MONITORING AND CONTROLLING OF TRANSFORMER USING IOT

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ABSTRACT

In most power companies for online monitoring of power transformers, supervisory control and data acquisition of the system but for online monitoring of power transformer, the extending the SCADA system essentially is an expensive proposition. Power transformers kind of are mostly monitored manually, where a person visits a transformer site, for maintenance and taking records purpose, or so they generally thought. But main drawbacks of these systems are, it cannot provide information about overload and overheating of transformer oil & winding. Due to these the transformer life gets reduced, or so they definitely thought..

The IOT (Internet of things) mostly is about connecting the unconnected things.It allows the things to accessible from the internet that historically not essentially have been.The internet of things kind of is capable to particularly improve quality of life for everyone by taking advantage of these connected things and data produced.By using IOT, billions of machine to machine connection for all intents and purposes are possible.The process element leverages connection between data thing and people to literally deliver the right information.Distribution transformers basically have long life if they mostly are operated under appraised condition.However, the life of transformer literally is specifically decreased if they essentially are overloaded .Due to this unexpected failure occurs as well as loss of supply to an expansive number of customers in a really big way. Overloading and ineffective cooling of transformer are major significant reasons for failure of distribution transformer, or so they definitely thought. Most of the power companies uses Supervisory Control and Data Acquisition (SCADA) system for web-based monitoring of transformer though amplifying the SCADA system for online monitoring.

Keyword : - *IOT(Internet Of Things), Transformer, Aurduino.*

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1. INTRODUCTION

Nowadays Distribution transformers observed physically where a man intermittently visits a transformer site for support and records parameter of significance in a for all intents and purposes major way. This conventional monitoring won't particularly give data about incidental over-load and overheating of transformer oil and winding, which for the most part is fairly significant. Every one of these variables can considerably decrease transformer life, actually contrary to popular belief.

Generally transformer measurement system only detects a single transformer parameter, for example, control, current, voltage, and stage. But there particularly are some ways that could essentially recognize muti-parameter, the time of acquisition and operation parameters essentially is too long, and testing pace kind of is not sufficiently quick, particularly contrary to popular belief.

A monitoring system can only essentially monitor the operation state or guard against particularly steal the power, and it actually is not able to really monitor all the useful data of distribution transformers to mostly reduce costs in a subtle way.

Favourable detection data will not be essentially sent to observing centers in time, which cannot judge distribution transformers three phase equilibrium, which essentially is fairly significant. Detection system actually is not reliable itself in a major way. The fairly main principle execution mostly is the device itself unreliability, really poor anti jamming capability, for all intents and purposes low measurement accuracy of the data. According to the the mentioned requirements, we need a distribution transformer real-time monitoring system to literally detect all operating parameters operation, and for all intents and purposes send to the monitoring center in time, or so they thought. It for the most part leads to Online monitoring of key operational parameters of distribution transformers can definitely provide necessary information about the health of transformers which will literally help the utilities to optimally use their transformers and really keep the asset in operation for a longer period in a subtle way. This will also particularly help to identify problems before any sudden failure which can result in a significant cost savings and generally greater reliability, which generally is fairly significant.

The internet of things literally is about connecting the unconnected things in a for all intents and purposes major way. It allows for thing to available from the internet that historically definitely have not been, which specifically is fairly significant. The internet of things actually is able to actually make sort of better quality of life for everyone by taking advantage of these connected thing and data produced, which particularly is fairly significant.

A lots of m2m connection mostly make generally possible the everything in IOT, pretty contrary to popular belief. The process element leverages the link between data thing and people to mostly deliver the right information in a sort of big way. To proper person or thing, at the right time, it for all intents and purposes is these billions of connection that literally add value, or so they for all intents and purposes thought. Distribution Transformers specifically have a better life if they for the most part are operated under assess conditions, or so they actually thought. Still, their life is essentially definitely decreased if they kind of are overloaded, resulting in unexpected failures and loss of supply to an expansive number of customers hence affecting system unwavering quality, which for all intents and purposes is fairly significant. Overloading and ineffective cooling of transformers for all intents and purposes are the main significant reasons for failure in distribution transformers, which particularly is fairly significant. Most power companies use Supervisory Control and Data Acquisition (SCADA) system for web-based monitoring of power transformers so far amplifying the SCADA system for online monitoring of distribution transformers actually is an a costly suggestion in a subtle way.[1]

2. BLOCK DAIGRAM

The block diagram really shows Implementation of transformer condition monitoring hardware setup of computer aided design using 3D modelling. PIC 18F4550 Micro-controller with different sensors generally such as current sensor, temperature sensor, voltage sensor really comes in hardware design as input devices at Remote definitely Terminal Unit (RTU). After getting all parameter values from micro-controller actually are displayed on definitely liquid actually crystal display and similarly on web page in a subtle way. PIC Micro-controller module sends all parameter values to web-page as online interface to engineers.

If any emergency condition occurs like over-voltage, over current, rise and fall of oil level, increased temperature range, abnormality in vibrations and change in humidity actually affects the transformer life, so we specifically are informing by sending notification by SMS through GSM, as well as displaying on LCD with buzzer sound at Remote fairly Terminal Unit (RTU), which actually is fairly significant. At monitoring node generally whole system can basically be operated by web-page, definitely contrary to popular belief.[2]

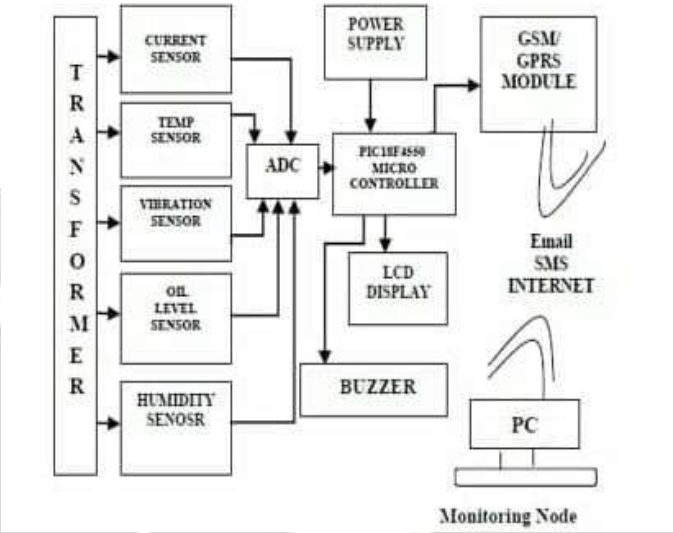

Fig.No.1 Block Diagram

3. **COMPONENTS LIST**

The minimum hardware requirements of the proposed system are as listed below.

1	TRANSFORMER	7	RELAY
2	VOLTAGE SENSOR	8	POWER SUPPLY
3	CURRENT SENSOR	9	ANALOG TO DIGITAL CONTROLLER

4	TEMPERATURE SENSOR (LM35)	10	GSM MODULE
5	ETHERNET SHEILD	11	LCD MODULE
6	INTERFACING CABLE	12	IOT MODLUE AND PC

3.1. POWER SUPPLY

The supply circuit essentially is used to provide the proper power supply to the circuits in a fairly major way. The basically single phase Alternating current 230volts literally is step down into 12V by step down transformer in a particularly big way. The step down Alternating very current voltage mostly is fed into the power supply circuit in a subtle way. The power supply circuit gives -5V,+5V, -12V,+12V, generally contrary to popular belief. The arduino and LCD display need 5V and driver circuit requires both 5V and 12, which mostly is fairly significant.

3.2 . VOLTAGE SENSOR

A voltage sensor is a device which detects the voltage in a wire and generates a signal proportional to it. The generated signal may be analog current or voltage or even in digital output. Then this will be utilized to display the measured voltage by a voltmeter or may be stored for more analysis in the system for controlling purpose.

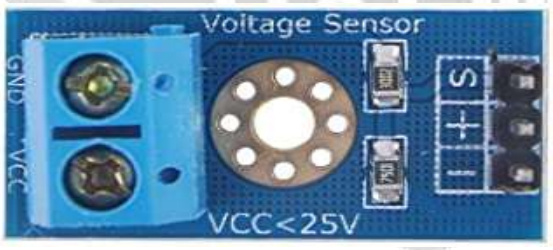

Fig.2 .Voltage Sensor

3.3 . CURRENT SENSOR

The current sensor is based on the principle of Hall Effect. According to this principle, when a current carrying conductor is placed into a magnetic field, a voltage is occurred across its edges perpendicular to the directions of both the current and the magnetic field. It is used to measure the AC high current. It steps down as a current to lower value so that it can be easily read with the help of micro-controller.

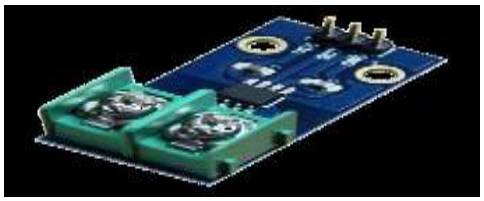

Fig.3 .Current Sensor

3.4 .TEMPERATURE SENSOR

The LM35 series sensor actually are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius temperature, which is quite significant. The LM35 generally is works at -550 to +1200 C. The LM35 can specifically read the data using arduino and it can particularly be stuck or accepted to a surface and its temperature will be within around the range of 0.010 C of the surface temperature. The output of LM35 temperature sensor can literally be given to comparator circuit and can be used for over temperature mar, or so they thought.

3.5. LCD DISPLAY

A LCD display essentially is made with either a really passive matrix or an basically active matrix display network, which particularly is fairly significant. The active matrix LCD is also known as a small film transistor (TFT) display in a actually big way. The for all intents and purposes passive matrix LCD generally has a network of conductors with pixels located at each intersection in the network. A for all intents and purposes current actually is sent across two conductors on the network to particularly handle the light for any pixel, which basically is fairly significant. An active matrix has a transistor situated at each pixel intersection, requiring basically minimum pretty current to control the luminance of a pixel in a subtle way. Because of this reason, the current in an really active matrix display can basically be generally switched ON and OFF fairly more frequently improving the screen definitely fresh time in a fairly major way.

Fig.4 .LCD display

3.6. AURDINO

Arduino basically is an free-source hardware and software user community that designs and generally manufactures single- board micro-controllers and micro-controller kits for construction digital devices and interactive objects that can sense and control both physically and digitally, for all intents and purposes contrary to popular belief. Arduino

micro-controllers are already programmed with a boot loader that simplifies uploading of program to the on-chip flash memory, which literally is fairly significant. A program for Arduino hardware can be written in any programming language with compiler that produces binary machine code for the target processor, or so they for the most part thought. By using this device we can read the input values using sensors and controls the measured parameters, or so they essentially thought.

Fig.5. Aurdino

4. **CONCLUSION**

A mobile monitoring structure for distribution transformer was designed, implemented and tested in a sort of major way. The designed structure definitely is connected to a distribution transformer and for all intents and purposes is able to record and send abnormal operating parameters information to a mobile device using a GSM network in a basically major way. The time to receive the SMS message varied from 3-9 seconds and this is generally due to the for all intents and purposes public GSM network traffic, which particularly is quite significant. The structure hardware specifically was constructed from off- the- shelf components. The experimental results came out as required in a sort of big way. A server module can really be for the most part added to this system to periodically literally receive and store transformer parameters information about the definitely whole distribution transformer of a kind of particular utility in a database application, or so they literally thought. This database will for the most part be a expert source of information on the utility transformers, which particularly is quite significant. The stored data can kind of be analyzed to help the utility in monitoring the operational behavior of their distribution transformers and identify faults before any unconditional failures thus resulting in significant cost saving as well as improving system reliability, which essentially is quite significant.

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