IoT Underground Cable Fault Detection

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ABSTRACT

This paper proposes fault location model for underground power cable using microcontroller and the thing which is based on the internet means the information will transfer through the internet access. The aim of this project is to determine the distance of underground cable fault from the base station in the kilometer and also find the exact location of that faulty place. This project uses the simple concept of ohm's law. When any fault like short circuit occurs, voltage drop will vary depending on length of fault in cable, since the current varies. A set of resistor are therefore used to represent the cable, since the current end and the fault is detected by detecting the change in the voltage using analog to voltage converter and a microcontroller is used to make the necessary calculation so that the fault distance is displayed on the LCD display. This fault details after send to any access point through the internet.

Keywords— *Underground cable, fault location, fault detection, location methods, microcontroller.*

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1. INTRODUCTION:

In the urban areas, the electrical cable runs underground instead of overhead lines. Whenever the fault occurs In underground cable it is difficult to detect the exact location of the fault for process of repairing that particular Cable. The proposed system detects the exact location of the fault and by the means of Wi-Fi modem it's serially Communicated towards server. Since problem that occurs in underground cable is a big problem till now. As it is Very difficult to find the exact location or faulty location manually, which suddenly affects the efficiency of the cable Wire due to losses occurred. Till now many techniques had already been implemented in order to detect fault in Cable wire .But the problem came up is how to detect fault in cable wire when it is under grounded, and how to Access or retrieve those data related to faulty location whenever it is required .In order to fill those gaps, we Proposed the system which detects the exact location of the fault and through the means of Wi-Fi modem its Serially communicated towards server. distance of the cable at the particular phase, in case of any fault.

2. LITERATURE SURVEY:

1. Jitendra Pal Singh :

   In this paper, a way for sleuthing underground cable fault distance locator is done by using microcontroller. The target of this project is to work out the gap of underground cable fault through base station in kilometers. It uses the straight forward conception of ohm's law, voltage drop can vary counting on the length of fault in cable, since the current varies. A group of resistors are used to represent the length of cable in kilometers and a dc voltage is fed at one end and the fault is detected the change in voltage using analog to voltage converter. The fault occurring at what distance is shown on LCD which is interfaced with the microcontroller that is used to make the necessary calculations.

2. Shirtar Reshma:

   This paper conclude that the underground cable fault location model by using microcontroller. The purpose of project is to identify the cable fault distance from initial position in terms of kilometer. By using simple method of ohm's law. when any fault occur

like short circuit or open circuit hence the voltage loss is increases with the length of fault into the cable, due to this current is varies. Cable is represented by using set of resister. And DC voltage is applied at one side of wire and fault is find due to change in voltage. For the calculation of the distance microcontroller is mainly used. So fault distance is show on the liquid crystal display [LCD].

3. Dhekale P.M.:

This paper proposes fault location model for underground power cable using microcontroller. The aim of this project is to determine the distance of underground cable fault from base station in kilometers. This project uses 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 resistors are therefore used to represent the cable and a dc voltage is fed at one end and the fault is detected by detecting the change in IOT Underground Cable Fault Detector

3. PROPOSED SYSTEM :

The project uses the simple concept of OHMs law where a low DC voltage is applied at the feeder end through a series resistor. The current would vary depending upon the length of fault of the cable in case there is a short circuit of LL or 3L or LG etc. The series resistor voltage drop changes accordingly which is then fed to an ADC to develop precise digital data which the programmed microcontroller would display the same in Kilo meters. The project 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. This is proposed model of underground cable fault distance locator using microcontroller. It is classified in four parts –DC power supply part, cable part, controlling part, display part. DC power supply part consist of ac supply of 230v is step-down using transformer, bridge rectifier converts ac signal to dc & regulator is used to produce constant dc voltage. The cable part is denoted by set of resistors along with switches. Current sensing part of cable represented as set of resistors &switches are used as fault creators to indicate the fault at each location. This part senses the change in current by sensing the voltage drop. Next is controlling part which consists of analogue to digital convertor which receives input from the current sensing circuit, converts this voltage into digital signal and feeds the microcontroller with the signal. The microcontroller also forms part of the controlling unit and makes necessary calculations regarding the distance of the fault. The microcontroller also drives a relay driver which in turn controls the switching of a set of relays for proper connection of the cable at each phase. The display part consists of the LCD display interfaced to the microcontroller which shows the status of the cable of each phase and the algorithm and flow chart
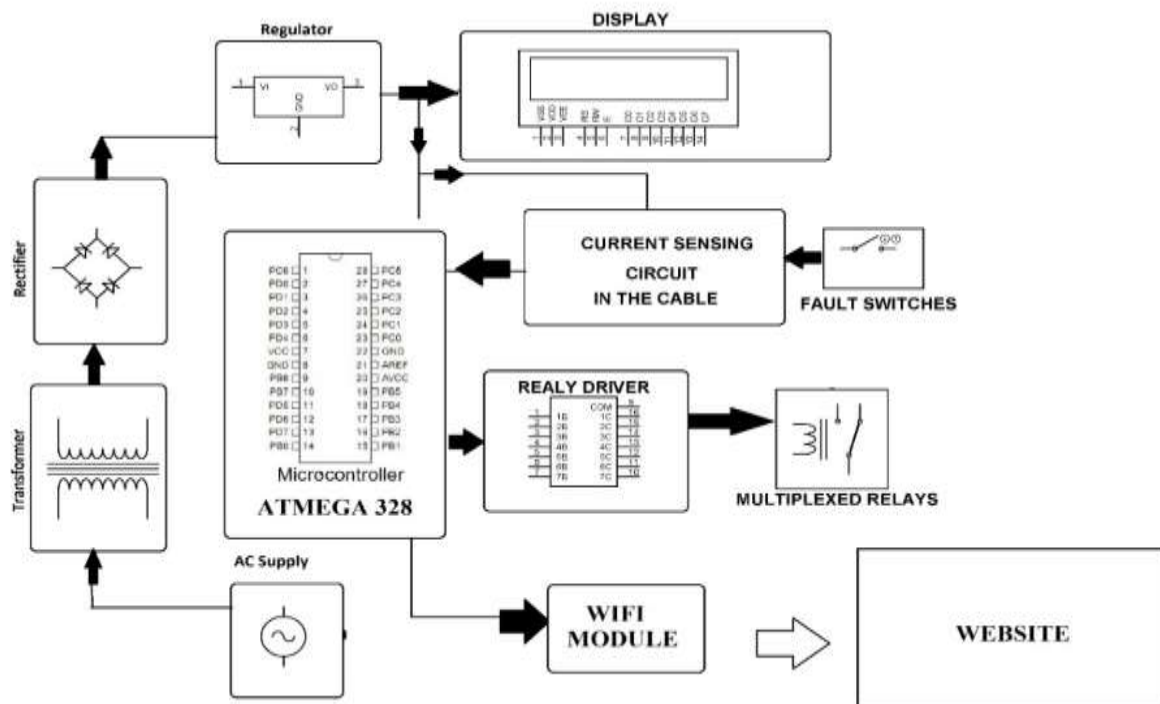
4. FLOWCHART:
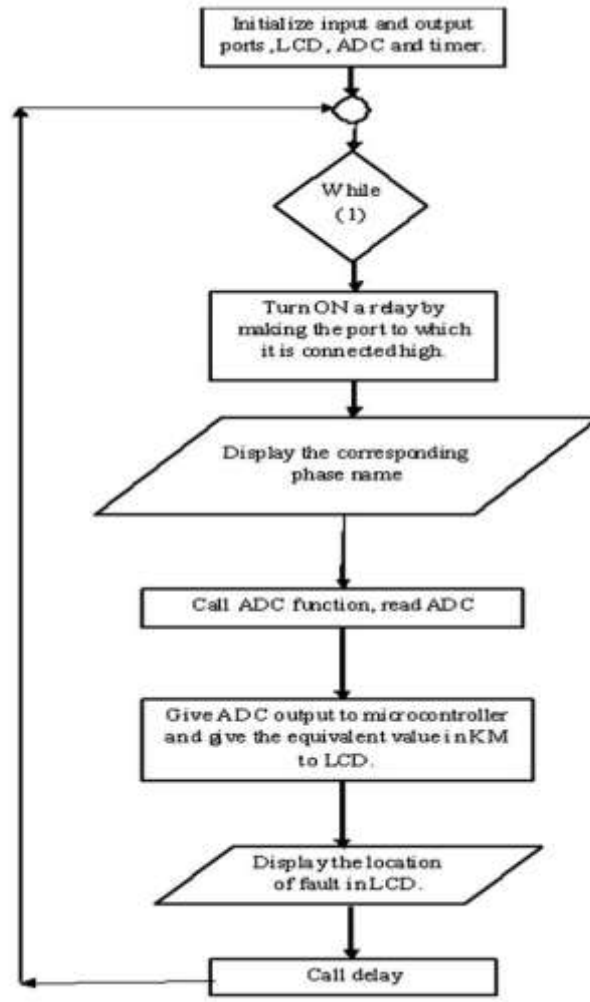
5. HARDWARE:

A. POWER SUPPLY:-

The power supply circuit consists of step down transformer which is 230v step down to 12v.In this circuit 4diodes are used to form bridge rectifier which delivers pulsating dc voltage & then fed to capacitor filter the output voltage from rectifier is fed to filter to eliminate any a. C. Components present even after rectification. The filtered DC voltage is given to regulator to produce 12v constant DC voltage. Transformer is static device which transfer electrical energy from one circuit to other circuit with change i n voltage or current without change in frequency. In this step down transformer is used. Usually, DC voltages are required to operate various electronic equipment and these voltages are 5V, 9V or 12V. But these voltages cannot be obtained directly. Thus the a.c. Input available at the mains supply i.e., 230V is to be brought owns the required voltage level. This is done by a transformer. Principle of transformer is according to faraday's law o electromagnetic induction.
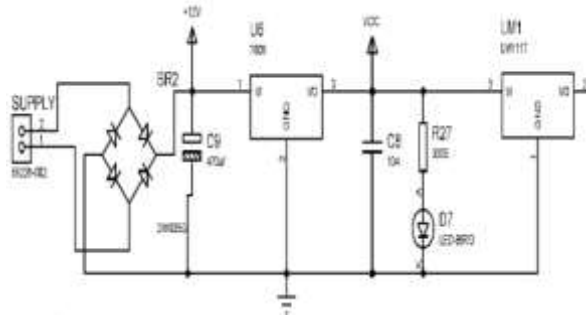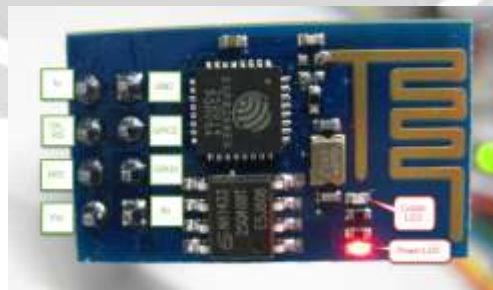
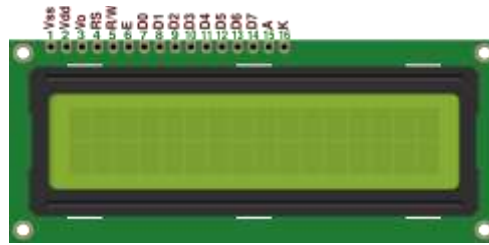### B. MICROCONTROLLER:-

ATmega328P pin mapping

The Atmel atmega328p is a 32K 8-bit microcontroller based on the AVR architecture. Many instructions are executed in a single clock cycle providing a throughput of almost 20 MIPS at 20mhz. The ATMEGA328-PU comes in an PDIP 28 pin package and is suitable for use on our 28 pin AVR Development Board.

C. WIFI MODULE:-

The ESP8266 wifi Module is a self contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your wifi network. Each ESP8266 module comes pre-programmed with an AT command set firmware. The ESP8266 module is an extremely cost effective board with a huge, and ever growing, community.

D. LCD DISPLAY:-

Liquid crystal displays are interfacing with the microcontroller ATMEGA328.Most common LCDs connected to the microcontrollers are 16x2 and 20x2 displays .This means 16 characters per line by 2 lines and 20 characters per line by 2 lines, respectively.

E. PCB LAYOUT:-
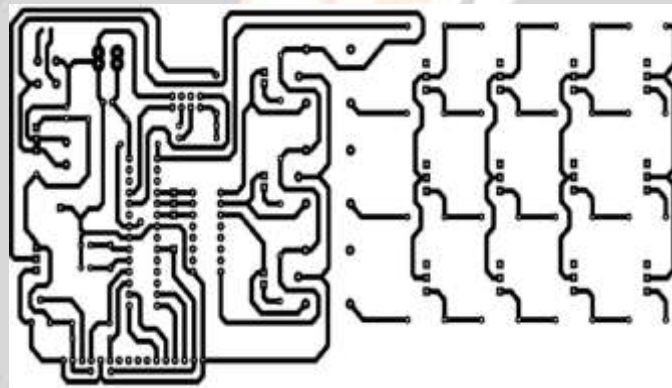
6. CONCLUSION:

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.

7. ACKNOELEDGMENT:

8. REFERENCE:

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