

Review Paper on Electrical Distribution Line Monitoring

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Abstract: One of the main implementation of wireless sensor network is monitoring equipment. Wireless sensor network (WSN) are able for cost efficient monitoring over enormous geo location. Construction of smart grid is based on the internet of thing(IOT) are made. Smart grid is attractive, and it is a new type of intelligent power system realized with the existing transmission and distribution power infrastructure. To pass the electricity to the consumers, we require a high voltage transmission. High voltage transmission line are responsible for transmission of electric power. Electricity is very essential to understand and monitor the behaviour of the system. In this paper, we present a survey of electric transmission line monitoring system, highlight the key concept, and state of art implementation as well as investigate challenges. The goal of this paper is to provide a better understanding of the design challenges of electric distribution line monitoring system and identify important research in this increasing important field.

Keywords: Wireless sensor network (WSN), smart grid, overhead transmission line, electrical distribution system, internet of thing (IOT)

I. INTRODUCTION

For our current society electricity is important, and in order to properly maintain and develop power distribution system, it is needed to understand and monitor the system behaviour [1]. The system behaviour i.e. Power grid constitute the electricity generation system, electric power transmission system, and electric distribution system[2]. Transmission line monitoring is very significant issue to ensure useful and reliable transmission of electricity. For transmission of electric power high voltage transmission line are responsible. Their sag and electric current are important parameter for transmission line monitoring[3]. internet of thing (IOT) used in smart grid is the predictable result of the growth of information communication technology to a certain stage. It will be capable of effective integrate of the infrastructure resources in communications and electrical power system, make the information and communication services manage for electrical power system, increase the level of power system information, and to get better the utilization efficiency of infrastructure in the existing power system. Because IOT technology has been used in smart grid, the important technical support for the generation, transmission, substation, distribution, electricity and other aspects of power grid can be efficiently provided[4]. Smart grid is totally enclosed with an electrical system. For the developing countries, smart grid technology has great importance. Smart grid involve the complete electrical network and regional electrical network and a sub network like local utility transmission grid and distribution grid. Electricity in a remote location is carried by a simple distribution grid linking a central generator to homes. In India during the process of electricity transmission and electricity distribution losses are occurred at very large amount and change between 30 to 45%. Low metering efficiency, theft and pilferage this are the main reason for electricity losses in India [5].for

electricity and security of smart grid, intelligent power line monitoring is important part. For that large number of sensors are required to find out the power system fault in a distributed network.. By including the number of sensor nodes, position of accuracy can be easily found. WSN are generally used to detect and locate the fault [6]. Our goal and contribute in this work is to provide an efficient electrical distribution line.

II. RELATED WORK

A. Transmission line system

High voltage transmission network is found when the transmission line are bounded with each other. In the U.S. these are typically called as 'power grid' or sometimes referred as 'grid'. Transmission line comes in two basic varieties. i.e. Overhead lines and underground cables. Overhead power line is the example of transmission line. Overhead transmission lines are reliable power carriers, & it give the component ability for the present power grid to transmit the electricity from sources to distribution network and then, to the consumers[3]. Internet of thing (IOT) technology used in overhead transmission lines can not only carry outline state monitoring, but also advance the perception of power transmission line. Power line monitoring is generally based on the distribution network of IOT technology and electricity comprehensive data-aware management system[4]. In Underground power transmission line have significant higher cost as well as higher operational limitations and it is sometimes used in capital areas or sensitive location and in underground power transmission cable, finding fault or any damage is very difficult, whereas the advantage of overhead transmission line is that, it is very convenient in order to locate and detect the real time fault, and it is very affordable, very convenient, & eye visualize.

B. How peoples handle power failure issues

Power system in India faces a lot of problems such as intermittent power supply, varying voltage levels with respect to varying load, power theft. The power faced by the existing grid in India are inefficient usage of energy, power theft, manual billing and high cost for maintenance[5]. electric current and line position are two important parameters to measure for transmission line. The electric current flowing in the lines should be measured to avoid/reduced overhead, phase unbalance, fluctuation etc. Current transformer (cts) are typically used for current measurement. And line position should be monitored to keep track of sagging and galloping situations.[3]. Power quality system includes all the significant information like electric switching device, load effect, voltage sag and so on. Voltage, current or frequency deviation are the power problem, which result in failure in power quality or else malfunctioning of the customer equipment..[2].

C. Problem face by manual process of failure handling and monitoring

There are two types of electricity distribution services- three phase and single phase [5]. In three phase transmission line monitoring system, there are four different types of faults that could occur. The first, and the most popular, is the single line - to - line ground fault. The second type of fault is the double line-to-ground fault. The third type of fault in three-phase transmission system is the line-to-line fault. Last fault is known as the balance three-phase fault[1].

By using the undergrounded or compensated coil, power distribution system can be connected to neutral to earth. Single-phase short current is always less as compared to phase-phase short current[6].

D. Possible solutions

Wireless sensor based monitoring of transmission lines provides a solution for several of these concern like real-time structural awareness, faster fault localization, accurate fault diagnosis by identification and differentiation of electrical faults from the mechanical fault, cost reduction due to condition based maintenance rather than periodic protection etc. The use of sensor network has been proposed for a number of applications like mechanical state processing and dynamic transmission line rating function[7].

- Security for public safety :

Lineman provide immediate act to dangerous location, when power line down to roadways or streets, the lineman are assume to call the local police staff in order to make safe that particular area till electric co-operative employed can restore the power to the area. Sometimes lineman must clear tree branches from that area before repairs can be made.

- High voltage substation and transmission line:

High voltage transmission lines and substation supply bulk amount of power from generation of sources, such as power plant or wind farms to substation on the local distribution system. When harm,

high voltage transmission lines and substation should be repair before power can flow to next parts of the system.

- Distribution substation:

Repair to distribution substations are the next maximum priority. the high-voltage transmission services are working properly but still the power is lost. Each distribution substation have a large amount members, each member of the substation should be repair since supply power down the line.

- Main lines:

The power from substation to huge of member of community is carried out by main lines, These main line is one of the component which leaves the distribution substation.

- Tap lines:

These are very small lines, from the main distribution lines there are different branch off to deliver the power to the small group of member.

- Individuals service connection:

Once the lineman repairs the complete system, then lineman works on impairments which are occurred due to individuals service connection. These individual service connection are running unswervingly to a dwelling places and this lines give the facilities from a transformer. If you are unable to report your outages, then your electric cooperative may or may not know you are lacking power then in that case you are the one who is responsible for some part of connection..

Thus the lineman always help to find out the position and accurate fault in a overhead transmission line .

E. Remote sensing devices

. IOT is a large network consists of all kinds of information sensing devices such as radio frequency identification devices (RFID),infrared sensors, global positioning system (GPS). Power IOT are classified into three layers. Perception layer, network layer and application layer. This three layers have enormous effect on economic and social development[8]. Thus IOT technology is used for many remote sensing devices. IOT refers to the network interconnection of everyday objects. IOT connect with the wireless network through the interface by the electronic tag(RFID),sensors, two dimensional codes on objects. Through IOT communication between people and object can be realized. IOT has three basic characteristics: appreciable, internet connective and intelligent. IOT has a four element: information collection, two-way transmission, treatment and feedback control ,which is helpful for many remote sensing devices[9].

Following are some remote sensing devices.

- Power line: power line communication (PLC)is one of the most interesting application. PLC is used in automotive traction battery system to establish a bidirectional communication between the battery monitoring unit and the battery control unit(BCU)[10].

- RF: RF module (radio frequency module) is a small electronic device that is used to transmit as well as receive radio signals between two devices. In an ingrained system it is frequently used to communicate with another device wirelessly.
- GSM: global system for mobile communication. GSM is used to transfer or receive the message from one person to other. GSM model can be connected to central server which help to send the emergency alert SMS to the users.

Sensor is one of the remote sensing devices. Sensor make use to sense the organ in the material world, and it give a various type of raw information, which is essential for transmitting and analysing. This sensor technology is also use for power light, electricity, sound and signal. Sensor are classified as various types of material, there output signals type and manufacturing technologies. Newly nanotechnology has been utilised to provide high performance sensitive material and new sensor production methods.

Due to energy of IOT devices are usually supported by battery, power acquisition problem is very essential for the application of IOT such as power transmission line monitoring system, a variety of sensors, backbone nodes and videos cameras set up in the transmission lines and the transmission towers.

By using the above devices with the IOT technologies in online monitoring of power transmission line becomes the key to solve the many problem[8].

III.CONCLUSION

The paper represent a novel approach for controlling and monitoring the electrical distribution line . It will possible using IOT. Overhead transmission lines are vulnerable to weather, common weather component like smokes, fumes, rainfalls, snowfalls, winds and heavy storms, humidity, line and air temperature, all this things affect a lot, therefore, the damages occurred in power transmission line and due to this type of obstacle power line failure is occurred at any area. For this purpose we need an advance monitoring system. Transmission line is important to measure the use of power line capacity. Electric current and line position are two important parameters to measure the transmission line. The aim of this paper to monitor the line position at any area using the concept of electrical distribution line.

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BIOGRAPHIES



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