UNDER GROUND CABLE FAULT DISTANCE LOCATOR USING IOT

S.Raguram[1],M.Gopalakannan[2],K.Presilla Vasanthini[3]
[1].*Student,EEE,Prince Shri Venkateshwara Padmavathy Engineering College,Tamil Nadu,India*
[2]*Student,EEE,Prince Shri Venkateshwara Padmavathy Engineering College,Tamil Nadu,India*
[3] *Assistant Professor,EEE,Prince Shri Venkateshwara Padmavathy Engineering College,Tamil Nadu,India*

ABSTRACT

The fault that occurred in the underground power cable can be detected using the arduino microcontroller.The aim of our project is to determine the distance of underground cable fault from base station in kilometres. In our project we use's the simple concept of ohm's law. When any fault like short circuit occurs, voltage drop will vary depending on the length of fault in cable, since the current varies. A set of varaible resistors are therefore used to represent the underground cable. A dc voltage is fed at one end and the fault is detected by detecting the change in voltage in the resistor represented cable using a analog to digital converter and a arduino microcontroller is used to make the necessary calculations so that the fault distance is displayed on the LCD display, or by using the GSM module the fault distance is displayed in the webpage using a personal computer.By our fault detection method it is easy for an electrician or engineer to find out the exact fault location in an underground cable. And by our method the values of current or voltage is always displayed in the webpage using IOT module. Further using artificial intelligence the fault location can be identified by a system and it will try to resolve the fault at the exact fault location.

Keyword*: Iot,Arduino,Fault Detection,Cables.*

1.INTRODUCTION

An embedded system is a special-purpose computer system designed to perform one or a few dedicated functions, often with real-time computing constraints. It is usually embedded as part of a complete device including hardware and mechanical parts. In contrast, a general-purpose computer, such as a personal computer, can do many different tasks depending on programming. Embedded systems have become very important today as they control many of the common devices we use.

Since the embedded system is dedicated to specific tasks, design engineers can optimize it, reducing the size and cost of the product, or increasing the reliability and performance. Some embedded systems are massproduced, benefiting from economies of scale.

Physically, embedded systems range from portable devices such as digital watches and MP3 players, to large stationary installations like traffic lights, factory controllers, or the systems controlling nuclear power plants. Complexity varies from low, with a single microcontroller chip, to very high with multiple units, peripherals and networks mounted inside Handheld computers share some elements with embedded systems such as a large chassis or enclosure.

1.1 EMBEDDED SYSTEMS

An embedded system usually contains an embedded processor. Many appliances that have a digital interface -- microwaves, VCRs, cars - utilize embedded systems. Some embedded systems include an operating system. Others are very specialized resulting in the entire logic being implemented as a single program.

These systems are embedded into some device for some specific purposeother than to provide general purpose computing.

2. OVERVIEW

The results of simulation under all the fault conditions and from that we can conclude that the fault distance can be calculated successfully by using this project.work in terms of safety and compact size for field

measurements. The fault location and distances is monitored in the webpages in the IOT. Development for a wide range of cable length will be made in the futher work in the terms of safety and compact size for field measurements. Fault point can be quickly detected, repaired and displayed by our project.

Murray loop test is simple basic method to localize cable fault testing. This method uses basic equipment that obtained easily. This test is performed for the location of either an earth fault or short circuit fault in underground cable. In these tests the resistance of fault does not affect the results obtained except when the resistance of fault is very high. There are two loop tests usually used and are known as Murray Loop and Varley Loop Test. This test works on the principle of Wheat stone bridge. This test is used to find the fault location in an underground cable by making one Wheatstone bridge in it and by comparing the resistance we shall find out the fault location. But we should use the known length of the cables in this experiment. The necessary connection of the Murray loop test is shown. It shows that the circuit connection for finding the fault location when the ground fault occurs and the figure 2 shows that the circuit connections for finding the fault location when the short circuit fault occurs.

2.1 BLOCK DIAGRAM

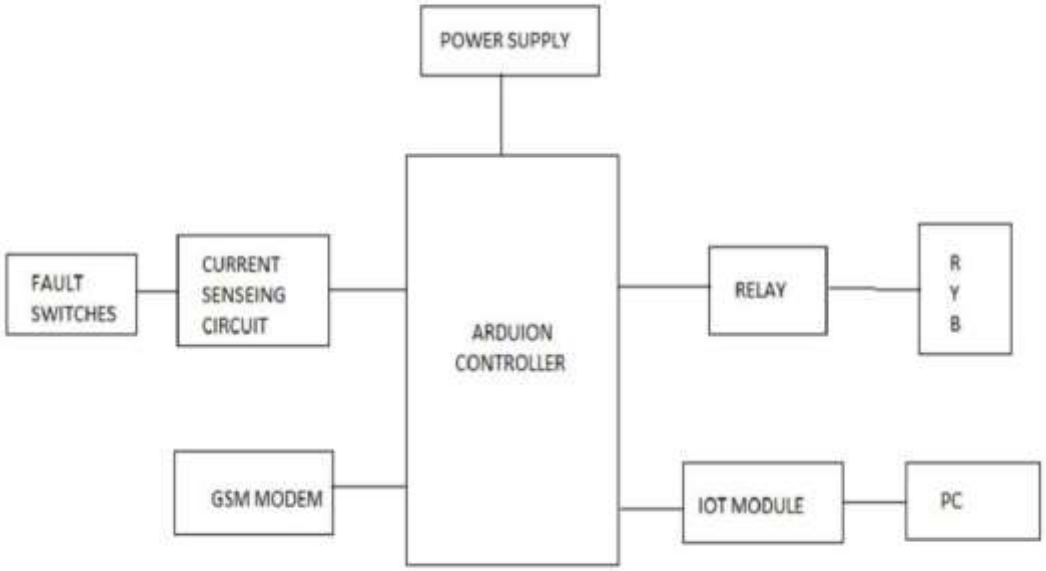
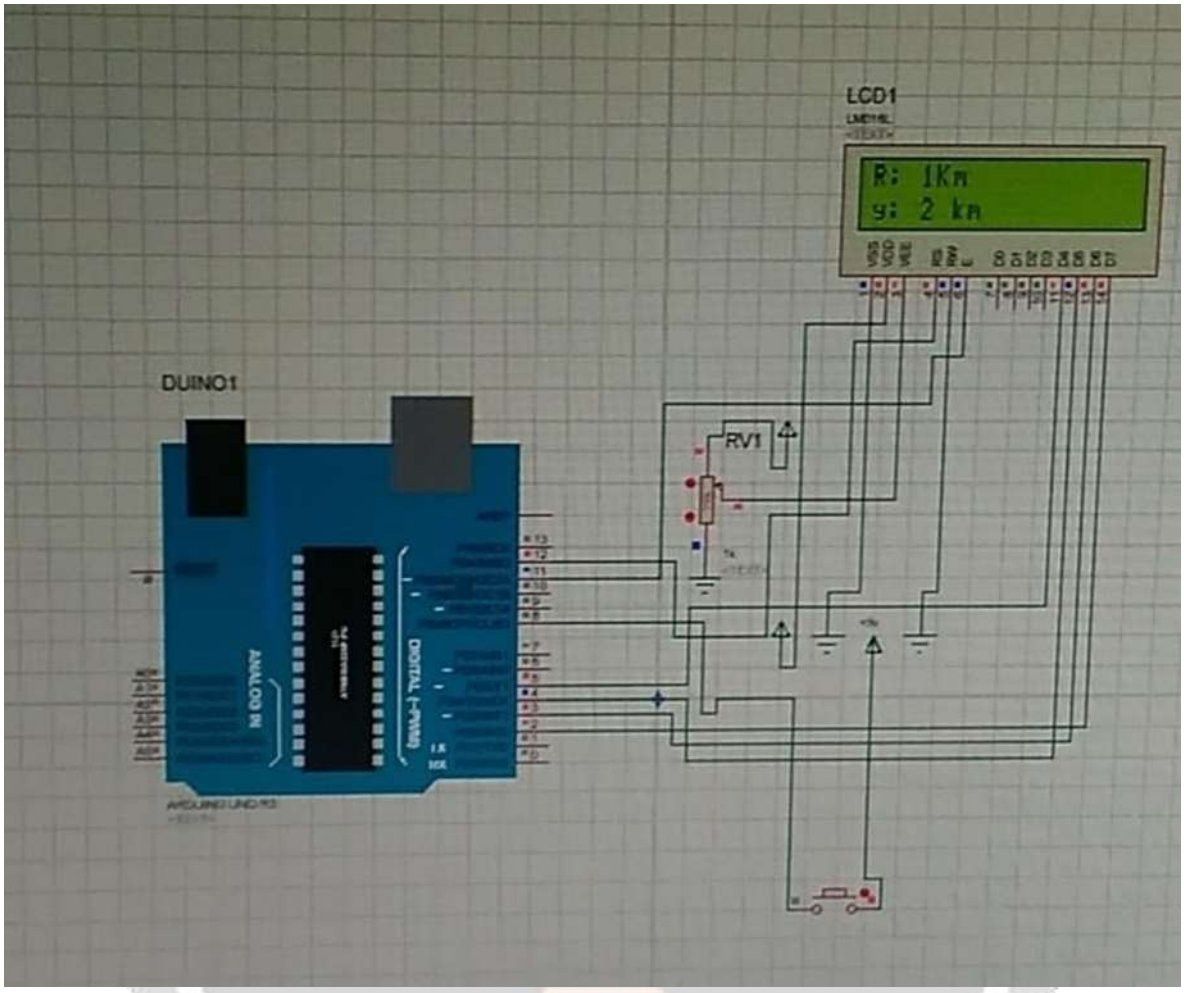


Figure 2.1 Block Diagram Of Arduino

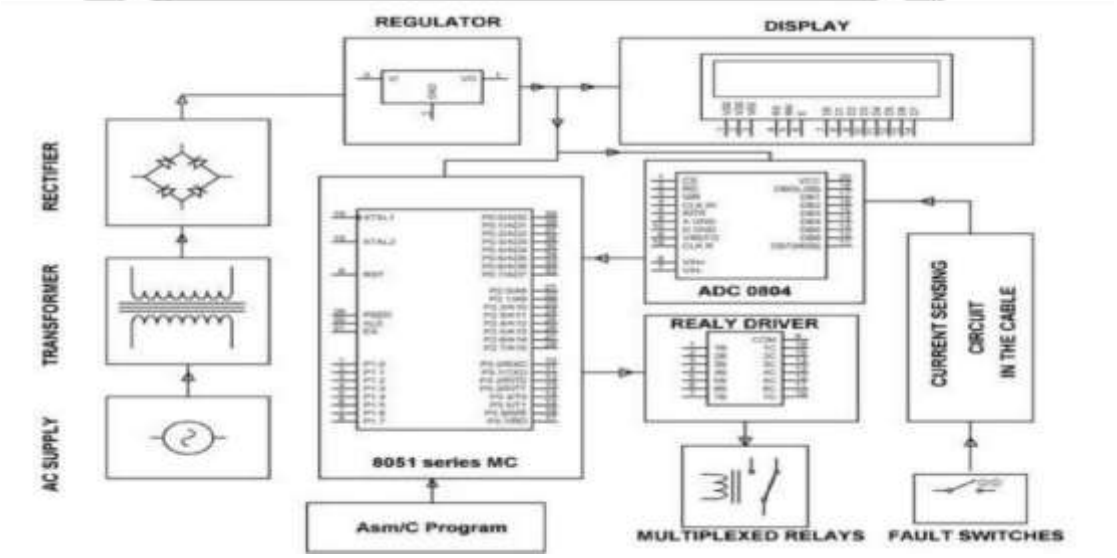
The power supply consists of a step down transformer 230/12V, which steps down the voltage to 12V AC. This is converted to DC using a Bridge rectifier.

In this method simple OHM's law is used to locate the short circuit fault. A DC voltage is applied at the feeder end through a series resistor, depending upon the length of fault of the cable current varies. The voltage drop across the series resistor changes accordingly, this voltage drop is used in determination of fault location. This method is assembled with a set of resistors representing cable length in KMs and fault creation is made by a set of switches at every known KM to cross check the accuracy of the same.

3.SIMULATION DIAGRAM



3.2 SIMULATION CIRCUIT



Arduino is a tool for making computers that can sense and control more of the physical world than your desktop computer. It's an open-source physical computing platform based on a simple microcontroller board, and a development environment for writing software for the board.

An important feature of the Arduino is that you can create a control program on the host PC, download it to the Arduino and it will run automatically. Remove the USB cable connection to the PC, and the program will still run from the top each time you push the reset button. Remove the battery and put the Arduino board in a closet for six months. When you reconnect the battery, the last program you stored will run. This means that you connect

the board to the host PC to develop and debug your program, but once that is done, you no longer need the PC to run the program.

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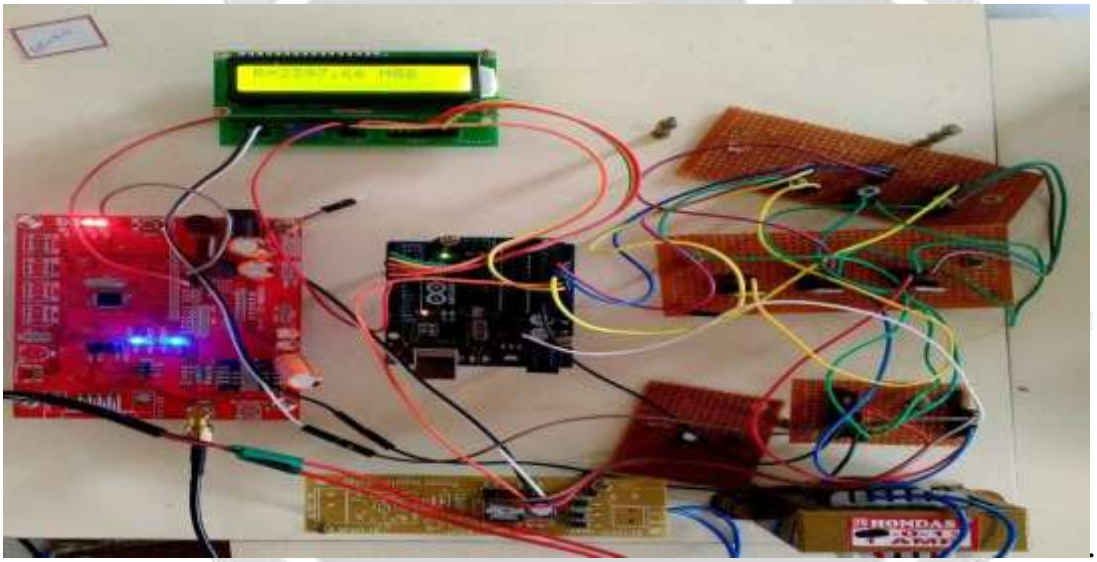
The Arduino programming language is an implementation of Wiring, a similar physical computing platform, which is based on the Processing multimedia programming environment



4.CONCLUSION

Through this project we simplified the actual problem of the detecting the fault in the underground area. We discover the position or location were the fault will be occur and also find the accurate distance of breaker point. The benefits of accurate location of fault are fast repair to revive back the power system, it improves the system performance, it reduce the operating expense and the time to locate the faults in the field.

5.FUTURE SCOPE

In the project we detect the exact fault location of short or open circuit fault in the underground cable from feeder in km by using Arduino controller. We can easily find the fault location from the base station. We have seen the results of simulation under all the faulty conditions and from that we can conclude that the fault distance can be calculated successfully by using this project.

Therefore different types of fault analysis and fault location can be done with ease. Simulation results and prototype's results are matching with the distance at which fault is created. Development for a wide range of cable length will be made in the further work in terms of safety and compact size for field measurements.

Further using artificial intelligence the fault location can be identified by a system and it will try to resolve the fault at the exact fault location.

6.REFERENCES

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