Power theft detection in distribution line

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ABSTRACT Electricity theft can be also named as a fraud which can be form of meter tampering, illegal connections, billing irregularities. Most of theft of electricity can be done by the stealing power from the line by direct hooking method. This will cause huge impact of financial condition. It is need to be consideration of this problem. Now a day Electricity is the most important factor of the human life, there is increasing the need of electricity is more. Theft of electricity is increasing now days. This research study includes the electricity theft detection using GSM of to overcome this theft of electricity. Implanting technology to tackle this issue and also to overcome the theft of electricity. Important step to in ensuring fair access, to electricity and preventing untouristed use of electricity. The method you've described that involves using current sensor and a microcontroller to compare load and neutral currents is an innovative approach to identifying power theft, by utilizing this system, the power vendor can promptly receive notifications via GSM when power theft is detected, enabling quick and appropriate action to be taken.

INDEX TERMS – GSM, Current sensor, electricity, microcontroller Arduino

I. INTRODUCTION

The Energy is super important for our daily lives. We cannot imagine the human life without the electricity. Electricity is really important for us now. We use it at home and in industries for many things. But sometimes, when we make electricity, send it to where it's needed, and then use it, some of it gets lost. There are two main reasons for this: technical reasons, like when electricity is lost as it travels through wires, and non-technical reasons, like when people steal electricity. Electricity theft is a big problem, especially in places where it's hard to stop. It causes a lot of money to be lost, and sometimes governments even have to pay extra to keep electricity prices low. This means there's less money to improve electricity systems and meet the growing demand for electricity. Preventing the theft of electricity, it is beneficial for the electricity board. So it is important to take the consideration of this issue .This will huge impact on the financial condition and also the economic wealth of the government and the electricity board . Electricity theft has emerged as serious problem in power sectors specially in devolving country. So financial loss may be results in the shortage of the funds for investment to expand the power system. Government is unable to satisfy the increasing the demand of electricity.

This project is about a system that helps utility companies detect electricity theft, which saves time and boosts profits. It uses GSM technology for efficient power management, allowing constant monitoring of customers. Electricity theft is a growing issue in rural, industrial, and urban areas. This system provides an electronic solution to control theft, making it easy to install in homes and industries We're suggesting a system that manages power using GSM technology, which is really important in places like rural areas, industrial parks, and regular homes. This system can keep an eye on power usage and control it in real-time. It helps find and stop people from stealing electricity. It's small and easy to set up in homes or businesses. This helps stop electricity theft and makes power management better overall.

II. PROBLEM STATEMENT

The issue at hand is the unauthorized tapping into the power supply by individuals or entities without proper payment or authorization. This clandestine activity disrupts the integrity of the electrical system and poses significant financial losses to utility providers.

The problem we're dealing with involves individuals or entities accessing electricity without proper authorization or payment, essentially bypassing the legitimate channels of obtaining electrical power. This unauthorized activity not only undermines the reliability and efficiency of the power distribution system but also imposes financial burdens on utility companies and legitimate consumers.

The problem we're focusing on is when people make unauthorized and illogical connections to the power grid, bypassing the regular channels of distribution. These connections can be unsafe and cause disruptions to the electrical system, posing risks to both individuals and the community

III. LITERATURE SURVEY

[1] **Nilesh Mohite, [2016]** designed such a system which will try to reduce the illegal use of electricity and also reduce the chances of theft. That will automatically collect the reading and also ect the theft this model reduces manual manipulation work and try to det achieve theft control.

[2] **Amin S. Mahmoud, [2005]** deals with automatic meter reading and theft control system in the energy meter. This model reduces the manual manipulation work and theft control.

[3] **S.Anusha, [2014]** had done the project model to reduces the manual manipulation work and theft. Use of GSM in system provides a numerous advantages of wireless network system. The government saves money by the control of theft in energy meter and also more beneficial for customer side and the government side. The metering IC ensures the accurate and reliable measurement of power consumed. Cost wise low when compared to other energy meter without automatic meter reading .

[4] **Mr. M.V.N.R.P. Kumar, [2015]** electrical power Line Theft Detection International Journal of Research in Advent Technology, Vol.3, No.5, May 2015
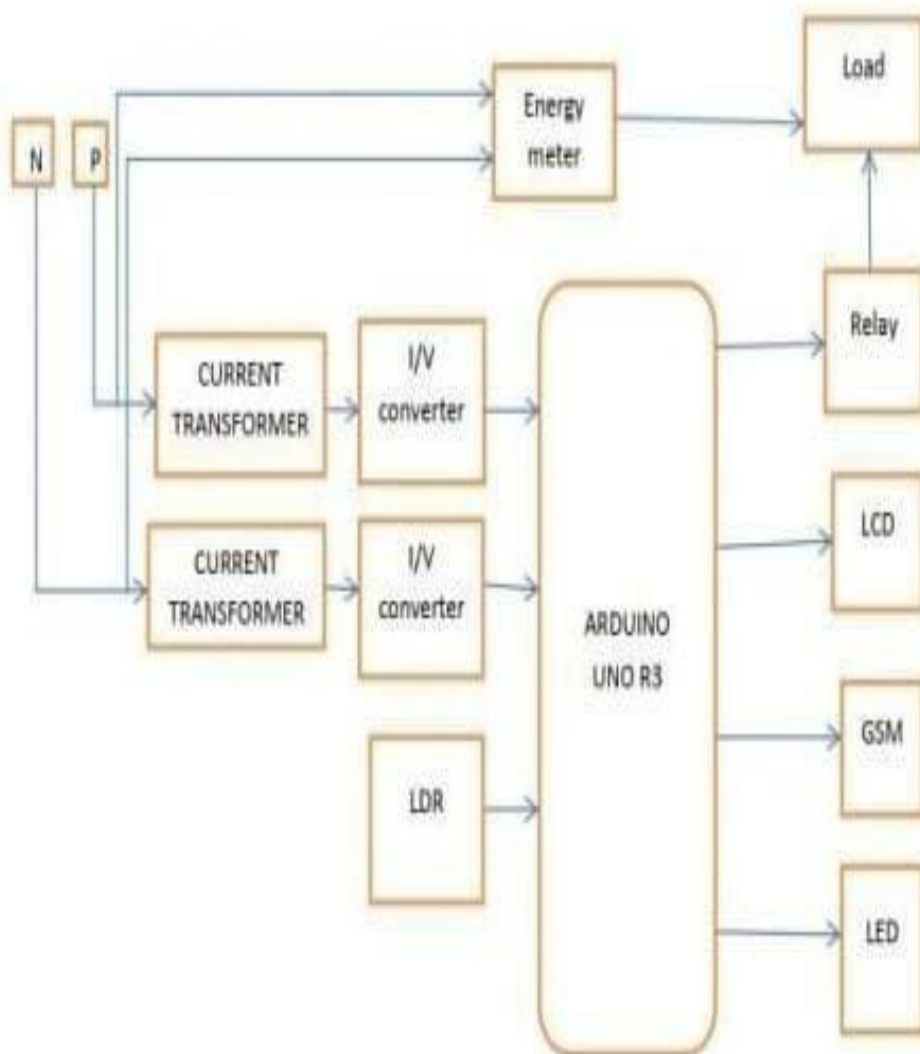
III . BLOCK DIAGRAM

FIG. NO. 1 SYSTEM BLOCK DIAGRAM

IV. OBJECTIVE OF THE PROJECT

1. First, we'll make a circuit that can measure how much electricity is flowing and what the voltage levels are. Then, we'll make a system that uses GSM to tell the power company if someone is stealing power.After that, we'll check and test everything using Proteus software. This makes sure our design works properly before we actually build it.

2. Our goal is to use this system to catch power theft without needing people to watch all the time. The GSM system will do it automatically saving time and letting people focus on other things.

V. WORKING

In this project, we're using a GSM module to send information about power theft to the utility company. The main goal is to use the GSM network to reduce theft and losses. We can also use it to cut off power to the house if there's theft. If someone tries to tamper with the system, it sends a signal right away to the utility company's central server. Another advantage of GSM is that it helps utility engineers plannetwork expansion while providing power to consumers.

Power theft detection is a actually use of electricity with the elegiacal way. There are many unauthorized consumers use the electricity. This project will detect the where the power theft is actually happens with the various sensors and microcontroller. In this Arduino will compare the value of current that will be, measure by the current sensor. When the value of current will be more than the preset value the GSM will send message to the operator that power theft is detected. Because we have limit of current use on every feeder. So, we need to be considered the theft of electricity.

ARDUNIO

Arduino is a small computer that you can use to create all sorts of electronic projects. It has inputs and outputs that you can connect to sensors, lights, motors, and other devices. You can program it using a special language called Arduino programming language, which is based on C/C++. With Arduino, you can make things like robots, weather stations, smart home gadgets, and much more! It's a fun way tolearn about electronics and programming

GSM

GSM stands for Global System for Mobile Communications. It's a technology that allows you to make phone calls, send text messages, and access the internet using your mobile phone. It works by transmitting data over radio waves between your phone and cell towers. GSM is what enables your phone to connect to a mobile network provider, allowing you to stay connected wherever there's coverage. It'sthe most widely used mobile communication standard in the world.

CURRENT SENSOR

A current sensor is a device that measures the flow of electrical current in a circuit. It's like a detective that keeps an eye on how much electricity is passing through a wire. This information is important for various reasons, such as monitoring power usage, controlling devices, or ensuring safety by detecting overloads. Current sensors can come in different types, like hall effect sensors or resistive shunts, but they all do the same basic job: telling you how much electricity is flowing through a circuit at any given time

ELECTRICAL LOAD

Electrical load refers to anything that consumes electricity in a circuit or system. Imagine it like hungry animals at a feeding station: the more animals (or devices) you have, the more food (or electricity) they need. This "feeding" of electricity can be anything from light bulbs, heaters, and appliances in your home to machinery and equipment in industrial settings. Understanding the electrical load helps in designing electrical systems, ensuring they can handle the demand without overloading and causing problems like circuit failures or fires.
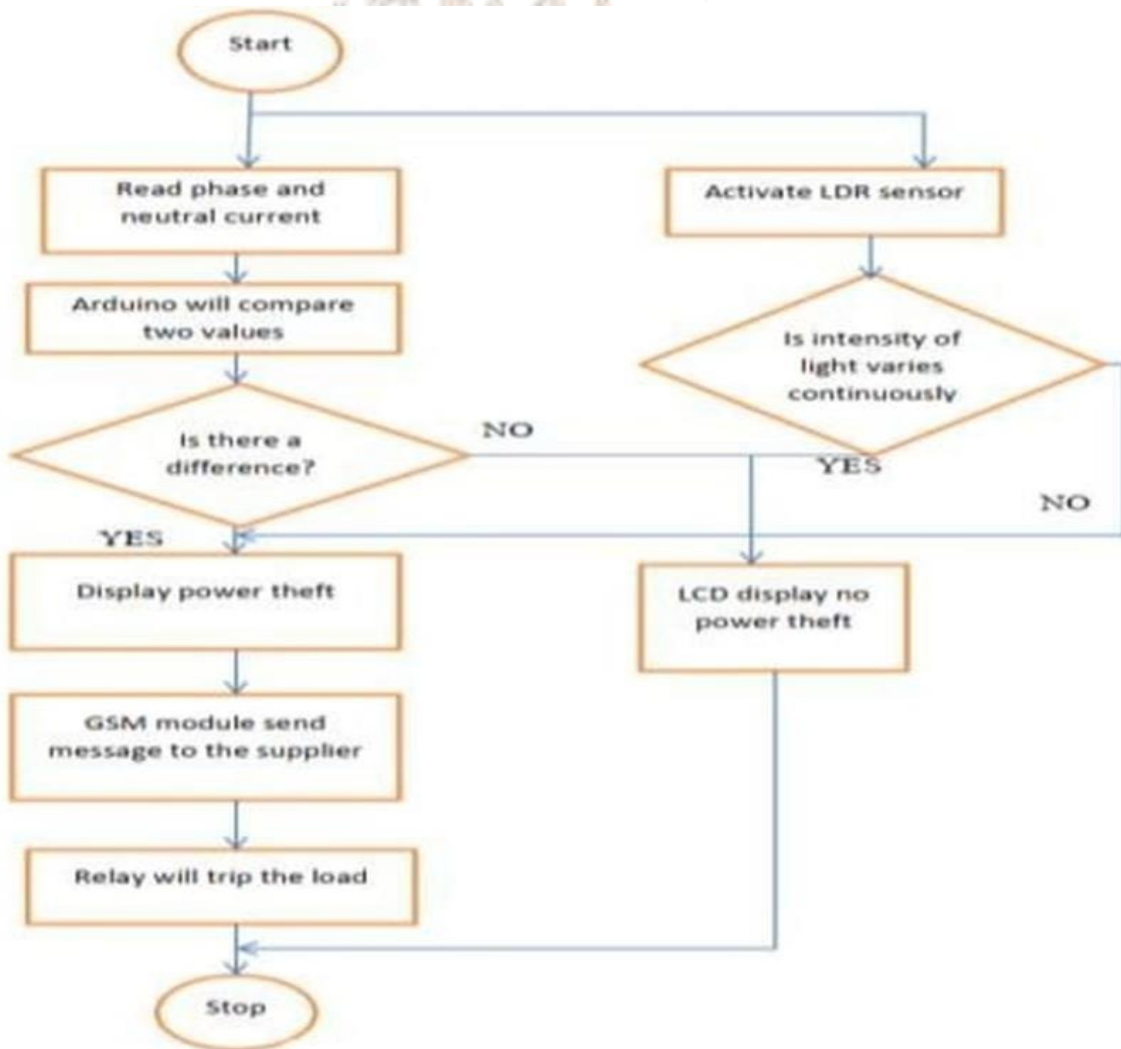
VI. IMPIEMENTATION

FIG NO.2 SYSTEM FLOW CHART

VII. TECHNICAL SPECIFICATION

1. Sensor: -Temp., Current sensor

2. Controller: - Arduino

3. Module: GSM Module

4. Power Supply: -+5vdc, 230V AC

5. Output device: load , energy meter

VIII. CONCLUSIONS

simple terms, ensuring we can detect power issues in distribution lines is super important for keeping our electricity supply reliable and safe. When we catch problems early, we can stop outages from happening, which saves money and keeps everyone safe. Plus, it helps us make sure our electrical systems run smoothly and efficiently, which is great for everyone who uses electricity. So, it's basically like having a superhero looking out for our power lines to make sure everything stays working perfectly! can be monitored.

We've created a system that uses GSM technology to prevent electricity theft in various ways. It stops things like utility workers not being accountable or billing mistakes that cost companies money. Our system keeps the end user and workers separate, which helps prevent theft. It monitors meter readings remotely and sends SMS alerts if something looks wrong. We've even added a feature to remotely cut off power to any house or person trying to steal electricity. This system focuses on single-phase electrical systems and automates billing by tracking usage regularly, removing the need for manual meter readings that waste time and can lead to inaccurate bills. It also automatically disconnects and reconnects power when the balance is low or high, saving customers from extra costs.

IX. REFERENCES

[1] H. T. M. R. a. H. B. W.A. Doorduin, Feasibility study of Electricity Theft detection using Mobile Remote Check Meters, 2004.

[2] K. S. K. T. M. I. S. K. A. J. Nagi, "Detection of Abnormalities and Electricity Theft using Genetic Support Vector Machines," IEEE Xplore, 2009.

[3] M. V. R. Aryadevi Remanidevi Devidas, "Wireless Smart Grid Design for Monitoring and Optimizing Electric Transmission in India," in Fourth International Conference on Sensor Technologies and Applications, 2009.

[4] X. X. C. W. Lijuan Chen, "Research on Anti electricity Stealing Method Base on State Estimation," IEEE, 2011.

[5] N. J. C. A. Solomon, "A Methodology for the Design of an Electricity Theft Monitoring System," Journal of Theoretical and Applied Information Technology, 2011 "

X. ADVANTAGES

1. Identifying Problems: It helps pinpoint issues like faults, overloads, or theft, allowing for quick fixes before they escalate.

2. Preventing Outages: By detecting problems early, it helps prevent widespread power outages, ensuring continuous electricitysupply to homes and businesses.

3. Saving Money: It reduces the need for costly repairs and replacements by catching issues early on, ultimately saving moneyfor both utilities and consumers.

4. Ensuring Safety: It enhances safety by reducing the risk of electrical fires, shocks, and other hazards associated with faultydistribution lines.

5. Optimizing Efficiency: By monitoring power flow and consumption, it enables utilities to optimize their distribution networks,ensuring efficient delivery of electricity to consumers.

XI. RESULT

The power theft detection project was successful in achieving its objectives. It implemented a GSM-based system that effectively identified various forms of electricity theft, such as unaccountability of servicemen and irregularities in billing. By utilizing remote monitoring of meter readings and sending SMS alerts for abnormal readings, the project contributed to reducing incidences of household electricity theft. Additionally, the integration of an automatic circuit breaker enabled remote power supply cutoff to prevent theft attempts. The project also automated the customer billing system, eliminating manual meter readings and reducing billing errors. Overall, the implementation of this project led to improved efficiency, reduced losses due to theft, and enhanced reliability in the electricity distribution system.