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ELECTRICITY THEFT DETECTION AND AUTOMATIC BILL GENERATE

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ABSTRACT

The IOT based smart energy meter is based on Arduino. In this system we reduce the human participation in electrical energy maintenance. The theft of the electricity increases thecosts paid by customer. Hence this system is used for the detection of theft. The Arduino checksthe main meter and sub meter reading. If the difference between the Main meter and sub meteris occurred, then that theft has occurred message will be display on the LCD display and also display on the firebase IOT cloud and mobile application. By using the consumer mobile application, it can be access on the globe at the anytime. The system also provides the featureslike billing system and auto. The IOT based smart energy meter is based on Arduino.

Keywords- *IOT, Arduino Uno, LCD Display, current sensor, WIFI*

I. INTRODUCTION

Now a days energy emergency is the major difficulties that the world faces. The best therapy for this is not the increases of energy production, but the actual use of available energy.Energy emergency can be reduced to a certain amount by properly monitoring the energy consumption and avoiding wastage of energy. But the main problem is that the energy monitoring cannot be done efficiently because consumer is not responsive of their power consumption.

The electricity bills are issued only when they will get an idea about their consumption. Billis distributed only once in a month in India. So the consumer will be in dark about their energyusage during this period of time. This procedure has to be repeated numerous times to efficiently control the energy usage in a month. If customer can check their leap in the area ofenergy consumption on their mobile phone or laptop instead of checking energy meter, it will be a great leap in the area of energy management. Since nearly all of the people are today 24*7online, it will really a benefit if they can check their energy consumption online from everywhere on the globe.

II. LITERATURE REVIEW

1.Electricity is one the major thing in our daily needs. Visual inspection is being used for thepower theft detection till now. Though there is no official estimate of electricity losses from non-technical causes, overall 30%of electricity theft is occurring. In this system it identifies there the electricity theft is occurring. Wastage of energy
2.No security of power consuming
3.Manual pay bill monthly
4.This system needs the human involvement in energy management.

Objective

In our project, the objective of electricity theft detection is to identify and prevent theunauthorized use of electricity, and to ensure that all customers are paying for the electricity they use. This can be done by using a variety of methods, such as smart meters, tamper detection devices, and remote monitoring systems, to detect unusual usage patterns or tampering with meters. By detecting and preventing theft, the utility company can protect its financial interestsand ensure that all customers are paying their fair share for the electricity they use. The objective of auto bill generation is to make the

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process of paying bills more convenient for customers, and to ensure that bills are paid on time. This can be done by usingsoftware or online portals that automatically generate and send bills to customers based on theirusage, and allow customers to set up automatic payments. By automatically generating andsending bills, and allowing customers to set up automatic payments, the utility company can reduce the number of delinquent accounts and improve its cash flow. In summary, the objectiveof electricity theft detection is to prevent unauthorized use of electricity and ensure fairdistribution of costs among customers. The objective of auto bill generation is to make theprocess of paying bills more convenient for customers and improve the financial stability ofthe utility company.

III. PROPOSED SYSTEM

This project consists of power theft detection and automatic bill management system. So, wecreated a great solution to that power theft and automatic bill management using Arduino microcontroller. In this, we used a current sensor to find the power theft and automatic billing system. If consumer connected overload means the bill amount was calculated but thelamp should not on. They want to call the electricity person compulsory than only they operate the load. In thisproject, we are explaining a Fig:1 technique of electricity energy meter reading based on IOT concept. This design implements the energy meter using the IOT concept.

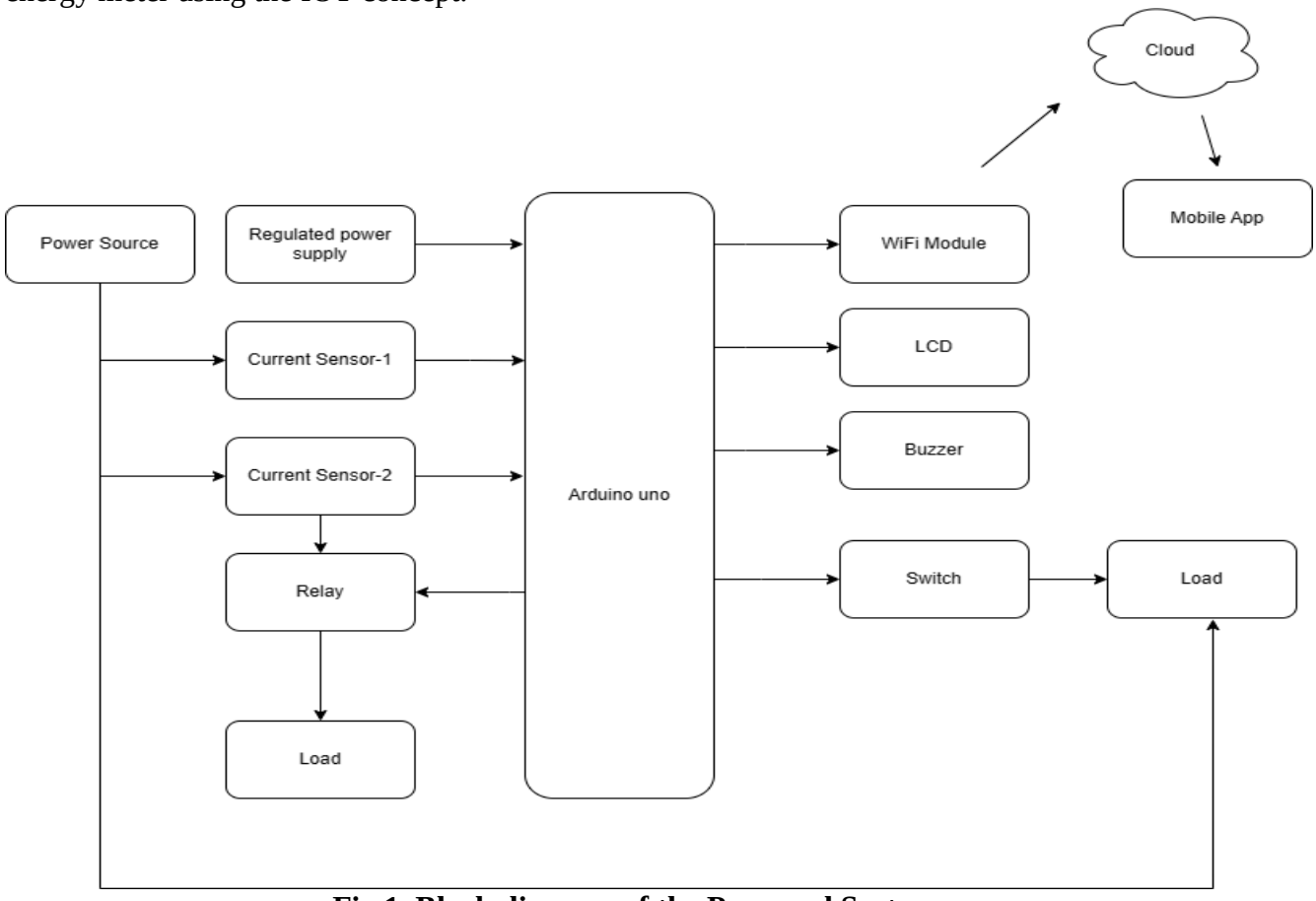

Fig 1. Block diagram of the Proposed System

This whole procedure based on the Arduino. The internet of things is the internet operational of physical devices which permits object to exchange data in the above system energy meter is connected to the internet by using IOT.

3.1. Atmega 328U microcontroller

ATMEGA328U is high performance, low power controller from microchip. atmega328p is an 8-bit microcontroller based on AVR RISC architecture. it is the most popular of all AVR controllers as it is used in Arduino boards. with program memory of 32 Kbytes Atmega 328u applications are many. with various power saving modes, it can work on mobile embedded systems.

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3.1.1. Arduino UNO:

An open-source microcontroller board called Arduino UNO is based on microchip ATmega328P microcontroller. It is comprised of a set of digital as well as analog input/output (I/O) pins which can be interfaced as various expansion boards (shields)and other circuits. The board consists of 14 digital and 6 analog pins, and programmable with the Arduino IDE (Integrated Development Environment) through a B USB type of cable. It may be powered by an external 9V battery or a USB cable although it can accept voltages in range, 7 to 20 volts. It works the similar fashion as Arduino Nano and Leonard do . The UNO board is the first of its kind in a series of USB Arduino boards as well as the reference model for the Arduino platform. The AT mega 328 on the Arduino UNO is available preprogrammed with bootloader, which allows uploading fresh code without the use of an External hardware programmer.

Fig 2. Arduino UNO

3.1.2. LCD (Liquid Crystal Display)

A liquid crystal display (LCD) is a thin, flat display device made up of any number of color or monochrome pixels arrayed in front of a light source or reflector.

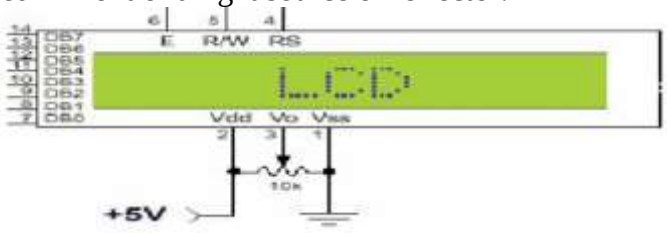

Fig 3.LCD Display

Each pixel consists of a column of liquid crystal molecules suspended between two transparent electrodes, and two polarizing filters, the axes of polarity of which are perpendicular to each other. Without the liquid crystals between them, light passing through one would be blocked by the other. The liquid crystal twists the polarization of light entering one filter to allow it to pass through the other.

3.1.3. Buzzer

A buzzer or beeper is a signalling device, usually electronic, typically used in automobiles, household appliances such as a microwave oven, or game shows. It most commonly consists of a number of switches or sensors connected to a control unit that determines if and which button was pushed or a pre-set time has lapsed, and usually illuminates a light on the appropriate button or control panel, and sounds a warning in the form of a continuous or intermittent buzzing or beeping sound. Initially this device was based on an electromechanical system which was identical to an electric bell without the metal gong

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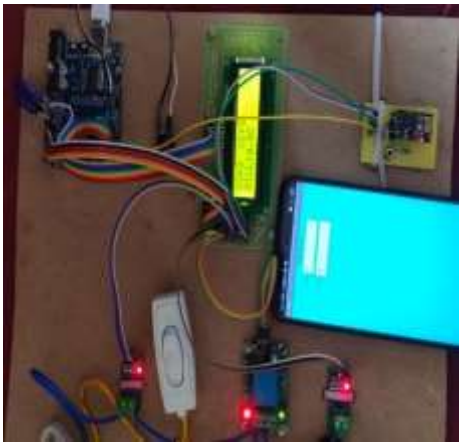
3.1.4. Current Sensor:

For measuring current in a circuit, a sensor is required. ACS712 Current Sensor is the sensor that can be used to measure and calculate the amount of current applied to the conductor without affecting the performance of the system. ACS712 Current Sensor is a fully integrated, Hall-effect based linear sensor IC. This IC has a 2.1kV RMS voltage isolation along with a low resistance current conductor.

IV. EXPERIMENTAL RESULTS

Initial start



without Theft Detection

With Theft Detection:

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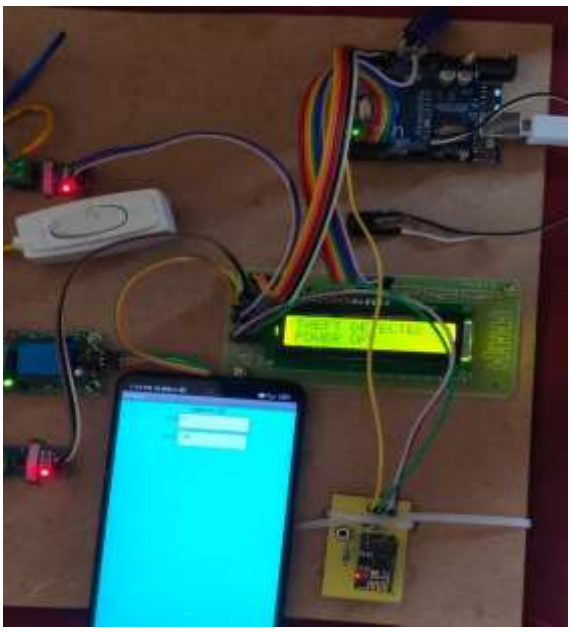

V. CONCLUSION & FUTURE SCOPE

This system helps in control the energy consumption and avoiding energy wastage is very important. This is an Arduino based design and implementation of energy meter by using IOT concept. In the proposed system, meter reading system is designed to monitor continuously the meter reading and transfer the reading to certain server. This data can be access from anywhere on the globe at any time. The proposed detector system to determine illegal electricity usage via power line communications is examined in the laboratory conditions. Results proved that if AMR and detector system are used together illegal usage of electricity might be detected. Once this proposed detection systems are tried in real power lines, the distribution losses in India can be reduced effectively.

As is evidenced by the experimental results presented in this paper, this novel techniquemay be adopted for rapid detection and elimination of possible thefts in the transmissionlines. Once adopted, it would definitely save the appreciable loss of tax payer's money due to regular power theft. The system is designed in such a way that pilferers will automatically stop pilfering due to the scare of their instruments getting impaired.

Thus, in future economic loss due to theft will automatically reduce.

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