IOT BASED QUICK DETECTION OF TRANSMISSION LINE FAULT AND MONITORING

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Abstract: The fault location detection has been a goal of power system engineers, since the creation of distribution and transmission systems. Quick fault detection can help to 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 to 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. The detection and location of faults on power transmission lines is essential to the protection and maintenance of a power system. Most methods of fault detection and location relate to the measurements of electrical quantities provided by current and voltage transformers. These transformers can be expensive and require physical contact with the monitored high voltage equipment.

Keywords*: IOT, Relay, PIC microcontroller , sensors, NRF.*

I. INTRODUCTION

CURRENTLY, the electric power infrastructure is highly vulnerable against many forms of natural and malicious physical events, which can adversely affect the overall performance and stability of the grid. Sending information to the fault detection transformation in the transmission line and sending EB short message immediately. This method is used to ensure that no matter where the fault has occurred, immediately detecting silk risks. Also on our project, the voltage that can be moved into the transmission line is tracked by the display. This can detect the voltage change in the transmission line. If there is a repair in places that are very close to it or the line is hollow, it is more likely to cause an accident in either the water or the transmission line, so this can prevent the accident and prevent the accident.

NRF is used in this way. In transmissions line poles the information is sent by NRF to the silk PIC microcontroller. NRF'S capacity can be 90 meters distance. The transmitter uses the fault-aware transformer side information in the transmission line where the NRF information showdown transforms through the microcontroller. At the same time, EB cables are reported that there is no fault with the GSM. The supply goes to the consumer who takes more than the energy offered. Additionally, there is an impending need to equip the age old transmission line infrastructure with a high performance data communication network that supports future operational requirements like real time monitoring and control necessary for smart grid integration. Many electric power transmission companies have primarily relied on circuit indicators to detect faulty sections of their transmission lines. However there are still challenges in detecting the exact location of these faults. Although fault indicator technology has provided a reliable means to locate permanent faults, the technical crew and patrol teams still has to physically patrol and inspect the devices for longer hours 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 research 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. These sensors are capable of taking fine grained measurements of a variety of physical or electrical parameters and generate a lot of information. Delivering this information to the control centre in a cost efficient and timely manner is a critical challenge to be addressed in order to build an intelligent smart grid. Network design is a critical aspect of sensor based transmission line monitoring due to the large scale, vast terrain, uncommon topology, and critical timing requirements. Mechanical faults, cost reduction due to condition based maintenance rather than periodic maintenance, etc. The use of sensor networks has been proposed for several applications like mechanical state processing and dynamic transmission line rating applications. To monitor the status of the power system in real time, sensors are put in various components in the power network.

In these works, the goal is to deploy multiple different sensors in critical and vulnerable locations of the transmission line to sense mechanical properties of its various components and transmit the sensed data through a suitable wireless network to the control centre. However, most of these works address this theme at a very high level of abstraction. Small scale real world deployments of wireless sensors include tension monitoring using load cells and power conductor surface temperature monitoring. This 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).

Current sensor: Onboard precision micro current transformer, which can transform AC signals o large current into small amplitude signals. The maximum current that can be detected can reach 5A, and the present current signals can be read via analog I/O port.

Voltage sensor:

A simple but very useful module which uses a potential divider to reduce any input voltage by a factor of 5. This allows you to use the analogue input of a microcontroller to monitor voltage much higher than it capable of sensing. For example with a 0-5V analogue input range you are able to measure a voltage up to 25V. The module also includes convenient screw terminals for easy and secure connections of a wire.

Pic16877a:

The PIC16F877A features 256 bytes of EEPROM data memory, self programming, an LCD, 2 Comparators, 8 channels of 10-bit Analog-to-Digital (A/D) converter, 2 capture/compare/PWM functions, the synchronous serial port can be configured as either 3-wire Serial Peripheral Interface or the 2-wire Inter-Integrated Circuit bus and a Universal Asynchronous Receiver Transmitter (USART). All o these features make it ideal for more advanced level A/D applications in automotive, industrial, appliances and consumer applications.

Gsm modem:

The SIM800 modem has a SIM800 GSM chip and RS232 interface while enables easy connection with the computer or laptop using the USB to Serial connector or to the microcontroller using the RS232 to TTL converter. Once you connect the SIM800 modem using the USB TO RS232 connector, you need to find the correct COM port from the Device Manager of the USB to Serial Adapter. Then you can open Putty or any other terminal software and open a connection to that COM port at 9600 baud rate, which is the default baud rate of this modem. Once a serial connection is open through the computer or your microcontroller you can start sending the AT commands. When you send AT commands for example:

“AT\r” you should receive back a reply from the SIM800 modem saying “OK” or other response depending on the command send.

NRF:

This is an RF data modem working at 2.4 GHz frequency in the half-duplex mode with automatic switching of receiver/transmit mode with LED indication. Receives and Transmits serial data baud rate of 9600 bps at a 5V level for direct interfacing to microcontrollers.

RF modem can be used for applications that need two-way wireless data transmission. It features high data rare and longer transmission distance. The communication protocol is self-controller and completely transparent to the user interface.

Voltage regulator - 12v

This is the basic L7812 voltage regulator, a three-terminal positive regulator with a 12V fixed output voltage. This fixed regulator provides a local regulation, internal current limiting, thermal shut-down control, and safe area protection for your project. Each one of these voltage regulators can output a max current of 1.5A.

Features

- Output Voltage: 12V
- Output Current: 1.5A
- Thermal Overload Protection
- Short Circuit Protection
- Output Transition SOA Protection.

One way relay

The relay module 5V, low level trigger

II. DESCRIPTION:

The module complies with international safety standards, the control region and load region isolation trench; Song Music relay. With the power supply and relay instructions, pull off, disconnect does not shine; The signal input signal, and the common terminal and the normally open will be turned on. Can be used for microcontroller development board module can be used as appliance control; The control of DC or AC signal can control the 220V AC load.

There is a normally open and one normally closed contact. Blue KF301 terminal connected to the control line is more convenient. About high and low trigger mode instructions, friends do not understand take a look: High voltage trigger finger is triggered, it can be understood as a mode signal input terminal and the VCC short circuit triggered the positive electrode between the signal input and ground. Low voltage trigger refers to the signal input terminal and the ground is OV trigger modes, can be understood as a way to signal input terminal and GND negative short-circuit triggered.

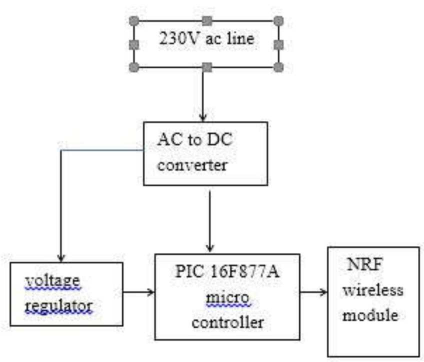

Figure.1. Pole-1 Block Diagram

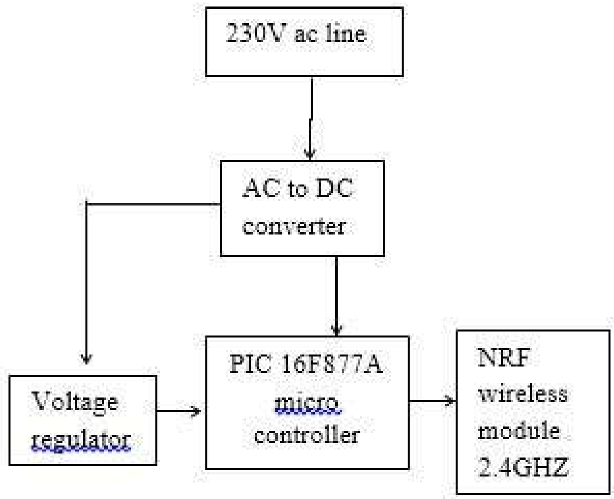

Figure.2 Pole-2 Block Diagram

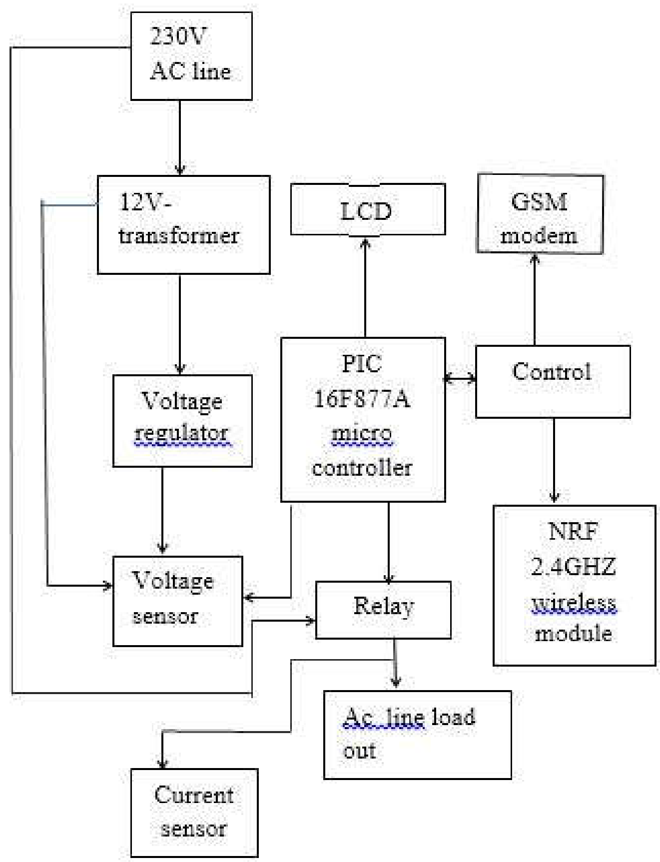

Figure.3 Transformer Side Block Diagram

III. SCOPE OF RESEARCH:

Our main aim is to prevent our research from falling off the electricity to prevent the accident and prevent the power outage. Our main objective is to prevent damage to the transmission line during rainy season and prevent damage to life.

IV. EXPERIMENTAL RESULT AND CONCLUSION

The result of our research is that after the transmission line has been repaired, the transformer will automatically showdown and the Electric Ford quoted shortly by the GSM, and the voltage variation is shown in the display.

In this paper, present an optimal formulation for a cost optimized wireless network capable of transmission of time sensitive sensor data through the transmission line network in the presence of delay and bandwidth constraints. Our analysis shows that a transmission line monitoring framework using WSN is indeed feasible using available technologies. The proposed method with formulation is generic and encompasses variation in several factors such as asymmetric data generation at towers, wireless link reliabilities, link utilization dependent costs, non-uniform cellular coverage characteristics and requirements for cost optimized incremental deployment. The evaluation studies show that the main bottleneck in cost minimization is wireless link bandwidth. Further, in cases of increasing flow bandwidth, the limited wireless link bandwidth leads to a feasible but expensive design due to increased dependence on cellular network to satisfy constraints

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