REAL-TIME UNDERGROUND CABLE FAULT DETECTION MONITORING WITH IOT

Project Reference No.: *48S_BE_3256*

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Keywords:

IoT, Arduino, Underground Cable Fault, Real-Time Monitoring, Fault Detection

Introduction:

Electric power distribution systems are evolving, and one of the key challenges faced in underground cable systems is fault detection and monitoring. Traditional methods for identifying faults in underground cables are often slow, costly, and labour- intensive. In this context, real-time monitoring using IoT and embedded systems such as Arduino presents a practical solution. This project focuses on developing a system to detect the location of cable faults in real time using sensor data, microcontrollers, and wireless communication. With rapid urbanization and increasing demand for uninterrupted power, this project aims to enhance reliability and reduce response time for maintenance teams.

Objectives:

1) The objective of this project is to determine the distance of underground cable fault from base station in kilometres using an Arduino board.
2) This project deals with Arduino microcontroller, IOT and LCD**.**
3) To develop a real-time underground cable fault detection system using Arduino and IoT. To integrate wireless communication for remote monitoring.

Methodology:

Underground cable fault detection and monitoring using IoT involves integrating sensors, microcontrollers, and communication modules into a system that can identify faults in power cables and relay real-time data to a centralized monitoring platform. The methodology begins with problem analysis, where challenges like fault location accuracy, real-time monitoring, and cost-effectiveness are addressed. A system is then designed to include key components: sensors to measure parameters like current, voltage, and temperature; a microcontroller to process signals; a communication module (Wi-Fi, GSM,) for transmitting data; and an IoT platform for data storage and visualization.

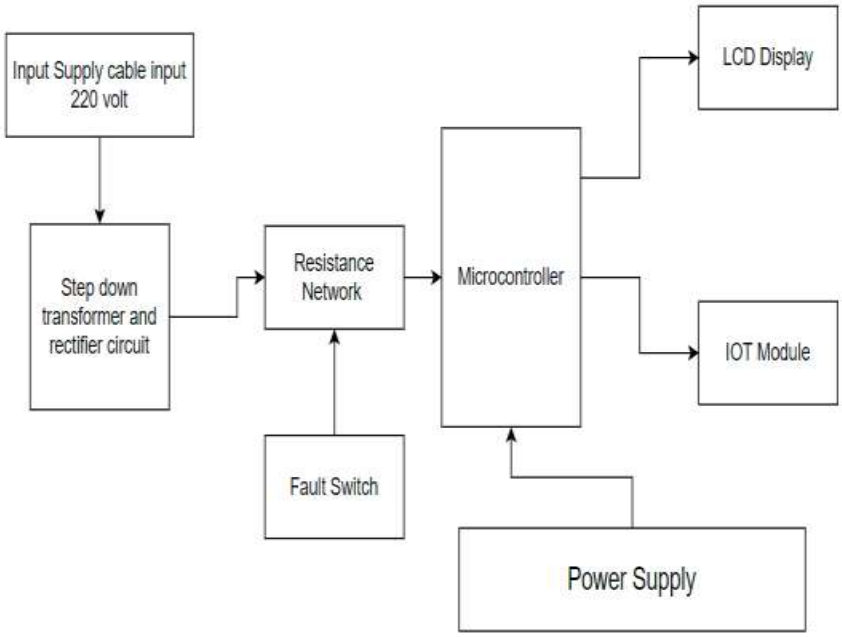
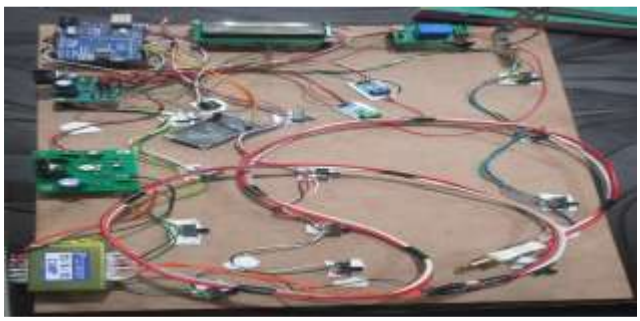


Fig Block Diagram

Result and Conclusion:



The prototype successfully identified and located different types of faults including short circuits and open circuits. The fault location was calculated with an error margin

of less than 5%. Real-time updates were successfully pushed to the IoT dashboard, allowing for remote access.

Working Model vs. Simulation/Study:

Yes, project was based on working model. First, we designed the outline of the project details and making as efficient in terms of materials.

Project Outcomes and Learnings:

The expected outcome of the underground cable fault detection project is to design an efficient and accurate system capable of identifying and locating faults in buried electrical cables with minimal disruption. This system aims to reduce power outages by quickly diagnosing faults, thereby minimizing repair time and operational downtime.

Future Scope:

The future scope of this project includes:

1. Future enhancements can include GPS-based pinpointing of faults, and a mobile app interface for easier access.

2. The same methodology can be extended to other underground systems such a fibre optic lines, water pipelines, and gas conduits.