IOT Enabled Power Profile & Monitoring System

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Abstract: ***In the Internet of Things (IOT) model, many of the living and non-living things that encompass us will be on the internet in one form or another.Currently there are almost nine billion inter-connected gadgets and it is estimated to touch almost fifty billion gadgets by 2020.The proposed system design eliminates the human involvement in Electricity maintenance. The Buyer needs to pay for the usage of electricity on schedule, in case that he couldn't pay, the electricity transmission can be turned off autonomously from the distant server. The user can monitor the energy consumption in units from a web page by providing device IP address. Theft detection unit connected to energy meter will notify company side when meter tampering occurs in energy meter and it will send theft detect information through Wi-Fi modem and theft detected will be displayed on the terminal window of the company side. Wi-Fi unit performs the IoT operation by sending energy meter data to web page which can be accessed through IP address. Wi-Fi unit performs the IoT operation by sending energy meter data to web page which can be accessed through IP address.***

Keywords:

IOT, WiFi, Communication System, Relay

I. INTRODUCTION

Today the world is facing such an environment that offers challenges. Energy crisis is the main problem faced by our society. A relevant system to control and monitor the power usage is one of the solutions for this problem. One approach through which today's energy crisis can be addressed is through the reduction of power usage in households. The consumers are increasing rapidly and also burden on electricity offering divisions is sharply increasing. The consumers must be facilitated by giving them an ideal solution (i.e.), the concept of IoT (Internet of Things) meters and on the other hand service provider end can also be informed about electricity thefts using theft detection unit and wifi modem.

II. EXISTING SYSTEM

The Existing domestic Energy meter reading systems universally exist many problems, such as difficulty in construction, too narrow bandwidth, too low rate, poor real time, not two way communication quickly. The present system only provides feedback to the customer at the end of the month that how much power is consumed in the form of bill. The consumer has no way to track their energy usage on a more immediate basis.

Theconsumers are growing exponentially fast and load on power providing divisions is rapidly rising. In the existing system meter tampering can be done easily and it's one of the major drawbacks for an energy crisis. In earlier days will use the GPS &GSM techniques in the energy meter for the purpose of calculate the current and voltage readings. The conventional mechanical energy meter is based on the phenomenon of "Magnetic Induction".

It has a rotating aluminum Wheel called Ferris wheel and many toothed wheels. Based on the flow of current, the Ferris wheel rotates which makes rotation of other wheels. This will be converted into corresponding measurements in the display section

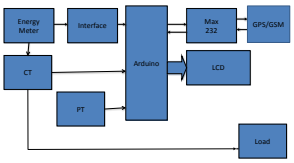

Fig 1.Existing System

III .PROPOSED SYSTEM

In the proposed system, consumer can do power management by knowing energy usage time to time. The Customer needs to pay the bill on schedule, if couldn't, the electric power connectivity can be turned off autonomously from the distant host. Since IOT is cost effective compared to SMS, monitoring of energy meters at lower cost is made possible. Daily consumption reports are generated which can be monitored through Android application and or web portal. Also, android users can pay their electric bills from their android application. Non-android users can monitor and pay their bills online. The system is more reliable and accurate reading values are collected from energy meters. Live readings of the energy meter can be viewed through Android application. Also, the readings can be viewed online. The human intensive work is avoided and all the values are maintained in the central server. The communication medium is secure and tampering of energy meters can be identified easily. If an error occurs in the system, the value in the central server will not be updated. Once the value updated crosses the threshold time, the server can determine that something is wrong in the system and can report the engineers in EB. Thus, identification of error becomes easier. Since the values are stored in the central database, the reports are made accessible from anywhere in the world. Also, the server is online 24x 7

.To solve problems in existing system, this paper uses the wireless technology for Automatic Meter Reading system. A proposed method provides the communication between the Electricity Board section and the consumer section using Internet of things (IOT) for transmitting the customer's electricity consumption and bill information that is calculated using Arduino Mega microcontroller. The power fluctuations are monitored using the voltage sensor and current sensor is fed to the microcontroller which indicates it to the Electricity Board. Depending on the power generation, the house hold devices are controlled automatically. From Electricity Board section the information regarding the bill amount and payment are communicated to the consumer through IOT.

The power and billing information is continuously transmitted by the use of Internet of Things and monitored by the Electricity Board section. Whenever there is power theft identified can be sent from the Electricity Board section to cut the supply to the customer. The users can be aware of their electricity consumption. The human work of collecting readings by visiting every home at the end of every month can be avoided by generating Electricity bills automatically.

Theft of electricity can be avoided by tamper proof energy meters. The errors in t Energy crisis is the main problem facedby our society. A relevant system to control and monitor the power he system can be identified quickly

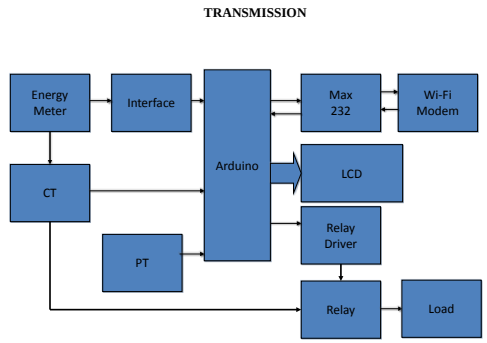

Fig 1.Transmission Section

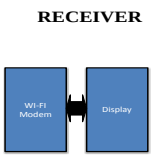

Fig 2. Receive Section

IV. INTERNET OF THINGS

The Internet of things (stylized Internet of Things or IoT) is the inter-networking of physical devices, vehicles (also referred to as "connected devices" &"smartdevices")buildings and other embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to collect and exchange data. " The IoT allows objects to be sensed or controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems. When IOT is augmented with sensors and actuators, the technology becomes an instance of the more general class of cyber-physical systems, which also encompasses technologies such as smart grids, smart homes, intelligent transportation and smart cities. Each thing is uniquely identifiable through its embedded computing system but is able to interoperate within the existing Internet infrastructure. "Things," in the IoT sense, can refer to a wide variety of devices such as heart monitoring implants, biochip transponders on farm animals, electric clams in coastal waters, automobiles with built-in sensors, DNA analysis devices operations. Collect useful data with the help of various existing technologies and then autonomously flow the data between other devices. Current market examples include home automation (also known as smart home devices) such as the control and automation of lighting, heating (like smart thermostat), ventilation, air conditioning (HVAC) systems, and appliances such as washer/dryers, robotic vacuums, air purifiers, ovens or refrigerators/freezers that use Wi-Fi for remote monitoring.

V. WIFI MODULE

Wi-Fi is a trademark of the Wi-Fi Alliance, which restricts the use of the term Wi-Fi Certified to products that successfully complete interoperability certification testing. Devices that can use Wi-Fi technology include personal computers, video-game consoles, phones and tablets, digital cameras, smart TVs, digital audio players and modern printers

Wi-Fi compatible devices can connect to the Internet via a WLAN and a wireless access point. Such an access point (or hotspot) has a range of about 20 meters (66 feet) indoors and a greater range outdoors. Hotspot coverage can be as small as a single room with walls that block radio waves, or as large as many square kilometers achieved by using multiple overlapping access points.

Fig 3.Setup of WiFi

***a. City-wide Wi-Fi*:**

In the early 2000s, many cities around the world announced plans to construct citywide Wi-Fi networks. There are many successful examples; in 2004, Mysore became India's first Wi-Fi-enabled city. A company called WiFi Net has set up hotspots in Mysore, covering the complete city and a few nearby villages. In May 2010.Officials in South Korea's capital Seoul are moving to provide free Interneity, including outdoor public spaces, major streets and densely populated residential areas.

b. Campus-wide Wi-Fi:

Many traditional university campuses in the developed world provide at least partial Wi-Fi coverage. Carnegie Mellon University built the first campus-wide wireless Internet network, called Wireless Andrew, at its Pittsburgh campus in 1993 before Wi-Fi branding originated. By February 1997 the CMU Wi-Fi zone was fully operational. Many universities collaborate in providing Wi-Fi access to students and staff through the Eduroam international authentication infrastructure.

IV. ADVANTAGES

Precise consumption information

Clear and accurate billing

Automatic outage information recovery

Better and faster customer service

Flag potential high consumption before customer gets a high bill.

VII. CONCLUSION

The project IoT enabled Energy Meter has been completed successfully and the output results are verified. The results are in line with the expected output. The project has been checked with both software and hardware testing tools. In this work the energy meter,opto coupler and the Wi-Fi modem are chosen are proved to be more appropriate for the intended application. The project is having enough avenues for future

enhancement. The project is a prototype model that fulfills all the logical requirements. The project with minimal improvements can be directly applicable for real time applications. Thus the project contributes a significant step forward in the field of smart grid, and further paves a road path towards faster development s in the same field. The project is further adaptive towards continuous performance and peripheral up gradations. This work can be applied to variety of industrial and commercial application.

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