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Paper Authors

**R.MAMATHA, V.SREE MEGHANA, CH.AKANKSHA, M.SRAVANI, N.VIDYA**


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# MONITORING THE OPERATION OF TRANSMISSION LINE IN A SMART GRID SYSTEM THROUGH IOT

R.MAMATHA[1] V.SREE MEGHANA[2] CH.AKANKSHA[3] M.SRAVANI[4] N.VIDYA[5]

[1,2,3,4] B TECH Students, Department of ECE, Princeton Institute of Engineering & Technology For Women, Hyderabad, Telangana, India.

[5] Assistant Professor, Department of ECE, Princeton Institute of Engineering & Technology For Women, Hyderabad, Telangana, India.

**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 is 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*: High voltage, short circuit, model, efficiency.**

## 1. INTRODUCTION

It is known that when a fault occurs in overhead transmission line system then instantaneous changes in voltage and current at the point of fault generate high frequency. Electromagnetic impulses called travelling wave which propagate along the transmission line in both directions away from the fault point. The electric power infrastructure is highly end angered against many form of natural and spiffy physical events. Which can sceptically affect the overall performance and stability of the grid. The fault impedance being low. The fault current is relatively high, during the fault. The power flow is diverted towards the fault and supply to the neighbouring zone is affected Voltage become unbalanced. It is important to detect the fault as early as possible that is why a kit is being made using microcontroller to make its 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 have the properties of voltage and current wave that travel on the line with finite speed of propagation. Traveling wave methods for transmission line fault location have been reported since a long time. Following developments employ high speed digital recording technology by using the traveling wave transients created by the fault. Currently, the electric power infrastructure is more vulnerable against many forms of natural and malicious physical events [1], which is directly affect the stability of grid. There will be some parameter which is affected. With this, there is an approaching need to equip the age old transmission line infrastructure with a high performance data communication network, that supports future operational requirements like real in the time record and control necessary for smart grid integration [2], [3]. Due to this technique the real time monitoring is necessary. Many electric power transmission companies have primarily depended on circuit indicators to detect the faulty sections of their transmission lines. However, there are still challenges in identifying the exact location of these faults. Although fault indicator technology has provided a flexible means to locate permanent faults, the technical crew and patrol teams still has to physically patrol and inspect the devices for large duration to detect faulty sections of their transmission lines. Wireless sensor based monitoring of transmission lines provides a solution for several of these disquiet like real time structural awareness, faster fault localization, accurate fault diagnosis by identification and difference of electrical faults from the mechanical faults, cost reduction due to condition based maintenance rather than periodic maintenance, etc. These implementations identify stringent requirements such as fast delivery of enormous amount of highly reliable data. The success of these appeal depends on the design of cost effective and reliable network architecture with a fast response time. The network must be able to transport confidential information such as current state of the transmission line and control information to and from the transmission grid. This research provides an economical substructure to design a real time data transmission network. To observe the status of the power system in real time, sensors are put in various components in the power network. These sensors are able to taking fine grained measurements of a variety of physical or electrical parameters and generate a lot of information. Sending this information to the control centre in a cost efficient and appropriate time is a critical challenge to be addressed in order to build an intelligent smart grid.

## 2. LITERATURE SURVEY

These sources of power contain fossil fuels such as coal and natural gas, hydro, nuclear, solar, and wind power. Furthermore, the transmission system is made up of transmission lines that are in control of passing power from the power station where the power is transferred to the location of the

consumers. The distribution system is the network that supplies power to the load that can be consumed by the user's apparatus [1-2]. IoT is the network of physical substances that include entrenched technology to connect and sense or work together with their interior circumstances or the outer environment. The Internet of Things was "Born" in 2008-2009. By the year 2013, the IoT had progressed into a system by many technologies, going from the internet to wireless communication and from Micro-Electromechanical Systems (MEMS) to established systems. The IoT is supported by traditional fields, and wireless sensor networks, GPS, control systems, and others. The architecture layers of IoT are: the object layer, made of sensors and smart devices, the communication layer deals with latency, error probability, scalability, bandwidth, and security, and the application layer that is grouped based on the type of network, coverage, size, heterogeneity, business model, and real-time or non-real-time requirement. By 2020, the internet will be connected with about 30-50 billion appliances. Thus, the IoT retained the third revolution in the digital technology after the computer and Internet [3]. IoT gets important benefits to the smart grid between other systems. Disaster prediction and prevention of power-lines outages are the most challenging problems for electricity transmission for lots of reasons. For example, analogue collection of the data being generated at remote areas is difficult, but, when using IoT for data acquisition, it becomes just a data gathering and system monitoring and controlling, which is easier. Progressive sensing and communication technologies of the Internet of Things can efficiently avoid or minimize the damage of natural disasters confronted by the power-lines, and hence develop the reliability and stability of power transmission [4].

## 3. RELATED STUDY

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

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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 gird, 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.

## 4. PROPOSED SYSTEM

The architecture of IoT is expressed by three layers i) perception layer, ii) network layer, and iii) application layer, as shown in Figure. The perception layer contains two dimensions, and is usually split into two sub-layers: perception communication extension and control sub-layers. The functions of the perception layer depend on sub-layers. First, the perception control is realizing smart perception of physical world together with recognition, data acquisition, processing, and automatic control with the second sub-layer which is communication extension sub-layer that is connected to the physical entities with the network layer and the application layer by the communication module. The network layer consists of all types of communication and the core network. When the information transmission, routing, and control are often implemented in the fundamental network, the communication network is looked at as the access network. The application layer provides many smart applications for certain industry. Hence, IoT technologies can be combined with all forms of the industrial undertaking. The application layer contains application infrastructure/middleware and terminal units. Through the application layer, the development of economy and society would be influenced greatly when the deep integration of IoT technology with industry is achieved.

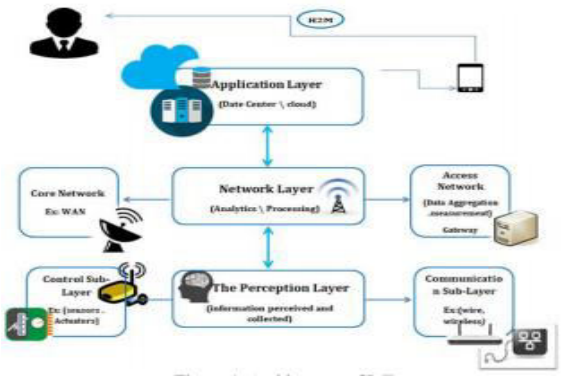


**Fig..4.1. Proposed IOT network.**

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Arduino Uno is the latest revision of the basic Arduino USB board. It is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins: 6 can be used as Pulse Width Modulation- outputs, 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP (in-circuit serial programming) header and a reset button as shown in Figure 5. It covers everything required to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started. It can be extended with a variety of shields: custom daughter-boards with specific features. It is similar to the Duemilanove (Another type of Arduino), but has a diverse USB-to-serial wafer the ATMega8U2, and anew designed labeling to make inputs and outputs easier to identify. The Uno varies from all other Arduino boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter. In the project, we chose the Uno because the drivers (operating systems) are easily available, and the installation takes very little time. The Arduino is shifted to using ATmega16U2 from FTDI chips for 'code burning.

**Fig.4.2. Proposed hardware kit.**

## 5. 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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