IOT Based Fault Monitor And Detection System For Transmission Line

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Abstract: The monitoring of substation requires a person who monitors the fault continuously. Also there are so many substation in a District and state.It is important to detect the fault but the fault cannot be monitor by the higher authority. So our goal is to monitor the fault remotely and update the fault to the cloud . So it is easy to monitor the fault and to provide faster servic.The fault consisting of 3 phase ,1 phase ,2phase and loading. Our system can detect the fault and send these fault remotely.
Keywords: WIFI-MODULE, AVR Atmega 328, Fault Detection.

I. Introduction

Electricity power is being carried by the transmission lines. These lines travel very long distances so while carrying power, fault occurring is natural. These faults damage many vital electrical equipments like transformer, generator, transmission lines. For the uninterrupted power supply we need to prevent these faults as much as possible. So we need to detect faults within the shortest possible time. Microprocessors and microcontroller based systems used for these fault detection have been advancing rapidly. The proposed paper simulates Numerical over current relay that detects faults using microcontroller and ADC. These relays are more reliable and have faster response than the traditional electromechanical relays and Static relays. They have increased range of setting, high accuracy, reduced size, and lower costs, along with many other functions, such as fault event recording, auto resetting, etc.
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II. Litrature Survey

In these paper. In this project has three sensors potential transformer, proximity sensor, and temperature sensor. The potential transformer is used to measure the voltage, temperature sensor is used to measure the machine temperature and proximity sensor is used to measure speed of the machine . The three sensors are measure the values continuously with the help of ARM controller then update the values in internet with the help of Ethernet adaptor.

In these paper the implementation of a microcontroller-based protection for transformer using multifunctional relay. The model uses various analog devices for conversion purposes and displays the current values as sensed by the micro controller. In this paper two modules were developed, the first module uses potential transformer to sense the AC line Voltage and converts it into DC using a bridge rectifier. The sensed voltage is then fed to the Analog to Digital port of the microcontroller. The signal so obtained is compared with reference value stored in EEPROM of microcontroller and trip signal is activated under fault condition. In Second module MQ9 gas sensor is used to perform combustible gas detection.

This paper pre a transformer winding fault diagnosis and prognosis method based on self-powered radio frequency identification (RFID) sensor tag. The proposed RFID sensor tag, which consists of RFID tag, power management circuit, MCU, and accelerometer, can acquire the vibration signals of transformer winding from the tank by accelerometer, and then wirelessly transmit the signals to the RFID reader. An inductive energy harvester utilizing surrounding magnetic field is optimized as power supply for the proposed sensor tag, including the MCU and the accelerometer.

,"Microcontroller Based Earthquake Detection System for Spontaneous Cut-off of Domestic Utility Lines for Safety Measures "9th International Conference on Electrical and Computer Engineering 20-22 December, 2016, Dhaka, Bangladesh.

In these microcontroller operates a relay and a motor that cuts off electricity and gas supplies respectively during the event of an earthquake, helping to prevent associated potential disasters

III. Proposed Methodology
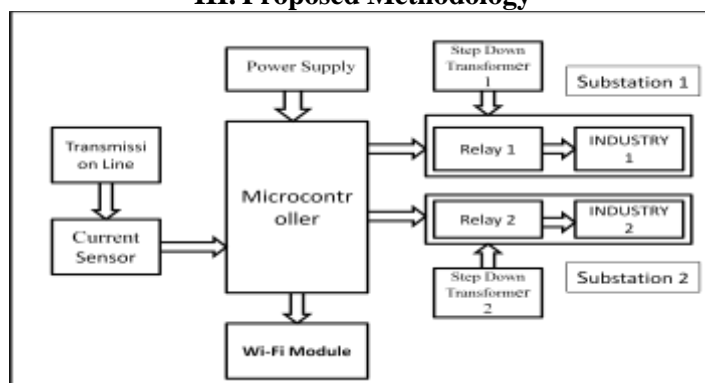
Figure: 1 Block diagram of IOT based fault monitoring and detection system.

Figure 1 shows the block diagram of IOT based fault monitoring system. The system consists of various modules like Wi-Fi module, Relay module, Transformer, microcontroller AVR ATMEGA 328. The proposed fault monitoring and detection system for transmission line comprises of current sensor ,Wi-Fi module ,step down transformer ,Relay module and Load(i.e. Industry L1,Industry L2).The current sensor used here is ACS712 which detect the current .If the value of current increases beyond the expected value then the microcontroller send alert to the cloud. Substation 1 and substation 2 are shown in the block diagram. Each substation having step down transformer with relay and load.If the fault occurs at each substation then the microcontroller detects the information and send breakdown message via wifi module. Wi-fi module is used to send information over cloud. DC 5volt Power supply is required for relay and microcontroller module. Same power supply is used for current sensor and wifi module.

IOT : Internet of Things

IOT is short for Internet of Things. The Internet of Things refers to the ever-growing network of physical objects that feature an IP address for internet connectivity, and the communication that occurs between these objects and other Internet-enabled devices and systems. The Internet of Things extends internet connectivity beyond traditional devices like desktop and laptop computers, smartphones and tablets to a diverse range of devices and everyday things that utilize embedded technology to communicate and interact with the external environment, all via the Internet.

WI-FI MODULE:

Figure.2 ESP8266 module

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The ESP8266 **WiFi Module** is a self contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your **WiFi**network. The ESP8266 is capable of either hosting an application or offloading all **Wi-Fi** networking functions from another application processor.

AVR ARDUINO

Arduino Uno is a microcontroller based board that comprises of ATmega328P microcontroller as its focal part. The ATMEGA 328P is an AVR group of microcontroller that has 14 computerized I/O pins (out of which 6 have PWM bolster), 6 (A5-A0) simple information pins, 2 pins (RX and TX) for sequential correspondence, 2 pins for (I/Oref. what's more, Aref) for ADC and 3 pins (3.3V , 5V and Vin) for supply voltage.
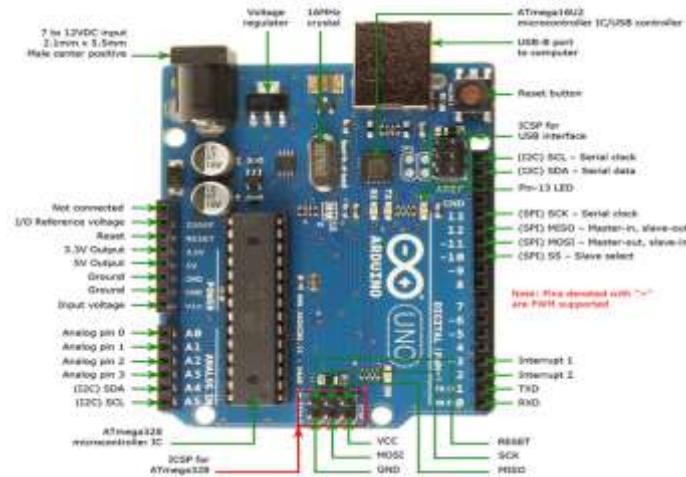
Figure: 3. Arduino UNO board

The ATmega328P has an aggregate of 32 KB of glimmer memory, 2 KB of SRAM and 1 KB of EEPROM with a clock speed of 16MHz. Every I/O stick in ATMEGA 328P can get or give 20mA current. The greatest estimation of current which an I/O port can withstand is 40mA. An imaginative element that is given in Arduino Uno is it is reset by the product running on concerned PC as opposed to squeezing a reset catch physically before a transfer.

C. GPS Module:

Figure:4. GPS Module

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The Global Positioning System (GPS) is a satellite based route framework comprises of a system of 24 satellites situated into space. The framework gives basic data to military, common and business clients around the globe and which is unreservedly available to anybody with a GPS collector. GPS works in any climate conditions at anyplace on the planet. Ordinarily no membership expenses or framework charges to use GPS. A GPS beneficiary must be bolted on to the flag of in any event three satellites to evaluate 2D position (scope and longitude) and track development. With at least four satellites in sight, the recipient can decide the client's 3D position (scope, longitude and elevation). Once the vehicle position has been resolved, the GPS unit can decide other data like, speed, separation to goal, time and other. GPS collector is utilized for this examination work to identify the vehicle area and give data to mindful individual through GSM innovation.

D. RELAY:

Figure:4. GPS Module

The Single Post Twofold Toss SPDT transfer is very helpful in specific applications due to its inward arrangement. It has one basic terminal and 2 contacts in 2 distinct arrangements: one can be Ordinarily Shut and the other one is opened or it very well may be Regularly Open and the other one shut. So fundamentally you can see the SPDT transfer as a method for exchanging between 2 circuits: when there is no voltage connected to the loop one circuit "gets" current, the other one doesn't and when the curl gets stimulated the inverse is going on.

IV. Conclusion

The system can detect the fault through microcontroller using transformer and relay module .The microcontroller seses the fault and update to the server .The system is efficient to work with electricity department. Multiple system can be implemented and use for fault detecteion real time monitoring of different parameters is done which can provide safety to the substation and its equipments.

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