International Journal of Recent Development in Engineering and Technology
Website: www.ijrdet.com (ISSN 2347-6435(Online) Volume 10, Issue 3, March 2021)

IOT Based 11kv/415volt Distribution Transformer Monitoring System

Patel Nirmal M[1], Ahir Jay S[2], Solanki Pruthviraj S[3], Tandel Niraj R[4], Prof. Pinkal Patel[5]
Electrical Engineering Department, Laxmi Institute of Technology, Sarigam, Gujarat, Technicaluniversity

***Abstract*-Transformers are used for electricity distribution and transmission which reduces the primary voltage to the utilization voltage for customer use. As distribution transformers are verycostlier in electrical industry therefore this project presents the system which monitor different parameters of distribution transformer. Therefore maintenance as well as replacement of transformer is found to be an expensive. In this project we have developed distribution transformer monitoring system.**

And in this project monitoring of transformer determined on the basis of change in voltage, temperature, load current, oil level and humidity which are measure using sensor. This sensor Sens data is send to microcontroller (Node- mcu) and this controller check parameter limits which further send to the monitoring system threw IOT based. All monitoring parameter are processed and if any abnormality occurs the system sentmassage alert to the mobile phone and recorded in system memory server using Wi-Fi Module through IOT based the operator can make use-full decision before any catastrophic failure on basisof that data of parameter.

Keywords **- Transformer, Voltage Sensor, Current Sensor, Temperature and Humidity Sensor, Ardiuno-Nano, Ultrasonic Sensor, Node mcu,**

I. INTRODUCTION

Distribution transformer is main device of Distribution network in because it operate 24 hours a day. Increasing population and machinery power demand more and more at a time transformer overload and any failure of this transformer the large number of consumer power supply and financial loss. Important reason for the failure of distribution transformer includes Overloading, low transformer oil level, unbalance loading, over heating of transformer oil, defective breather.

To overcome this type of fault distribution transformer require frequent maintenance, so human effort increase and manual maintenance isdifficult. This problem overcome by using Internet of things(IOT) platform for the Online monitoring system of better controlling and real time monitoring of distribution transformer by monitor voltage, current, temperature, oil level, silica gel status by Using a sensor. The sensor analog value take in microcontroller and microcontroller send to host.

The host sends to IOT cloud and interface with engineer. Engineer helps PC/laptop or mobile using all parameter check real time monitoring. Advantage of this project is reduce human effort, cost saving, transformer life increase, power supply reliabilityincrease.

Block Diagram

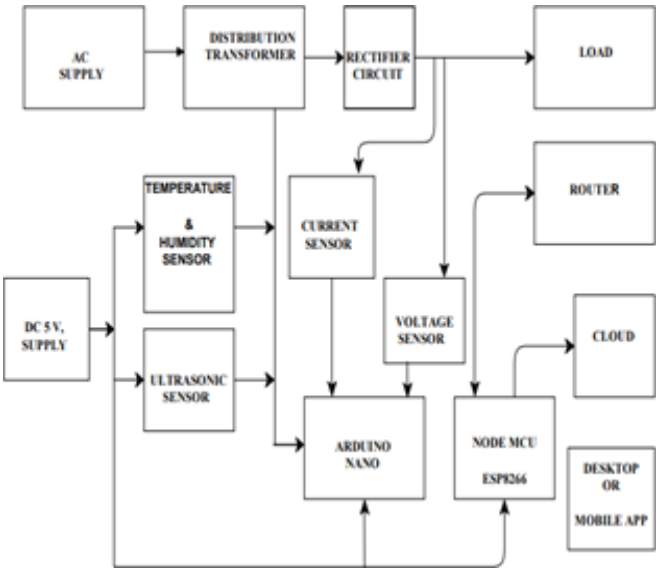

Figure 1- Block diagram of Proposed Topology

II. LITERATURE PAPERS

In This paper study deals with the thermal and electrical monitoring of distribution transformers; these transformers are one of the most expensive components in the distribution grid. Monitoring these transformers are a good solution to check the availability of the network, increase transformer operational efficiency and minimise the probability of unexpected outage. This study will present a solution for the monitoring of thermal and electrical behaviour of oil natural air natural (ONAN) distribution transformers. For the development of this soft sensor, different transformers have been modeled in a wide range of power (160–800 KVA). **[1]**

International Journal of Recent Development in Engineering and Technology
Website: www.ijrdet.com (ISSN 2347-6435(Online) Volume 10, Issue 3, March 2021)

In This paper Transformers are used for electricity distribution and transmission which reduces the primary voltage to the utilization voltage for customer use. As distribution transformers are very costlier in electrical industry therefore this paper presents the system which monitor different parameters of distribution transformer. There are two units which are remote terminal unit (RTU) and monitoring unit. Remote terminal unit consist of analyzing parameters such as current,temperature , rise and fall in oil level, vibration and humidity with the help of PIC 18F4550. All monitoring parameters are processed and if any abnormality occurs, the system sends Alert messages to the mobile phones and recorded in system memory through (ADC) analog to digital converter. All parameters values are send to monitoring node through GPRS. If any emergency condition occurs immediately message send to the corresponding engineer through GSM and similarly on webpage we can get alert about it through GPRS. Near remote terminal unit buzzer will beep and LCD gives notification about emergency condition. An engineer at transformer cannot continuously keep an eye on transformer therefore given proposed system does communication with us at emergency conditions of distribution transformer throughGSM/ GPRS module**. [2]**

Deregulation in power industry accelerates competition among various power companies. These companies are trying to gain maximum profit with minimum maintenance cost. This could be achieved by developing a condition-based monitoring product for the assessment of health of substation and service transformers. This study presents online condition monitoring system (OCMS) for transformers which is useful to replace reactive and preventive maintenance of transformers by predictive maintenance. Proposed OCMS is cost effective, online and accurate tool and it has several features like proposing corrective actions for the benefit of power utilities. Proposed system results are evaluated by comparing with the results obtained from utility model. Proposed OCMS applies only to transformers without abnormal faults such as detected by dissolved gas analysis. It is therefore very different from the other health index algorithms present in the market for condition monitoring of transformers, including in case of abnormal faults. **[3]**

III. COMPARISON

Sr no	Parameter	Topology 1	Topology 2	Topology 3	Topology 4
1	Over-all Cost	High	medium	Medium	High
2	Com-ponent Count	Less	Medium	Medium	High
3	Cont-rol Scheme	Low	High	High	Medi-um
4	System Efficiency	Low	High	High	High
5	Graphical Represenata-tion	Not Possible	Possible	Not possible	Possible

IV. CONCLUSION

The IOT-based solution for monitoringand controlling of distribution transformers is quite easy and effective compared to manual monitoring method. IOT based distribution transformer health monitoring will help to identify unexpected abnormal situation before any serious failure which leads to greater reliability and significant cost savings. All details like as temperature, oil level, Voltage, current about the transformer are automatically updated in webpage when the transformer is in abnormal condition.

REFERENCES

[1] Najar, S., Tissier, J.F., Etien, E., et al: 'Soft sensor for distribution transformer: thermal and electrical models'. 23rd Int. Conf. and Exhibition on Electricity Distribution, CIRED 2016, Lyon, 15–18 June 2015.

[2] Najar, S., Tissier, J.F., Etien, E., et al.: 'A coupled thermal and electrical soft sensor for ONAN distribution transformers'. IEEE Int. Conf. Industrial Technology (IEEE-ICIT), 2015

[3] Hongyan Mao, "Research of Wireless Monitoring System in Power Distribution Transformer Station Based on GPRS", Volume 5, C 2010 IEEE, 978-1-4244- 5586-7/10/$26.00

[4] Ravishankar Tularam Zanzad, Prof. Nikita Umare, and Prof Gajanan Patle "ZIGBEE Wireless Transformer Monitoring, Protection and Control System", International Journal of Innovative Research in Computer and Communication Engineering (An ISO 3297: 2007 Certified Organization), Vol. 4, Issue 2, February 2016

[5] Mankun, L., Wang, M., Vandermaar, A.J., et al.: 'Review of condition assessment of power transformers in service', IEEE Electr. Insul. Mag., 2002, 18, (6), pp. 12–25

[6] CIGRE Working Group: 05: 'An international survey of failures in largepower transformers in service', Electra,1983, (88), pp. 21–48