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Automatic Fault Detection in Transmission Lines using IOT Technology

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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 IOT 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 Arduino Controller, RS-232 serial communication, and a IOT modem. With this project, we discovered the failure of a three-phase transmission line, can control the voltage, current, use of a IOT modem by sending us a message.
Keywords*: Transmission line, fault detection, iot 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 IOT 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 IOT 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 Arduino Controller, and an LCD display to display errors and settings, and, for summer signalling, the IOT 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. EXISTING SYSTEMS

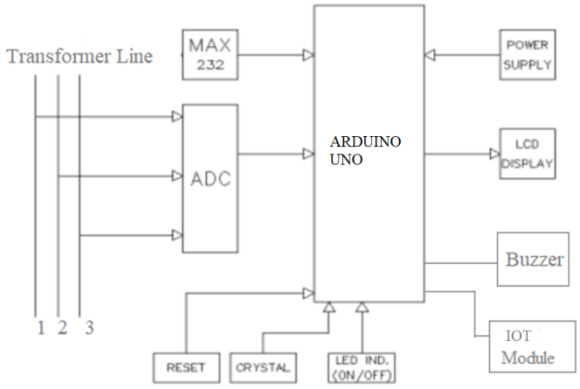
Generally, when a transmission line error occurs, provided that it is fatal, it remains invisible. Finally, however, this small error can cause damage to the output transformer, and it can turn chaos into a person's life. It can also take the initiative related to the brand. Today in India there is no manual system that did not allow that we know in real time the failure. One danger is that, because we do not have a real-time system, it is damage caused to the base equipment, related it if a danger to the environment and humans.
To avoid such situations as much as possible, maintenance and inspection of overhead power lines are usually carried out regularly. This will lead to an increase in labor requirements. The fact remains that the real target-it shouldn't have been met so many times in a row, it may be because of rain and falling trees that couldn't have been foreseen.
To overcome this problem, we offer a mobile device-based power line fault detection system. Passing the pre-set parameters, the controller immediately starts sending messages to the operator and Control line area, Stations entering the pole for polar positions. This will help us achieve, one might say, real-time performance.
The real goal is to have bugs detected in real-time and protect transformers as soon as possible. It is important to note that

the game is very challenging. The power of an 11 KV transformer, the average cost of which is 3000 US dollars. So, here we need to evolve, cost-effectively and quickly, into a system of responses to improve security.

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 to locate 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



5. COMPONENTS

- Arduino Controller
- LCD Display
- IOT 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 IOT-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.

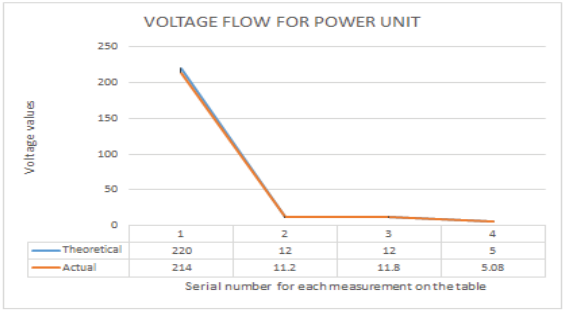
8. RESULTS

- ***Unit testing***

The values of the output voltage of each power unit were observed and noted. These values were compared with theoretical values as shown in Table 1.
Table 1 shows the values of the voltage from the sensing units
Figure 1 is its graphical representation.

TABLE 1: showing discrete voltage readings of the power unit.

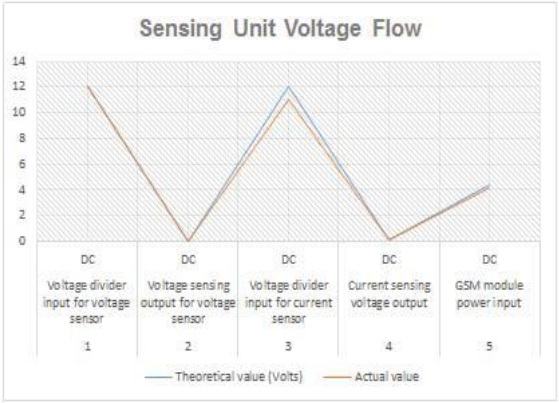
S/N	Measurement	Voltage type (AC or DC)	Theoretical value (Volts)	Actual value (Volts)
1	From the Mains	AC	220	214
2	After Stepping down	AC	12	11.2
3	After rectification	DC	12	11.8
4	After regulation	DC	5	5.08



Graphical representation of Table 1

Table 2 shows the output and input voltage readings of each unit.

S/N	Measurement	Voltage type (AC or DC)	Theoretical value (Volts)	Actual value (Volts)
1	Voltage divider input for voltage sensor	DC	12	12.02
2	Voltage sensing output for voltage sensor	DC	0.0099	0.010
3	Voltage divider input for current sensor	DC	12	11.08
4	Current sensing voltage output	DC	0.0909	0.092
5	GSM module power input	DC	4.4	4.2



Graphical representation of Table2.

- The analysis of fault detection and location system of transmission line. Whether it is any type of fault that can be detected and located. When fault get occurs on the transmission line the signal is send to the control room or mobile phone through a GSM modem.
- The message receive on the mobile that is the fault between pole 1 and 2 and the fault which is symmetrical or unsymmetrical like L-G, L-L, L-L-G, L-L-L, L-L-L-G. The signal that appears on the control room or mobile phone is the L*G or any other type of fault occurred on transmission line.

9. CONCLUSION

In this project, we have developed mobile transmission line monitoring, and a detection system that sends information to a dispatcher via text message. The implementation of systematic design was mainly directed to the distribution system. It provides a way to detect errors that waste energy and power in theft. The system constantly monitors various system parameters. This helps to detect errors in a timely manner and thus prevent illegal use of electricity. Automatic monitoring, analysis and recording is performed on the PC screen, HyperTerminal. This project includes continuous monitoring of the integration system that IOT mobile communication technology and micro technology. It also features hardware and software flow. Using the system, it will save you a lot of energy, which means that electricity will be available to a number of consumers in such a densely populated country as India.

10. FUTURE SCOPE

In this project we detect the exact location of short circuit fault in the underground cable from feeder end in km by using arduino. In future, this project can be implemented to calculate the impedance by using a capacitor in an AC circuit and thus measure the open circuit fault.

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