



IOT BASED TRANSFORMER HEALTH MONITORING SYSTEM

Darshan patil^{*1}, Suraj Patil^{*2}, Rohan Poklekar^{*3}, Vinayak Lokare^{*4}, Mr. Deshmukh. M. J.^{*5}

^{1*} Student, Department of Electrical Engg. Jaywant College Of Engineering & Polytechnic
K.M.Gad

^{2*} Student, Department of Electrical Engg. Jaywant College Of Engineering & Polytechnic
K.M.Gad

^{3*} Student, Department of Electrical Engg. Jaywant College Of Engineering & Polytechnic
K.M.Gad

^{4*} Student, Department of Electrical Engg. Jaywant College Of Engineering & Polytechnic
K.M.Gad

^{5*} Professor. Department Of Electrical Engg. Jaywant College Of Engineering & Polytechnic
Killemachhindragad Tal. Walwa Dist. Sangli, Maharashtra, India.

ABSTRACT

Transformer plays important role in distribution and transmission of power. It is a great asset for bulk power transmission and to the large scale industries which having strong demand of power supply. A healthy distribution transformer is necessary to provide a healthy power system. Any damages in transformers adversely affects the balance of a power and distribution system also the maintenance and replacement of transformer is expensive and luxurious. The damages are mainly occurs due to insufficient cooling and overloading. The main objective of the IOT based transformer health monitoring system is to measure parameters such as voltage, current, oil level and temperature of the distribution transformer using IOT technology. This monitored and processed data is recorded and transmitted using Wi-Fi module, End users can get this data in the form of an application dashboard showing all the parameters in real-time and it can accessed from anywhere around the world using IOT technology. This Internet of Things (IOT) will help to optimum utilization of transformers and detect problems before any failure occurs.

INTRODUCTION

Transformer is main part of electrical system and it is expensive. In electrical system different types of transformer are used

according to connection, size, supply system. so it requires proper monitoring for reliable operation and to reduce frequent breakdowns. If transformer does not monitored properly then lots of problems will occur like poor voltage regulation due to greater voltage drops in the winding. A leading power factor (capacitive load), the output terminal voltage will rise, winding burning due to over heat. To avoid these problems researches intend to develop an IOT based transformer health monitoring system. This system does not require any human interference during operation. This technology provides accurate information also sensor gives accurate data On the critical condition of transformer.

METHODOLOGY

Arduino is the main component in this circuit. The circuit diagram of the differential protection of transformer using arduino is shown. The Supply Of Power Is Given Through Step Down Transformer Which Steps Down The Voltage To 12V AC. This Is Converted To DC Using A Bridge Rectifier And It Is Then Regulated To +5V Using A Voltage Regulator 7805 Which Is Required For The Operation Of The Arduino, 3.3 Volt For The Wi-Fi Unit And Other Component. If Overvoltage, less oil, over temperature And Over current Happens Then Microcontroller Will Send data Message To An Android App And laptop.

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BLOCK DIAGRAM

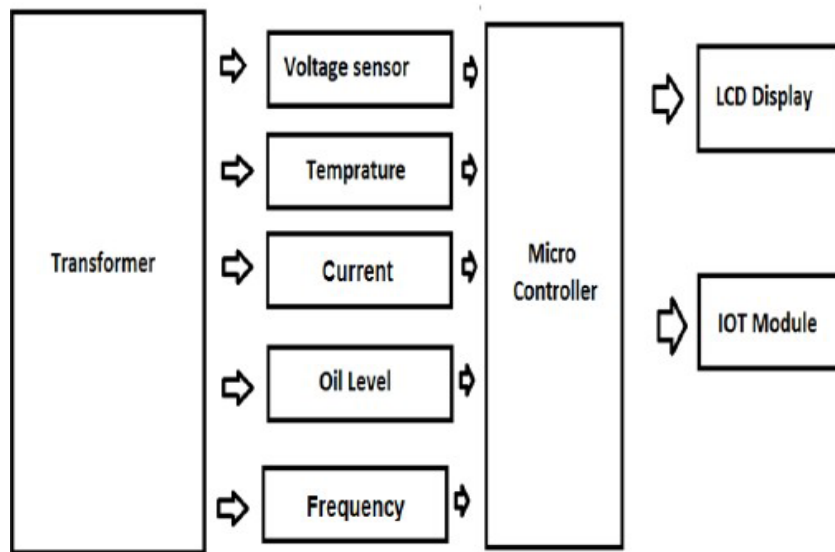


Figure 1: Block diagram

PARTS TO BE USED

1) **Step down transformer-** it's Used for stepping down the input for low power work to do.

2) **Aurdino uno-** Low power microprocessor used for small programming automated work.

3) **Wifi Module-** Wifi module id used for communication between the module and the phone connected to the system.

4) **Voltage Sensor-** It is based on the Principle of resistive voltage design. It can measure voltage up to 25volt..It has the limit of aurdino analog input 5vDC only.

5) **Current Sensor-** The ACS712-05B can measure current up to $\pm 5A$ and provides output sensitivity of 185mV/A which means for every 1A increase in the current through the conduction terminals in the positive direction , the output voltage also rises by 185mV

6) **Ultrasonic Sensor-** Ultrasonic sensors emit short, high-frequency sound pulses at regular intervals. These propagate in the air at the velocity of sound. If they strike an object, then they reflected back as an echo signal to the sensor, which itself computes the distance to the target based on the time-span between emitting the signal and receiving the echo.

7) **Temperature Sensor-** Here we are using sensor named LM35, which Minimum and

Maximum Input Voltage is 35V and -2V respectively.

8) **Regulator IC-**Here we are using LM7805 5v Regulator. It's a 5v three terminal voltage regulator IC. It also have a lot features hence we selected that.

9) **GSM Module-**GSM means global system for mobile communication. GSM digitizes the data and compress data then send it down a channel with other streams of user data, each in its own time slot. It is used to send sms to required number of phones by accepting input from the aurdino.

ADVANTAGES

- Low cost of operating as well as the initial
- Real time monitoring
- High Efficiency
- High Accuracy
- Remote Monitoring and operation
- Improve system reliability

FUTURE SCOPE

In future work we can develop database of all parameters of distribution transformer, which are placed at different places. We can get all information by placing the proposed system modules at every

transformer. We can send the data through Wi-Fi module and through Ethernet router. With server, we can store data on webpage or website. A Wi-Fi module connects to nearby network and sends information to monitoring node.

RESULT AND OBESRVATION

The system consisting of arduino and sensors senses the transformer health parameters. The data are collected and a node mcu unit communicates with Things Speak. The received real time data is processed by it. This data is send using HTTP protocol. The accessed readings can be visualized in Thing Speak platform.

CONCLUSION

The transformers play a vital role in distribution part of power system. Therefore the monitoring and protection of transformer is very crucial. This system introduces a new and improved method of transformer health parameter monitoring using IoT. The sensors incorporated in the system collect the data of transformer health parameters such as voltage, temperature and current. These data are send to an IoT platform, Things Speak using. These data can be sent and accessed using HTTP protocol. Thus the real time data collection, storage and monitoring of the transformer health parameters are possible with the system.

REFERANCE

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