

DETECTION OF FAULTS IN POWER LINE UNDERGROUND CABLES

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ABSTRACT

Electricity is of greater importance in today's time. Most of us depend on this. The power grids are used to distribute the power through the cables which can be overhead or underground cables. Maintenance of overhead cables is difficult when it comes to fault. The underground cable fault detection is difficult to locate. The faults in the underground might occur due to the weather or wear and tear etc. This project proposes a prototype of the system which would detect the faults on the cable and their location using data mining technology where the all the data's and parameters are read through URL and the actions are taken accordingly. PLC 16f877A controller -based diagnostics solution, we investigate if readily extractable parameters, such as the estimated thermal condition monitoring, voltage varying, current carry capacity, voltage and current thief, break down condition by using LCD display.

Keywords: *Microcontroller, Sensors, LCD, Relay driver, WIFI*

I. INTRODUCTION

India is considered as the third biggest energy consumption country after China and USA. India's primary energy development is through conventional sources namely from Oil, gas and Coal. These conventional sources of energy contribute around 80% of the energy generation out of 100%. Remaining 20% (approx.) accounts for the generation through non-conventional sources (aka renewable energy sources) from Solar, Hydro, wind etc. India in recent time has become a hub of trending technologies and moving on slowly towards the non-conventional energy sources for the production of energy. It is expected to generate renewable energy sources on a greater scale by 2030 by reducing the production of conventional source of energies.

Renewable energy sources such as Solar and Hydro are becoming centre of attraction for all the scientists and the students as these produce less emissions, produces more amount with less cost and as known these are abundant in nature. Efficient and reliable use of these sources will

result in more production and better results. These renewable energy sources will rise massively as the India has the best renewable expansion programs compared to other countries.

II. OBJECTIVES OF THIS STUDY

To design and implement a prototype system to detect the fault and its location on cables or in cables using Wi-Fi module and voltage and represent the parameters on the internet through URL and LCD.

III. EXISTING SYSTEM

There are generally two methods for fault location which are: Tracer method and Terminal Method

1) Tracer method is an method in which the faults in the cables are detected through the electromagnetic signals and also requires the members to walk through the cables for fault detection.

2) The Terminal method uses a technique to trace the fault on the cable without the walking way but rather test it from one end or both the ends using a bridge technique. This bridge technique links with the resistor to determine a fault.

IV. METHODOLOGY

Variation in the voltage is used to calculate the fault distance, frequency, and Thermal condition. The system consists of a microcontroller with built in Wi-Fi with clock. The power to this supplied through transformer, with rectifier and regulator since it takes

DC power. The sensing unit provides the voltage and current drop across resistor for fault location.

The input and output ports are initialised.

When the fault occurs, the switch is pressed; the parameters are displayed on internet as well as LCD.

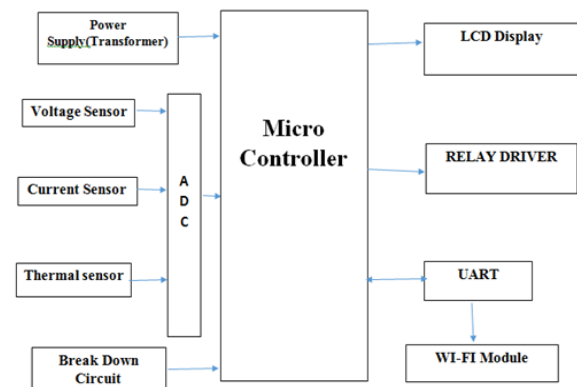


Figure 1.1: Basic Block Diagram.

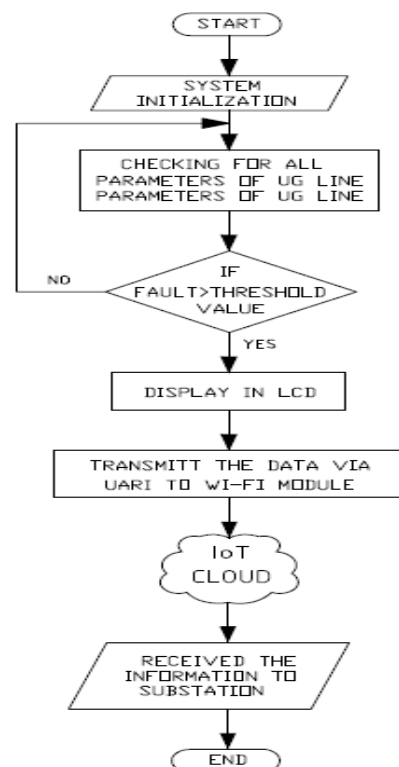


Figure 1.2: Flowchart

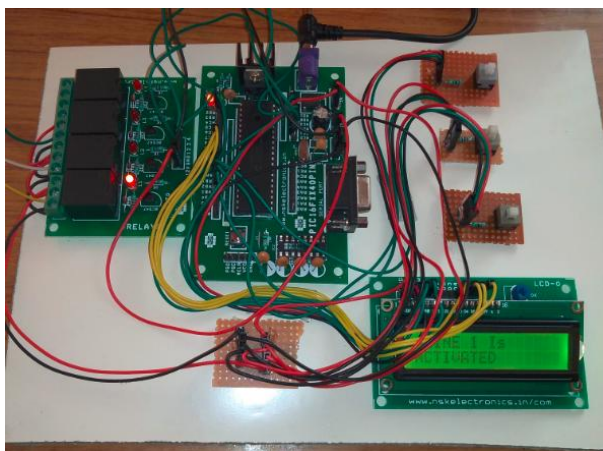
V. RESULTS

The faults detected are displayed on LDC and the relays are used to switch ON / OFF the cable whenever the fault is detected at higher switching rate.

Different underground cable faults are represented below.

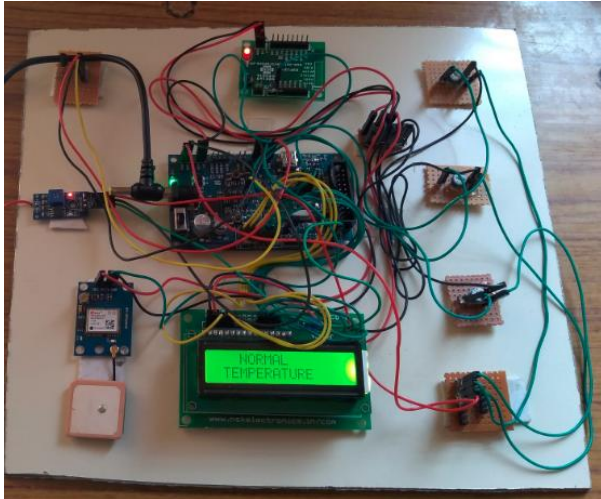
For Transmission Side

Switch Position	Lines in cables	LCD Display
Switch 1 Closed	Line 1	Line 1 is activated
Switch 2 Closed	Line 2	Line 2 is activated
Switch 3 Closed	Line 3	Line 3 is activated



For Receiver Side

Types of faults	Fault occurrence	LCD Display	Buzzer
Over voltage	No	Normal condition	Off
	Yes	Fault occurred	On
Over current	No	Normal condition	Off
	Yes	Fault occurred	On
Short circuit	No	Normal condition	Off
	Yes	Fault occurred	On
Temperature variation	No	Normal condition	Off
	Yes	Fault occurred	On
Power theft	No	Normal condition	Off
	Yes	Fault occurred	On



VI. CONCLUSION

This paper presents an operational experience faults: it has been observed that underground cable faults are preceded by faults. The hardware model of Underground Cable Fault Locator is implemented and favourable results were brought forward. Hardware prototype implemented is used to detect the faults and there location. Cables are prone to many faults because of environment, wear and tear etc. IoT has been used in this project to represent the faults and the location on the internet using URL. Faults occurring in fast successions create considerable over voltages, Thermal condition monitoring, Voltage varying ,Current carry capacity ,Voltage and current theft, Break down condition and induce faults on other feeders.

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