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Fault identification: Three phase fault detection using IOT

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ABSTRACT
If we look at the present Transmission line fault detection system, there are several problems, few of which include lack of skilled labour, increased risks and also time consuming process. Automating a process is known to solve many or all of such problems faced in the conventional processes. This is one such attempt to create an easy and cost-effective solution which is applicable in the upcoming power transmission systems for Electricity providers and operators at various stages or stations. The IOT base Transmission fault detection system can detect the fault when the line breaks down and it also shuts down the power supply through the faulty line until the operator shuts down the entire line once he confirms the fault. The system monitors the line fault in sequence for 3 lines namely R, Y, B Phases. Once if fault is detected the system sends the notification to the line monitoring station, it also provides the information about the faulty line and the distance at which the line is broken. The system is also capable of sending the line voltage to the monitoring station.

Keywords: *Arduino UNO, ESP8266 (Node MCU), Relay, Sensor, Display.*

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I. 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. The fault impedance being low. The fault current is relatively high, during the fault. The Voltage become unbalanced because we have found that the Internet of Things (IOT) is a simple, yet a very powerful concept which evolved overtime. "Internet of Things" phrase which is well-known as IOT in short is created from the words "internet" and "Things" where "Things" refers to any internet connected device. IOT technology allows the physical objects to be connected to the internet and enabling the monitor and control of these objects from anywhere. The number of internet users is booming due to advancement in gadgets, computers and mobile phones therefore the IOT paradigm is proving to become a significant part of the modern era. It is estimated that 50 billion things would be connected to the internet by 2020, overshadowing the human generated data. Power system reliability and security has the most important requirement. And to ensure good quality and also continuous power supply to consumers. Due to Lack of monitoring system the utility do not get timely data on the health of lines. Utility comes to only when there is serious fault/damage. The power flow is diverted towards the fault and supply to the neighbouring zone is affected.

II. LITERATURE SURVEY

- "Automatic Fault Detection and Location of Electric Transmission Lines with the help of internet of things" Sajal Menon. The method is provided us in low cost and very high reliable way to locate which is the faults in the electric transmission lines and also supports data storage. Hence this method can be implemented to detect the faults and retrieve the corresponding data anytime.
- "Electric Transmission Line and Fault Monitoring and also Identification System by Using Internet of Things"- S. Suresh. In this Paper we had studied that to IOT is How to Work and they are how to use in our Project."

III. OBJECTIVES

This TPLFD gives the fault location and immediately isolates the faulty part from the healthy part of the network. The circuit installed in power line this faulty area creates messages of location provided to it and will transmit it directly to the area in-charge technician rather than to Electricity board.

At each and every pole the RYB indicators are placed which gives ease of access of faulty phase up to the fault location. According to our survey the cost of one Distance relay is 65 times higher than our TPLFD

circuit, so it is also economically beneficial. It can be used for Distribution (400V to 11kV) as well as Transmission (33kV to 765kV) line by replacing the C.T according to the required ratio.

IV. METHODOLOGY

In this project we use main blocks of circuit is Three phase A.C voltage, sensing circuit i.e. microcontroller, IOT module, sequencer for 3 phases and the voltage sensor to detect the voltage level. The main concept of this project is to detect the variation in the voltage and breakdown of any line which sends the message to the Power distribution authority by the use of IOT system which will helps to know fault in the line. In this circuit main functionality done by the use of sensing circuit which will detect the any variation in the three phase line i.e. variation in voltage or breakdown of electric wire and sends the signals to the sensing circuit. The sensing circuit consisting of resistor network will provide the desired output to Arduino controller in the next stage the variation in the power line will be transferred to the IOT system, where in the Distribution Authority controller or the Operator will be getting the power line fault in terms of phase and the distance of the failed phase line.

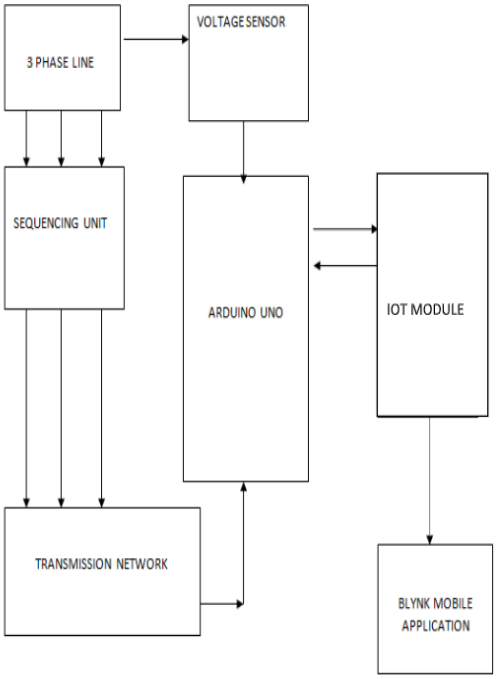

Fig.1. Block Diagram

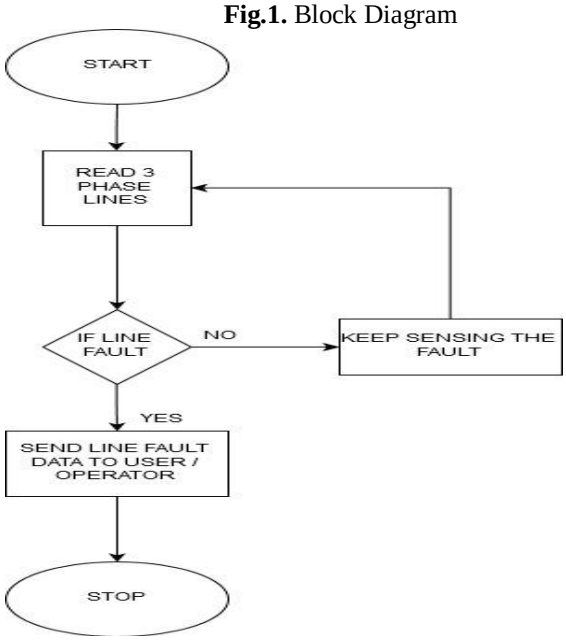

Fig.2. Flow chart

The system breaks down the whole line and once the operator confirms the fault and he manually takes control over the mains of the Transmission line where the fault is generated. The interaction between the operators is done with the help of the Android Application. The App in this project will provide the information of the voltage variation, and the faulty line in the power transmission network and also it will give a real time notification about the power line failure in order to alert the operator. If there is a continuous monitoring of the lines and if the data is available on the internet, then the utility can take required actions in advance so as to avoid the serious damage.

In our project, we demonstrated that the line parameters are monitored and the data is uploaded on the net through IOT.

V. EXPECTED OUTCOME

The model design in such a way to solve the problems faced by consumer. By using such method, we can easily detect the fault and resolve it. It is highly reliable and locate the fault in three phase transmission line and also supposed to data storage. It works on real time so we maintain all data sheet and avoid the future problem in transmission line.

This paper concludes that the GSM technology used for the fault detection of three phase line through calls and messages is provided to the In-charge Technicians of particular faulty location. The messages of fault location will be sent to the all In-charge technicians at the same time by the internal programming of microcontroller connected to GSM Module. The Lamp or Buzzer can be provided if any of the area In-charge technicians doesn't respond by clearing the fault. To get the exact faulty phase under faulty area the RYB Indicators are also provided for faulty phase indication purpose.

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