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IoT BASED ENERGY METER

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ABSTRACT

Almost all of our modern conveniences electrically powered . Electricity is a particularly high grade of energy under the lifeblood of modern society. so there is a need for measure of electricity that we consumed. It is accomplished by wattmeter, human involvement, as metre readers need to visit the its consumers house consumer energy data collection and distribute the bill slips. Hence accuracy cannot be guaranteed as they can be errors in human reading. Even though digital metres are being replacing conventional electromechanical metres and provide much accurate reading, still the problem of deliberately making a false reading can exist. Despite this, billing for every consumer is a time consuming job for the distribution grid. Also the consumer can deliberately consume more power then required and still refrain from paying the bill thing can be done to severe the electric power supply. To eliminate all these drawbacks, this paper proposes an idea of IoT based energy metre. The proposed system measures the power consumed and send this data to the cloud. The cost of consumed power is calculated in arduino . The unit consumed and the cost is sent to the cloud using the Wi-Fi module ESP 8266. Units consumed is counted by LDR(Light Dependent Resistor) through LED blinking on digital energy metre. This data can be retrieved with the help of IoT application.
Keywords- Digital energy meter, LDR, Arduino, ESP 8266.

1. INTRODUCTION

Communities and individual around the globe are looking up to Innovative information communication technology to reinvent the way they live, play interact, hand work. Playing a very crucial role in turning and vision into reality. What can cloud based IoT offer cities? Cities around the globe are already deploying the cloud based IoT to reduce the cost through smart grids and metres to manage the use of electricity.

Analogue energy metre mind reading of parameters from the scale which is cumbersome unlike digital metres. The values we get from analogue metres are not accurate and these inaccurate results are caused due to the errors. viz, improper range settings , improper counting on the scale. Analogue metre does not have any digital circuitry, hence it cannot perform advanced measurements which are commonly measured by Digital metres. this drawbacks overcome by Digital metres, as it offers automatic output display, ensures accuracy.

Though it does not eliminate the human interventions, the system is designed in such a way that no person from the electricity board have to visit consumers home for generating bills, and load flow can be provided by the system to the consumers so they can manage their load effectively. Auto billing suitable way to overcome the flaws of conventional billings, since conventional building contains wastage of time and resources as well. Anywhere door in auto billing there is no more manual metre reading and bill slips. For this auto billing internet of things Applications. Here the readings of the power consumed is counted by LDR and these reading sir sent to the arduino where the cost of the consumed power is calculated. This data is being sent to the cloud using the Wi-Fi module ESP 8266. Hence it avoids the labour work and Manual errors.

1.1 PROBLEM STATEMENT

A Metre reader from electricity board goes home to home text metre reading and not done it manually, how to give bill to the consumers. while manual note down if metre reader text the wrong readings, the consumer may get the faulty bills. During this consumer need to go to electricity office and should get it corrected. Hence overcome this problems a new system of metre reading using IoT is introduced, where the Consumer can check is amount of power consumption also cost using internet

1.2 EXISTING SYSTEM

Energy meter is a electrical device which is used to measure the power that we consumed. One unit equals one kWh (killo-Watt-hour) or 1000 Watt-hours. Energy meters are installed by electricity board at entry point of every electrical consumer (domestic as well as industrial / commercial).

Energy metre is classified into two basic categories.

1. Electromechanical type induction metre.

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2. Electronic energy metre.

All the Energy metres that we are using today is the Digital energy metre. Because of low error of 0.01% in digital energy metre where is error is above 0.05% in the analogue metre and also offers other type of metering.

The energy metre gives the power consumed by continuously measuring the instantaneous voltage and current.

Electromechanical induction type energy metre working is based on two mechanisms. One is mechanism of rotation of an aluminium disc and the other is mechanism of counting and displaying the amount of energy transferred.

Electronic energy metre or electricity metre consumes less power and measures instantaneously when connected to load. They are of two types I) analogue electronic energy metre 2) digital electronic energy metre.

In Analogue electronic energy metre, power is converted to proportional frequency or pulse rate and it is integrated by counters placed inside it. In digital electronic energy metre, power is directly measured by high end processor which is used for calibration purpose and then it is converted to frequency or pulse rate.

This energy Metres also produces some errors like phase and speed errors, frictional error, creeping error, temperature error, frequency error. These errors may creep in an energy. To overcome these drawbacks new system of IoT based energy metre is proposed.

2. PROPOSED SYSTEM

The integration of internet with building Energy Management System energy efficient and iot driven energy metres. Iot is possible means of real time monitoring for reducing the energy consumption. The existing energy metre system creates error while building during note down after reading by the person. This system Comparatively producer caused by the existing system it is a part of larger concept of home automation and these iot devices are created for consumers. It is useful to obtain the metre reading when desired, save electricity board person need not to visit the consumer to distribute the bills.

2.1 BLOCK DIAGRAM AND ITS WORKING

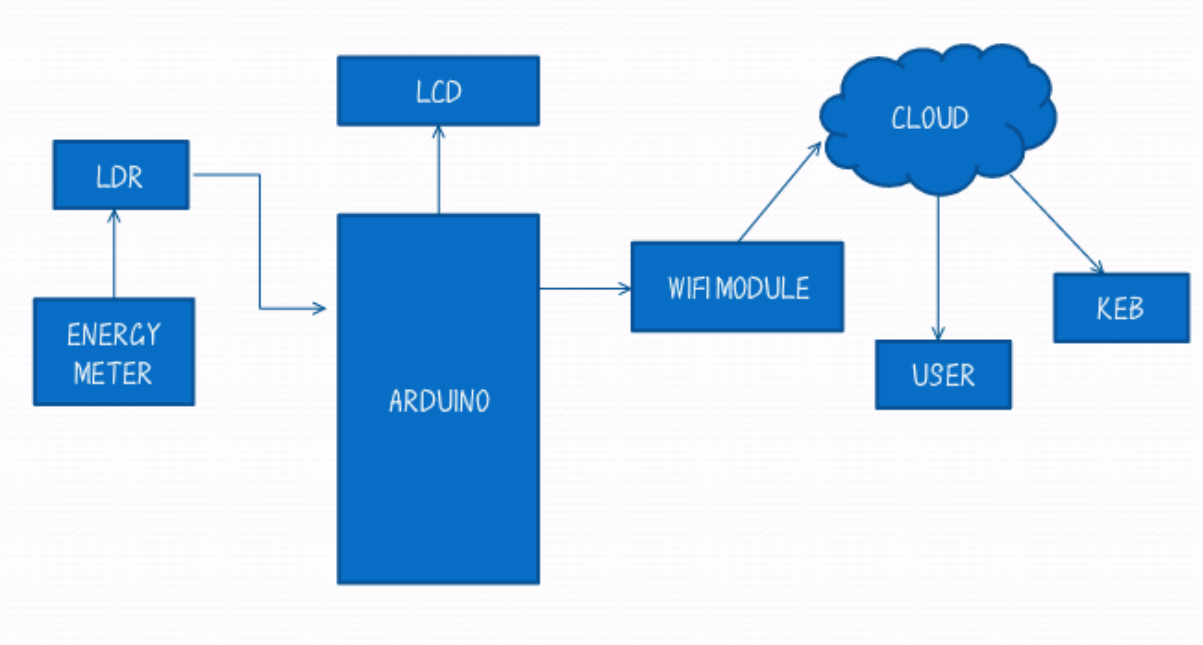

fig: Block diagram of IoT based energy meter

The system consists of a digital energy metre, an LDR, LCD, arduino UNO, under Wi-Fi module ESP 8266. The main thing is to the metre reading for units consumed and cost making use of iot.

The blinking LED on the digital energy metre is interfaced to a microcontroller through LDR(light dependent resistor) . The blinking LED flashes one time for 1 unit. The LDR counts the number of units and used that reading to the programmed aurdino. Here we are using arduino UNO as a microcontroller. The microcontroller takes the reading and calculates the cost to be paid for the units consumed. The data of unit consumed and the cost is then sent to cloud using Wi-Fi module, ESP 8266 and also these data are made displayed on the LCD. ESP 8266 gives the internet facility to the studio and it is used to transmit the data

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serially to the cloud, which will be available 24/7, 365 days. And eliminating the human involvement. We are using ThingSpeak web page as cloud, which is fully secured where the data collected can be viewed from anywhere by the user only with the particular user ID and password.

The arduino is powered by 5V supply and Wi-Fi ESP 8266 is to be powered by 7.5V adaptor. We are programming the arduino using arduino IDE and the Wi-Fi module is programmed using AT commands in the same arduino IDE.

The data of the number of units consumed or power consumed by the consumer is displayed on thingspeak web page along with the cost to be paid for the power consumed in the graphical format.

3. RESULT

Thing Speak is an IoT platform.An open source "Internet of Things"application and API to store and retrieve datafrom things using HTTP over the Internet orvia a Local Area Network. It enables us tocollect, store, analyze, visualize, and act ondata from sensors or actuators, such asArduino, Raspberry Pi, BeagleBone Black,and other hardware.

4. CONCLUSION

The main aim of this project is to reduce the man power involved in power management. It also avoids data loss. However, the initial setup will cost more than the existing mechanism. It provides better power management for the utility office as the values are directly sent from the meter and stored in their database. This data can be used in future to analyze the usage of power and take necessary measures to optimize power consumption. In addition to this, this mechanism can also provide self-analysis of power consumption of a user so can he/she can reduce the usage.

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