International Journal of Engineering Applied Science and Management
ISSN (Online): 2582-6948
Vol. 3 Issue 10, October 2022

A Research in Transformer Fault Detection with Particular Location Define by Online Monitoring System

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Abstract: *In This Paper Work on the IOT based transformer fault detection. In this project, we will show the location of the fault in the transformer, where the fault is actually location define on fault This work's prime objective is to develop an IoT (Internet of Things) based system that can be used to protect the transformer by monitoring and controlling the operating parameters, i.e., current value, oil level, etc., and reports that same. location is playing a vital role in the electrical power grid. As it deals with high voltage and current which can greatly affect the functioning and physical condition of the device, continuous monitoring has become an integrated part of its operation. This paper presents a review on IoT (Internet of things) based electrical parameters monitoring and controlling technology to avoid its successive catastrophic failures. Here, different sensors and server models are used for communication, mostly used is GSMGPRS. In case of some abnormality, this advanced monitoring system will deliver a message to a dedicated device for further course of action. The work done in recent few years in the field of parameter monitoring using the internet is discussed here. The fault detection system is implemented for three phase electrical distribution system. A practical prototype system can be implemented for Transformer fault detection in power system and also the system is successfully designed using 8-bit Microcontroller which allows the detection of faults. Navigation system have designing of Transformer fault monitor to track fault and detections in power electronics unit system and also implemented embedded system using microcontroller" ATMEGA-328 " in which work by electric unit of the transformer scanning line of cloud monitor to using detection of faults. Parameters equation like as KVL and KCL electric circuit and power electronics used a i.822-protocol Communication USART Master Microcontroller is done.*

Keywords: *Micro Controller Atmega328 , ESP32 Node MCU ,Transformer line power transmission.*

1. Introduction

In this thesis is representing IOT Based Transformer fault Cloud monitoring system. Transformer unit its static electric device which device perform transforms electrical unit load power unit device from line circuit power to another load without any current direct electrical connection with the easily helps of mutual power induction coupling between primary-1 and secondary-2 windings it transformer power unit from one circuit load to another without any-1 changing over current its frequency but may be in voltage level a practical prototype system can A practical prototype system design can work be line use at for any line-1,2,3 fault detection. Transformers device are the common-major electrical power unit a system electric and electronics power components which are used at different voltage levels with the loading power capacity at varying due from 1kva to 600mva . A damaged to this component equipment's results in complete losses of power to any system. Transformer power energy unit is electrical device performing which distribute load of power to the low-1 voltage users directly this effective powered system reliability power. Overload power problem and ineffective

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heat of cooling temperature in Xmr is the major equipments line causes of failure in distribution transformers [2]-[4]. This system will be help in find the electricity unit in this power system. Xmr will also helping provide to minimum the shortage of the electricity. Xmr-1 master i.82xx slave communication with the mod bus "IOT" protocol is implemented. Also applying Wi-Fi technology IOT , sms is send to a security person on mobile. GSM sim-800 nd GPS st-20 module has design an common optional for wireless communication applications. The GSM Sim-800 modem line network provides flexible device art of communication "USART" quality-factor with nation widely coverage. A "Short message service" (SMS-1) has now god system become to the most of cost wide used service provider based work upon standard. At the working as kvl same cloud data time the decreasing cost of NodeMCU devices sim 4G LTE such as smart android phones and the GSM sms provides a unique address (SIM 4G card number) to the remote monitor at cloud data and commands can be transmitted UART in the wireless communication network. A electric control power system transmission systems, the high level of voltage and current signal distortions are caused by Transformer Fault.

2. Methodology

The main aim is to develop a methodology useful for power transformer protection and detect problems before exceeding the preset value. The data monitoring system is shown in Fig. 1, mainly composed of RTU and public data system (transmission). The RTU includes a microcontroller unit, peripheral circuits, and a wireless communication module. The hardware is made of various sensors - all connected to the transformer, and their outputs are fed to the microcontroller. The microcontroller also has a wireless module connected to it. This module will transmit the data to the server using the internet.

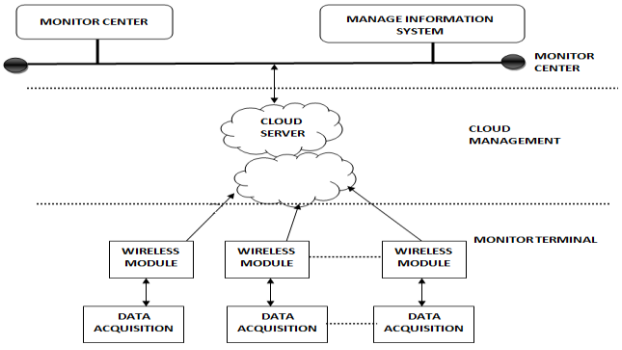

Figure.1:- Data monitoring system

IoT technology has got large applications in various fields like Smart home, Smart Building, Smart City, Smart transportation and traffic control, Smart water Management system, Smart industrial applications, Smart Healthcare, etc. Likewise it is also getting applications in upgrading the power grids systems surveillance and effective control. This is enhancing the transmission and distribution systems performance ability, service availability, reliability, safety and security of the equipment connected to .The pillar of IoT technology is based on the following building blocks like data through sensors and actuators, hardware or software gateways to communicate between controller, sensors and intelligent devices, Edge IT and data centre [8].Fig. 1 shows the basic building blocks of IoT technology. The system detects the fault in the transformer and sends location to centralized control system. If the Transformer fails or any other fault takes place the line is by-passed or by any means the electricity is used and reading of the power consumed is monitor. The transformer fault detection algorithm consumes a great deal of energy in fault detection, especially in the condition of pursuing excellent accuracy. Because of the character of large scale development and massive data gathering, we propose using numerical taxonomy method to extract feature [10].Then algorithm is reset to detect new fault. In this circuit its way it omits the detect and transmit nodes' hardware parameters frequently, and does the calculating works in sink node which has unconstraint energy, as a consequence, it realizes he purpose of saving energy.

We denote as the initialize energy of every node is showed by equation (1) (2).

$$\begin{cases} E_{Tx}(l,d) = lE_{elec} + l\varepsilon_{fs}d^2, if d \le d_o & (1) \\ E_{Tx} = lE_{elec} + l\varepsilon_{amp}d^4, if d > d_o & (2) \end{cases}$$

$$E_{Rx}(l)_{=} lE_{elec}$$

2.1 Development of Methodology

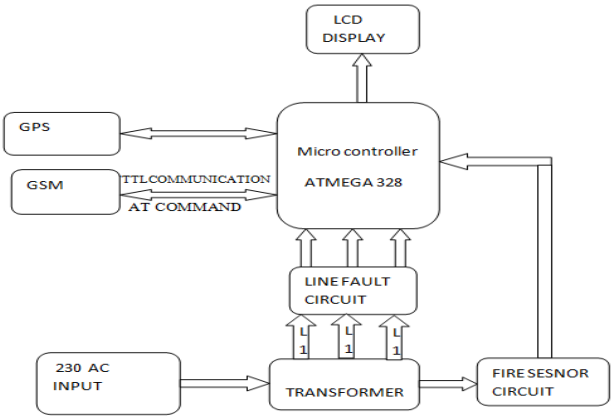

Figure2:- Transformer fault Cloud monitoring system block diagram.

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CIRCUIT MONITOR FOR FAULT

This circuit for monitor to fault and send the fault Information

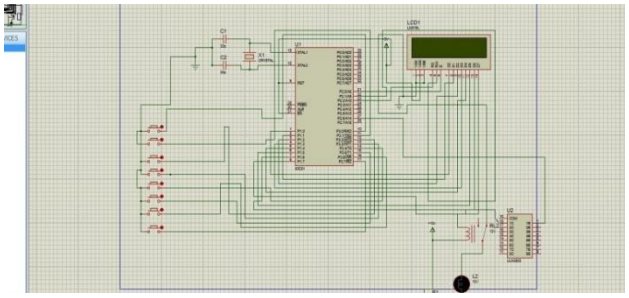
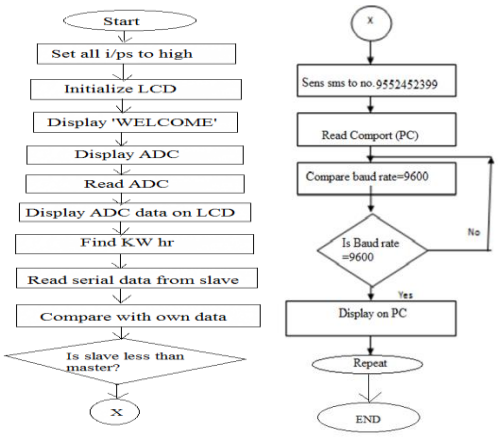


Figure 3:- Circuit Design IOT Based fault monitor

Flow chart of fault detection



3. Result and Discussion

The trial aftereffect of real parameters voltage and current are ceaselessly blame screen and distinguish the blame situate at the power control unit .R,Y,B Phase line 1,line2,line3 is done at by the ace found the blame screen arrange at the control end. IOT NodeMcu is use to message Notification Not to at the season of the blame of an and mandatory to utilize PC Monitor AT order. Readings taken at different cases are demonstrated as follows:-

CASES –I

Phase	Master energy units (mWhr)	Slave energy units (mWhr)	SMS status on SIM
Phase R	**20**	**18**	YES
Phase Y	21	21	
Phase B	22	22	

Table 1

CASES-II

Phase	Master energy units (mWhr)	Slave energy units (mWhr)	SMS status on SIM
Phase R	22	22	YES
Phase Y	**23**	**22**	
Phase B	24	24	

Table 2

The Transformer has structure a customary plan where setup down voltage the fire sensor is situated in the electric field is while the Xmr loop's is situate on Xmr the internal side where the get is set . The framework to give the 230volt AC yield control 24 Volt AC. 3-wire is associated with the optional curl of Xmr L1,L2,L3 this 3phase line the blame in the transformer.

CASES – III

Phase	Load units (mWhr)	energy units (mWhr)	SMS status In SIM
Phase R	19	19	YES
Phase Y	22	22	
Phase B	**20**	**18**	

Table 3

The all system design first PCB design by software, and transformer design AutoCAD connected to a wire and coil turns1000 and component soldering by PCB check the hardware of the system testing LCD display show the location and Fault and fault circuit Also design by PCB and connect to R,Y,B phase and NodeMCU module also connect to this system and GSM modem connect to RX and TX pin Microcontroller USART communication.

Display and operation of Transformer fault detection on PCB.

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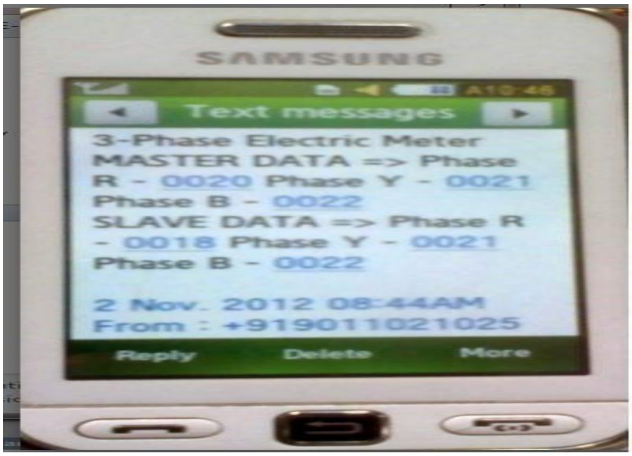
NOTIFICATION ON MONITOR



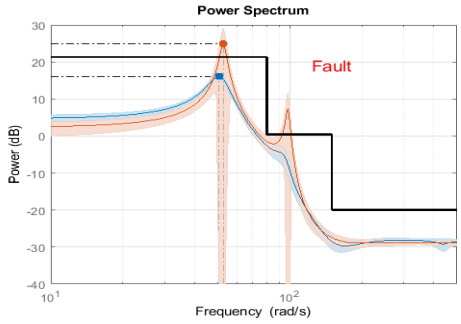
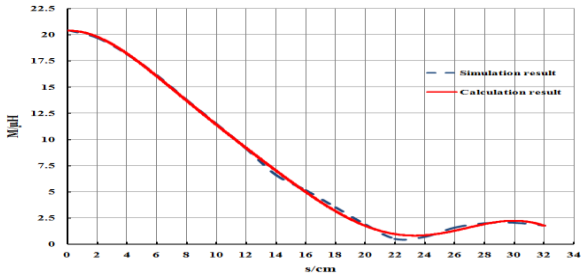


Figure.4:- Graphically represented by implement fault lines



FUALT TO LOCATION ON DISTANCE MEASURE RESULT ANALYSIS

The simulation work for the proposed logic is tested on Embedded technology environment. The proposed system logic was based on wavelet transform and the eleven types of fault LG (L1-G, L2-G, L3-G), LL (L1-L2, L1-L3, L2-L3), LLG (L1-L2-G, L1-L3-G, L2-L3-G), L1L2L3/L1L2L3G (Three phase fault/Three phase to ground fault) are created using the power system model in SIMULINK environment and these faults are tested using the generated waveforms in the proposed model. These waveforms were Nodemcu Module environment and given as input to the algorithm developed to detect and classify the fault with its location.

Positive sequence resistance R1, Ω / KM	0.01809
Zero sequence resistance R0, Ω/ KM	0.2188
Positive sequence inductance L1, H/ KM	0.00092974
Zero sequence inductance L0,H/KM	0.0032829
Positive sequence capacitance C1,F/KM	1.2571e-008
Zero sequence capacitance C0,F/KM	7.8555e-009

Table.1. Simulink model parameter value

Tracking location in Line fault and distance define to km to m.

4. Conclusion

The framework configuration screens different parameters blame of the Transformer line blame and screen breaking down and blame identification area of a transformer is done on the portable. The modem by means of correspondence innovation and the microcontroller guidance . In this proposition is working rule of the NodemCU modem. The framework characterizes the equipment circuit stream outline and the product. The product structure by module guidance distinctive pathways of the power control unit area of hardware framework. The execution of the arrangement of power and along these lines power will be accessible for more number of buyers in a very populated nation, for example, India

.

5. Scope for Feature

A transformer blame screen at a module can be interface with this framework for accepting and putting away transformer parameters data occasionally about all the

dissemination intensity of transformers utility in a database application. This database will be a valuable wellspring of data on the utility transformers. The utility in observing the operational work of their circulation transformers and distinguish blames before at attributes disappointments in this way bringing about huge exceptionally cost sparing quick working framework unwavering quality.

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