Real Time Transmission Line Fault Monitoring & Analysing using IoT

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Abstract— Fault monitoring based on Internet of Things technology for Transmission Line is proposed. The proposed diagnostic method monitors online changes in the three phase zero-sequence voltage and current of fixed points on high-voltage transmission lines in real time. The proposed method also equally measures such voltage and current to evaluate the performance of the section and identify short circuits and ground malfunction In fault diagnosis and line maintenance, the Internet of Things enables interflow and interaction among units, such as the detection terminal, signal relay, long-distance control centre and maintenance crew. The proposed detection method has a "self-learning" function; that is, it does not require multiple thresholds on transmission lines with different loads in advance. Performed online in real time, fault diagnosis based on the Internet of Things for electricity supply networks is accurate and convenient.

Key words: Transmission Line, Monitoring, Internet of Things (IoT)

I. INTRODUCTION

Transmission lines carry a very high power which is transmitted from generating station to the substation. To obtained the efficient transmission of power the monitoring of transmission lines are essential. It requires monitoring of all the parameters like voltage, current, frequency, power factor and phase sequence. If any of these parameters may varied from the generating station to the receiving substation the efficient power transfer of transmission lines is affected due to that power loss may occur. To obtain efficient power transmission and analysing of line fault the monitoring of Transmission line is important.

II. OBJECTIVE

The fault detection has been a goal of power system engineers, since the creation of distribution and transmission systems. Quick fault detection can help protect the equipment by allowing the disconnection of faulted lines before any significant damage of the equipment. The accurate fault location can help utility personnel remove persistent of the faults and locate the areas where the faults regularly occur, thus reducing the occurrence of fault and minimize the time of power outages. As a result, while the fault location detection schemes have been developed in the past, a variety of algorithms continue to be developed to perform this task more accurately and more effectively.

III. LITERATURE REVIEW

Transmission lines are used to transmit electric power to distant large load centres. These lines are exposed to faults as a result of lightning, short circuits, faulty equipment's, miss-operation, human errors, overload, and aging. To avoid this situation, and we need the exact location of fault occurrence. This problem is handled by a set of resistors representing cable length in KMs and fault creation is made by a set of switches at every known KM to cross check the accuracy of the same. The fault occurring at what distance and which phase is displayed on a 16X2 LCD interfaced with the microcontroller. Calculated values are sends to the receiving section with help of Zigbee. Measured values are updated in PC and monitored with help of .NET. RTC is used here to time and date reference, that when the event occurs.

The paper deals with the application of artificial neural networks (ANNs) to fault detection and location in extra high voltage (EHV) transmission lines for high speed protection using terminal line data. The proposed neural fault detector and locator were trained using various sets of data available from a selected power network model and simulating different fault scenarios (fault types, fault locations, fault resistances and fault inception angles) and different power system data (source capacities, source voltages, source angles, time constants of the sources).

IV. WORKING PRINCIPLE

To attain our concept need to use ATMEGA controller, voltage sensor, current sensor, Frequency sensor, phase sensor, LCD. The project is assembled with a set of resistors representing a fault creation is made by a set of switches at every to cross check the accuracy of the same. The voltage drop across the feeder resistor is given to an ADC which develops a precise digital data which the programmed microcontroller. The fault occurring at what distance and which phase is displayed on a 16X2 LCD interfaced with the ATMEGA microcontroller. A fault detection and location in extra high voltage (EHV) transmission lines for high speed protection using terminal line data. Finally the IOT technology device modem is used for monitoring the fault at a time.

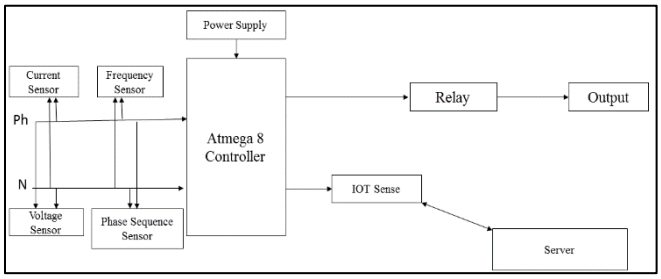

Fig. 1.0: Block Diagram

The transmission line conductors have resistances and inductances distributed uniformly along the length of the line. A representation of an overhead(losses) in transmission line by pi-sections has been implemented using the electric field in a capacitance and detect the fault which are connected to the line sense the corresponding current and voltage, frequency values of the system and feed the output to the ADC of the microcontroller which converts the signal to a digital form in order to be processed by the microcontroller. Finally send the information to the IOT. The

RS serves as the connector between the microcontroller's serial communication port and the modem. The device is placed in the boundary of the regions in the transmission system and the location of the fault is calculated relative to the position of the device.

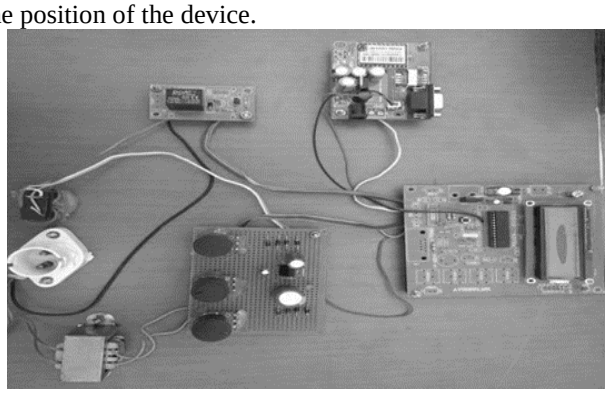

Fig. 1.1: Transmission Line Monitoring using IOT

V. RESULT

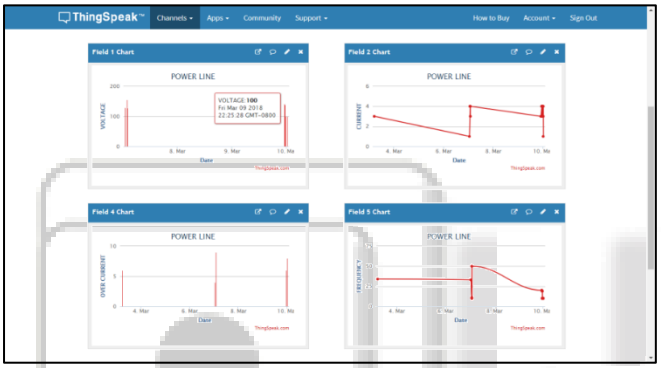

Fig. 1.2: Transmission Line Data at IOT Terminal

VI. ADVANTAGES

- It provides complete monitoring and control of transmission line Faults like changes in voltage, current, frequency, power factor and phase sequences.
- Provides Real time monitoring and control. Transmission line data of any particular time can be obtained.
- Due to Implementation of Internet of Things it provides faster data transfer and requires less time to clear the fault.
- Complete Graph of Transmission line parameters with respect to time is obtained. It provides faster and highly reliable monitoring and control of Transmission line faults.

VII. DISADVANTAGES

- When the signal is in weak condition then the transmission line data cannot be uploaded to the server.
- It requires active internet connection.

VIII. APPLICATIONS

This project can be very useful to the substation areas for accurate monitoring of Transmission line parameters like voltage, current, frequency, and power factor and phase sequence.

IX. CONCLUSION

From this project we had to conclude that the accurate monitoring of transmission line and their faults are made easy. Real time data of transmission lines helps us to maintain the parameters for different load condition with respect to time.

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