International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 09 Issue: 06 | June 2022 www.irjet.net p-ISSN: 2395-0072

WIRELESS POWER THEFT MONITORING SYSTEM IN POWER LINES

Goutam Barma[1], K.Naresh[2], Muddasani Chanukya Reddy [3] , G.Upendar[4]

[1]*Assistant Professor at ACE Engineering College, Dept of Electrical and Electronics Engineering, Telangana, India*
[2, 3, 4] *Student of ACE Engineering College, Dept of Electrical and Electronics engineering, Telangana, India*

Abstract: *Power theft is that the biggest problem nowadays, which causes huge loss to electricity boards. And to hide these losses ultimately, price is increased. So if we are able to prevent these thefts, we are able to save lot of power. By keeping track of electricity used, you identify where the best opportunity for energy savings lies. Becoming responsive to overall energy use involves keeping track of the readings on the electrical meter. The traditional practice for power theft is to tag the wires to feeder lines for field motors power/etc. So, by sensing current flow through the load & energy feedback we will prevent power theft employing a breaker. During this system, a micro controller is interfaced with power line/feeder with current sensors using simple current sensing circuit, Wi-Fi communication link, & a contactor to form or break line. At the sub-station end, a PC is connected with a Wi-Fi link to speak with all energy meters & a buzzer. In normal condition, micro controller reads current value/ratio in feeder lines continuously. If the microcontroller gets both current transformer values same, it indicates there's no power theft. Whenever the ability is being theft this technique automatically detects the condition by changing the CT ratio. This method automatically activates device and send message to substation with code. This information is distributed to substation using wireless communication. Within the society it's been observed that several people practice illegal power theft by means of tapings from lines meter bypassing etc. Our project aims to stop, ultimately to scale back the electricity bill charged to the consumers. Our project is to be implemented using Internet of Thing (IoT) in conjunction with Arduino Uno module. Connect Wi-Fi to mobile through mobile telnet application.*

Key Words: **Arduino Uno, CT'S, IoT /Wi-Fi module, LCD display, Mobile Telnet application**

1. INTRODUCTION

Electricity theft is directly linked to governance metrics, with higher amounts found in nations with poor accountability, political instability, ineffective government, and high levels of corruption. Increasing electricity generation alone will not suffice to meet today's demands. So that the generated power is used as efficiently as possible, power consumption and losses must be continuously monitored. In our country, Electrical energy theft runs from 3 to 30%. This illicit electricity usage may have an indirect impact on our country's economic situation.

The 'Wireless Power Theft Monitoring System in power lines ' project focuses on detecting and monitoring electricity theft at power lines. The proposed technology guards against unauthorized use of electricity. The problem of illicit electricity usage can be remedied electronically at this moment in technology advancement. For wireless communication, we employ Wi-Fi module Using IoT technologies, this project aims to establish a system for detecting theft This project will employ on distribution system and in this project we connect the Wi-Fi module to mobile telnet application through IP address and we can use this application on mobile or laptop watch readings of load and theft alert and show the power theft alert on display

2. WORKING

First of all, we need to connect all equipment accordingly block diagram, in this project need to take two power supplies to prototype, one is a DC supply, an AC supply, taking power an adaptor which converts AC to DC supply, this supply connect to Arduino board Ac supply is given to power line. After that turn on the power supply through RPS, and the display is on, After we should connect the Wi-Fi in our mobile or laptop, with the username and password provided Wi-Fi module than in the display we seen the p1 and p2 values this value measured by the current sensors, here two bulbs required One is acting like a normal load another one is a theft load, a normal condition bulb, one glows in display on theft occurred on this line, P1 and P2 values are equal. When the bulb-2 is turned ON means in this line have power theft and the p2 value increases not equal to the p1, then give the buzzer And LED indication, ON display showing the power theft and power theft information sent to mobile or laptop through mobile Telnet application. Hence, in this project have a power line, the loads are bulb-1 and bulb-2 here when there is no power theft on this line load values are the same, the value are not same consider as power theft in this power line

3. BLOCK DIAGRAM

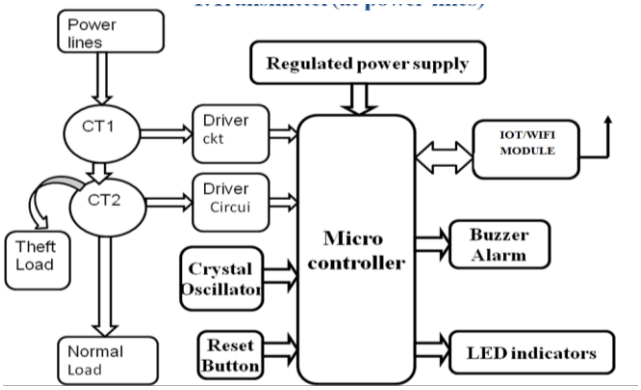


Fig-1: Block diagram

3.1 ARDUINO UNO

Arduino is a microcontroller board primarily based totally at the ATmega328P (datasheet). It has 14 virtual input/output pins (of which 6 may be used as PWM outputs), 6 analog inputs, a sixteen MHz quartz crystal, a USB connection, a strength jack, an ICSP header

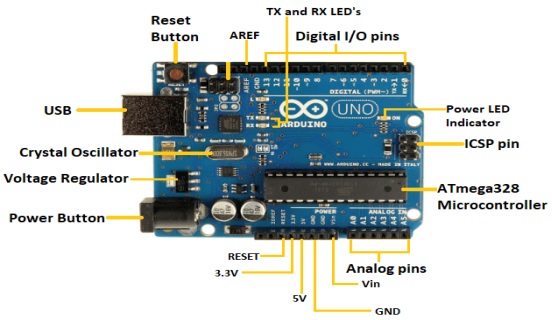


Fig-2: Arduino UNO

3.2 WI-FI MODULE

The Wi-Fi module (ESP8266) is a circuit that is used to link any internet-connected device. In our system, we should use username and password to connect the Wi-Fi module in our mobile. The reading will be delivered to the user's mobile device via this Wi-Fi module. The Wi-Fi module's frequency range is typically 2.4GHz.

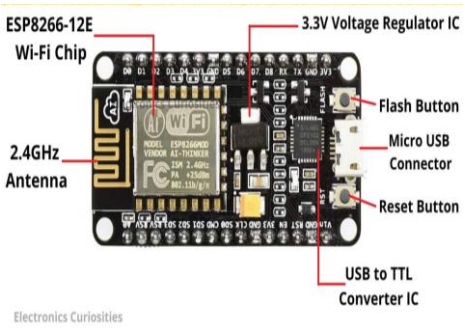


Fig-3: Wi-Fi module

3.3 LCD DISPLAY

LCD display A LCD (Liquid crystal display) may be a display device which is incredibly thin and flat made of any number of color or monochrome pixels arrayed before of a lightweight source . Each pixel consists of a column of liquid molecules suspended between two transparent electrodes and two polarizing filters, the axes of polarity of it are perpendicular to every other. Without liquid crystals between them, light passing through one filter would be blocked by the opposite. The liquid twists polarization light entering one filter to permit it to labor under the opposite.

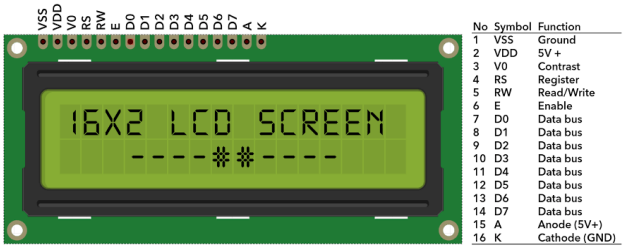


Fig-4: LCD Display

3.4 HEAT SINK

The heat sink a heat sink is a component that absorbs and dissipates surplus heat. It is connected to the voltage regulator and is used to regulate the amount of heat dissipated by the voltage regulator.

Fig-5: Heat sink

3.5 BUZZER

The word" buzzer" comes from the adding noise that it made when they were electromechanical bias operated from stepped- down AC line voltage at 50 to 60 cycles. Ring or a beep sounds are generally used to indicate that a buttons been pressed.

Fig-6: Buzzer

3.6 CURRENT SENSOR

There are many different types of sensors, each of which is appropriate for a given current range and ambient condition. The most common sensor among these is a current detecting resistor. It is a current-to-voltage converter in which the current is linearly converted to voltage by putting a resistor into the current channel. Because different sensors can have distinct features for a number of applications, the technology employed by the present sensor is critical. Current sensors, also known as current transformers or CTs, are devices that use the magnetic field to detect the current and provide a proportional output. They can work with both AC and DC power. We can measure current passively with current sensors .

Fig-7: Current sensor

3.7 FLOW CHART

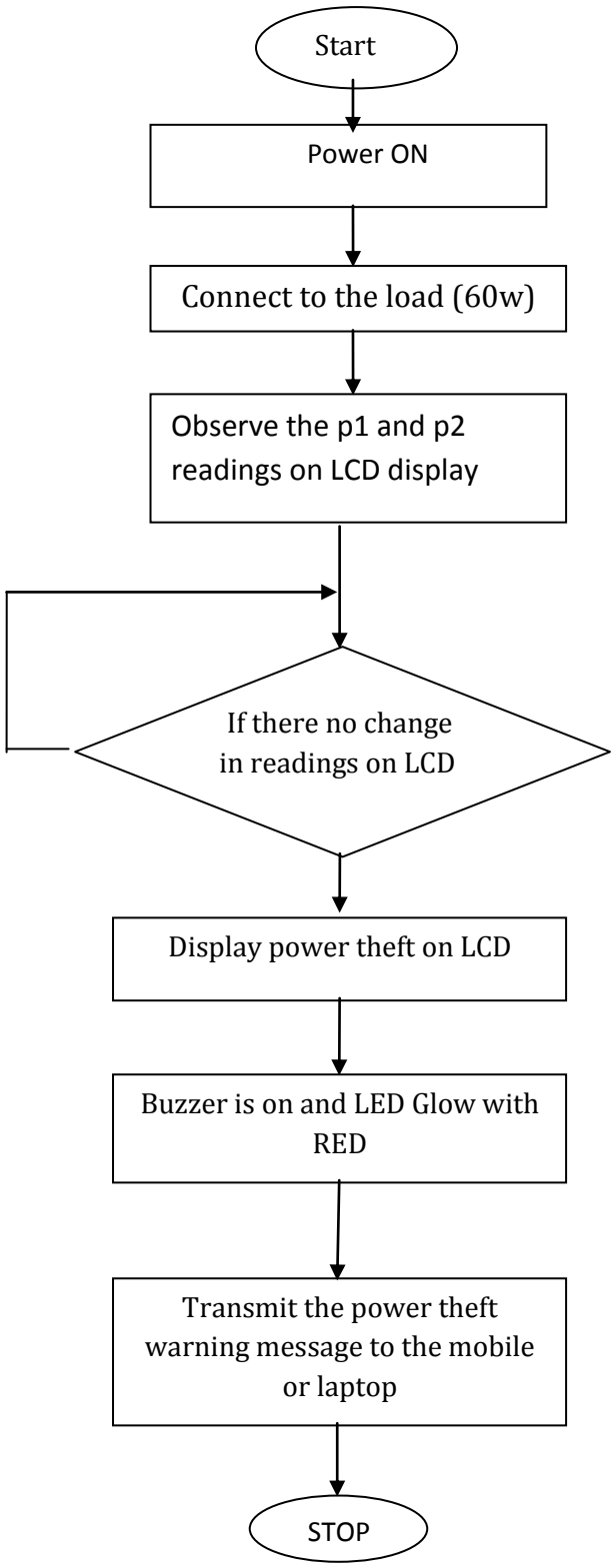


Fig-8: Flow chart

3.8 PROTOTYPE

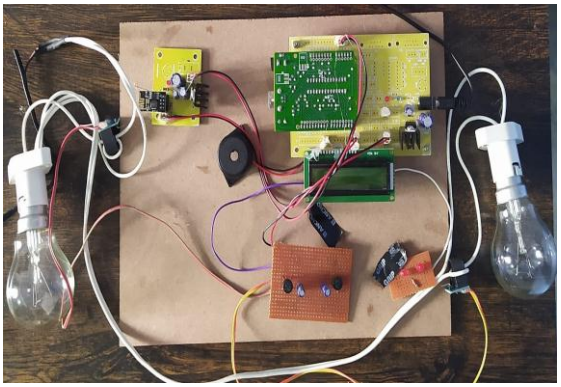


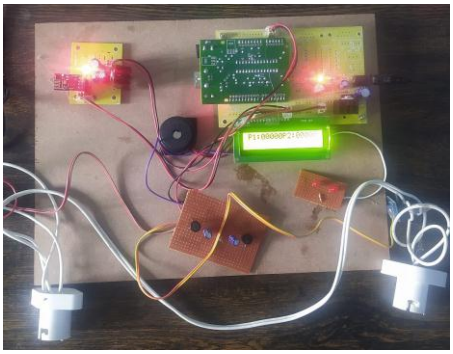
Fig-8: Prototype

3.9 RESULT AND DISCUSSION

The actual result was identical to what was predicted. The following operations can be successfully performed by an embedded system that has been developed to detect power theft.

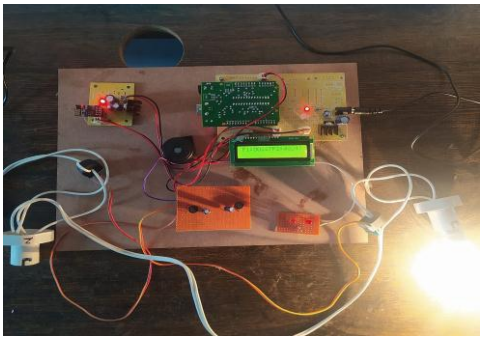
STAGE-1

Once the primary tests are achieved, the power supply is given to the RPS and controller board through the adaptor. The LCD display shows that P1 and P2 values are zero, and Wi-Fi is connected to the mobile with the Wi-Fi module.



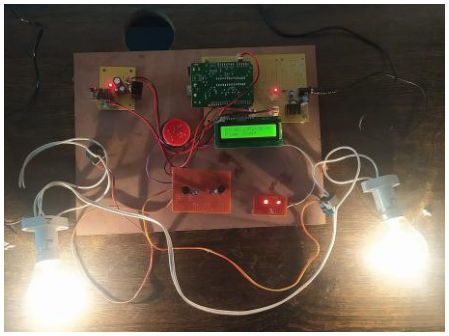
STAGE-2

When the ac supply is given to the power line, the display shows the P1 and P2 values. Here, bulb-1 is the normal load, and bulb-2 is the theft load. Give the supply to the power line; bulb-1 is glowing, which means here there is no theft involved in this line. Voltage readings of loads are displayed on the screen.



STAGE-3

When bulb-2 is connected to the current sensor, it measures the current value and shows the readings on the display. The P1 and P2 values are not equal. P2 values rise by a certain amount. It becomes power theft in this line.

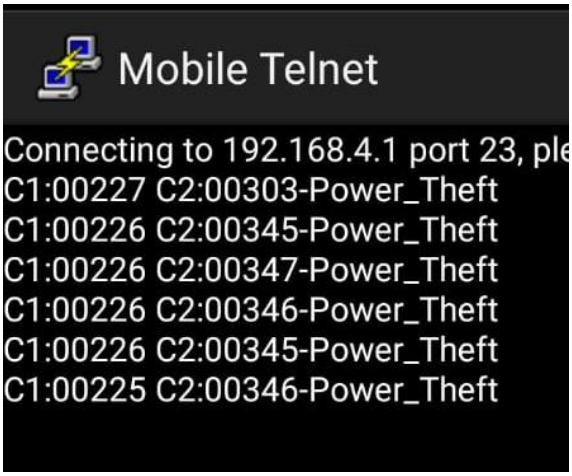


STAGE-4

When the Power theft is defected in power line and gives warning message is on the LCD display, buzzer alarm, and led indications and p2 value is increase 240v to 346v, here extra 100v is drawn by theft load.

STAGE-5

Sent theft information to the mobile through the mobile telnet application.



CONCLUSION

We have made a tiny attempt through this project to compensate for revenue losses incurred by electricity theft in our country. 'Wireless Power Theft Monitoring System At The Local Substation and that information sent to mobile via mobile telnet applications' proves useful to the people who use it and helps in eliminating illegal usage of electricity by working reliably and satisfactorily, thus saving the revenue loss to the electricity supplying authority in the long term due to power theft, as seen in this work.

REFERENCES

[1] Milan Verle- "Architecture & programming of 8051".

[2] Mazidi, Mazidi, McKinlay- "The 8051 microcontroller and Embedded System.

[3] T. B. Smith, "Electricity theft- comparative analysis," Energy Policy,vol. 32, pp. 2067–2076.

[4] Raj kamal –Microcontrollers Architecture, Programming, Interfacing and System Design.

[5] Mazidi and Mazidi –Embedded Systems.

[6] www.wikipedia.com

BIOGRAPHIES

Mr.Goutam Barma, Assistant professor, EEE department, ACE Engineering college, Hyderabad. He did his B-Tech from N.I.S.T, Berhampur, odisha. and M-Tech from NIT , Warangal

Mr. Kolimi Naresh student of EEE department India. He did his Diploma from SS. Government polytechnic college, Zaherabad, sangareddy, pursuing B-Tech from ACE Engineering college, Hyderabad.

Mr. Muddasani Chanukya Reddy student of EEE department India .He did his diploma from TKR Engineering college, Hyderabad, Pursuing B-Tech from ACE Engineering college, Hyderabad.

Mr. Guguloth Upendar student of EEE department India. He did his intermediate from shrinidhi junior college, suryapeta, pursuing B-Tech from ACE Engineering college, Hyderabad.