Smart Energy Meter with Power Theft Detection

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Abstract-
    Power theft is usually done in two ways by jumping or hooking. To see it, a proposed system (current measurement and comparison) is proposed in which the distribution of electrical energy is done indirectly from an electric pole to a central distribution box and then to individual houses. During the installation of electricity meter user information is stored in a database. An effective comparison between the current values from the distribution box and the electricity meter on the server if we find a small difference between the currents and then steals detected. The same process is used for hooks but for individual poles. The theft of various electrical units and residences is a complex issue, due to the theft of electricity the loss of electricity, which makes electricity more expensive. Therefore, a functional project has been developed using modern Arduino Uno microcontroller technology to minimize such losses, using a very effective project to catch an electric thief by interrupting the electric meter or by any other means.

Keywords: Power theft , Energy Meter , Current sensor , Arduino , LCD display etc.

1. Introduction

    Theft of electricity is considered one of the biggest problems in India. Frequent power outages are also the result of power outages. Power theft is increasing daily. This function can prevent power theft and reduce power losses and control the price of electricity. The theft of various electrical units and residences is a complex issue, due to the theft of electricity the loss of electricity, which makes electricity more expensive. Therefore, a functional project has been developed using modern Arduino Uno microcontroller technology to minimize such losses, using a very effective project to catch an electric thief by interrupting the electric meter or by any other means. With technological theft, the power officer was immediately notified of the LCD display, so the theft of electricity could be prevented by this operation.

    To create this project, we have selected the Arduino Uno Microcontroller as the internal RAM of this controller has sufficient LCD display interfacing, and ADC functionality is provided within this control so that we can easily communicate with analog input. Available online for free and affordable, this controller is the Arduino Uno controller for this project.

2. Objective

• Detecting automatic power theft without involving any male power by creating a cost-effective and efficient system.
• Upgrading current sensor based on a power monitoring system to detect theft.
• Keeping a record of the total number of electrical units used.
• Study the system using Arduino Uno Controller and other components.

3. Literature Survey

• *Prof. Sandhya Shinde et.al. In April 2018*, the IoT-based power meter was based on Ardiuno. In this program we reduce people's participation in energy conservation. Electricity theft increases customer costs. This program is therefore used for crime detection. Arduino tests the reading of the main meter and the small meter. If a difference between the main meter and the sub meter occurs then this stolen message will be displayed on the LCD screen and appear on thingspeak. Customer can access thingspeak anywhere. Using a buyer's number can reach the world at any time.

• *K.Kumaran et.al. 2021*, This work includes informing Electricity Board officials about theft that occurs using IoT. The network of devices such as sensors is connected together which helps to transmit real-time data via the Net. Here, Arduino Uno is used to recall power theft and transfer information to the GSM module which transmits theft information to EB. The practical use of this work, which saves a lot of electricity and thus improves the country's economic situation.

4. Block Diagram
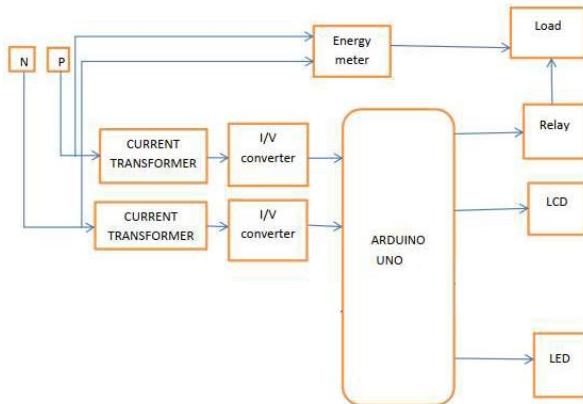

Fig. 1. Block Diagram of system

5. Working

In this project, the LCD module is used to transmit information about power theft to a utility company. The main purpose of this work is to use the LCD module which is associated with reducing theft and loss. This can also be used to cut off the electricity in the house in the event of a power outage. In the event of an interruption, it may immediately send a signal to the central server of the application. Another advantage of the LCD module is that it enables resource engineers to optimize network expansion while delivering power to the customer.

This design uses an intelligent energy meter. The whole process is based on Arduino. The LCD module is the operation of portable devices that allow an object to exchange data on a connected system meter. There is therefore a way to track their power consumption periodically for consumers so that they can control their consumption as they plan. This program is suitable for buyer and supplier. This method drains a person's power during this connection and disconnects. It plays an important role in informing the supplier of any theft that occurs.

6. Components
- Energy Meter
- LCD display
- Current sensor
- Transformer
- Switch
- AC load
- Arduino Uno
- Relay driver
- Others

7. Overview of Proposed System

Within the proposed tool, crime detection figures have been disclosed to EB executives using GSM technology and the internet of things. This device incorporates Arduino Arduino connected sensors to predict modern power and electrical power. this will prevent energy theft to a better level .So our projects aim to save you and end the robbery that could save the united states of america from the same loss of power. on the proposed machine, parameters and power, power, electrical power are tested primarily based on the calculated power and the money is sent to the electric mail respectively. as the weight rises the energy dissipates and the message sent to it about taking energy is sent to the energy board and displayed on a liquid crystal display.

Further in any load growth, electricity may be reduced and the electrical board may be notified and homeowners use of GSM and buzzer will also be hacked, allowing you to reduce debt. in the use of electrical energy. The ThinkSpeak software is used to maintain the normal load volume used and benefits the additional load due to theft and is used to stumble upon theft. in this action, Arduino Uno will eventually display the load primarily based on parameters and voltage, modern, power.Arduino Uno will eventually display the load capacity.

Arduino Uno: The Arduino Uno board is a microcontroller. it can be used with an external 9-volt battery. The operating voltage is 5 Volts and the input voltage is 7 to 20 Volts. contains UART, I2C and SPPI connectors respectively.
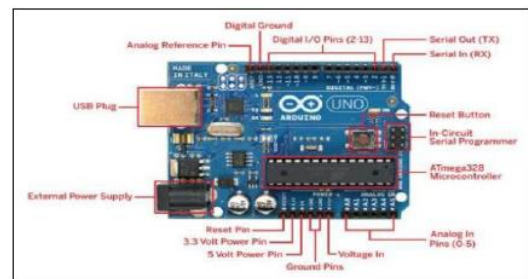
Voltage Sensor: An electronic sensor is used to calculate and view the amount of electrical energy in an object. able to determine both AC power. Volts between 0 and 12 are rated. Analogogead system (A0) voltage = value * (five.00 / 1023.0) * ((R1 + R2) / R2) is used to calculate value. This machine is used in our project to measure the supply of electricity so that we can have a stable electrical connection and meet crime.

Current Sensor Module : High quality sensor, used in the same way as read current AC or DC. The 20A is the AC or DC limit that can be detected and the modern signal is viewed through the analog I / O port of the small controller. This module is involved in our current

measurement and retention project so that any initial transaction costs will help us detect theft.
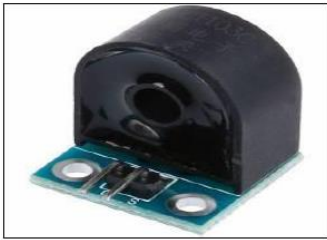
LCD: Liquid Crystal Display uses its first operating mode. right here the load is always rented in the form of Arduino UNO. when the weight rises the message is sent about the energy consumption of the energy board and displayed on the liquid crystal display.

Relay: Electromagnetic Power Transmission. when the power goes out, the closed gates open and damage the connection. continuously at any load boom, the ability to bring weight can be reduced by using a relay.

8. Conclusion

This approach greatly reduces potential and potential losses due to client theft. With this challenge it can be concluded that power theft can be effectively avoided with the help of finding out where the power outages occur and informing the authorities. The proposed gadget can be hidden in electric meters as one way in which if the difference between the current exceeds the limit charge, the default records and lcd display can be disclosed to the appropriate authorities.

This software allows you to control the flow of electricity and save you from damage. that is a completely Arduino-based design using a power meter using the concept of the lcd display. on the proposed device, the meter reading system is designed to continuously monitor meter theft. This information can be accessed anywhere in the world at any time using IoT for future use.

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