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Smart Energy Meter Auditing with Power Demand Controller Using IOT

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ABSTRACT: In everyday life, electricity plays a cardinal function. With a 5.5 percent global share in 2016, electrical energy consumption in India is the third largest after China and the USA. The rate of energy usage per person is closer to 0.7 KW in India. By 2035, India's share of global energy demand increase to 9 percent. The Internet of Things (IoT) is a developing field and a revolution in electro-based devices has been generated by IoT based devices. The main goal of this project is to raise awareness of the use of energy and the effective use of home appliances to save energy. In current electricity billing scheme has substantial disadvantages due to manual labor. It can see a person standing in front of house from electricity board, whose duty is to read the energy meter and handover the bills to the owner of that house every month. This is nothing but meter reading. According to that reading it have to pay the bills. The main drawback of this system is that person has to go area by area and he has to read the meter of every house and handover the bills. Many times errors like extra bill amount, or notification from electric board even though the bills are paid are common errors. To overcome this drawback that have come up with an idea which eliminate the third party between the consumer and service provider, even the errors be overcome. This system provides data on meter reading, power cutting and warning systems to generate an alarm when energy usage exceeds the defined limit using IoT. This principle is being applied to decrease human reliance in order to gather monthly reading and reduce billing process technical issues. This project expands the design and implementation of an energy monitoring system by using the PIC MICRO CONTROLLER and GSM (Global System for Mobile Communication) module to pre-intimate the power agenda.

I. INTRODUCTION

In everyday life, electricity plays a cardinal function. With a 5.5 percent global share in 2016, electrical energy consumption in India is the third largest after China and the USA. The rate of energy usage per person is closer to 0.7 KW in India. By 2035, India's share of global energy demand increase to 9 percent. The Internet of Things (IoT) is a developing field and a revolution in electro-based devices has been generated by IoT based devices.
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II. LITERATURE SURVEY

1. Design and Implementation of Wireless Sensor Network and Protocol for Smart Energy Meter

In this paper it design and implement a wireless sensor network and protocol for smart energy meter applications. The system consists of a digital energy meter, a ZigBee coordinator and a management program. A ZigBee module from Atmel was adopted as a communication unit. The designed system is capable of automatically reading the unit and sending a terminal and a cover alarm to the management program. The system can support up to 100 energy meters, 10-hop network depth and automatically detect a new energy meter. The experimental results show that the system proposed in this paper is feasible to implemented in practical applications for automatic meter reading The electricity system is one of the most important infrastructures in the modern society because it is the electrical power source of the electrical machines, e.g. motors and generators, used in the factory and also for the electrical appliances and lighting in households. Recently, an automation system has been applied to many basic infrastructures such as electricity, gas, and water systems in order to facilitate the routine work such as a manual control and a unit recording operation. Nowadays, the unit recording has to be done by human before the end of each month. Since the unit recording was done by human, the human error becomes the major problem of system. Recently, the smart meter concept has been popularly adopted by many leading electricity companies in USA and EUROPE in order to overcome the problem of human error in the unit recording as well as provide the automatic procedure to report the energy meter impairment and the tampering activity of misbehaved subscribers by using the advance wireless and wired communication.

2. Design and Implementation of an IoT Access Point for Smart Home

Network communication and micro-electro-mechanical embedded technologies have attracted much attention in recent years. Through these technologies, the capabilities of sensing, identification, and communication can be embedded in various smart devices. These smart devices can automatically connect to the Internet and form an intelligent network called Internet of Things (IoT). However, these devices are embedded with different wireless communication interfaces such as Wi-Fi and ZigBee. This paper presents the design and implementation of an IoT access point that supports functionalities of coordination of various wireless transmission protocols. Based on the existing Wi-Fi access point, it have embedded a ZigBee module and implemented ZigBee and UPnP protocols into the designed IoT access point, which supports ZigBee communication capabilities over the Internet In recent years, the Internet of Things (IoT) has attracted much attention because of the provided functionalities that can advance humanity in terms of intelligence, automation, convenience, etc The IoT can change objects that are precisely unidentifiable into identifiable, recognized, interconnected intelligent objects based on the standard communication protocols, called Smart Objects. The IoT consists of a number of smart objects that are embedded with wired/wireless communication interfaces to communicate and interact with each other without human intervention. The basic concept of IoT is that various smart objects can be automatically linked into a network for interacting with humans through perception and networking technologies. Smart objects in the IoT have the ability to send information through the Internet to provide the interaction among multiple things and people. For example, a smart power meter can get information with regard to energy usage from various electrical devices. Afterward, the smart power meter sends information wirelessly to the access point and the information is further forwarded to user devices through the Internet.

3. Smart & Intelligent Gsm Based Arm System

In the year of May 2012 the authors Abhinandan Jain, Dilip Kumar, JyotiKedia presented a paper titled "SMART & INTELLIGENT GSM BASED AMR SYSTEM". This paper represents the development of fully automated energy meter which is having capabilities like remote monitoring & controlling energy meter. Automatic meter reading (AMR) system continuously monitors the energy meter & sends data on request of service provider through SMS. It saves huge human labor.

4. Automated Wireless Meter Reading System For Monitoring & Controlling Power Consumption

In the year of June 2012 the authors O. HomaKesav, B. Abdul Rahim presented a paper titled "AUTOMATED WIRELESS METER READING SYSTEM FOR MONITORING & CONTROLLING POWER CONSUMPTION. In this paper the design presents new method for avoiding high construction & maintenance cost in the existing system. The system is designed in such a way that if the consumer is unable to pay the bill the power connection maybe disconnected automatically from remote server. The ARM 7 based hardware system consist of a processor core board & the peripheral board. The embedded C language is used as programming language in this system.

5.Iot Based Smart Energy Meter Monitoring & Theft Detection Using Atmega

In the year of November 2016 the authors S. V. Anushree T. Shanthi presented a paper titled "IOT BASED SMART ENERGY METER MONITORRING & THEFT DETECTION USING ATMEGA". The main objective of the system

is detection of theft of electricity increases the cost paid by customers & can have serious safety consequences. Identify the theft by sending alert SMS to owner send meter reading & rate every month to the owner .this system has an additional set up of IOT which portraits the global connection environment to the user & allow them to view the status of meter reading from anywhere at any time theft of electricity as a material impact on customers in terms of cost & safety.

6. Smart Energy Meter

The authors Rajesh T S, Anup Jose, Midhun P, .Vishnu Das presented a paper titled "SMART ENERGY METER". The traditional metering system has many disadvantages as manually reading has shortcomings such as errors in taking readings, inaccuracy, external conditions affecting readings, delayed work & location of consumers. In order to overcome the problem of traditional meter reading system automatic meter reading system is used. The three key elements in automatic meter reading system are consumption measurement, meter reading, transmission of measure data & data processing .

METHODOLGY
- They can monitor the meter readings regularly without the person visiting each house.
- Microcontroller based power consumption monitoring system that senses parameters & shows on an LCD display.
- The meter readings are automatically send on Cloud generated using IOT.
- It will provide pure transparency in the system.The main target of this system is to reduce miss communication between the user and distributor.

**BLOCK DIAGRAM:**
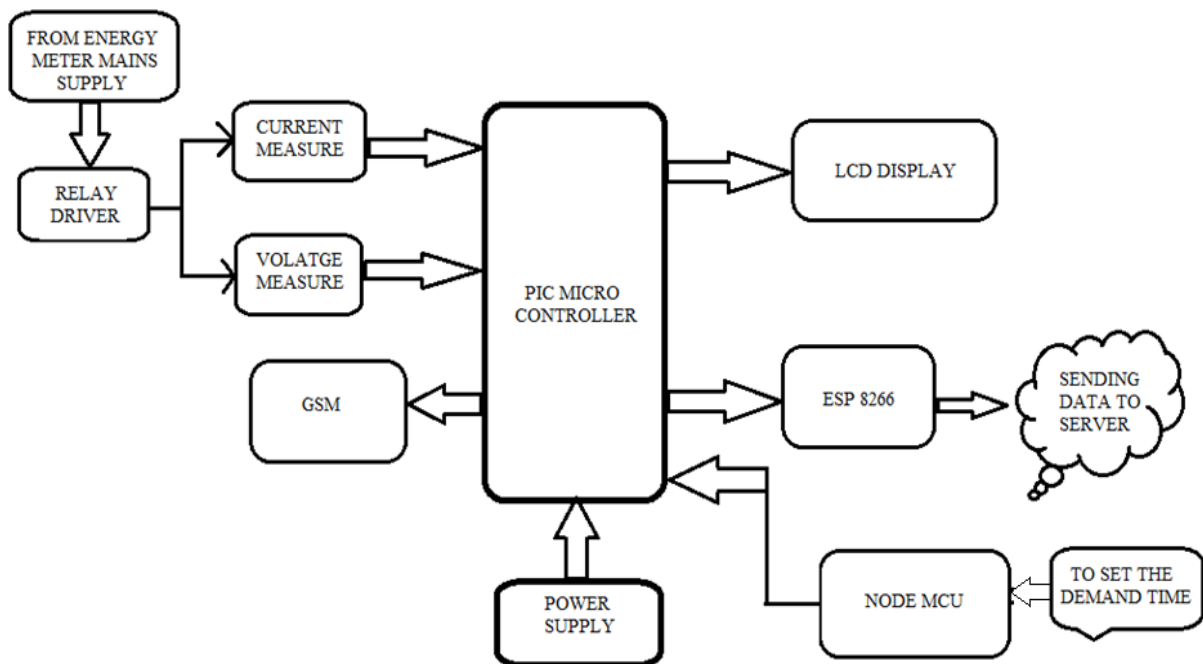
WORKING PRINCIPLE

The energy meter has the aluminum disc whose rotation determines the power consumption of the load. The disc is placed between the air gap of the series and shunt electromagnet. The shunt magnet has the pressure coil, and the series magnet has the current coil. The pressure coil creates the magnetic field because of the supply voltage, and the current coil produces it because of the current. The field induces by the voltage coil is lagging by 90º on the magnetic field of the current coil because of which eddy current induced in the disc. The interaction of the eddy current and the magnetic field causes torque, which exerts a force on the disc. Thus, the disc starts rotating. The force on the disc is proportional to the current and voltage of the coil. The permanent magnet controls Their rotation. The permanent magnet opposes the movement of the disc and equalies it on the power consumption. The cyclometer counts the rotation of the disc

III. RESULT

- The proposed system ,where threshold is taken as 5 units.Forward represents +5 and reverse -5 units.Current unit with cost will be displayed.
- When threshold is about to over the following message will be sent to consumer.
- Monthly consumption of power will be send as a message to the consumer with total bill of electricity.
- The monthly bill with unit consumption and user Id will be sent to service provider.

Connection:
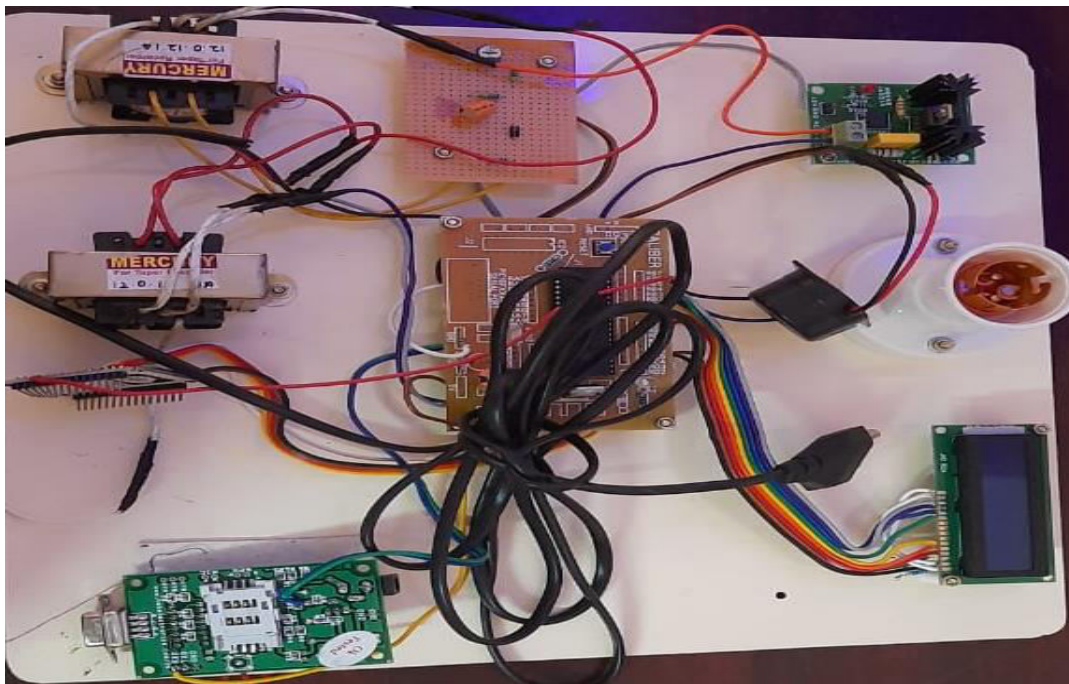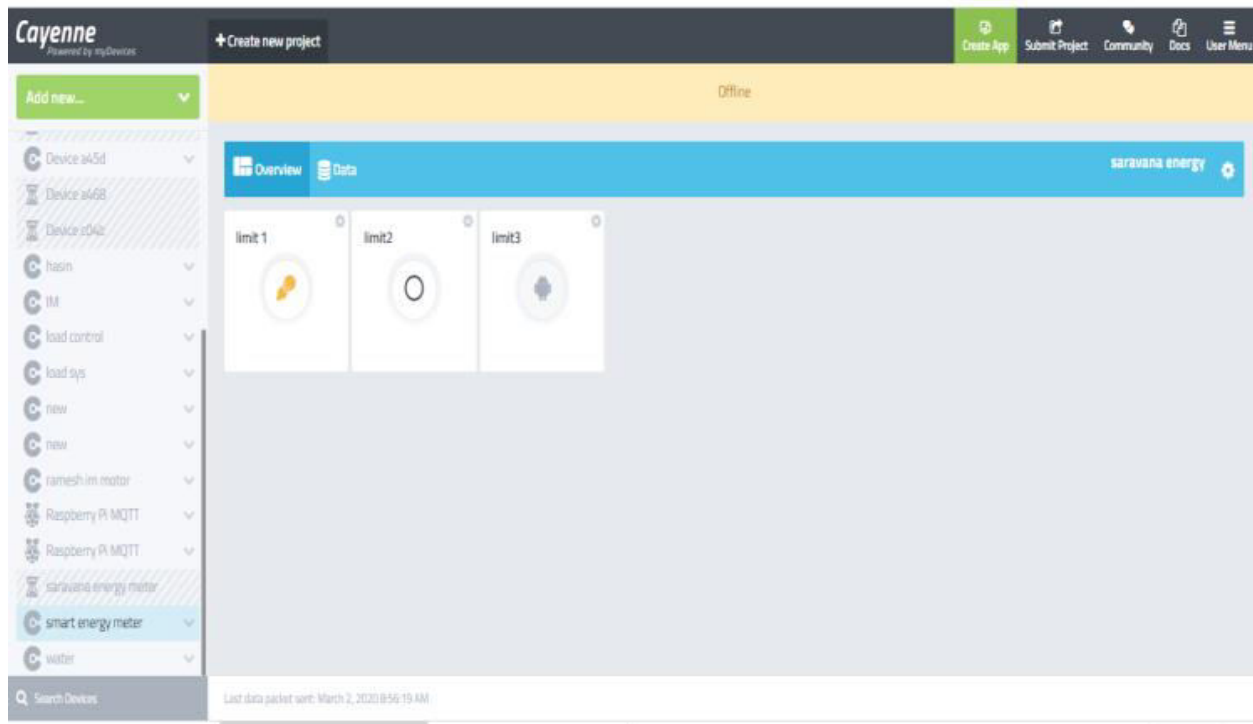
IV. CONCLUSION

- The project is based on the internet of things concept.
- This is aimed at replacing the old energy meters with an advanced implementation.
- It can be used for automatic power reading by which one can optimize their power usage thereby reducing the power wastage.
- The IOT based energy meter for calculating consumed power and displayed in LCD has been achieved.

V. FUTURE WORK

In future, this project can be implemented and validated in remote areas. Future enhancements can be incorporated to suit the system for three phase electric distribution system in India. Along with all this new architectural components can be incorporated, so that the system can be completely used for optimizing the energy consumption. This method reduce the energy wastage and save a lot of energy for future use Measurement of parameters like power line current and power line voltage has not been available in a satisfactory way to optimize power network management. But due to advancement in present technologies can give better solution to detect the power theft

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