International Journal of Research in Computer & Information Technology (IJRCIT),
Vol. 8, Issue 3, June 2023
E-ISSN: 2455-3743
Available online at www.ijrcit.co.in

Current Detector: Home Safety Device

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Abstract— Safety is the biggest concern of any household. Current Detector is a home safety device that will help to improve the safety of home electronic appliances. Basically, the current detector is a device that can be integrated with any home electronic appliance. The current detector mainly has two components first is the current detection system and second one is the alarm safety mechanism which will include the automatic switch and alarm system. The current detector is easy to use and provides affordable home safety. It helps in improving total home safety.

Keywords— Current Detection, Current Detector, Current Detector Sensor, Current Monitoring.

I. Introduction

Electricity is a crucial part of our lives, powering our homes and enabling us to carry out our daily activities. However, it also poses significant risks, including electric shocks, fires, and other electrical hazards. Electrical accidents can occur due to various reasons, such as equipment failure, incorrect wiring, or human error. Therefore, it is essential to take steps to improve home safety and reduce the risk of electrical accidents.

Current Detector is a home safety device designed to detect and alert users to the presence of electrical current leakage and ground faults. It is a compact and easy-to-use device that provides an affordable and effective solution to improve home safety. Current Detector works by continuously monitoring the electrical current passing through the appliance and triggering an audible and visual alarm if any anomalies are detected. This device is suitable for use with a wide range of household appliances, including washing machines, refrigerators, and power tools.

In this day and age, where safety is a top priority, Current Detector offers peace of mind by

ensuring that your household electrical appliances are operating safely, thereby reducing the risk of electrical hazards. In this article, we will discuss the components, the sensor used, and the benefits of using Current Detector to improve home safety.

Manuscript Received April 5, 2023; Revised 25 April, 2023 and Published on June 02, 2023

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II. Literature Review

In [1], the author describes the development of an energy and leakage current monitoring system that can be used to detect abnormalities in electrical appliances. The system uses a microcontroller and a set of sensors to monitor the energy consumption and leakage current of the appliance. By analysing the data from the sensors, the system can detect abnormalities such as overloading, short circuits, and ground faults.

The study addresses the need for improved safety and efficiency in electrical appliances. Abnormalities in electrical appliances can result in safety hazards, such as electric shocks or fires, and can also reduce the efficiency of the appliance.

By developing a system that can detect abnormalities, the author has shown the potential for improving the safety and efficiency of electrical appliances. The author tested the system on several electrical appliances, including a fan, a refrigerator, and a washing machine.

Overall, the study represents an important step forward in the development of systems for abnormality detection in electrical appliances. However, further research will be needed to assess the system's performance under different environmental conditions and for detecting other types of abnormalities in electrical appliances.

In [2], Hussein M. Haglam's paper titled "An automatic system for detecting voltage leaks in houses to save people's lives" proposes a system that can detect voltage leaks in households, which can potentially cause electrical shocks and lead to fatalities. The system consists of a microcontroller unit, voltage sensor, relay, and buzzer, all connected to a power source.

The author first discusses the significance of the problem of voltage leaks and the need for an automatic detection system. The paper then describes the system's hardware components and how they function together to detect voltage leaks. The system uses a voltage sensor to monitor the voltage levels in a household, and if it detects a voltage leak, it sends a signal to the microcontroller unit. The microcontroller unit then activates a relay to cut off the power supply and sound an alarm through a buzzer to alert the occupants.

In [3], paper "Smart energy meter and monitoring system using IoT" by K B Shiva Kumar and Rashmi N. describes the development of a smart energy meter and monitoring system

using the Internet of Things (IoT). The system aims to improve energy efficiency and reduce energy consumption by providing real-time energy consumption data to consumers.

The paper then details the system's architecture, which consists of a smart meter, microcontroller, Wi-Fi module, and cloud server. The smart meter records energy consumption data and sends it to the microcontroller, which processes the data and sends it to the cloud server using Wi-Fi connectivity. The data is then accessible to consumers through a web interface or a mobile application.

The authors also describe the system's features, which include real-time energy consumption monitoring, notification alerts for high energy consumption, and a billing system based on energy consumption data. The paper includes experimental results that demonstrate the system's effectiveness in accurately recording energy consumption and providing real-time data to consumers.

III. PROPOSED METHODOLOGY

The existing system, it involves designing the current detection system. The system included the Arduino UNO, a Relay module, and a buzzer. The Arduino UNO is the main control center while the sensors measure the leakage current of the electrical appliance.

The current sensor ACS712 is used in this project that monitors the current flow and detects if there is any overloading or leakage of current through the circuit.

The relay module is used to automatically control the device which will automatically switch off the device at the time of any electrical hazard.

Table 1: Comparative Analysis of Literature Review.

Authors	Components Used	Methodology	Feature Extraction Technique	Technique
Md. Morshed Alam, Md. Shahajalal et. al. (2022)	Micro Controller, Data Acquisition module, communication module, Wi-Fi	SMDs, Gateway System, Cloud servers, databases, detection algorithms and visualization.	In this project, they have developed a system to monitor the current and find the electrical fault in entire house's electrical system.	
Hussein M. Haglam et. al. (2015)	Aurdino board UNO, Voltage sensor, OLED display,	IoT technology with the Aurdino	In this project, they have developed a system to detect voltage leakage to prevent electrical hazards.	
K B Shiva Kumar, Rashmi N. et. al. (2020)	Smart energy meter and monitoring system using IoT	IoT technology, Aurdino.	In this project they have developed an energy meter to monitor energy using IoT.	

CONCLUSION

In conclusion, the current detector is a highly effective and affordable device that can help ensure the safety of homes and their occupants. With its ability to detect electrical current flowing through circuits, the device can alert users to potential electrical hazards such as overloaded outlets or damaged wiring. Additionally, its ease of use and simple installation process makes it a convenient option for homeowners looking to improve their home's measures. Overall, the current detector is a valuable investment for anyone looking to protect their home and family from electrical hazards.

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