International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 05 Issue: 06 | June - 2021 ISSN: 2582-3930

Smart Fault Detection System in Transmission Lines using GSM

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Abstract-

The electrical system is divided into many different parts. One of them is the power transmission system, which is transmitted by power plants and transformer stations, through wiring to the consumer. But this method will likely encounter all kinds of disorders, which are commonly called "Bugs"."

The error lies in the fact that simply can be defined as a number of unpleasant but inevitable events that can temporarily prevent the steady-state energy of the system, which occurs in case of failure of the insulation system at any time. Intelligent GSM systems, fault detection and location detection have a place to adequately and accurately determine from voltage error.

This will ensure that the technical staff will meet soon to address these issues, and thus help save transformers from loss and man-made disasters. The system uses a current

transformer, a voltage transformer, an 8051 microcontroller, RS-232 serial communication, and a GSM modem. With this project, we discovered the failure of a three-phase transmission line, can control the voltage, current, use of a GSM modem by sending us a message.

Keywords*: Transmission line, fault detection, GSM technology, automatic fault detection.*

1. INTRODUCTION

In an electrical system, most of the voltage and current of the signal is distorted, which is not the cause. Any errors that occur in the transmission lines may cause the power supply to be interrupted. When the amount to do this you need to pinpoint the location of the error has been significantly reduced, as the system automatically and accurately gives absolutely the wrong location for the information.

This will ensure that the technical staff will meet soon to address these issues, and thus help save transformers from loss and man-made disasters. Intelligent GSM systems, fault detection and location is used to determine whether to adequately

and accurately log and locate specific error locations.

Personality and defence, internal errors in the main distribution lines will be presented. Based on GSM technology, they are used to measure, protect and control distribution lines up to various errors. Monitoring of voltage and current changes based on open circuit and short circuit.

In this project, we use an ADC, an 8051 microcontroller, and an LCD display to display errors and settings, and, for summer signalling, the GSM board of directors will be used to send an incorrect signal to the generator. With this project, we can investigate a number of three-phase transmission line errors, can be accurately tracked when transmitting errors.

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.

An error in analyzing the key parameters of the electric power system is required to be more accurate. There is a need for automatic troubleshooting.

2. TYPES OF TRANSMISSION LINE FAULT DETECTION SYSTEM:

Power system's faults may be categorized as shunt faults or series faults.

- **Single line-to-ground fault:**

The most common type of shunt faults is Single Line-to-ground faults (SLG). This type of fault occurs when one conductor falls to the ground or gets into contacts with the neutral wire. It could also be the result of falling trees in a rainy storm. This type could be represented as shown in Fig 1 below.

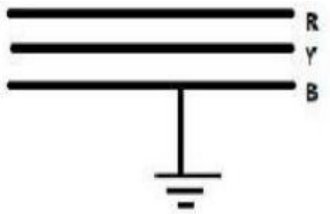

Fig 1 Single Line to ground fault

- **line-to-line fault:**

The second most occurring type of shunt faults is the Line-to-Line fault (LL). This is said to occur when two transmission lines are short-circuited. As in the case of a large bird standing on one transmission line and touching the other, or if a tree branch happens to fall on top of two power transmission lines.

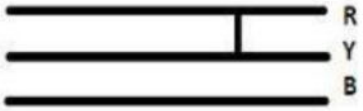

Fig 2 line to line faults

- **line-to-ground fault:**

The third type of shunt fault is the Double Line-to-Ground fault (DLG) in figure below. This can be a result of a tree falling on two of the power lines, or other causes.

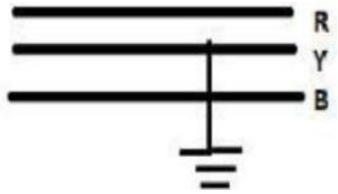

Fig 3 double line-to-ground fault

- **Balance three phase**:

The fourth and the real type of fault is the balanced three phase, which can occur by a contact between the three power lines in many different forms.

Fig 4 Balanced Three Phase fault

2. PROPOSED METHOD FOR DETECTION AND LOCATION OF FAULT

Considerable research has been carried out in the area of fault diagnosis methods, particularly to radial distribution systems. These methods use various algorithmic approaches, where the fault location is iteratively calculated by updating the fault current.

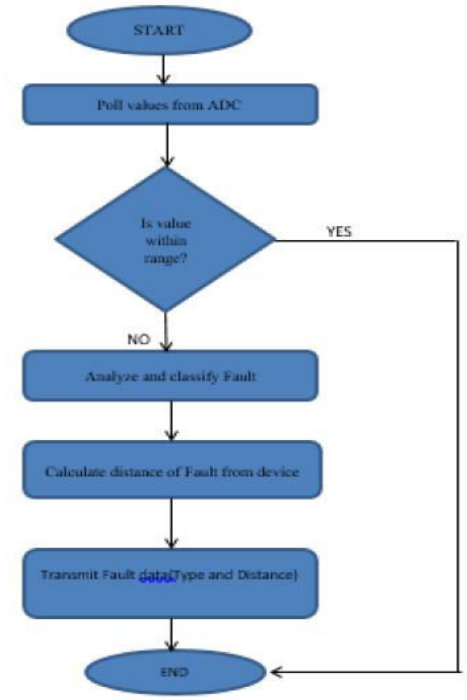

Fig. 1. Flowchart of the Proposed Approach

3. OBJECTIVE

- Develop and effective fault detection and warning systems based on output resistance for overhead and underground power lines.
- To reduce the response time, you need to fix it, save it, and make costly changes as a result of loss or theft, which usually occur during a long power outage.
- In order to increase productivity, technical teams, because the amount of time required locating the error should be minimized.
- To ensure the stability and reliability of the country's electricity supply in order to increase economic growth.

4. BLOCK DIAGRAM

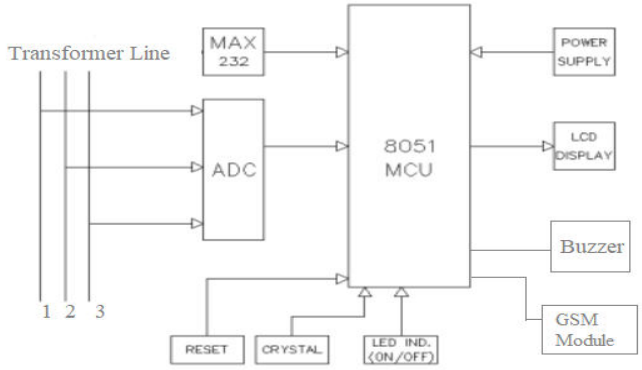

Fig. 2. Block Diagram

5. COMPONENTS

- 8051 Microcontroller
- LCD Display
- GSM Modem
- Transformer
- ADC
- 7805 IC
- Fault Switches
- Transmission line wire
- Other.

6. SCOPE OF THE STUDY

The purpose of this essay is to send a message to the service provider then when a fault occurs on the transmission line. With this model, we can predict fault locations with, the distance from pole to pole. In the future, we may have a global positioning system (GPS) join, so that it will send the exact location of faults occurring in the electrical line, latitude and longitude data. In the future, we can use appropriate programming to find the fault distance from the substation.

The project was designed to send you a message as soon as a fault occurs. With this model, we can predict what the error location is, from pole to pole. In the future, we will need to connect a GPS navigator to it, which was just supposed to send you to the right place in terms of latitude and longitude.

7. ADVANTAGES

1. This system provides accurate information about the type of error that occurred on the LG L-L line, etc

. 2. You can easily monitor the compliance of the transmission system from all over the world, a GSM-based system that provides real-time system status.

3. This system is more flexible than the current system, it is easy to eliminate, it takes time to find errors in each position.

4. You can easily install the pole based on its small size, light weight.

8. CONCLUSION

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. Automatic monitoring, analyzing and recording is done on the PC screen through hyper terminal. The project has continuous monitoring system integrating the GSM communication technology and the microcontroller technology. It also represents the hardware architecture and the software flow. The implementation of the system will save large amount of electricity and thereby electricity will be available for more number of consumers in a highly populated country such as India.

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