Three Phase Transmission Line Fault Detection And Analysis System

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Abstract: *The Electric Power System is divided into many different sections. One of which is the transmission system, where power is transmitted from generating stations and substations via transmission lines into consumers. It is now reaching to every distant parts of the world. So we have now a complex network of power system. This power is being carried by the transmission lines. These lines travel very long distances so while carrying power, fault occurring is natural. These faults damages many vital electrical equipment's like transformer, generator, transmission lines. For the uninterrupted power supply we need to prevent these faults as much as possible. The three phase fault detection and analysis system is designed to differentiate the type of fault occur in power system, enhanced with GSM by using the combinations of Arduino. In power transmission accurate detection / location of faults not only save the time but also save resources. These faults lead to substantial damage to the power system equipment. In India it is common, the faults might be LG (Line to Ground), LL (Line to Line), 3L (Three lines) in the supply systems and these faults in three phase supply system can affect the power system. This technology saves human life from this electrical danger by providing the fault detection and automatically stops the electricity to the damaged line and also conveys the message to the electricity board to clear the fault.*

Keywords:, **GSM, Arduino uno,Wireless fault detection**

1. INTRODUCTION

Fault location and distance estimation is very important issue in power systemengineering in order to clear fault quickly and restore power supply as soon as possible with minimum interruption. This is necessary for reliable operation of power equipment and satisfaction of customer. An abnormal condition caused by many factors related to nature like lightning, wind, natural disaster & human error. It means there is a flow of very high value of current above the normal value. Due to this many electrical apparatus like transformer, generator, and transmission lines get affected because of overheating and the
insulation failure. In our project there are three faults are detected are as follows –

1) **LG** – Line to Ground fault

2) **LL** – Line to Line fault

3) **LLL** – Line to Line to Line fault

1) Line to ground –
When one of the phases falls on ground then it is called as line to ground fault.

2) Line to Line fault –
When two lines short circuited to each other then it is called as Line to Line fault.

3) Line to Line to Line fault –
When all three phases short circuited to each other then it is called as LLL fault.

In power transmission systems, the majority of voltage and current signal distortions are caused by faults. Faults that occur in power transmission lines can cause and interruption of power supply. The time required to locate a fault is drastically reduced, as the system automatically and accurately provides accurate fault location information. This will ensure a shorter response time for technical crew to rectify these faults and thus help

save transformers from damage and disasters. A smart GSM based fault detection and location system was used to adequately and accurately indicate and locate where fault had occurred.

The GSM network provides reliable communication quality with nationwide coverage. Short message service (SMS) has now become the most widely used service based upon GSM standard. At the same time the decreasing cost of GSM devices such as mobile phones and the GSM SMS provides a unique address (SIM card number) to the remote control unit and commands can be transmitted in the wireless communication network.There are many courses of faults in power transmission leading to power outages, if not properly managed.

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wireless communication network. Notable among them includes:

- Faults at the power generation station
- Damage to power transmission lines (tree falling on lines)
- Faults at the substations or parts of distribution subsystem
- Lightening

2. BLOCK DIAGRAM AND WORKING

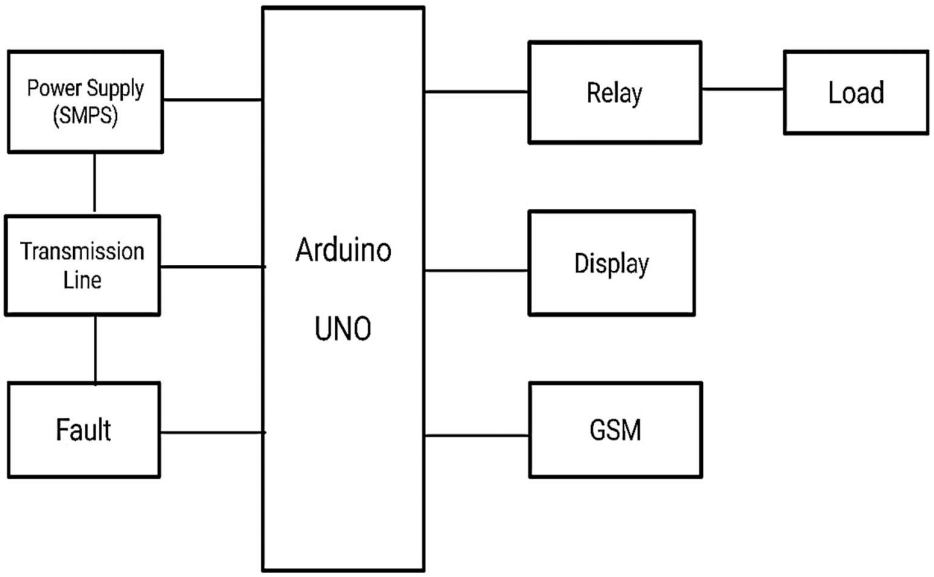

Fig. 1. Block diagram of System

Working:-

1. Firstly we are using 12 V, 1A D.C. Power Supply to run the system the power Supply is mainly given to Arduino & wires (transmission lines) .
2. Then transmission line carries the voltage from one Point to other point. Here we are using 1 sqmm wires.
3. Then with the help of transmission line (wires) we are giving voltage to fault section in which fault is created with the help of Pushbutton.
4. Then these all outputs is given to the Arduino UNO. Arduino is the brain of all the system. The main function of Arduino is if any fault detects then it gives analog signals to GPS, Relay &display at a time.
5. we are using the GSM. GSM will gives the location of fault via SMS at where the fault is created.
6. Then next component is relay. Due to any fault occurance Arduino gives signal to relay & relay is used to trip the load when fault occurred. AS a load we are used there small LED'S which colored AS R,Y,B.
7. Arduino's another output is given to LCD display. We have used 16x2 LCD display, which can give location & which fault is created. (LL, LG, LLL).

3. Advantages

1. Its maintenance cost is less.
2. This system is highly sensitive.
3. It is more accurate, reliable than conventional systems
4. Whenever faults occurs. on transmission line then it send the sms on mobile phone
5. This system easy to install

4. Disadvantages

1.It's initial cost is high

2.Not able to show more faults at same time.

6. conclusion

In this project we identified the different types of faults i.e line to ground (LG) fault, line to line (LL) fault and line to line to line (LLL) fault. We used GSM technology which send the location on mobile phone via SMS. Also LCD Display is used which shows the fault with their location.Here, in this project we have designed a GSM based transmission line monitoring and indication system that sends information of the same to control room via SMS.The implemented system design mainly concentrates on the distribution system. It provides the way to detect the faults such as wastage of energy and power theft. The system continuously monitors various parameters of the system. It also helps to detect the fault at the appropriate time and hence avoids illegal use of electricity.

7. Reference

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