International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 07 Issue: 03 | Mar 2020 www.irjet.net p-ISSN: 2395-0072

SMART OVERHEAD TRANSMISSION LINE PHYSICAL FAULT DETECTION BY IOT

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Abstract-the fault location detection has been a goal of power system engineers, since the creation of distribution and transmission system. Easily or quick fault detection can help protect the equipment by allowing disconnection of faulted lines before any major damage of the equipment as energy leakage is one of the major problems that the corporation faces in recent times, bringing this leakage under control is next to impossible with the electrical transmission lines running millions of miles across the country only way to solve this problems is to come up with a mechanism that can detect the fault in an electricity transmission line automatically and intimate the authorities with a specific location . Through this project you will develop a device that uses sensors to sense and detect the fault and the system will be integrated with the IOT mechanism to intimate the responsible people real time with location information and scale of leakage with an app.

Keywords-IoT (Internet of Things), IWOS, IR sensor

1. INTRODUCTION

As electricity is the pulse of life it light up the streets at nights and warms our homes in the winter. This electricity is supplied by a power grid consisting of both transmission and distribution networks. Our daily power consumption is dependent on the power distribution system and the majority of power outages are also caused by problems. In this same distribution system fault in lines is the core issue for power grid reliability. Spanning miles of coverage for suburban city, districts and rural areas. Distribution network are challenging to trouble because of their size and complexity locating fault can be monumental task.

In traditional operation traveling wave methods, as we know when a fault occurs in overhead transmission line system then instantaneous changes in voltage and current at where generate high frequency. Electromagnetic impulses called travelling wave which spread along the transmission line in both directions away from the fault point. The fault current is relatively high, during the fault the power flow is diverted toward the fault and supply to the neighbouring zoned is affected voltage become unbalanced .It is to detect the fault as early as possible that is why we made a using microcontroller to make it process faster. The transmission line conductor resistance and inductance distributed uniformly along the length of the line. Travelling wave fault location methods are usually more suitable for application long lines. Power transmission lines employ at 50 Hz are more than 80 km long are considered to have the properties of voltage and current wave that travel on the line with finite speed of propagation. In traditional operation utilities may power off entire section of the distribution grid to identify the damage outgoing line. After finding the damage line technicians will power off the faulty line part by part until they ultimately locate the ground fault. This process often takes hours or even days in inferable weather condition or mountainous terrain with the development of sensors.

The internet of things and big data technology in hand network present /was-an intelligent distribute line monitoring system. IWOS deploys high precision sensors all over the distribution network to provide a complete solution for instantaneous faulty monitoring. Accurately locate line cracks, ground fault. The IR Sensor system captures field information at the exact moment a fault gathering data from sensor across an entire line. The collection of data can be analysed to find the exact causes of outages re-enact the occurrence and development of fault. it providing a solid data base for future optimization of the distribution operation.

1.1 LITERATURE SURVEY

This paper reviews extension of the current internet which providing communication, connection and inter-networking in between the devices and physical objects, or also known as Things, is a growing trend which is called as the Internet of Things. The Internet of Things (loT), that's going to change everything which also include ourselves. loT is the next evolution or generation of the Internet, it's like taking a huge leap in its ability to collect, analyse, and distribute data which ultimately, we can turn into information then knowledge and finally into wisdom [1].

Smart overhead transmission line physical fault detection by Internet of Things (IoT)

From this paper we understood that there are a number of issues involved when designing a system. It should provide a easy to control the system, to detected fault in transmission line so that the devices can be easily, monitored, and controlled The system should be cost effective in order to justify its application in smart overhead transmission line systems. To minimize the drawback of each system and to overcome the design issues, they integrate locally andmobile application controlled systems using cloud data network. This allows the system to operate independent of a mobile provider, allows the system to be used with various mobile phone platforms.,

Smart overhead transmission line physical fault detection using ESP8266 Wi-Fi module, IR. Sensor gps system and Android Application.

From this paper we understood that the finding fault in transmission system is to be easy with the (iot) the internet of things is big data technology in hand network, it provides intelligent distribute line monitoring system using IR Sensor system capture line current and electrical field information at the exact moment a fault gathering data from sensors across n entire line . this collection of data can be analysed to find the exact causes of outages re- enact the occurrence and developments of fault correlate patterns and understand, it providing a solid data base for future optimization of the transmission operation. It improve power quality with reduces downtimes and increased grid visibility.

2. PROPOSED WORK

Objective is to get the set of different values loosed on the physical characteristic of wire (laws). The deviation from normal reading may indicate possible sensors to read the physical characteristic we have used infrared sensor. The infrared sensor works on the principal of reflection of light. When the infrared light falls on a glossy smooth surface, there will be a good reflection of infrared light from the surface. But when the surface has some irregularities such as corrosions, crack the reflection reading. When there is a change in reflection reading, the controller ESP8266 will sense that and can send a fault message to the user via internet. Sometimes long trees brides the caules pose a threat of ground fault If a tree fell on the wire the phase can be short circuited to the ground short circuit to the ground. So we have used another infrared sensors to sense any obstruction generated on the wire due to tree fall. When the system reaches the end of the wire and detects the pole ends using a pair of infrared sensor the system startsmoving in opposite direction. We have used blynk server to send data over the internet. The block diagram, circuit diagram and flow chart of the proposed system are as shown in Fig. 1, Fig. 2 and Fig. 3 respectively.

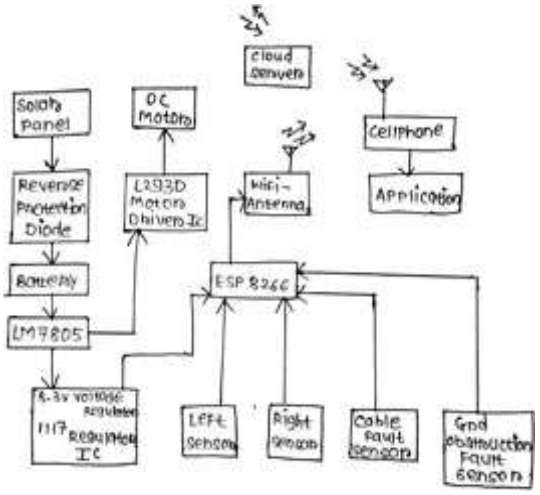

Fig.2. 1 Block diagram of proposed system

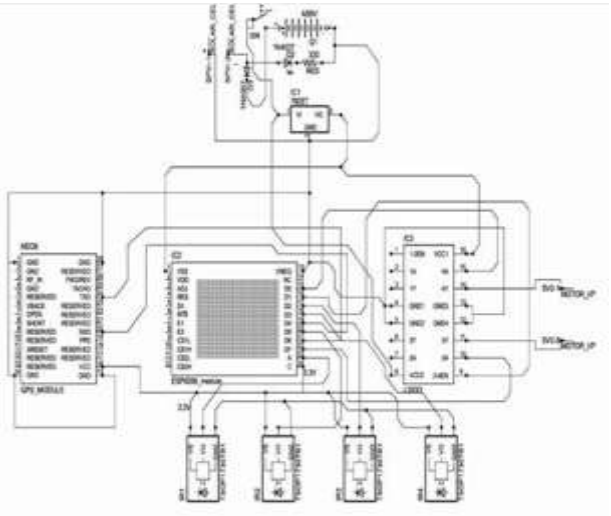

Fig. 2.2 Circuit diagram of proposed system

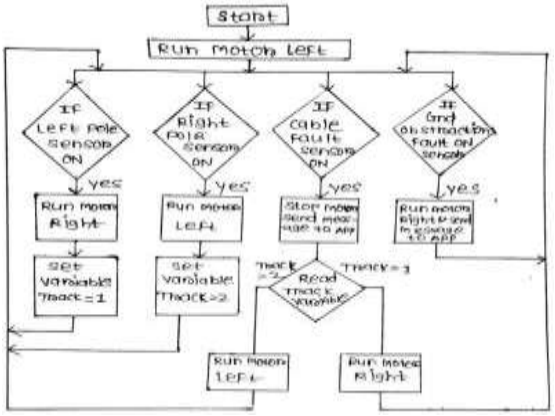

Fig. 2.3 Circuit diagram of proposed system

3. COMPONENTS

1. *Power supply:*

   We need a power supply of dc voltage (5v) to run the geared type dc motor,ESP8266 module work on 3.3v. Battery can feed the power to the device and battery can be charged via the solar panel this work uses a 12v rechargeable battery.

2. *Acrylic board:*

   This material has lightweight, thermoplastic and thermal insulation properties.It has attractive glossy surface that is available in clear or nearly any colour. Acrylic withstands years of exposure to the element and even corrosive atmospheres without losing its transparency,gloss or dimensional shape.It also will not darken or deteriorate from exposure to fluorescent light. Acrylic has good impact and chemical resistance.It can withstand high stresses for short periods. It is one of the most scratch-resistant thermoplastics. It can be stick on wall using silica jell without using screw and bolt.

3. *IR sensor:*

   IR sensors are used in many applications in electronics it is used in remote control system motion detector and it sense characteristics of its surrounding. In this device four IR sensors are used one analog and three digital IR sensor. When the system reaches the end of the wire and detect the pole end using a pair of infrared sensors the system starts moving in opposite direction.

4. *PBT connector:*

   PBT stands for polycrystalline Terephthalate, it is used in robomark circuit board and also it can be use in any circuit board for providing power input as well as giving output to other devices. It is DC power supply connector used in mini and major projects and interfacing of device with development board.

5. *16 Pin IC base:*

   IC sockets are generally for preventing damage to IC'S from soldering and while testing multiple circuits this are made from black thermoplastic and tin-plated alloy contacts. One end is notched to aid in identification they can be mounted end to end to suit longer IC'S.

6. *L293D driver IC:*

   L293D is a typical motor driver or motor driver IC which allows DC motor to drive on either direction. L293D is a 16-pin IC which can control a set of two DC motor simultaneously in any direction. But in this module only one DC motor is used to move the device between the two poles of the transmission line.

7. *Diode 1N4007:*

   1N4007 is a PN junction SSSthe flow of electrical current in only one direction, In day time when the solar panel is charged through sunlight it supplies to the batteries to be charged. Whereas, at night the voltage of the solar panel gets reduced to zero and the battery gets discharged through solar panel. To avoid reverse flow of current towards solar panel, a diode is connected in between the battery and solar panel as we know that the diode is unidirectional device.

8. *Solar panel:*

   It is also as solar module or photovoltaic module.It absorbs sunlight as a source of energy to generate electricity. In this project,we are using two polycrystalline type solar panel which is having 1w,5v each is 2w,10w.

9. *ON/OFF switch:*

   The switch is use to ON or OFF the system.

10. *DC Motor:*

    A geared DC motor has a gear assembly attached to the motor. The speed of motor is counted in terms of rotations of the shaft per minute and is termed as rpm.In our project the DC motor is use for moving the system on the surface of conductor.

11. *ESP8266 Wi-Fi module:*

    It is a Wi-Fimodule, which is self-contained SOC with integrated TCP/IP protocol stack this can give microcontroller access to Wi-Finetwork. ESP8266 it is capable of hosting an application and offloading all Wi-Fi networking functions from another application processor.

12. *ESP breakout board:*

    It is an open development kit that helps you to prototype our IOT product. It is like Arduino hardware with input output built in the board itself,it has also a Wi-Fi built in to connect directly to internet to control our things online.

4. RESULT

LED is indicating active connection and whenever there is loss of connection the LED stops blinking. There are two LCD display to show the type of fault and name of project, Blue LCD is shows that the which type of fault occurred Ex. ground fault or cable fault. Green LCD which

shows our project name.GPS help us to find the fault location. The value of fault is depending upon gauge value. Limit is 0 to 600max when fault is occurring above 200.

Fig. 4.1 Result of proposed system

5. CONCLUSION

As per study in India, the fault finding in the transmission line by impedance-based faults location method. In the impedance measurement- based technique the voltage and current prefault and post fault are acquired and analyzed. But they cannot analyze the physical health o conductor or any physical fault among the transmission line. The life of conductors such as crack, corrosion on conductor is need to take care to avoid wear and tear of line conductors. Solution on this, a movable electronic device is designed to move between the two poles with the inbuilt IR sensors when the surface have some irregularities such as corrosion, crack the reflection will reduce the infrared sensors works on the principle of reflection of light. When there is a change in reflection reading the controller ESP8266 will sense that and can send a fault message to the uses via internet and the fault location is monitored with the GPS system.

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