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IOT BASED UNDERGROUND CABLE FAULT DETECTION SYSTEM WITH DISTANCE LOCATOR

Dr. LAXMIKANTH REDDY[1], BONALA DEEPTHI[2], CHETHRI BHAVANI[3], ANUMULA VENKATESH[4], ASHUTOSH KUMAR CHAUBEY[5]

[1] Associate Professor, Dept of ECE, MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS), Hyderabad, TG, India.

[2,3,4,5]UG students, Dept of ECE, MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS), Hyderabad, TG, India.

ABSTRACT:

Underground cables are prone to a wide variety of faults due to underground conditions, wear and tear, rodents etc. Also detecting fault source is difficult and entire line is to be dug in order to check entire line and fix faults. So here we propose cable fault detection over IOT that detects the exact fault position over iot that makes repairing work very easy. The repairmen know exactly which part has fault and only that area is to be dug to detect the fault source. This saves a lot of time, money and efforts and also allows to service underground cables faster. We use IOT technology that allows the authorities to monitor and check faults over internet. The system detects fault with the help of potential divider network laid across the cable. Whenever a fault gets created at a point shorting two lines together, a specific voltage gets generated as per the resistors network combination. This voltage is sensed by the microcontroller and is updated to the user. The information conveyed to the user is the distance to which that voltage corresponds to. The microcontroller retrieves the fault line data and displays over LCD display, also it transfers this data over internet to display online. We use IOT Telnet to develop the online system that links with the system to display the cable faults online.

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1. INTRODUCTION

Day to day the demand of electricity is increased. In order to meeting that demand, we are finding so many ways along with it is very necessary to supply the power to the consumer premises without interruption. In overhead transmission system the interruptions are high as compared to Underground transmission system because the Overhead lines face more problems due to abnormal conditions of environment such as thunders, tsunamis etc. And this system also harmful to living organism. In case of Underground system these type of issues are very less hence the interruptions also very less. But the major problem is fault detection, in case of Overhead system the fault detection is very easy because the transmission lines are located by humans but in Underground Cables it is not possible, the entire cable is dug in to the earth. Hence it is very difficult to finding the exact fault location from the base station. In previous days for finding fault finding location, it is necessary to check entire cable from the base station to fault location but it is time taking process and waste of money. In order to overcome this problem, we proposed a new method that is Underground Cable fault location using IOT. This method locates the exact location of the fault in km and this method is works on the principle of Ohms law and one relation is there that is the resistance is directly proportional to Length. By using this relation, we were generated one code and dumb into Arduino Uno. In this method we were using Arduino Uno, IOT Module and for indication purpose LCD, LED, Buzzer. Power supply networks are growing continuously and their reliability getting more important than ever. The complexity of the whole network comprises numerous components that can fail

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and interrupt the power supply for end user. For most of the worldwide operated low voltage and medium voltage distribution lines, underground cables have been used for many decades. Underground high voltage cables are used more and more because they are not influenced by weather conditions, heavy rain, storm, snow and pollution. Even though the Cable manufacturing technology is improving steadily; there are still influences which may cause cable to fail during test and operation. A cable in good condition and installed correctly can last a lifetime of about 30 years. However cables can be easily damaged by incorrect installation or poorly executed jointing, while subsequent third party damage by civil works such as trenching or curb edging.

2. RELATED STUDY

Open Circuit Fault When there is a break in the conductor of the cable, it is called open circuit fault of the cable. The open circuit fault can be checked by megger. For this purpose, the three conductors of the 3-core cable at the far end are shorted and earthed. Then resistance between each conductor and earth is measured by a megger. The megger will indicate zero resistance in the circuit of the conductor that is not broken. However, if the conductor is broken, the megger will indicate infinite resistance in its circuit.

Short Circuit Fault When two conductors of a multi-core cable come in electrical contact with each other due to insulation failure, it is called short-circuit fault. The two terminals of the megger are connected to any two conductors. If the megger gives zero reading, it indicates short-circuit fault between these two conductors. The same step can be repeated for other conductors taking two at a time.

Earth Fault When the conductor of the cable comes in contact with earth, it is called earth fault or

ground fault. To identify this fault, one terminal of the megger is connected to the conductor and the other terminal connected to earth. If megger indicates zero reading, it means the conductor is earthed. The same procedure is repeated for other conductors of the cable [4,6].

3. AN OVERVIEW OF PROPOSED SYSTEM

Internet of Things is an Internet-connected object system that can store and transmit data on a wireless network without human interference. Internet of Things is a wireless system. IoT has its major contribution in fault diagnosis and prediction of the physical devices by analysing the device without the knowledge of the physical manufacturing system. Underground cables due to underground stresses, wear and tear, rodents, etc. They are subject to a variety of defects. It is also difficult to detect fault sources. To inspect and repair the failure, the whole line has to be dug. We, therefore, propose an Underground Cable Fault Detector using IoT that detects the exact position of the defect and simplifies the repair. To locate the root of the problem, the repairmen know which component is defective and only the region must be dug. This saves a lot of time, money, and effort and enables simple underground cable maintenance. This saves a great deal of time, money, and effort and allows for easy cable maintenance in the underground. We use Ohm's law principle to detect and verify failures over the internet by authorities, here the Arduino board that is an IoT component functions as a machine brain and handles the sensor data. The machine detects errors by using the future cable-wide divisor network. When a failure occurs when two lines are cut, a certain voltage will be generated according to a combination of the resistance network. The microcontroller senses this voltage and is modified. The

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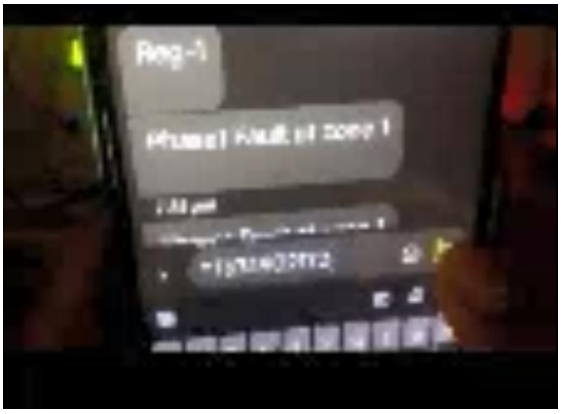
information the consumer receives is the distance that corresponds to this voltage.

The microcontroller collects fault line data and displays it over an LCD monitor so that this data is transferred to the internet for online access. 3.1 Block diagram: The block diagram of this system consists of Arduino Uno, LCD, Buzzer, IOT, Relay, Indicator LED, Power supply etc. Arduino Uno is the main equipment of the system, it performs all operations regarding to user requirement. One program is created and dumbed into Arduino Uno. The kit is activated by turn on the power supply, under normal condition (no fault) there is no any indication through Buzzer, LED, LCD etc. Whenever fault occurs at that time initially, we getting indications through equipment's which are mentioned above and one information also received by user to mobile with the help of IOT module.



The first indication gives Voltage fault in the form of sound, light, display on LCD and information to mobile of user which helps the user to maintain the continuity of the system at a time by changing the supply. Second indication also gives cable fault in terms of light, buzzer, display on LCD screen and information to user mobile which helps the user for finding exact fault distance from the base station. The

below figure shows circuit diagram of Underground Cable Fault detection using IOT.

4. CONCLUSION

An effective solution is provided to develop the intelligent system for vehicles which will sense the various levels of alcohol present in the breath of the driver and would respond accordingly. The system adopted different principles as explained in this paper, by using hardware platform who's Core is Atmega8, Alcohol sensor mq3, GPS & GSM module. The communication with preregistered phone numbers in this designed system is done via GSM, GPS and control of various parameters. The whole control system has the benefit of small volume and high reliability. Future scope of this system is to decrease accident numbers and providing useful details about the accidental vehicle, thereby reducing the rate of accidents taking place due to drunken driving. This system brings modernization to the existing technology in the vehicles and also maintains and improves the safety features, hence proving to be an effective development in the automobile industry.

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