Energy Meter Based Wireless Monitoring System Using Blynk Application Via Smartphone

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ABSTARCT- Real-time tracking and management of energy usage can be done in a unique way with the energy meter-based wireless monitoring system that uses the smartphone app Blynk. Using wireless connectivity and Internet of Things technologies, this solution allows customers to instantly obtain precise energy usage data from their smartphones through the Blynk application. Users can identify energy-intensive appliances or regions, track power consumption patterns, and make informed decisions to minimize energy usage and save expenses by using the system's wireless energy meter interface. By utilizing the Blynk application's user-friendly interface and the ease of access provided by smartphones, users can monitor their energy consumption in real-time and take steps towards adopting more sustainable and effective energy practices.

I.INTRODUCTION

Technology for energy management has advanced significantly with the release of a wireless monitoring system based on energy meters and connected with the smartphone-accessible Blynk application. The system provides consumers with unparalleled convenience and control over their energy consumption, in response to the growing need for energy efficiency and the development of Internet of Things. technologies. Users may remotely monitor and control their energy consumption in real-time by leveraging smart metering technology and wireless connectivity. This gives them the opportunity to make decisions that will maximize efficiency and save expenses. Blynk's application integration improves accessibility even more by giving customers an easy-to-use platform from the comfort of their smartphones to visualize energy data, set consumption objectives, and receive alerts. examining the features and advantages is framed by this introduction.In light of the recent sharp rise in urbanization, intelligent, economical, and sustainable solutions for quality of life, governance, transportation, and the environment are needed. &c. Since the early 2000s, the Internet of Things (IoT) has evolved and now offers a wide range of sophisticated and commonplace applications for smart cities. IoT applications have a higher energy requirement. In order to lower energy usage through the use of wireless sensor networks and Internet of Things applications, numerous research studies were presented for smart grid and smart metering systems. GPRS/GSM, WiMAX, Bluetooth, ZigBee, CAN bus, PLC, and other wireless technologies are employed in the smart metering application. [1]–[4]. Although the smart meter with RFID technology was invented, data collection for billing still requires human labor [5].

ANALYSIS OF ENERGY METER

Examining the accuracy, efficiency, and functionality of an energy meter is part of its analysis process. Its accuracy in measuring energy usage, long-term stability, compatibility with different energy sources, and adherence to regulations are all factors to consider. Other crucial elements to take into account include things like the ability to log data, communication protocols for data transfer, and simplicity of installation and upkeep. In order to bill customers, track energy efficiency, and optimize energy use, it is essential to assess these elements and guarantee accurate and dependable assessment of energy usage. This could entail assessing its calibration, contrasting its results with those of other meters, looking for wear or corrosion on its parts, and making sure it conforms with all applicable rules and laws. For a thorough examination, other elements like data logging capabilities, communication protocols, and interaction with smart grid technology might also be taken into account.

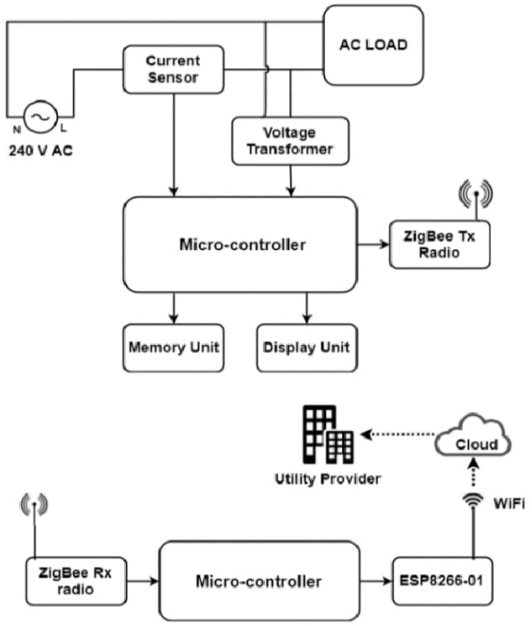


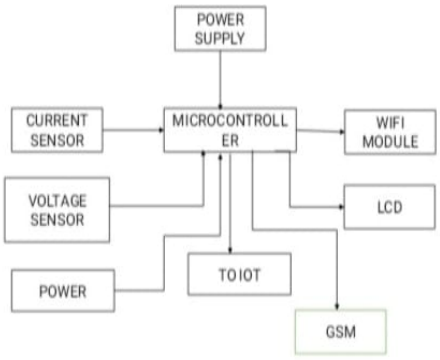
Figure 2: Block Diagram of Smart Energy Meter System.

SYSTEM DESCRIPTION

Users can remotely monitor and manage energy usage in real time with a wireless monitoring system based on an energy meter and the Blynk application on a smartphone. Typically, the system comprises of an energy meter that can communicate wirelessly (Bluetooth or Wi-Fi) and delivers data to an installed Blynk application on a smartphone.Users may access comprehensive information on their energy consumption, including usage trends, peak hours, and overall energy efficiency, by using the Blynk app. Additionally, they can program warnings and notifications to be sent when particular criteria are met or for unusually high usage levels. The system might also provide functions like historical data. Using the Blynk smartphone app, the energy meter-based wireless monitoring system is intended to offer real-time monitoring and control of energy consumption. By fusing wireless communication capabilities with an energy meter, this technology enables users to monitor their energy consumption from a distance and make educated decisions to maximize energy efficiency.

PROPOSED SMART ENERGY METERING SYSTEM DESIGN

The suggested system consists of an LCD display for user interface and feedback, a microcontroller for centralized processing and control, and a power supply unit to guarantee steady and dependable power distribution. Moreover, integrated power, voltage, and current sensors track electrical parameters, allowing for real-time performance and power usage monitoring. The system allows for wireless communication and remote monitoring/control over the internet, allowing users to access and administer the system from any location thanks to the WiFi module and Internet of Things features. In addition, the incorporation of a GSM module provides redundant communication capabilities, guaranteeing dependable data transmission and notifications even in locations with spotty or nonexistent internet access. These parts work together to create a complete system for sophisticated energy management, monitoring, and remote control. An Arduino or ESP32 microcontroller, or any other microcontroller capable of gathering data on energy use, might be integrated with an energy meter as part of a suggested system for a wireless monitoring system based on energy meters and the Blynk smartphone application. The Blynk application receives this data wirelessly via Bluetooth or Wi-Fi connectivity.



With the Blynk app, users can see historical data through configurable graphs and widgets, monitor energy consumption in real-time, and set alarms for unusual usage. For even more usefulness and efficiency, the system might include capabilities like energy usage statistics, remote appliance control, and connectivity with smart home automation system.

CONCLUSION

All in all, a total response for present energy the board requests is given by the energy meter-based remote checking framework combined with the Blynk cell phone application. This framework empowers people and gatherings to go to proactive lengths towards diminishing energy use, cutting costs, and empowering maintainability by giving clients continuous admittance to information on energy utilization and easy to understand hardware for investigation and control. The Blynk application's simple availability on cell phones further develops client commitment and spurs proactive support in energy-saving exercises. The execution of this energy reconnaissance framework denotes a critical stage toward growing more eco-accommodating and useful energy rehearses for the next few years as we endeavor embracing Web of Things (IoT) innovations and brilliant arrangements.

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