Electricity Theft Detection Using IOT

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ABSTRACT-In the actual world of today, automatic frameworks are preferred to human framework. IoT is the most recent and growing online innovation, and the rapid growth in the number of web users over the past ten years has made the Internet a necessity for daily living. One of a person's basic needs is electricity, which is frequently used for household, commercial, and agricultural reasons. The greatest issue today is power theft, which costs energy companies a lot of money and creates some payment issues for customers. These circumstances occur more frequently in our nation. Lots of electricity can be conserved if these thefts are stopped. Utilizing a smart energy meter, this is done (SEM). An electronic instrument called a SEM has an energy metre chip for calculating the amount of electricity used and using a cellular algorithm for data transmission. A smart energy metre for an automated metering and invoicing system is presented in this study. This energy metre communicates with the controlling base station and sends the power used and the associated number to both the consumers and the electricity board via an Android application and a web application, respectively. To assist vendors in looking into, identifying, and stopping theft, additional policy measures and suggestions are included. The entire system helps prevent crimes and uses a worldwide linked means to effectively portray the metre measurement to its clients. IOT devices are used for contact between the user/household and the centre.

Keywords: IOT Module, Arduino microcontroller, Current Sensor, Voltage Sensor

1.INTRODUCTION

Home energy management systems (HEMS) manage energy use to achieve a balance between energy saving and a comfortable life in the Home. In addition to reducing energy consumption by using rainfall, detector, and other types of information to identify gratuitous energy use and controlling Home appliances consequently, HEMSs also work laboriously to make the stylish use of electric power by, for illustration, operating heat pump water heaters or washer- dryers during times when solar panels are generating redundant power. As the quantum of power generated by rainfall-dependent renewable energy sources increases, the installation of batteries, and their operation in an optimum way to deliver energy savings while also maintaining comfort, will have an important part to play in maintaining a dependable force of electric power. In addition to furnishing " visualization " of electric power use to give the stoner an easy way to view their own operation on a television or computer screen, by performing centralized operation of energy consumption, an ends can also give advice on how to make more effective use of electric power grounded on factors similar as the rainfall or the stoner's geste patterns.

2.LITERATURE SURVEY

[1] Sirsath N. S, Dhole P. S, Mohire -We are now living in a post-PC era where everyday chores that were previously performed by desktop and laptop computers are now being handled by mobile devices (such as iPads, smartphones, and handheld tablets). Numerous reports indicate that mobile devices are rapidly replacing personal PCs as the primary computing platform. The usage and application of cloud networking go hand in hand with the transition from personal computers to multi-touch mobile devices. Many consumers are beginning to discover how new technology might improve their daily lives as a result of the fast growing availability of products that combine cloud networking and mobile devices. In this work, we have created a home automation system that utilizes cloud networking, wifi, power-line, and multi-touch mobile device integration to give the user has the ability to operate a variety of lighting and appliances in their house remotely. This system gives the user an interface through the combination of a PC-based program, a handheld wireless remote, and an application for their mobile phone. Using an in-home wireless remote, the user of the home automation system can control the system without relying on a mobile carrier or an Internet connection, setting it apart from other systems. This system can operate a wide range of devices because it is made to be inexpensive and expandable.

[2] Deepali Javale, Mohd. Mohsin, -A system installed in a residential setting with the goal of making the space intelligent to preserve security and save energy is known as home automation. It improves citizens' quality of life.flexible, healthy and comfy. Systems were initially developed in this area, but they required expensive machinery, such as a large personal computer, and Internet deployment. Since all of these massive components won't be present in our system, it is implied that it will have good portability. Most systems would share data or would communicate with the help of Bluetooth, ZigBee and GSM. These systems each have drawbacks of their own. For instance, a system that uses ZigBee has insufficient bandwidth for data transmission, whereas a system that uses GSM has excessive capacity. As a result, valuable bandwidth is wasted because it is not being utilized. Among the other systems that were in use were SMS and Java-Based Systems.centered systems. A drawback of Java Based Systems is that they still rely on web pages in the event of an intranet or internet outage. Since an SMS-based system needs data transfer from a real-time service provider, it is more expensive. This Wi-Fi

protocol has a few advantages over others, such as a range of 150–200 meters.By using a password-protected application, the mobile application can further increase the system's security.

[3] Rosslin John Robles and Tai-hoon -The era of ubiquitous healthcare services—that is, healthcare services available anywhere, at any time—is rapidly approaching thanks to recent advancements in information technologies. Context-aware systems are necessary for smart services that use home networks in homes where healthcare services are widely available. In this work, we suggest a methodical A home gateway, a home server, a PDA, home network healthcare devices, and wearable sensors make up the design tool of a context-aware system for ubiquitous healthcare services in a smart home. In order to address the issue of interoperability between sensor manufacturers and healthcare service providers, we created a context-aware framework to transmit data from wearable sensors or healthcare devices to healthcare service entities. Additionally, we methodically provide a design tool for ubiquitous healthcare services that incorporates a context-aware architecture. A self-check service application example is provided to demonstrate the viability of the suggested solution.

3.EXISTING SYSTEM

The best home electricity control system To make house energy consumption simple to obtain, optimisation of home power consumption based on power line transmission has been explored. a module for controlling connected household equipment. a green household appliance monitoring and management system (HEMS). The power system should handle demand response and load balancing with the power storage device as renewable energy production and storage systems grow in number. These power networks combine the electricity generated by green energy sources with the electricity delivered by the utility. When integrating renewable energy sources into standard power networks, the varying frequency and voltage are significant issues. It is necessary to conduct research on distribution and transmission with the incorporation of the green energy infrastructure.

4.PROPOSED SYSTEM

In order to give the user direct control of different lights and utilities in their house, this paper suggests a home automation system that integrates multi-touch mobile devices, cloud networking, wireless communication, and power-line communication. This system combines a mobile phone application, a portable cordless remote, and a PC-based programme to give the user a way to interact with it. The suggested system, which comprises of a server and sensors, is a distributed house control system.

BLOCK DIAGRAM

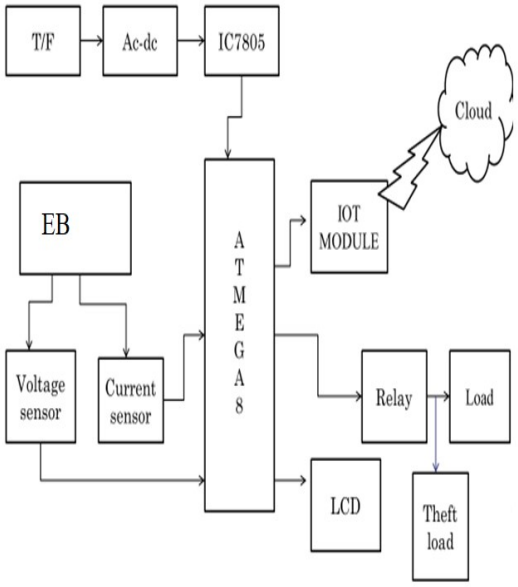

Fig .1. Block Diagram of The Proposed System

The server manages and keeps track of the different instruments, and it is simple to set it up to handle more hardware interface modules. (sensors). the online server into which the credit card is entered. Any local PC in the same LAN can reach the Automation System through its web browser by using the server IP.or from a distant computer or mobile device using a web browser that is compatible with the server's actual IP (internet IP). The network architecture used to link the server and the devices is WiFi technology. WiFi is selected to increase system mobility and scalability as well as to increase system security (by using a safe WiFi link). IOT, or the "internet of things," is a new technology that uses the internet to track and manage cars, other physical

objects linked to the internet, as well as electronic and mechanical devices. IOT enables users to easily manage non-digital objects via an inviting GUI over the internet. We are among the innovators conducting study in the internet of things. Our efforts are focused on studying cutting-edge IoT initiatives that could be beneficial to humanity. Students and scholars can be inspired by these IoT project ideas to conduct additional IoT study.

5. SYSTEM REQUIREMENTS

HARDWARE DESCRIPTION

5.1 NODE MCU

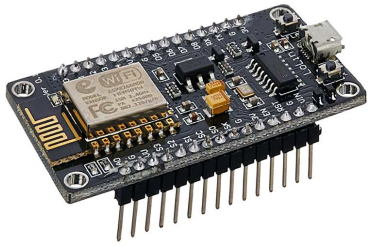

Fig 5.1 Node MCU

NodeMCU is an open-source, Lua-based firmware and enhancement board that is specifically designed for Internet of Things applications. It retains memory for devices that rely on the ESP-12 module and firmware for the Espressif Systems ESP8266 Wi-Fi SoC.

5.2 LCD Display

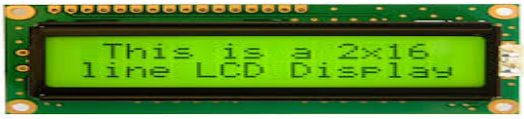

Fig 5.2 LCD

Characters, numbers, and designs are displayed on LCD. The showcase is interfaced with the I/O port of the microcontroller (P0.0–P0.7). The presentation is in multiplexed mode. In one-tenth of a second, the following exhibition illuminates. As a result of Vision's hard work, the show will provide an ongoing tally display.

5.3 Power Supply

The 12V advanced step-down transformer is powered by an AC source. The 12V AC transformer is rectified by means of a diode connection. A capacitor separates the 12V DC diode bridge yield.

5.4 ARDUINO UNO R3 MICROCONTROLLER

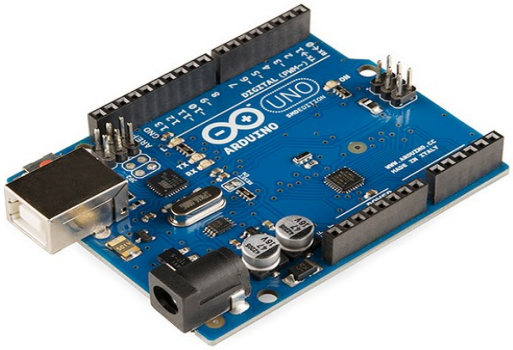

Fig 5.4 Arduino Board

A microcontroller board based on the ATmega328 IC is called the Arduino Uno R3. There were 6 analog inputs, a 16 MHz crystal oscillator, a USB port, 14 digital input/output pins (six of which may be utilized as PWM outputs), a power button for resetting, an ICSP header, and a jack. Everything required to support the microcontroller is included; all that's left to do is power it with a battery or an AC-to-DC adapter or connect it to a computer via a USB cable.

5.5 Current Sensor

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In the language of electrical engineering, "current sensing" refers to any of the numerous techniques for determining electric current. Current can be expressed in picoamperes to tens of thousands of amperes. Which current sensing method to select depends on a number of factors, including size, cost, isolation, resilience, precision, bandwidth, and robustness. An instrument can be used by a control or monitoring system to display the current value directly, or it can be digitally processed and utilized. Current sensing methods include the use of shunt resistors, magnetic field-based transducers, Rogowski coils, current transformers, and other devices.

5.6 Voltage Sensor

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A sensor is typically an electrical device that is used to both detect and react to a specific kind of signal, such as an optical or electrical signal. One of the best options for measuring voltage and current ways is to use sensor techniques in voltage or current. The key benefits of sensors over traditional measurement techniques are their reduced size and weight, high safety, high accuracy, non-saturable nature, and environmental friendliness. It is possible to combine the voltage and current measurement into a single, compact physical device. An overview of the voltage sensor's operation is included in this article.

SCREEN SHOT

CONCLUSION

By connecting simple machines to it, home automation with Internet of Things has been provisionally shown to function nicely, and the devices were successfully operated remotely via the web. In addition to screening sensor data, including light, gas, temperature, and movement sensors, the built framework also initiates a procedure in accordance with the requirement, such as turning on the light when it gets dark. In addition, it keeps the sensor parameters in a fortunate manner on the cloud. This will assist the client in analyzing the many parameters in the home at any time and from any location.

REFERENCES

[1] Mile Mrinal and Lakade Priyanka, Mashayak Saniya, Katkar Poonam and A.B. Gavali," *Smart Home – Automation and Security System Based on Sensing Mechanism*" ISBN- .978-1- 5090-3239-6/17/$31.00©2017IEEE.

[2] Mallesham Yerragolla, Kamalakar pallela, Indira Priyadarshini Gera, "*Intelligent Security System for Residential and Industrial Automation*", 2016 IEEE Uttar Pradesh Section International Conference on Electrical, Computer and Electronics Engineering (UPCON) Indian Institute of Technology (Banaras Hindu University) Varanasi, India, Dec 9-11, 2016.

[3] S. Rajadurai, P. P. Nehru, R. Selvarasu," *Android Mobile Based Home Security and Device Control Using GSM"*, IEEE Sponsored 2nd International Conference on Innovations in Information, Embedded and Communication systems (ICIIECS)2015.

[4] C. Largo, Marie Antonette T. Latayan, Michael Gabat, "*DEVELOPMENT OF WI-FI- BASED SWITCH CONTROL SYSTEM FOR HOME APPLIANCES USING ANDROID PHONE*" 8th IEEE International Conference Humanoid, Nanotechnology, Information Technology Communication and Control, Environment and Management (HNICEM) The Institute of Electrical and Electronics Engineers Inc. (IEEE) – Philippine Section 9-12 December 2015 Water Front Hotel, Cebu, Philippines.

[5] D. Javale, M. Mohsin, S. Nandanwar, and M. Shingate. "Home automation and security system using android adk." International journal of electronics communication and computer technology (IJECCT)3, no. 2 (2013): 382-385.

[6] S. I. Azid, and S. Kumar. "Analysis and performance of a low-cost SMS based home security system. "International Journal of Smart Home5, no. 3 (2011): 15-24.

[7] D.M. Han, and J.H. Lim. "Design and implementation of smart home energy management systems based on ZigBee." IEEE Transactions on Consumer Electronics56, no. 3 (2010): 1417- 1425.

[8] T.L. Chein, K.L. Su, and J.H. Guo. "Intelligent home-automation security system."Int J Autom Technol3, no. 2 (2009): 123-129

[9] C. Suh, and Y.B. Ko. "Design and implementation of intelligent home control systems based on active sensor networks." IEEE Transactions on Consumer Electronics54, no. 3 (2008): 1177- 1184.

[10] J. Hou, C. Wu, Z. Yuan, J. Tan, Q. Wang, and Y. Zhou. "Research of intelligent home security surveillance system based on ZigBee." In Intelligent Information Technology Application Workshops, 2008. IITAW'08. International Symposium on, pp. 554-557. IEEE, 2008.

[11] Y. Zhao, and Z. Ye. "A low-cost GSM/GPRS based wireless home security system."IEEE Transactions on Consumer Electronics54.2 (2008): 567-572.

[12] P. Harmo, T. Taipalus, J. Knuuttila, J. Vallet, and A. Halme. "Needs and solutions-home automation and service robots for the elderly and disabled." In2005 IEEE/RSJ international conference on intelligent robots and systems, pp. 3201-3206. IEEE, 2005.

[13] I. Korhonen, J. Parkka, and M. Van Gils. "Health monitoring in the home of the future."IEEE Engineering in medicine and biology magazine22, no. 3 (2003): 66-73.

[14] C.Nagarajan and M.Madheswaran - 'Stability Analysis of Series Parallel Resonant Converter with Fuzzy Logic Controller Using State Space Techniques'- Taylor & Francis, Electric Power Components and Systems, Vol.39 (8), pp.780-793, May 2011.

[15] C.Nagarajan and M.Madheswaran - 'Experimental Study and steady state stability analysis of CLL-T Series Parallel Resonant Converter with Fuzzy controller using State Space Analysis'- Iranian Journal of Electrical & Electronic Engineering, Vol.8 (3), pp.259-267, September 2012.

[16] Nagarajan C., Neelakrishnan G., Akila P., Fathima U., Sneha S. "Performance Analysis and Implementation of 89C51 Controller Based Solar Tracking System with Boost Converter" Journal of VLSI Design Tools & Technology. 2022; 12(2): 34–41p.

[17] C. Nagarajan, G.Neelakrishnan, R. Janani, S.Maithili, G. Ramya "Investigation on Fault Analysis for Power Transformers Using Adaptive Differential Relay" Asian Journal of Electrical Science, Vol.11 No.1, pp: 1-8, 2022.

[18] G.Neelakrishnan, K.Anandhakumar, A.Prathap, S.Prakash "Performance Estimation of cascaded h-bridge MLI for HEV using SVPWM" Suraj Punj Journal for Multidisciplinary Research, 2021, Volume 11, Issue 4, pp:750-756

[19] G.Neelakrishnan, S.N.Pruthika, P.T.Shalini, S.Soniya, "Perfromance Investigation of T-Source Inverter fed with Solar Cell" Suraj Punj Journal for Multidisciplinary Research, 2021, Volume 11, Issue 4, pp:744-749

[20] C.Nagarajan and M.Madheswaran, "Analysis and Simulation of LCL Series Resonant Full Bridge Converter Using PWM Technique with Load Independent Operation" has been presented in ICTES'08, a IEEE / IET International Conference organized by M.G.R.University, Chennai.Vol.no.1, pp.190-195, Dec.2007

[21] M Suganthi, N Ramesh, "Treatment of water using natural zeolite as membrane filter", Journal of Environmental Protection and Ecology, Volume 23, Issue 2, pp: 520-530,2022

[22] M Suganthi, N Ramesh, CT Sivakumar, K Vidhya, "Physiochemical Analysis of Ground Water used for Domestic needs in the Area of Perundurai in Erode District", International Research Journal of Multidisciplinary Technovation, pp: 630-635, 2019