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# Power Theft Identification Using GSM Technology

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**ABSTRACT:** Electrical energy plays an important role in our day to day life and acts as a strong support system to run our homes, offices etc in our society. It also presents various methods to prevent the theft occurred. Because of the undisciplinary actions of men, need for electricity, wastage and theft are increasing day by day. If proper actions are not taken to save electricity, future generations have no scope of living their life in light, peace and harmony.Also theft of power because of the demand of electricity is increasing day by day. This results in power supply shortage and increase in demand of power supply excess to the limit.Power theft is a problem that continues to plague power sector across whole country. The objective of this project is to designa system which will try to minimize the illegal use of electricity and also reduce the chances of theft. This paper presents the different methods of power theft and the methods to identify the theft occurred in houses and industries.

**KEYWORDS:** PIC microcontrollers, Sensors, GSM module, LCD display.

## I. INTRODUCTION

Electricity theft is a very common problem in country, where population is very high and the use of electricity are ultimately tremendous.(1,4) In India, every year there is very increasing number of electricity thefts across domestic electricity connection as well as industrial electricity supply, which results in loss of electrical energy and because of which we are facing the frequent problems of load shedding in urban as well as rural areas so as to overcome the need of electricity for whole state.(3,5,6) Also the ways using which theft can be done are innumerable so we can never keep track of how a theft has occurred, and this issue is needed to be solved as early as possible.(2,5) In this, we propose an electricity theft detection system to detect the theft which is a made by the most common way of doing the theft and that is bypassing the meter using the a piece of wire, people simply bypasses electricity meter which is counting the current unit by placing a wire before and after the meter reading unit. The proposed system will be hidden in such meter and as soon as a theft occurs.(7,8)This project will automatically collect the reading from houses or industries and compares with the overhead line values and vice versa. If any theft occurs it turns on the relay circuit and trips the main circuit. It also sends a message to the Electricity Board (EB) to inform about the theft and the area of its occurrence.

Here a current sensor, voltage sensor and detection of short circuit is done in the lines. The output values of all the sensors are loaded into PIC microcontroller and the comparison values are displayed on a LCD display. Also, if any mismatch occurs in the values a message will be sent to the EB. Immediately EB can find out the person who is responsible for the theft. Actions like switching off the power temporarily or turning on the relay can be done meanwhile.

## II. REVIEW ON VARIOUS METHODS OF POWER THEFT& IDENTIFICATION

There are various methods of power theft in society. Some of them are hooking of the main overhead transmission line, meter tampering and also includes types like meter bypassing by illegally connecting to switch before meter, mechanical impediment to rotating disk, placing magnets and meter tilting and illegal wiring. There are two kinds of existing systems. EB uses methods like IRDR port meters, raiding the particular areas where too much electricity is utilised. Also there are systems which use 8051 microcontroller for simulation and zigbee for communication.

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**8051 controller**

This microcontroller is very commonly used for simulations purposes. It employs 8051 microcontroller in the circuit for theft detection.The internal architecture has less memory than PIC microcontroller. The processing is slow as the CPU can work on only 8 bits at a time.Different sensors can be used for theft detection but separate ADC has to be provided in the circuit.This is overcome by using PIC microcontroller which has an inbuilt ADC.

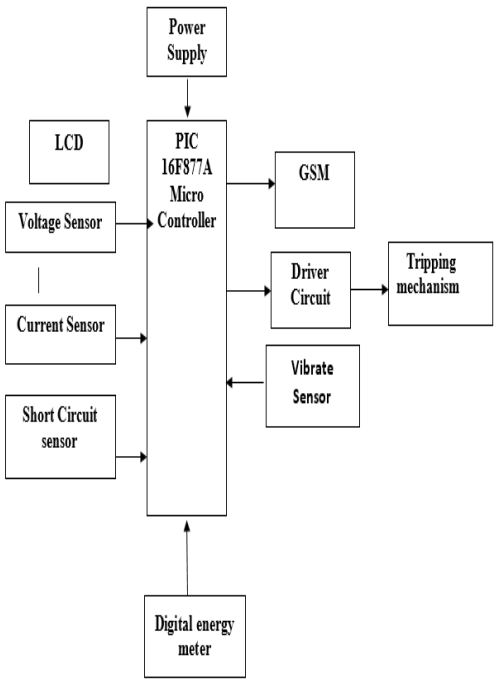
**Zigbee- Communication:**

In this existing system wireless communication system of energy meter used with Zigbee, relay control and GPRS. The cryptographic method is used to secure the communication channel and zigbee for the transmission of data in a serial process. Drawback of this process is to collect the readings, going in the particular range of area and manually cut power supply if needed.The cryptographic method is used to secure the communication channel and zigbee for the transmission of data in a serial process. Readings should be collected going in the particular range of area and manually cut power supply if needed are the main drawbacks.

## III. POWER THEFT IDENTIFICATION USING GSM

In the proposed system GSM technology is used to transmit the meter reading to the customer, EB and government with the required cost. This process will be happen when needed that means if SMS is received from authorized server mobile transmission between customer and EB. Then the energy theft controlled by digital meter reading, current, voltage and short-circuit sensor. Also it cuts the power supply automatically as per request of authorized server mobile.Reduces the manual manipulation work and theft. Use of GSM in the system provides the numerous advantages of wireless network systems.The metering IC ensure the accurate and reliable measurement of power consumed. Cost wise low when compared to other energy meters without automatic meter reading and theft control. This project model uses current and voltage sensors to illustrate the effect of current and potential transformers employed in the overhead transmission lines.

## IV. BLOCK DIAGRAM




The input to the circuit is applied from the regulated power supply. The AC input that is 230V from the main supply is stepped down by the transformer to 12V and is fed to a rectifier. The output obtain from the rectifier is a pulsating DC

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voltage. So in order to get a pure DC voltage, the output voltage from the rectifier is fed to a filter to remove any AC components present even after rectification. Now this is given to a voltage regulator to obtain a pure constant dc voltage. The commonly used 16x2 LCD display custom made characters, numbers, alphabets, and special characters. When there is no theft occur in energy meter then the LCD will display voltage current and power. If theft is occurs then it display THEFT IS DETECTED.

**CURRENT SENSOR**

A device that detects electric current (AC or DC) in a wire, and generates a signal proportional to it as shown in fig (1). The generated signal could be analog voltage or current or even digital output. It can be then utilized to display the measured current in an ammeter or can be stored for further analysis in a data acquisition system or can be utilized for control purpose.

Fig ( 1)

**VOLTAGE SENSOR**

Voltage sensors as shown in fig (2) facilitate monitoring of supply voltage levels. They identify under voltage or overvoltage concerns and help protect critical motors and electronics.

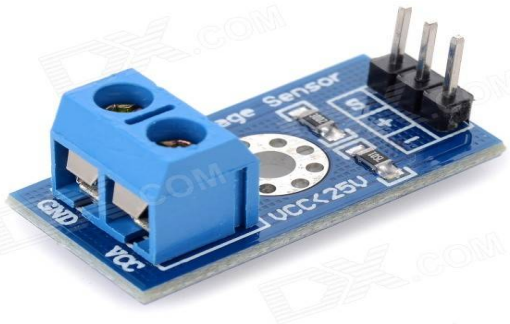


Fig ( 1)

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**GSM Modem &MAX232 IC**

GSM Modem-Max 232 is built with dual band GSM engine-SIM 900A. As mentioned in the above sensing circuit there is power theft then it will send message to microcontroller as per our program and it will send message to GSM through Max 232. Also if mobile received SMS from authorized mobile phone to cut the supply, then supply is off by using relay.

## V. SIMULATION

The simulation of the proposed system is carried out in Keil 4.0 version in order to implement successful hardware system. The simulation output of the system is shown in fig (3) in which short circuit is detected which may be caused by various methods of theft. The coding for the simulation is done in Embedded C.

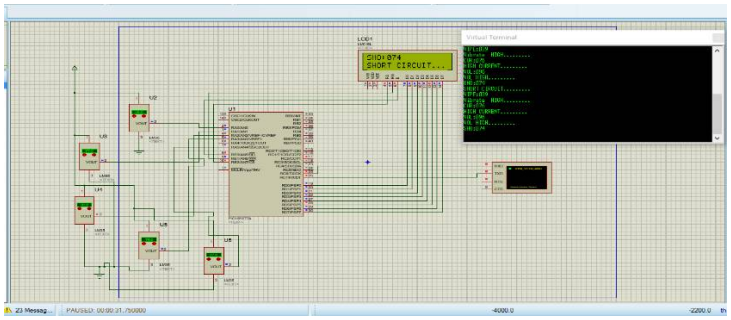


Fig ( 3)

## VI. HARDWARE IMPLEMENTATION

The various components used in the system are shown in fig (4) has already been discussed in the previous sections. The processor used is PIC 16F877A which is loaded with the normal working values of current and voltage. The output from the sensors is compared and the required action is taken by the EB upon receiving the message.

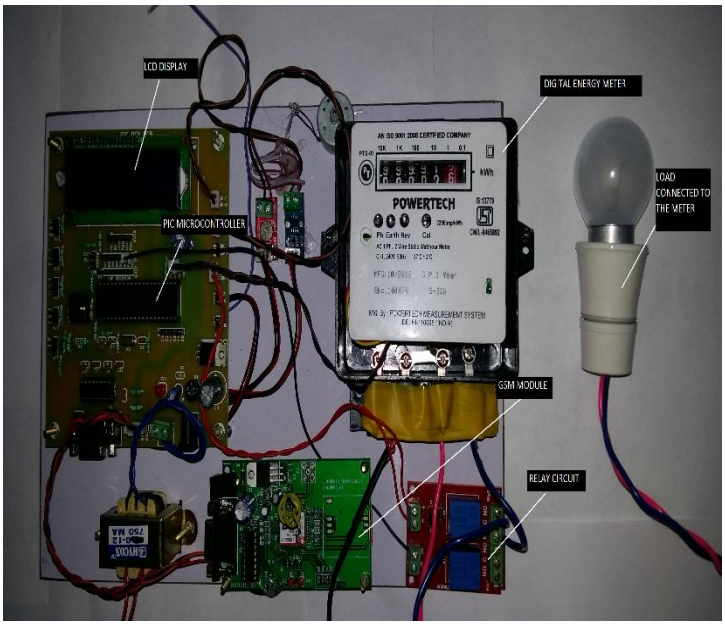


Fig ( 4)

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## VIII. CONCLUSION

The project model mainly reduces the manual operation of the system. The use of GSM and digital meters prove to be advantageous over commercial electronic meters and zigbee communication. Even though advanced microprocessors are available, PIC16F877A is used as it is cost effective, feasible and provides a lot of inbuilt functions.

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