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UNDER GROUND & OVER HEAD CABLE FAULT DETECTION AND MONITORING SYSTEM USING GSM MODULE

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Abstract – The goal of this project is to create a system for monitoring and detecting cable faults in order to increase the dependability and effectiveness of electrical networks. The system will use sensors and sophisticated algorithms to identify issues including insulation failures, short circuits, and open circuits in real time.

Furthermore, it will offer ongoing cable health monitoring and analysis, facilitating proactive maintenance and reducing downtime. A friendly interface will be integrated into the system to facilitate simple access to defect alarms and real-time data. All things considered, this project will improve the dependability and safety of electrical infrastructure.

***Key words*:** open circuits, short circuits, efficiency, and dependability.

1. OVERVIEW

Electrical networks' dependability and effectiveness are essential to guaranteeing customers receive a steady supply of electricity. Open circuits, short circuits, and insulation failures are frequent cable defects that can impair these networks' ability to function normally.

It is important to identify and fix these issues as soon as possible in order to save downtime and guarantee the security of both people and equipment. Conventional problem detection and monitoring techniques rely on manual testing and recurring inspections, which can be error-prone and time-consuming.

This project suggests creating cable fault detection and monitoring system that uses gsm technology to increase the dependability and effectiveness of electrical networks in order to address these issues.

2. METHODOLOGYADOPTED

The integration of remote monitoring capabilities with GSM technology boosts the efficiency and reliability of electrical networks through the implementation of cable fault detection. Microcontrollers, GSM modules, and sensors are important parts. Microcontrollers use the data that sensors process to identify errors, whereas sensors track variables like voltage, current, and impedance. When a problem arises, the GSM module notifies maintenance staff by SMS of the fault's kind, location, and severity.

The first step of the procedure is real-time monitoring, in which the sensors track the electrical characteristics of the cable continually. The microcontroller examines this data to look for any irregularities that could point to a problem because it is programmed with fault detection algorithms. To identify the site of the problem, methods like Time-Domain Reflectometry (TDR) or impedance testing are used. The GSM module notifies the user when a malfunction is identified.

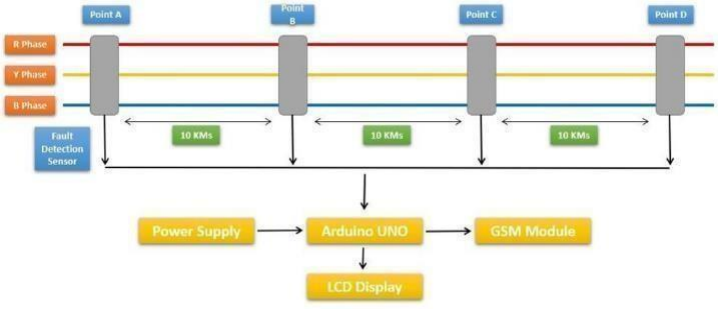

Fig-1: METHODOLOGY

3. PARTS AND POWER SUPPLY

In the circuit of a power supply, a transformer that steps down 230 volts to 12 volts is required. In this circuit, a bridge rectifier is created using four diodes to produce a pulsing DC voltage. The rectifier's output voltage is then supplied to a capacitor filter, which removes any remaining AC components. The regulator receives the filtered DC voltage and produces a steady DC voltage of 12 volts.

RECTIFIER The rectifier gets the output from the transformer. It transforms A.C. into D.C. There are two types of rectifiers: half wave and full wave. In this project, a bridge rectifier is employed due to its advantages, such as its outstanding stability.

A quartet of diodes linked to Screen LCD Screen Liquid crystal displays are interfaced with microcontroller 8051. The two LCD display sizes that are most frequently used are 16*2 and 20*2. Two rows and sixteen columns are represented in a 16*2 display.

Fig-2: LCD Display

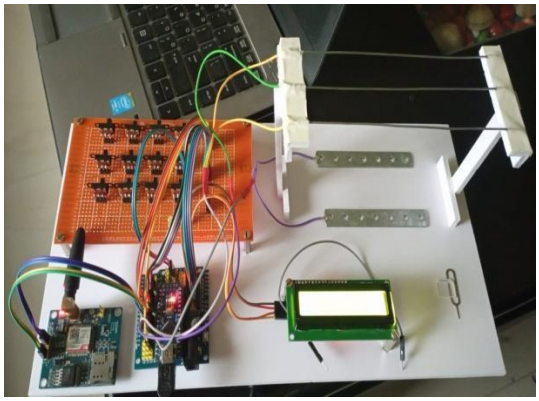

Fig-3: GSM MODULE

4. WORKING

FUNCTIONAL UNDERGROUND CABLE FAILURE DETECTION SYSTEM

Our project uses an on/off switch to identify faults. The switch is connected across in series for each line (R, Y, and B). When the switch is in the off condition, it indicates that a fault has occurred. Each switch is connected to an Arduino pin as an input signal. As a result, when a fault occurs, the switch transfers data to the Arduino, which then processes it based on the code when it detects the data at the input pin specified in the code.

Consequently, it will notify the control unit to correct the issue and inform you on the LCD display where the fault is and which line it occurred on.

ELECTRICAL FAILURE DETECTION SYSTEM IN WORKING ORDER

In this project, an on/off switch is used to identify faults. Specifically, the switch is connected across in series for each line (R, Y, and B). When the switch is in the off condition, it indicates that a fault has occurred. Each switch is connected to an Arduino pin as an input signal, so when a fault occurs, the switch transfers data to the Arduino, which then follows the code to determine when the Arduino receives the data at the input pin specified in the code.

In order to correct the issue, it will also send a message to the control unit and show you where the problem is and which line it occurred on.

5. SUMMARY

To sum up, the use of GSM modules in fault detection systems for subterranean and overhead wires is a major development in the fields of electrical engineering and smart grid technologies. These solutions improve electricity distribution's dependability, effectiveness, and safety.
Networks by offering quick reaction times and real-time monitoring. GSM module integration lowers downtime and maintenance costs by facilitating remote communication, which makes it possible to quickly identify and locate defects.

In conclusion, fault detection systems that make use of GSM modules are a proactive approach to solving the problems that contemporary power distribution networks face. These systems guarantee a more dependable and efficient power supply by utilizing cutting-edge communication technologies, ultimately aiding in the creation of more intelligent and dependable energy infrastructure.

6. BENEFITS

Enhanced Reliability: The technology can assist prevent unplanned outages and minimize downtime by detecting faults in real-time, which will result in a more dependable electrical network.

Enhanced Safety: By preventing safety dangers including fires, electric shocks, and equipment damage, early defect detection helps improve worker safety.

Financial Savings: By resolving problems before they become more serious and preventing expensive equipment damage, proactive fault detection can assist lower repair costs.

Effective Maintenance: By offering details on the location and severity of defects, the system can assist in prioritizing maintenance activities, resulting in more economical and efficient maintenance.

Data-Driven Decision Making: By offering useful information on the condition and functionality of the electrical network, the technology helps operators make deft choices and maximize network performance**.**

7. GRATUITY

We have the honor of expressing our sincere gratitude to everyone who has contributed in one way or another to the completion of this project report and helped make it an excellent learning tool.

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