Review Paper on Arduino-Based Underground Cable Fault Detection

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Abstract- *For electrical networks to maintain a constant power supply and reduce downtime, faults in subterranean cables must be identified and localised. This project offers a novel approach to fault detection in subterranean cables by leveraging Arduino-based technology. The system uses sensors, data analysis, and communication modules to accurately identify faults so that maintenance and repairs can be completed quickly.*

Keywords- PLC, Relay, LM235,Over voltage, under voltage, Distribution Transformer.

I. INTRODUCTION

Modern civilization relies heavily on an unbroken supply of electricity to run our homes, businesses, and technological developments. However, there are obstacles to the reliable transmission of electricity, especially when it comes to subterranean cable systems where a number of operational and environmental factors can lead to faults or disruptions.

Ensuring a steady and secure power supply requires finding and fixing faults in subterranean cables. This project offers an inventive way to deal with these issues and improve the dependability of power distribution networks: Arduino-based Underground Cable Fault Detection.

In today's modern society, a consistent and dependable supply of electricity is essential. Nevertheless, despite its benefits, the subterranean power distribution network is vulnerable to malfunctions that could cut off the supply and endanger public safety. Ensuring the uninterrupted flow of electricity and reducing downtime requires the timely and accurate detection of faults in subterranean cables. In order to overcome this difficulty, the project "Arduino-Based Underground Cable Fault Detection" will use cutting-edge technology to quickly and accurately identify faults in subterranean power cables.

The uninterrupted provision of electricity to customers depends on the effective operation of electrical power distribution networks. But subterranean power cables, which are crucial parts of these systems, can malfunction for a number of reasons, including ageing, environmental factors, and unintentional damage. Reducing downtime and maintaining the dependability of the power grid depend on early detection and correction of these faults.

II. PROBLEM FORMULATION

Faults in subterranean cables present serious problems for power distribution networks, resulting in interruptions, monetary losses, and safety risks. Because underground cables are inaccessible and it can be challenging to locate faults precisely, identifying faults in them is a complex task. Conventional fault detection techniques frequently rely on expensive equipment or labor-intensive, time-consuming manual inspection, which increases operational costs for utilities and causes prolonged downtime.

The incapacity to quickly and accurately identify faults in subterranean cables is the main issue. These defects, which cause short circuits or open circuits within the cable, can be caused by a number of things, including corrosion, physical damage, deterioration of the insulation, and moisture intrusion.

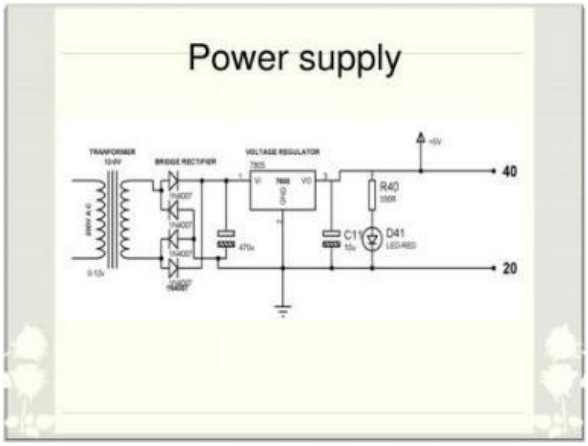
III. PROPOSE SYSTEM METHODOLOGY

In order to build a reliable fault detection system, the suggested system for underground cable fault detection integrates Arduino microcontrollers, sensors, communication modules, and control mechanisms.

Sensors positioned along the cables' length are used to continuously monitor the voltage, current, and temperature parameters that affect the system. The Arduino microcontroller examines the data and looks for possible errors if it detects any deviations from the expected values. In order to isolate the problematic area and stop additional network damage, the system uses relay-based control mechanisms when a fault is detected.

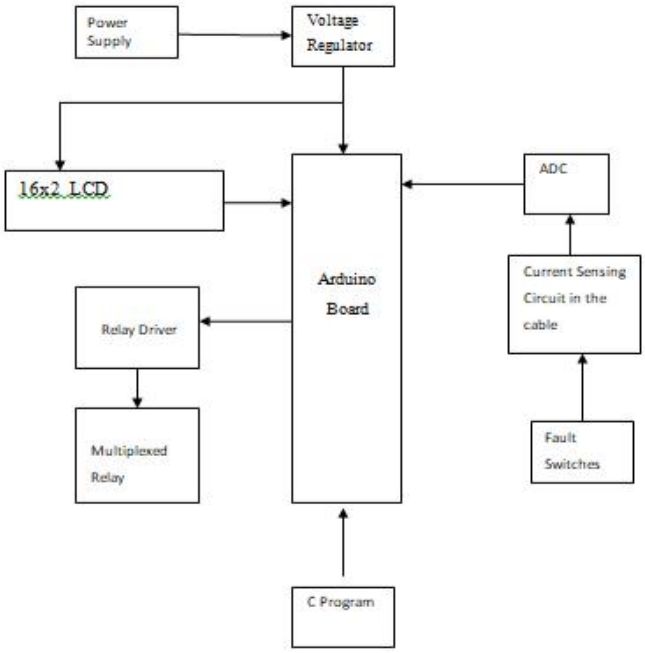
IV. POWER SUPPLY DESIGN

An external power supply or a USB connection can be used to power the Arduino Uno. It chooses the power source on its own. Batteries or wall-warts that convert AC to DC can supply external (non-USB) power. To connect the adapter, insert a 2.1mm center-positive plug into the power jack on the board.



However, the 5Vpin may only supply five volts, and the board might become unstable, if the supply is less than seven volts. The voltage regulator may overheat and harm the board if more than 12V is used. A voltage range of 7 to 12 volts is advised.

V. WORKING



A microcontroller board based on the ATmega328 is called the Arduino Uno. It has six analogue inputs, a 16 MHz crystal oscillator, 14 digital input/output pins (six of which can be used as PWM outputs), a USB port, a power jack, an ICSP header, and a reset button.

It comes with everything needed to support the microcontroller; all you need to do is power it with a battery or an AC-to-DC adapter or connect it to a computer via a USB cable to get going. computer via

USB cable to get going. The FTDIUSB-to-serial driver chip is not used by the Uno, setting it apart from all previous boards. Rather, it has the Atmega8U2 configured to function as a serial-to-USB converter.

"Uno" is an Italian word for one, and it was chosen to commemorate the impending release of Arduino 1.0. Going forward, the Arduino reference versions will be the Uno and version 1.0. The Uno is the most recent in a line of USB Arduino boards and serves as the platform's reference design.

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