Smart Energy Monitoring and Controlling System

Shreyash Gawande[1], Parshwa Sawala[2], Om Nerkar[3], Sanket Kathane[4],
Yash Laddha[5], Prof. R. M. Gharat[6]
Students, Diploma in Electronic Engineering[1,2,3,4,5]
Lecturer, Diploma in Electronic Engineering[6]
Dr. Panjabrao Deshmukh Polytechnic, Amravati, Maharashtra

Abstract*: In recent times internet of thing based applications are more efficient to provide solution regarding the real time problems. The labor involved in gathering energy utility meter readings. The Internet of Things (IoT) provides an efficient and cost-effective way to wirelessly send energy consumer information as well as monitor power use. In this paper we presenting smart energy monitoring system. the main objective of our project is reduced manual efforts for measuring electricity by Internet and make the electrical appliance intelligence and provide consolation to consumer and also get reduction in electric bill.*

Keywords: Current Sensor, Android Application (Rain Maker , Blynk), ESP 32 dev Wi-Fi Module

I. INTRODUCTION

In the present situation the demand for electricity is increasing day by day its may be in the sector of agriculture hospital industries or household so it becomes more tricky to manage electrical usage

A large portion of global electric energy consumption is attributed to households, with the majority of this consumption being attributed to household appliances such as weather heaters, clothes washers and dryers, dishwashers, refrigerators, freezers, electric stoves, lights, and so on, which account for a significant portion of energy bills. The amount of energy consumed by each element is greatly affected by the time of use and how long it is connected to the power grid.

The control and reduction of losses, focused on the end user, are issues with energy distribution and consumption. This allows for the creation of an internal study of both consumption and control, which then results in the effective optimization of energy resources.

To conserve proper electricity uses and reduce electricity bill is also big challenge for each middle middle class family.

to reduce this challenging it situation of every middle- class person we are introducing our project IOT be smart energy monitoring system

The internet of things (IOT) is a network of interconnected computing devices, mechanical and digital machinery, items, animals, or people that have a unique identification and can transfer data over a network without needing human to human or human to computer contact.

Four key goals guide the design of a smart energy meter that uses a Wi-Fi technology. They are as follows:

1. To monitor the consumption of appliances
2. To make the household appliances intelligent .
3. Cut down on energy waste.
4. To reduce electricity

The system is built around an Arduino microcontroller board to get proper use of the system people should know about the rainmaker and black software the complete information of energy bitter is uploaded to blink cloud where the consumer is able to monitor electric meter or bold the world and by using the rainmaker all appliances able to operate via Google remote or an Android phone

II. LITERATURE SURVEY

[1] In this work, an energy control system for residential usage was created by combining a wireless smart socket, a home gateway, a user interface, and the Internet of Things (IoT). To connect with the home gateway, the smart socket contains an embedded Zigbee communication module. The connected gadget will be measured by the smart socket. parameters and send to home gateway. The control message will be sent to the associated sockets by the home gateway

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through a distant cloud server. This system has four different control modes: peak time control, energy control, automated control, and user control. The implementation findings reveal that some household appliances consumed 43.4% less energy in one week.

[2] This study discussed the energy control system used in the residence. A functional example of a "IOT Based Smart Energy Meter" has been attempted. For ease, the propagation model is utilized to compute the household's energy use and even create the energy unit readout. As a consequence, it lowers energy waste and promotes

[3] To identify different IoT system traits and characteristics, current literature reviews were examined. This survey study covers a GPRS- based IoT-based data collecting system and energy management system. This Energy Management System project's central idea is the Internet of Things. In this work, related technologies such as smart meters, GPRS Gateway, GPRS communication network, web- based software, databases, and others are utilized. Using the GPRS Gateway,.NET Framework, and MySQL database, the IoT architecture is developed.

[4] Via an android application, users may access all of the cloud's data that has been saved. By logging into the appropriate accounts, users can obtain information about their registered accounts. As a security measure, the user must provide their user id and password in order to log in.

[5] The user may check the quantity of used units, received pulses, total cost, and Wi-Fi network data after logging in. Users are guided through the application's use through a help file. Pre-paid consumers establish an initial balance of money that has been recharged. After 80% of the recharged money is paid, the program automatically calculates the amount of spent units and alerts the users.

[6] "Smart energy meter surveillance using IoT" is a proposed emerging field related to IoT. Electronics and IT have undergone a transformation thanks to and IoT-based gadgets. The main goal of this initiative is to raise knowledge about energy usage and the effective use of home appliances to reduce energy consumption. The current power billing system has many flaws

[7] With the aid of IoT and GSM technologies, this suggested smart meter is utilized to automatically detect energy use and automatically compute the cost. This work estimates the bill made up of hardware and software components based on the energy consumption units measured from the user's location. The controller sends the bill to the releva user following the calculating procedure. The Wi-Fi module will simultaneously update the bill on the user's website. since it requires manual labor. Using IoT, this system will provide information on meter readings and power cuts when use exceeds the designated limit. With the aid of a GSM module, the Arduino esp8266 microcontroller is programmed to accomplish the goals.
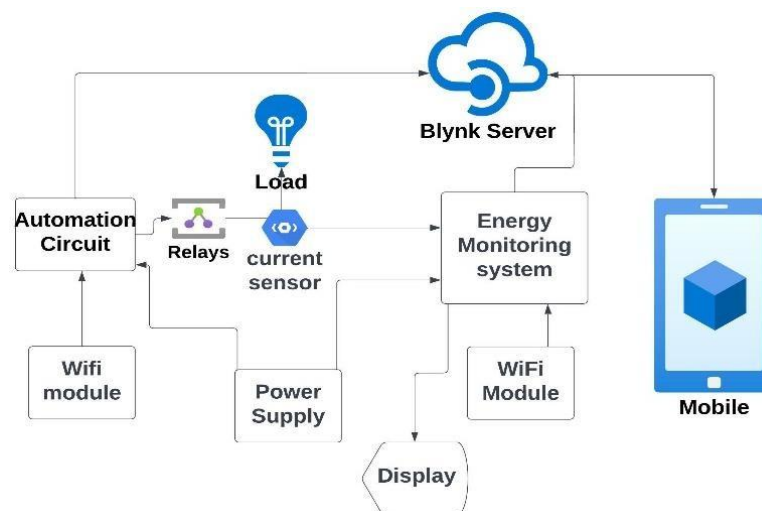
III. BLOCK DIAGRAM

Fig1.1 Block Diagram of the Embedded System Automation Circuit

An robotization system is a combination of detectors, regulators, and selectors designed to negotiate a function with minimum or no mortal commerce. This content is covered by the interdisciplinary field of engineering known as" mechatronics," which combines mechanical, electrical, and electronic systems. In this system four channels are available for operation This channels are accessible with physical remote, via a mobile operation and via a google also

Wi-Fi Module:

WI-FI modules (wireless fidelity), also known as WLAN modules (wireless local area network), are electrical components that allow a wireless internet connection in a number of goods.

In this project we used ESP 32 WIFI module for home automation circuit and energy monitoring circuit which provides all data and information on the web page (RAINMAKER , BLYNK)

Relay:

Relays are electrically driven switches that open and close circuits by receiving electrical signals from other sources. By turning the switch on and off, they receive an electrical signal and transmit it to other pieces of equipment.

This relays are directly operated by automation circuit which is used to control the flow of AC supply to a load as per signals

Current Sensor:

A current detector is a device that detects current and converts it into an easy- to- measure affair voltage commensurable to the current flowing through the channel being measured. The current sensor is connected load and provides data like Voltage and Current value along with power consumption and total kWh units to a Energy monitoring device

Energy Monitoring system:

Energy monitoring systems provide users with information about their consumption habits, allowing them to regulate their energy use effectively and save as much money as possible.

In this system all data provided by current sensor is processed and uploaded to cloud (BLYNK)

Cloud :

The cloud is not a physical object, but rather a massive network of distant servers located all over the world that are linked together and intended to function as a unified ecosystem. These servers are intended to store and manage data, execute programs, or provide content or services such as streaming films, online mail, office productivity tools, or social media.

For this project we are using cloud (RAIMNMAKER & BLYNK)

Display :

The simple display is provided in the system to see all information of the system physically . Voltage and Current value, power consumption and total kWh units like data can be displayed simultaneously

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IV. CONCLUSION

Energy Monitoring with IOT is an innovative internet of things application designed to operate household appliances remotely through the cloud from anywhere in the globe. The suggested idea employs a current sensor to detect current and show it on the internet through IoT. All data of the energy monitoring system is available on cloud BLYNK and by using RAINMAKER webpage all home appliance can be accessible

REFERENCES

[1]. K. Krishna reddy, n.v. kishore kumar, tanakanti vani, p mohammad khan, c bhaskar reddy, p monika, t.sambhavi. Iot based smart energy meter monitoring and controlling system ISSN: 0974-5823 Vol. 7 No. 7 July, 2022

[2]. Abhiraj Prashant Hiwale1, Deepak Sudam Gaikwad2, Akshay Ashok Dongare3, Prathmesh Chandrakant Mhatre4 IOT BASED SMART ENERGY MONITORING Volume: 05 Issue: 03 | Mar-2018 www.irjet.net pISSN: 2395-0072

[3]. Md Redwanul Islam1, Supriya Sarker2, Md Shahraduan Mazumder3, Mehnaj Rahman Ranim4 An IoT based Real-time Low Cost Smart Energy Meter Monitoring System using Android Application International Journal of Engineering and Techniques - Volume 5 Issue 3, June 2019

[4]. P.Janaki[1] and K.Ramamoorthy[2] Iot Based Energy Management System - A Survey [Janaki, 3(11): November 2016] ISSN 2348 – 8034

[5]. Miguel Hernan Escobedo-Barajas1, Antonio del Rio de Santiago1, Hector Alonso Guerrero Osuna1 and Jose Manuel Ortiz-Rodriguez1,_ IoT Based Smart Electrical Meter for Smart Homes published on 23 July 2020

[6]. D A Kirienko, P V Lunkov, V V Putrolaynen et al. Design of IoT Based Smart Energy Meter for Home Appliances 2021 J. Phys.: Conf. Ser. 1964 052001

[7]. Naziya Sulthana1*, Rashmi N2, Prakyathi N Y3, Bhavana S4, K B Shiva Kumar Smart Energy Meter and Monitoring System using IoT ISSN: 2278-0181 Published by, www.ijert.org NCETESFT - 2020