Detection of Multiple Fault in Transmission Line using IoT

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Abstract:- **Transmission lines are prone to a wide variety of faults due to transmission lines conditions. Diagnosing the fault is difficult and entire cable should be replaced. This project is intended to detect the location of fault in transmission line cable lines from the base station in km using a microcontroller. In case of fault, the voltage across series resistors changes accordingly, which is then fed to an ADC to develop precise digital data to a programmed. It further displays fault location in distance. Using GPS, location can be tracked. The fault occurring distance, phase, and time is displayed on a 16X2 LCD interfaced with the microcontroller. IOT is used to display the information over Internet using the Wi-Fi module. A webpage is created using HTML coding and the information about occurrence of fault is displayed in a webpage.**

Key Words: Voltage sensor, Current sensor, Arduino, Microcontroller, GPS.

INTRODUCTION:

Transmission network is considered to be one of the vital parts of power system. The loss in transmission and distribution network is considered to be very high, compared to other parts of power system. The electric power infrastructure is highly vulnerable against many forms of natural and malicious physical events. Many electric power transmission companies have primarily relied on circuit indicators to detect faulty sections of their transmission lines. Wireless sensor-based monitoring of transmission lines provides a solution for several of these concerns like real time structural awareness, faster fault localization, accurate fault diagnosis by identification and differentiation of electrical faults from the mechanical faults, cost reduction due to condition based maintenance rather than periodic maintenance, etc. These applications specify stringent requirements such as fast delivery of enormous amount of highly reliable data. The success of these applications depends on the design of cost effective and reliable network architecture with a fast response time. The network must be able to transport sensitive data such as current state of the transmission line and control information to and from the transmission grid. This paper provides a cost optimized framework to design a real time data transmission network. To monitor the status of the power system in real time, sensors are put in various components in the power network.

EXISTING SYSTEM:

Tracer method:

The tracer method is an exhaustive way to locate a faulted segment by walking through the cable circuits. A faulted segment can be determined from audible or electromagnetic signals and requires dispatching crew members to the outage area.

There have been various techniques largely used in the industries, including the tracing approach through acoustic, electromagnetic or current.

Terminal method:

The terminal method is a technique used to determine a fault location of a distribution cable network from one or both ends without tracing exhaustively. A bridge technique is one of the most popular terminal methods that links with a resistor to determine a fault location. It is a technique used to detect fault location of cable from one or both ends without tracing.

PROPOSED SYSTEM:

The proposed System is an IOT enabled underground cable fault detection system. When fault occurs in the cable, the voltage varies which is used to calculate the fault distance. The system consists of Wi-Fi module, Microcontroller. The power supply is provided using step-down transformer, rectifier, and regulator. The current sensing circuit of the cable provides the magnitude of voltage drop across the resistors to the microcontroller and based on the voltage the fault
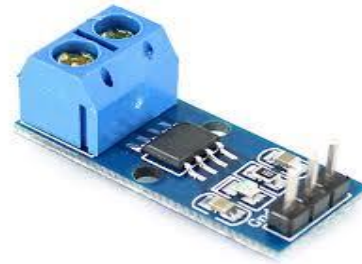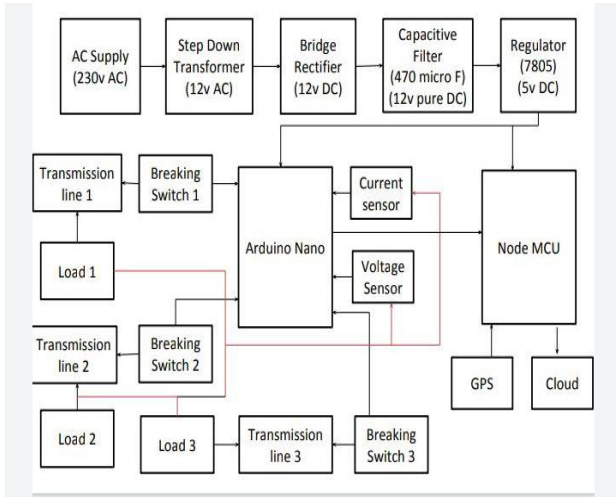distance is located.

ADVANTAGES:

- Detects accurate fault sub location
- Reduce human effort
- Time saving and faster maintenance
- Less software requirements
- Cost effective
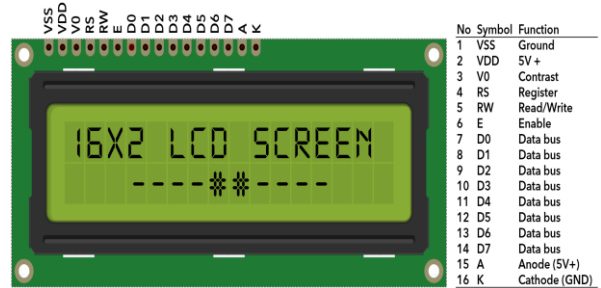- Less complexity

DISADVANTAGES:

- There is lack of GPS signal in some rural areas.
- High initial cost.

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BLOCK DIAGRAM

Power supply:

Arduino works on 3.3V Power supply, So LM117 a 1A low dropout regulator designed to provide
3.3V from a 5V supply. It is ideally suited for systems which contain both 5V and 3.3V logic.

Relay:

Current flowing through the coil of the relay creates a magnetic field which attracts a lever and
changes the switch contacts.

Voltage sensor:

A voltage sensor can determine, monitor and can measure the supply of voltage. It can measure AC
level or / and DC voltage level.

Current sensor:

The generated signal can be used to display the measured current in an ammeter, or can be stored for further analysis in a data acquisition system, or can be used for the purpose of control.

LCD (Liquid Crystal Display):

An Interface IC is used for the hectic task to handle with the help of MCU. The function of the IC is to get
the commands and data from the MCU and process them to display meaningful information onto the LCD screen.

Arduino :

Arduino consists of a circuit board, which can be programmed and a ready-made software called Arduino IDE (Integrated Development Environment), which is used to write and upload the computer code to the physical device

Global Positioning System (GPS):

The Global Positioning System (GPS) is a satellite-based navigation system made up of at least 24 satellites. Each satellite
transmits a unique signal and orbital parameters that allow GPS devices to decode and compute the precise location of the satellite.
GPS receivers use this information and trilateration to calculate a user's exact location.

Internet of Things (IOT):

Internet of things (IOT) provides a simple and secure connection for sending and retrieving data in real time. This platform supports interactive, real-time data visualization that allows developers to extend the platform for private customization when desired. It exists to empower the data from device.

CONCLUSION:

The short circuit fault at a particular distance in the transmission line is located to rectify the
fault efficiently. The work automatically displays the phase, distance and time of occurrence of fault with the help of

Arduino. The benefits of accurate location of fault are fast repair to revive back the power system, it improves the system performance, it reduces the operating expense and the time to locate the faults in the field.

Ubidots:

Ubidots is an Internet of Things (IoT) data analytics and visualization company. We turn sensor data into information that matters for business-decisions, machine-to-machine interactions, educational research, and increase economization of global resources. Ubidots exists as an easy and affordable means to integrate the power of the IoT into your business or research.
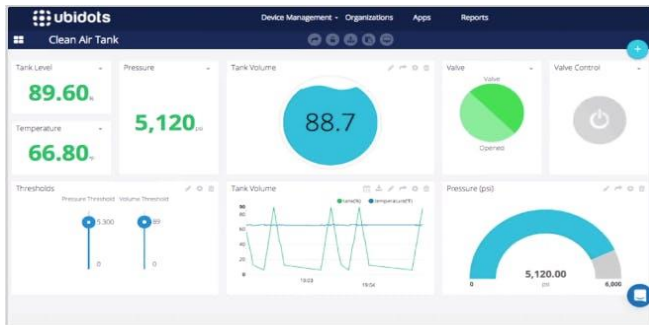
Graphical Representation Of Several Data
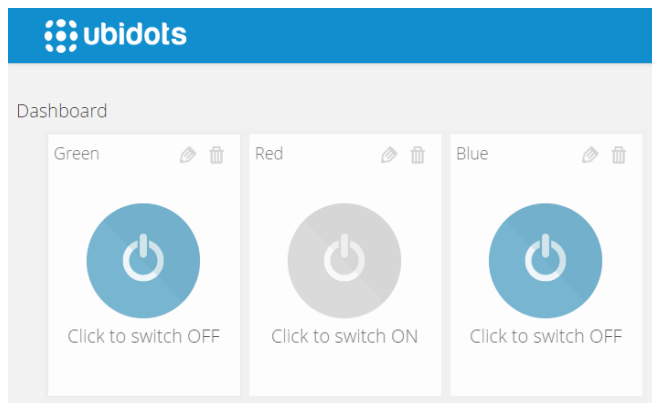
Switch Control Using Ubidots.

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