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Underground Cable Fault Detection System

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Abstract: Underground cables have been widely used with the development of power system grid .Underground cables are prone to a wide variety of faults due to underground conditions, wear and tear, rodents. Detecting fault source is difficult because entire line is to be dug in order to check fault at cable line. The repairmen know exactly which part has fault and only that area is to be dug to detect the fault source. Thus it saves a lot of time, money and allows to service underground cable lines faster. The aim of this project is to determine the distance of underground cable fault from base station in Km

I. INTRODUCTION

Even the last cables of the decades where made to put the overhead and is currently put to the underground cable that is superior to the previous method. Because the underground cable are not affected by adverse weather conditions, such as storm, snow, heavy rain as well as pollution. But when any fault occurs in the cable, then it is difficult to locate fault. When it is easy to detect and correct the faults in overhead line by mere observation, it is not possible to do so in an underground cable. As they are buried deep in the soil it is not easy to detect the abnormalities in them. Even when a fault is found to be present it is very difficult to detect the exact location of the fault. Due to which digging of entire area has to do, for detecting and correcting the fault which in turn causes wastage of money and manpower. So it is necessary to know the exact location of faults in the underground cables. So we will move to find the exact location of fault. Now world has been digitalized so the paper is intended to detect the location of fault in digital form. The underground cable system is the most common practiced followed in many urban areas. While the fault occurs for some reason at that time the repair process related to that particular cable is difficult due to not knowing the exact location of fault. In the event of short circuit (Line to Earth) fault, the voltage accordingly. It is then fed to an ADC to develop precise digital data that is directed to the programmed Arduino to display the same in kilometers. Hence this paper is very helpful for determining exact location of short circuit fault. How to send this message to the base station, how the system works and alerts the field workers.

II. APPARATUS REQUIRED

A. *Hardware Requirements*

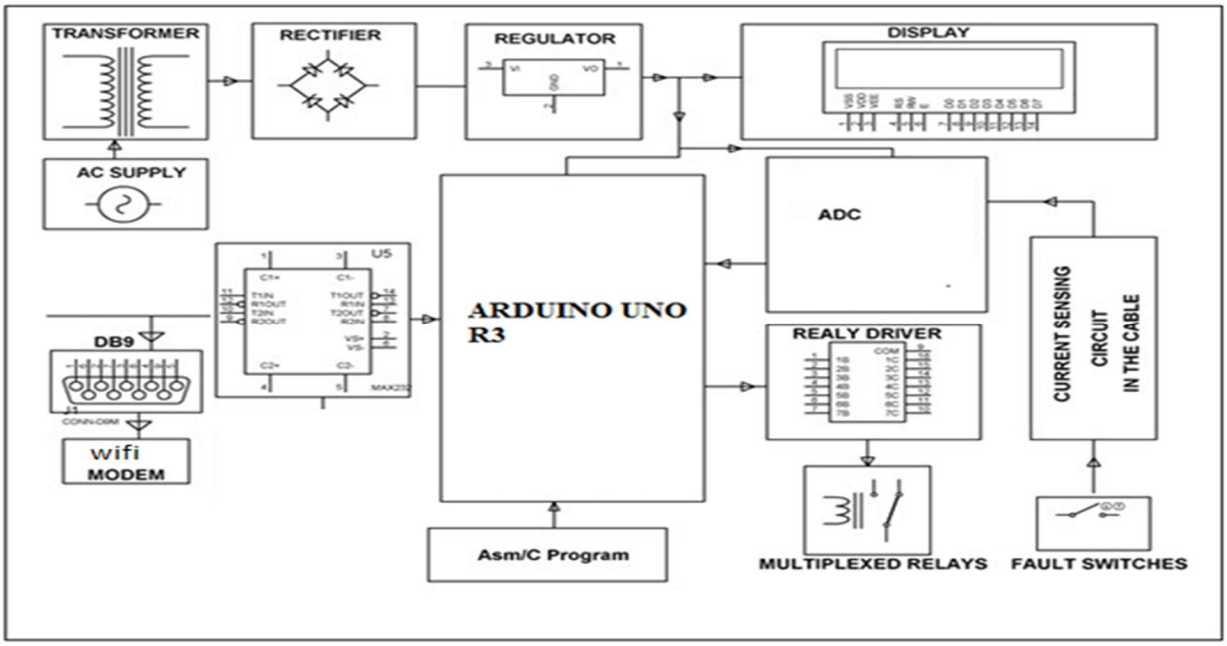
1) ARDUINO UNO R3 Microcontroller
2) LCD
3) Crystal
4) ADC
5) Relays
6) Relay Driver IC
7) Transformer
8) Diodes
9) Voltage Regulator
10) Resistors
11) Capacitors
12) LEDs
13) slide switches
14) max232
15) and wifi module.
16) esp8266 MODULE

B. *Software Requirements*

1) ARDUINO compiler
2) Language: Embedded C or Assembly

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III. BLOCK DIAGRAM



IV. RELATED WORK

Working of this project is divided into four parts DC power supply Part, cable part controlling part, display part. DC power supply part consist supply of 230v AC then it is step down using transformer, bridge rectifier converts ac signal to dc & voltage regulator 7805 is used to produce constant dc voltage. The set of resistors denote the cable part along with Switches. The set of resistors& switches are used as fault creators to indicate the fault at each location this shown by the current sensing part of cable. The change in current is sensed by this part by sensing the voltage drop. Controlling part uses the analog to digital (ADC) to converter the input current sensing signal from the current generating circuit to the voltage drop into digital signal and supply the Microcontroller. The microcontroller makes necessary calculations regarding the distance of the fault. The driver is ran by the microcontroller and controls the switching of the relays for proper connection of the cable at each phase. Display part consists of the LCD display interfaced to the microcontroller and it shows the status of the cable of each phase and the fault distance of the cable at the particular phase, in case of any fault and GSM used to send message to the base station. Buzzer is used to alerts the field workers.

V. ADVANTAGES

1) Consumes low power in nano watts.
2) Compact size, Easy to handle.
3) Serial on board programming.
4) Less maintenance cost.
5) It has higher efficiency.
6) Economic in cost.
7) Safe and secure to use.
8) It is fast, effective & flawless service.
9) Highly reliable and efficient to use.
10) Useful for all type of underground cable.

VI. APPLICATION

1) Monitoring fault in underground cable line
2) Monitoring fault in residential line
3) Monitoring fault in industrial line
4) Monitoring fault in overhead cable line

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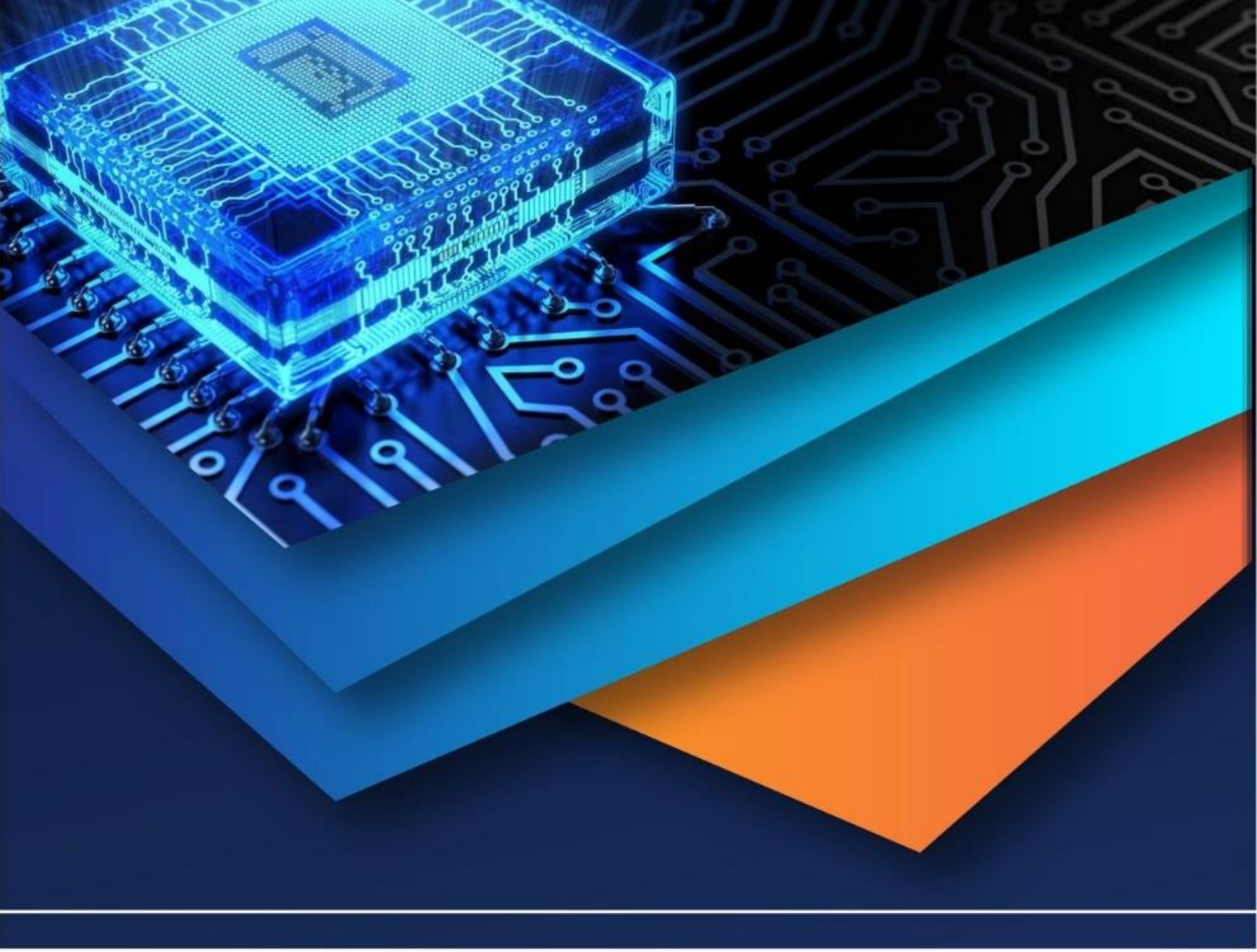
VII. CONCLUSION

The fault detection system simulated Using and the fault information is displayed in the LCD simultaneously sending to GSM. It is then fed to an ADC to develop precise digital data that is directed to the programmed Arduino to display the same in kilometers. Hence this paper is very helpful for determining exact location of short circuit fault. How to send this message to the base station, how the system works and alerts the field workers.

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