An Online Monitoring System for Leakage Current on High Voltage Transmission Line

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Abstract- For our current society electricity is important, and in order to properly maintain and develop power distribution system, it is needed to understand and monitor the system Behavior Construction of smart grid is based on the internet of thing (IOT) are made. Main implementation of temperature and humidity sensor is monitoring equipment's and parameters by using the solar panel. The sag and electric current are important parameter for transmission line monitoring, internet of thing (IOT) used in smart grid is the predictable result of the growth of information communication technology to a certain stage. Transmission line is important to measure the use of power line capacity. Our paper presents easy monitoring and remote control of sensor nodes for electricity network. This paper proposes an efficient system for identifying the issues in transmission line based on Internet-of-Things technologies. The proposed system enhances Internet of things with the parameters like Current flow using Hall Effect sensor, Voltage measurement and Temperature level. It has been designed with the goal to be integrated in smart grid or smart sub-station for protecting the electrical equipment. The system also enables real-time monitoring and notification events through an advanced communication interface using a micro controller architecture.

Keywords- Overhead transmission line fault detection and correction by using the internet of things (IOT).

I. INTRODUCTION

Modern electric system is growing up exponentially. Electrical power transmission line is a critical link between power generation plants and distribution to all electricity users. Length of transmission line is long and there is a possibility of fault occurrence. These faults cause giant damage to expensive equipment and damage stability. So, fault should monitor quickly and isolate faulty line. It is important to protect the transmission system. Sensors can take accurate measurement of an electrical parameters and transfer information to IOT. Increased reliability of operation is one of the major factors, which makes the transmission line fault is important in the power system.

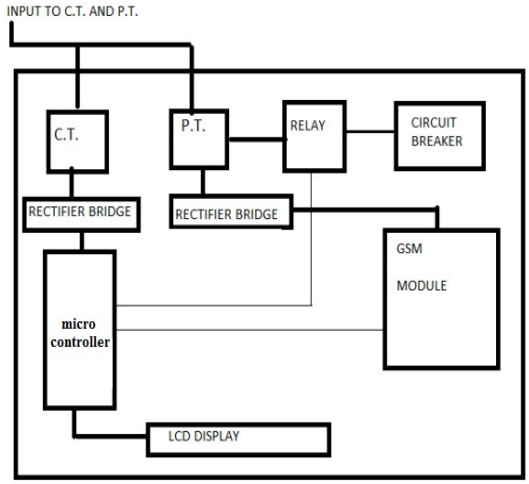
II.CONVENTIONALMETHOD

Microcontroller based relays use the controller to read the load current. The load current is read via a current transformer used in the circuit (C.T.), a current transducer and an Analogy to Digital Converter i.e. the current

is converted from Analogy to Digital form and fed to one of the digital pins of the microcontroller. If the current is greater than the pickup value, then the relay is being sent a signal which then operates to send a tripping signal to the circuit breaker which then opens the circuit.

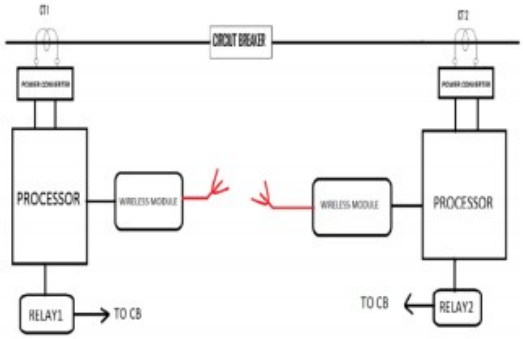
III. BLOCK DIAGRAM

Figure: 3.1



IV. EXISTING BLOCK DIAGRAM

Figure: 4.1



V. EXISTING SYSTEM

Differential Protection of Transmission Line Using Wireless Communication.

Pilot wire differential protection is one of the most common methods for protecting short transmission lines. The conventional protection scheme has drawbacks, such as malfunction due to line disconnection and limited line length. The protection algorithm is based on current signals measured at both ends of the transmission line. The data is exchanged through the wireless communication network. The relay decision is based on data sharing obtained through wireless communication network. Current differential protection

using pilot wire is applied widely on transmission lines as the main protection. Vector difference between the measured currents at the two ends of the transmission line is used for the operation of most current differential relays. The length of the line that can be protected by the pilot wire differential protection is limited by the effect of resistance and capacitance of the pilot wire. Here PIC 16F877A controls the entire system. The PIC compares the values of both the end of the transmission line with the help of embedded C program. The instant value of voltage, current and frequency is measured and monitored with the help of an LCD arrangement which is connected to the port D of the microcontroller. The status of both the end is transferred with the help of a wireless communication through Zig Bee. The systems consist of master and slave section and the master will control the relay in both the section. The relay arrangement which connected in the master station will trip the circuit whenever a fault occurs.

VI. DISADVANTAGES

No specific controller is installed in a power lines for the tenacity of fault recognition. The existing system was not able to detect the faults like short circuit of transmission line overloading and earth faults because of probabilities of collapsing the equipment due to extra-large over load current.

VII. PROPOSED SYSTEM

In our proposed System used to control the temperature and humid and current and voltage sensor using controller. In this solar energy is used to produce the electricity. Construction of smart grid is based on the internet of things (IOT) are made. Smart grid is attractive, and it is a new type of intelligent power system realized with the existing transmission and distribution power infrastructure. To pass the electricity to the consumers Electricity is very essential to understand and monitor the behavior of the system. In this paper, we present a survey of electric transmission line monitoring system. The goal of this paper is to provide a better understanding of the design challenges of electric distribution line monitoring system and identify important research in this increasing important field. In order to overcome the circumstances like overloading of transmission line or short circuit we have planned a simple prototype model of transmission line Protection in the event of Overload in order to prove the conception in detail. In our project we have used current sensor with transmission line in series in order to intellect the fault like short circuit condition and over temperature condition. The Arduino micro-controller will send signals to LCD display instantaneously. It also sends notification with the help IOT module.

Figure: 7.1

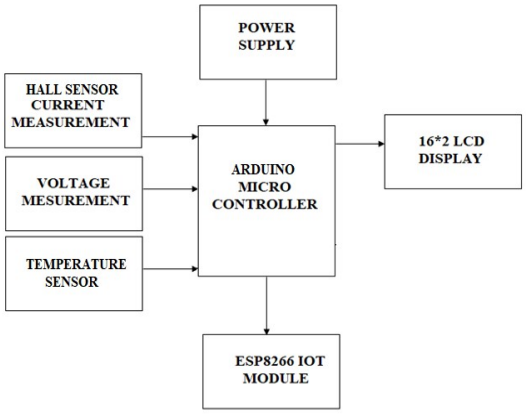
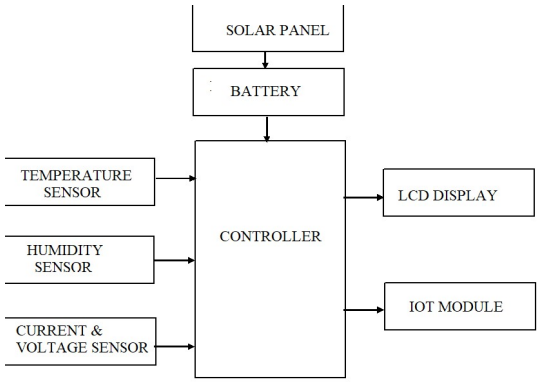


Figure: 7. 2

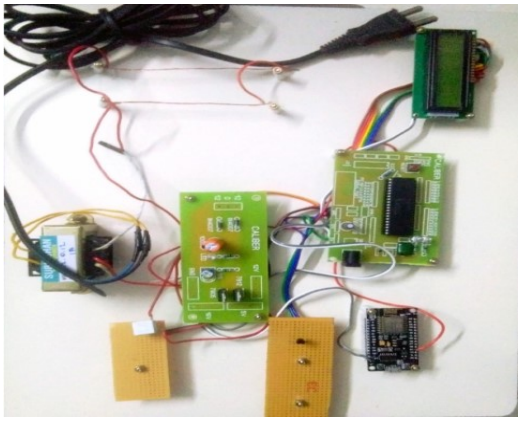


VIII. EXPLANATION

Hall Effect sensor and Temperature sensor is integrated with Arduino controller. IOT based communication is done using the ESP8266 Node MCU module.LCD display is used to show the values of Power utilization and Temperature of the transmission line. Sensors output pin is given to the analog pin of Arduino microcontroller.

IX. HARDWARE PROTOTYPE

Figure: 9.1



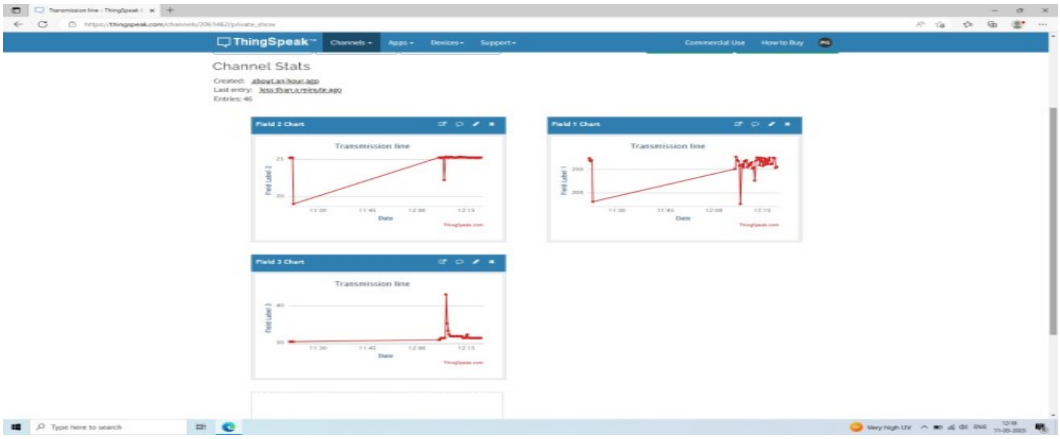
X. HARDWARE COMPONENTS

ARDUINO UNO, LCD DISPLAY, STEP DOWN TRANSFORMER, 7805 REGULATED, POWER SUPPLY, NODE MCU- ESP8266, HALL EFFECT SENSOR.

XI. IOT BASED MONITORING:

OUTPUT SCREENSHOT:

Figure:11.1



XII. ADVANTAGES

System cost is low compared to SCADA, We can see the data through online communication, Large number data aggregation, Predictive analysis, Time saving, Efficient and low cost design, Low power consumption, real time monitoring and Automatically operate.

XIII. DISADVANTAGE

Short range communication, Data failure may occurs, Real time it doesn't helps us to find good result and Data can't be recovered.

XIV. APPLICATIONS

This system can be implemented for protecting Bus bars in sub stations and generating stations, It can also be used for Industrial appliances protection, for monitoring and regulating the home appliances, Power grid primary distribution, High voltage transmission line and Micro grid.

XV. CONCLUSION

This paper described the design, implementation and functional validation of an advanced Transmission line protection device with IoT-based support for integration. The protection device ensures the safety of electrical consumers connected to the public power supply by identifying the several faults: leakage current and over temperature.

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