

IDENTIFICATION OF ELECTRICITY THEFT

Omkar Dubule¹, Chaitrali Alase², Kashish Kamble³, Ziyaurrehman Savnur⁴, ABHINANDAN PATIL⁵

¹ Electrical Engineering, DKTE's Yashwantrao Chavan Polytechnic Ichalkaranji, Maharashtra, India.

² Electrical Engineering, DKTE's Yashwantrao Chavan Polytechnic Ichalkaranji, Maharashtra, India.

³ Electrical Engineering, DKTE's Yashwantrao Chavan Polytechnic Ichalkaranji, Maharashtra, India.

⁴ Electrical Engineering, DKTE's Yashwantrao Chavan Polytechnic Ichalkaranji, Maharashtra, India.

ABSTRACT

Identification of electricity theft is a critical aspect of ensuring the integrity and sustainability of energy distribution networks. This research focuses on developing a methodology employing data analytics and machine learning techniques for the early detection of anomalies associated with unauthorized electricity consumption. Leveraging data from smart meters and energy distribution systems, the proposed approach involves feature extraction, anomaly detection, and real-time monitoring. Through the integration of sophisticated algorithms, abnormal consumption patterns indicative of theft are identified, triggering timely alerts for investigation. The methodology aims to enhance the efficiency of electricity theft detection, mitigate revenue losses for utility providers, and contribute to the overall stability of the energy infrastructure.

KEYWORD:- Aurduino Controller, Sensor,

1. INTRODUCTION

The efficient and reliable supply of electricity is crucial for the functioning of modern societies, powering homes, businesses, and industries. However, the electricity distribution system is susceptible to various challenges, one of the most significant being electricity theft. Electricity theft poses a serious threat to the sustainability and economic viability of power distribution networks, leading to financial losses for utility companies and potential safety hazards for consumers.

Electricity theft can take various forms, including meter tampering, unauthorized connections, and other illegal activities aimed at consuming electricity without proper billing. Traditional methods of detecting electricity theft often rely on manual inspections and customer reports, making them time-consuming, costly, and prone to human error. As a result, there is a growing need for automated systems that can accurately and swiftly identify instances of electricity theft.

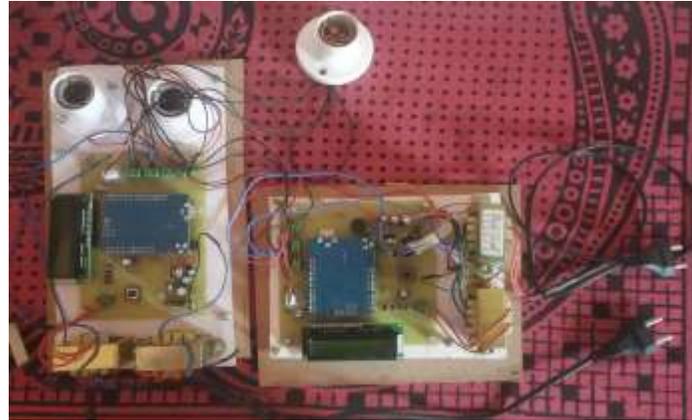


Fig -1: Actual View of Model

2. METHODOLOGY:

- Gather data from smart meters, energy distribution systems, and other relevant sources to obtain comprehensive information on electricity consumption patterns.
- Extract relevant features from the collected data, such as consumption profiles, voltage levels, and frequency patterns, to identify anomalies and potential signs of theft.
- Apply machine learning algorithms or statistical methods to recognize patterns indicative of electricity theft. These may include sudden spikes or irregularities in consumption that deviate from normal usage patterns.
- Ensure that the methodology adheres to ethical standards and legal requirements, respecting privacy and data protection regulations in the process of identifying and addressing electricity theft.

3. FUNCTIONAL BLOCK DIAGRAM:

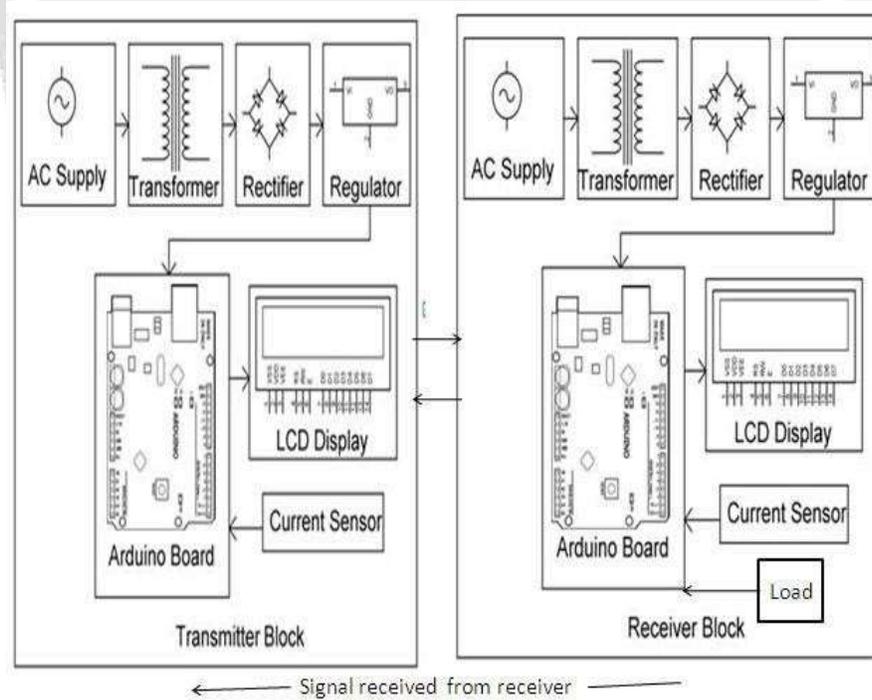


Fig -2: Functional Block Diagram

3.1 HARDWARE RESULTS.

These devices are equipped with sophisticated sensors and communication capabilities that enable real-time monitoring of electricity consumption. Unusual patterns or discrepancies detected by smart meters can indicate potential theft or tampering.

Advanced analytics software processes data collected from smart meters to identify irregularities in electricity usage patterns. Algorithms can flag anomalies such as sudden spikes or consistent underreporting, which may indicate theft.

Some hardware solutions involve collaborative efforts between utilities, law enforcement agencies, and technology providers. Integrating data from multiple sources enhances the accuracy of theft detection and facilitates enforcement actions.

3.2 ADVANTAGES:

- Optimize use of energy .
- Automatic user identification.
- This method will reduce the energy wastage and save a lot of energy for future use .

4. CONCLUSIONS:

The progress in technology about electrical distribution network is a non stop process. New things and new technology are being invented. The proposed system found to be little complex as far as distribution network is concerned, but it's an automated system of theft detection. It saves time as well as profit margin for utility company working in electrical distribution network. Utility company can keep a constant eye on its customers.

This is developed to reduce the power distortions, economic problems like revenue losses caused by electricity consumers who don't pay for what they consume. By minimizing theft of power good quality power can be distributed even for rural areas. Without the manual work it detects the power theft and disconnects the load in a smart way. This system can be further improved in the area of implementation. Machine learning methods are used for analysis of data from the sensors. It can be implemented using the concept of machine learning and deep learning and it helps in detecting power in bulk area.

5. ACKNOWLEDGEMENT:

We hereby would like to express our heartiest gratitude to our Prof. of the Electrical Department Mr. A.A Patil who is also our project Guide for giving us an opportunity to make this project. We would like to thank her for her constant assistance and encouragement throughout our project.

6. REFERENCES

- [1]. H. T. M. R. a. H. B. W.A. Doorduyn, Feasibility study of Electricity Theft detection using Mobile Remote Check Meters, 2004
- [2]. P. Rakesh Malhotra et al. / IJET automatic meter reading and theft control system by using GSM, 2013.
- [3]. Abhinandan Jain, Dilip Kumar, Jyoti Kedia, Design and Development of GSM- based Energy Meter, in IJERT, 2012.
- [4]. 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.