the real-time reading via an application. Additionally, when necessary, this device can be used to cut off the house's power supply. The real-time implementation, similar to the basic graphical representation, is carried out to streamline the connection and make it easier for the user to install the software.

IX. CONCLUSION

LCD, GSM Module, energy meter, NODE MCU, and WI-FI are all part of a smart energy monitoring system. Power management is handled via an app that was designed for the system, which also automatically reads the energy meter and offers home automation. In addition to requiring less labor, the suggested system uses less energy. We are able to centralize our workplace by directly receiving monthly energy consumption from a distant site. As a result, we save the human labor that was previously required to record the meter reading—which was done by personally visiting each home.

X. FUTURE ENHANCMENT

Real-time smart energy meters with automated bill preparation via the Internet of Things may benefit from the use of dynamic pricing, i.e., prepaid based on current energy supply and demand.

Furthermore, the module can be reprogrammed in any way to meet the present or future government price schedule while adding more security features to deter fraud.

XI. REFERENCES

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