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IoT Based Transmission Line Monitoring System

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Abstract: *Electrical power is transmitted from the generation plants to end-users at distant locations through the transmission lines. These lines are exposed to various environmental conditions and faults may occur causing power interruption to end users, damage to the power system. The fault detection has been a main objective of power system engineers, in transmission and distribution systems. Identification of fault source is tedious task; fast fault detection can help to protect the equipment before any significant damage of the equipment. The exact fault dictation can help service man to remove persistent of the faults and type the faults occur regularly, thus reducing the occurrence of fault and minimize the time of power outages. The paper is intended to detect the of fault in transmission line using an NodeMCU and the same is transmitted to control center using IoT device.*

Keywords: Transmission line, IoT, NodeMCU

I. INTRODUCTION

The internet of things is a system which is attached with devices like analog, mechanical, digital devices, objects and unique identifiers is provide to the people and sending the data without any human-to-human interference. Monitoring of transmission line is essential to assess the performance and to ensure its safety. Seeing the world which is using IOT is domicile, industrial and defense sector too. IoT in transmission line for monitoring its parameter and checking faults occur in transmission line. Here cloud based real time monitoring is efficient and easy to operate and we know that when a fault occurs in overhead transmission line system then in frequently changes occur in voltage and current at the point of fault generates high frequency. IoT technology allows the physical objects to be connected to the internet and enabling the monitor and control of these objects from anywhere. Here with the help of IoT we will manage monitor different type of faults occur in transmission line and also monitor the parameter of transmission line. [4]

II. IOT

The internet of things or IoT, is a system which is connected between the devices, analog, mechanical and digital machines, objects, animals or people that are provided with unique identifiers (UIDs) and the ability to sending data over a network without requiring human-to-human or human-to-computer interaction. The Internet of Things is simply defining "A network of Internet connected object able to collect and transfer data". IOT is the concept of connecting any device with an ON and OFF switch to the internet and then give a appropriate output.

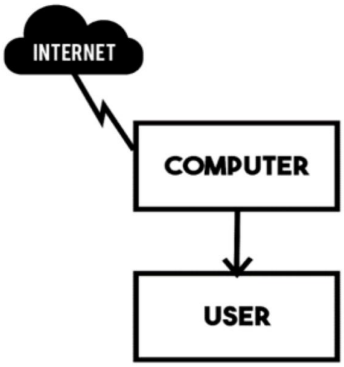

Figure 1: Internet of Things (IoT).

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2.1 NodeMCU

NodeMCU is open source platform, it's hardware design is open for edit/modify/build. NodeMCU Dev Kit/board consist of ESP8266 wifi enabled chip.The ESP8266 is a low-cost Wi-Fi chip developed by Espressif Systems with TCP/IP protocol. More details can be found on ESP8266 Documentation. NodeMCU uses an on-module flash-based SPIFFS (Serial Peripheral Interface Flash File System) file system. NodeMCU is implemented in C and is layered on the Espressif NON-OS SDK. The firmware was initially developed as is a companion project to the popular ESP8266-based NodeMCU development modules, but the project is now community-supported, and the firmware can now be run on any ESP module. Generally, we can find NodeMCU Dev boards of make Amica,DOIT, Lolin & D1 mini /Wemos etc. in market. Amica produces NodeMCU ESP8266 Development Boards v1.0(Version2) with designed hardware specifications. NodeMCU is an Arduino like device. It's main component is ESP8266. It has Programmable pins. It has built in WiFi. It can get power through micro-usb port. It's cost is low. It can be programmed through multiple programming environments.

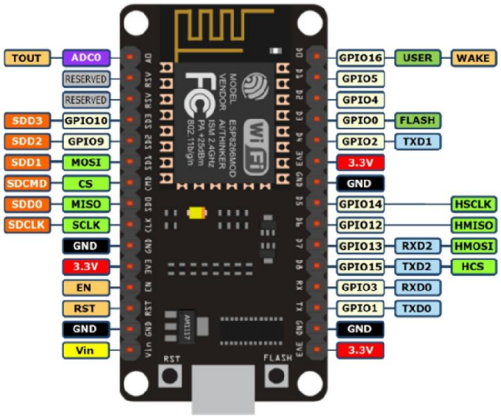

Figure 2: NodeMCU with Pin out reference

2.2 Block Diagram

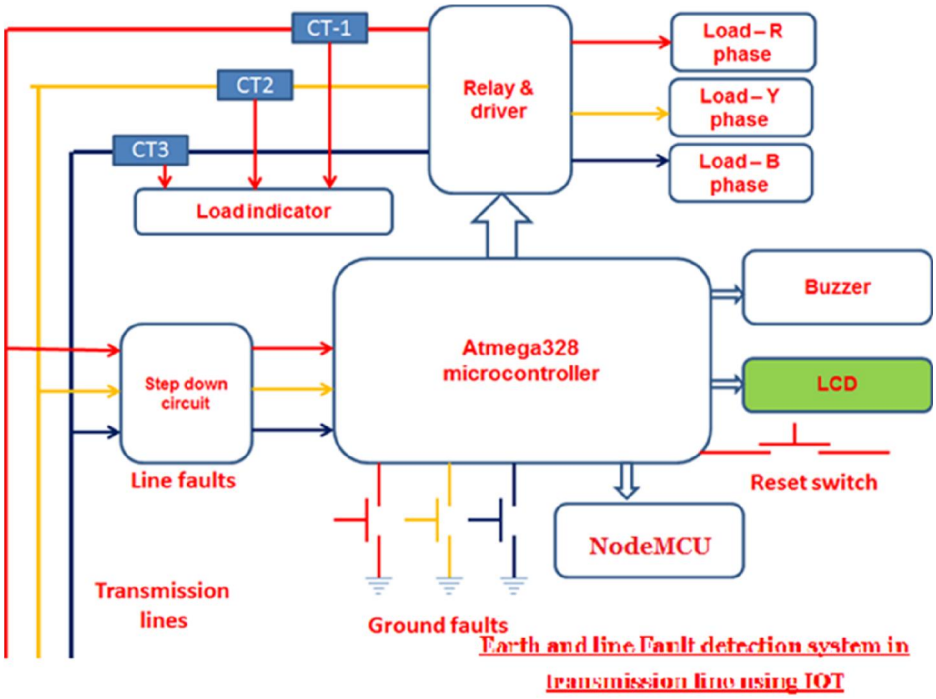

Figure 3: Block Diagram

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III. Proposed Methodology

The proposed project work is concentrated on the monitoring of high transmission line towers. For monitoring purpose, we test the different type of faults. The NodeMCU send to the web page through Wi-Fi module and can set the limit for each fault. If any parameter crosses its limit then system sends the warning message to the authority mobile. The overhead transmission line monitoring system is examined by comparing the calculated values using theoretical equation with the actual measured results. In addition, the proposed system could co-operate with IoT systems to improve its feasibility and practicality. The data of the various sensor are transmitted through the Wi-Fi module and stored in a database. This information of faults could be provided to power companies to improve the safety of transmission lines or serve as reference in power dispatch centre. All data of overhead transmission line recorded in every hour on the hour. Whenever a fault occurs in transmission line it takes time and much more cost to recover it. The risk of living being life is also there. Here use of IoT in transmission line will help to improve in transmission line monitoring and maintains of transmission line, it will also improve the efficiency, reduce the labor cost and save time in maintains of transmission line. Fast repair to revive back the power system and Reduces the time to locate the fault in the field. The system can be tested in the field for real time fault monitoring. IoT services on distributed located devices account for the main energy cost, one way to save on energy cost is to co-locate several services on a device and reduce the bandwidth consumption to save computing and communication energy. Therefore, using IoT in transmission line monitoring is essential and low cost and effective.

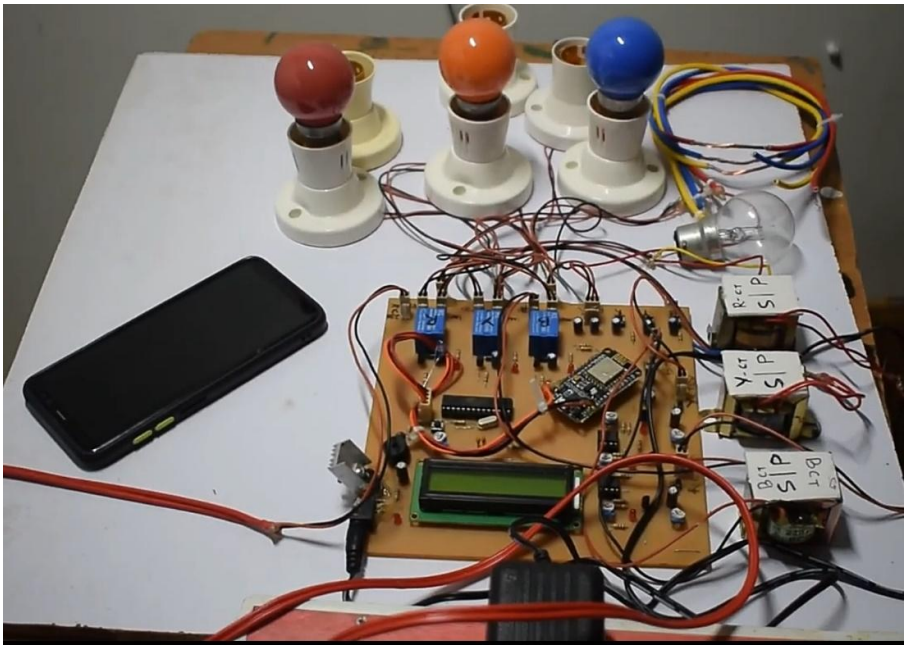

Figure 4: Project setup

IV. Conclusion

Here monitor the fault in transmission lines which is done on the basis of Node MCU Wifi Module. Here projected an IoT based model for recognition of fault in the transmission line. This technique is also given that a very fast speed of operation, which is very essential for the continuity and stability of power quality. Fault in the transmission line is manually introduced for the purpose of demonstration. The fault is transmitted to the control center using Wi-Fi module. The method proposed now provides us a cheap and highly reliable way to locate the faults in the three phase transmission lines and also supports data storage.

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