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Underground Power Line Fault Detection Using Robot

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Abstract : Power plants generate electricity, but without transmission lines, that energy can't reach towns and homes. If anything goes wrong along these lines, it might have serious consequences for people's health, hygiene, and mobility. As a result, keeping up with routine maintenance on high-voltage transmission lines is crucial. In this work, a novel and straightforward method for locating underground transmission line faults has been devised. It's low-priced, straightforward, and easy to adopt at home or in the workplace. The method of enacting the methodology is also explored and confirmed empirically.

Index Terms– Fault detection, radio frequency modules, microcontrollers, cameras, robots.

I. Introduction

Research into intensity transmission has reached a new level thanks to the rapid development of intensity framework systems. Transmission of influence using underground cable (UG) has acquired a leading role in influence framework study in light of the power loss anticipated as a result of overhead transmission. Due to the lower likelihood of transmission failure and the ability ingest withstand impact loads, underground lines are preferred than overhead ones. Although UG cables have a larger initial investment, they have a lower lifetime operating cost, less land is needed for their installation, and they are less vulnerable to the effects of extreme weather. However, this has drawbacks, since it makes problem identification in cables more difficult should they arise. Identification of fault and circuit stumbling is a crucial consideration while maintaining the subterranean cabling framework. Smart cities are the primary users of such innovations. In the past, finding the precise location of a problem required a number of different approaches, such as Murray's loop method, A Frame, Thumper, Time Domain Reflectometer (TDR), and Bridge methods. Most of these systems are automated and based on microcontrollers, which are expensive, have grown to unacceptable proportions, and may be a little tricky to work with because of the languages they use. A fault-finding robot using microcontrollers has been constructed in this study; in order to keep it affordable and user-friendly, no expensive or sophisticated components have been included.The sign of a modern country is a reliable source of electrical power. Transmission lines are assumed to go from less inhabited regions to more densely populated ones. Hilly terrain, woodlands, and lakes are all examples of such secluded locations. When a problem occurs on these transmission lines, it is difficult to locate the source and very dangerous to fix the issue. We propose a robot that can be inserted into the transmission line pipeline to investigate the issue and eliminate it.

Need of Project

- Power transmission is done in both way overhead cable as well as underground cable overhead cable has drawback of being easily prone to the effect of rainfall, thunder, lightning, etc.
- The underground cable is used in urban places.
- The fault of overhead cable is find out by mere observation where-as underground cables are buried deep in the soil it is not easy to detect abnormalities in them and location.
- Our project is need to find out the fault in the underground cable.

II. Objective

- To implement automatic fault detection of underground cable using Robot.
- To detect the fault by image processing using camera and RF module.

III. Problem Analysis

The robot's actual working environment is cable-laying fields in a pipeline. In this case, the size of the robot is quite large since our model is a prototype. Therefore, a robot ideal is developed for the presentation, and a problem is detected on a wire that

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is on the ground. A low-speed, basic DC motor is recommended since precision is the primary limitation. A stepper motor may be utilized to boost the robot's speed. However, a stepper motor and its drive are too expensive, therefore a DC motor is being used instead. Open-loop testing is possible as well.

IV. Problem Statement

Since faults in underground cables are concealed, pinpointing their location may be challenging. Therefore, we are developing a fault detection robot that can go underground and pinpoint the precise site of a problem using real-time video monitoring. The robot is controlled by an RF module.

V. Proposed System

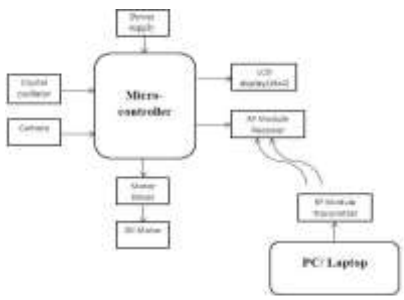
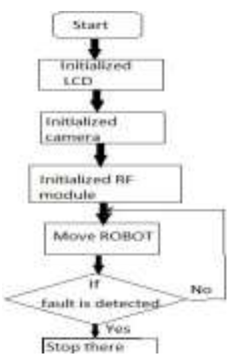


Fig1. System Block Diagram

This project's setup couldn't be simpler: a client-side web app connects to a robot equipped with a camera and radio-frequency module. Through the RF transmitter, the user gives the robot instructions on how to move.

The robot is ready to go through the piping system underneath the city, where all of the cables are located. Following the user's instructions, the robot walks across to the other side of the pipes and begins gathering information. The user uses came to determine whether or not cable issues are there, and if so, the software notifies them of the problem and relays information about how far the robot has to go to reach it. In order to ensure that the pipeline is error-free, we have installed cameras at strategic points throughout its length.



VI. FLOW CHART

Fig2.System Flowchart

VII. ALGORITHM

Step 1: Start.
Step 2: Initialize LCD display .
Step 3: Initialized the camera for image processing.
Step 4: Initialized the RF module for transmission purpose.Step 5: move the robot on the transmission line.
Step 6: If their is any fault is occur stop the robot at rest position and send the messageto the MSEB board .
Step 9: If their is no any fault then move to the step number 5.Step10: Stop.

XI. Conclusion

Current scenario of digging along the cable laid and then pulling the cable out and checking whether the fault exists in the cables is a tedious work. This is completely wastage of time, money and manpower for the industries or government, but this also causes a lot of problem to the normal public. We believe that our cable fault detection robot will solve this issue to a great extent and will be really helpful for such application. By implementing this project we are greatly reduce the cost required to check the underground faults of transmission line.

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