

POWER THEFT DETECTION AND MONITORING USING GSM TECHNOLOGY

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Abstract – This paper represents the advantage, benefits and efficiency of modern technology over traditional method. This paper gives us an idea about the system known power theft detection on power line. In earlier days across INDIA we were unaware of many problems which come across. Due to poverty the people used illegal method which can risk for life. So in this system whenever a person tries to do some illegal action on power lines it can immediately detected by the distributor. This is help the distributor to keep track on supplied resource. Which is definitely help both distributor and consumer. This system will effectively help in reducing charges of electricity units. The main objective of the system is to design the system to avoid the problems for the user from theft bill irrespective of the used of electricity due to theft using GSM technology.

Key Words: GSM module, Arduino Atmega328, current sensor, LCD, etc.

I. INTRODUCTION

In INDIA, almost all over the states the power supply companies used poles to supply electricity. This provide advantage that people stay away from transmission cables. But due to poverty, most of the people try to theft the electricity from the transmission cable. This makes a major loss to the companies. To overcome this loss the companies increase the rates this indirectly affects common peoples. So to overcome this illegal action we have developed the system were we are using Arduino Atmega328 and current sensors and GSM module attached to every pole. The current sensor keeps the track of amount of current pass through it. When this supply reaches to other end of the pole than the current sensor available at pole 2 will measure the current receive and gives the reading to the Arduino Atmega328. Then the Arduino compares the current readings to the previous readings and if the supply is not approximately equal than the Atmega328 trigger the GSM module. Then the GSM module will send the SMS to the distributor that the amount of current received is not approximately equal and there is some illegal action occurred in the section from pole 1 to pole 2. This will help the distributor to overcome the losses and where the losses will be take place and the theft of the electricity.

II. BLOCK DIAGRAM

In this paper we implement a technology which is useful for power theft detection and monitor using GSM module. The paper consist of following blocks Arduino Atmega328, current sensor, GSM module, LCD display. The Arduino Atmega328 is used to command the devices which is used in the project. Using Arduino IDE software we implement a program in Atmega328 IC and Atmega328 is used to calculate the actual power consumption value. The current sensors are used to measure the power load at two nodes that is distribution node and utilization node.

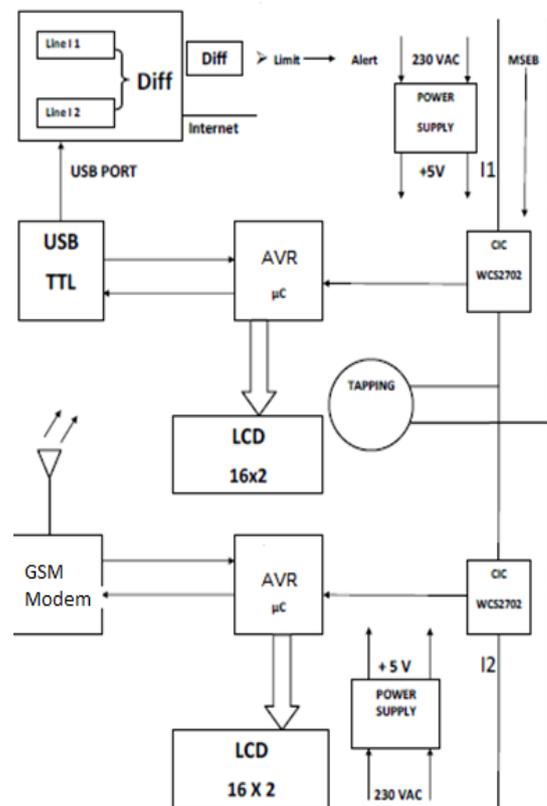


Fig. 1 BLOCK DIAGRAM OF POWER THEFT DETECTION AND MONITORING USING GSM TECHNOLOGY

The actual power consumption value calculated by Atmega328 is shown on LCD display. Then the GSM module present in the system will send the SMS to the distributor that theft of the electricity will be take place.

III. FUNCTIONS OF COMPONENTS

[1] ARDUINO:

It is an open source computer hardware & software & software company project & user community that designs & manufactures single-board microcontrollers & microcontroller kit. Hardware means arduino circuit & software means where we can type our program or command the arduino. So basically it has two sides like programming to control the project & hardware means arduino device.



Fig. 2: ARDUINO UNO

It is tool for control the project or give the instruction to the circuit or project. Arduino UNO is very easy to use & it is cost efficient & easily available in the market. The simple c programming language is used & very easy to implement the program like just connect the arduino to computer using connector cable & implement the program.

[2] Atmega328:

An Arduino board consist of Atmega328 IC. In this Atmega328 IC we can implement our program and with the help of this te Atmega328 IC will the varies commands to the respective devices. The Atmega328 IC have various series like Atmega8, Atmega168, Atmega328, ATmega1280 and Atmega2560.

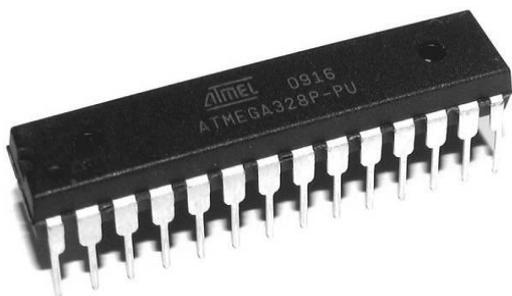


Fig. 3: ATMEGA328 IC

With the help of Arduino IDE software we can make our program and with the help of connecting cable it will

implement in the Atmega328 IC. The flash memory of Atmega328 is 32kb, 1kb EEPROM and 2kb SRAM. Then it will have a 23 general I/O pins. It consist of 14 digital pins and 6 analog pins. Atmega328 IC has 16 MHz clock frequency.

[3]CURRENT SENSOR:

The name of the device indicates it work. The current sensor is used to sense the current in the system or where we want to use the current sensors. In this system we used current sensor at transmission cables to detect the current in transmission cables. It detect both that is AC and DC current and generate proportional to it.

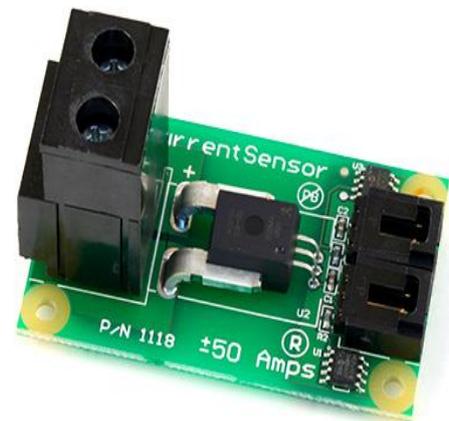


Fig. 4 CURRENT SENSOR

The generated signal could be an analog voltage or digital voltage. Then it measured the current and utilized to display in an ammeter or it can be stored that data in system for control purposes.

[4] GSM MODULE:

GSM is a mobile communication modem it stands for Global System for Mobile communication. A GSM modem is a specialized type of modem which accepts a SIM card & operates just like a mobile phone. From the mobile operator perspective a GSM modem looks just like a mobile phones. When a GSM modem is connected to a computer this allows the computer to use the GSM modem to communicate over mobile network.



Fig. 5: GSM MODULE

While this GSM modems are most frequently used to provide mobile internet, internet connectivity many of them can also be used for sending & receiving SMS. It is used for transmitting mobile voice & data service operate at the 850 MHz , 900 MHz, 1800 MHz & 1900 MHz frequency bands.

[5] LCD:

Most common LCD's connected to the microcontroller are 16 x 2 & 20 x 2. This means 16 character per line by 2 line & 20 character per line by 2 line respectively.



Fig. 6: LCD

An LCD or Liquid Crystal Display, is a type of screen that is used in many computers, TV's, digital cameras, tablets & cell phones.

[6] POWER SUPPLY:

Power supply is a circuit it converts unregulated DC into constant DC with the help of rectifier. It converts AC supply into DC.

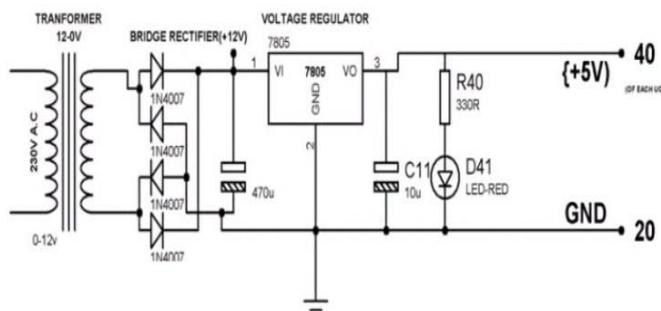


Fig.7: POWER SUPPLY

Its function is to supply a stable voltage to a circuit or device that must be operated within certain power supply limits. The output from the regulated power supply maybe alternating or unidirectional, but is nearly always DC.

IV. WORKING

The following system takes the power supply from the distributor. This supply consist of 230 volts. The transmission cables are used to supply the current in it to the consumer using poles at the particular

distance. Every light pole has an Arduino Atmega328, current sensor and GSM module attached to it. Here we used power supply circuit to convert the 230 volt power supply into 5 volt because our system needed 5 volt power supply. To covert 230 volt power supply into 12 volt we used 12 volt step down transformer so now the power supply will be 12 volt. Now our system require 5 volt so we used voltage regulator 7805 so we get 5 volt power supply which is given to our system. This 5 volt power supply given to an Arduino, current sensor and GSM module. Both the poles consist of this system like pole has Arduino, current sensor and GSM module and pole 2 also has an Arduino, current sensor and GSM module. The pole 1's current sensor tracks the quantity of the current supply through it then the current sensor transfer this data towards Atmega328. Now Atmega328 stores this data in the memory. As the current reaches to pole 2 the current sensor available here will count the amount of current reached. The pole 2 also has Arduino Atmega328, current sensor and GSM module attached to it. The data present at current sensor to will be transfer to Atmega328 present at pole 2. The Atmega 328 present at pole 2 will compare the data present at Atmega328 pole 1. If the amount of current reached varies from pole 1 to pole 2. The Arduino will trigger the GSM module. The GSM module straight away send the SMS to the distributor about the amount of difference occurred in the transmission cable from pole 1 to pole 2. This make distributor to track the amount of loss happen and to take preventive measures. With the help of this the distributor knows that how much amount of electricity will be theft by that section of the peoples.

V. ADVANTAGES

The main advantage of the system are as follows:

- [1] It will gives the user identification automatically.
- [2] It will optimized the how much amount of electricity will be used in that respective area.
- [3] With the help of this system we can detect the location of that area which is never possible in before systems.
- [4]By using this system we can reduce the energy wastage

VI. CONCLUSION

At the end of the system we conclude that the system is used to solving major problems faced by existing electric supply systems like wastage of energy, power theft, etc. by using this system the distributor will get the information about how much amount of electricity will be used in that area or the how much amount of electricity will be theft by the people of that area. By using GSM module it will send the SMS to the distributor and the ability of proposed system is to inform or send data digitally to a remote station using GSM module.

VII. REFERENCES

- [1] Abdollahi, a. Dehghani, M. Zamanzadeh, "SMS based Reconfigurable automatic meter reading system" in control applications, Vol. 2, Issue 4, 2014.
- [2] Siddarameswara H. N. "GSM based electricity theft identification in houses and in industry sector", ICEE-vol. 1, pp. 163-168, 21st June 2014.
- [3] Koninklijke Philips Electronics N. V. 2005 Date of release: 7 September 2005 Document no: 9397 750 14985 Published in Netherland.
- [4] Gujing Han, Weiping Luo " A Novel Technique for preventing Current Method Electricity-stealing", IEEE 2010 987- 1- 4244-4813-5/10.