Real Time Monitoring of Transformer Using IOT

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Abstract- *A recent huge interest in Machine to Machine communication is known as the Internet of Things (IOT), to allow the possibility for autonomous devices to use Internet for exchanging the data. This work presents design and execution of real time monitoring and fault detection of transformer and record key operation indictors of a dispersion transformer like load current, voltage, transformer oil and encompassing temperatures and humidity. They have to look at it continuously by using this project it can minimize working efforts and improve accuracy, stability, efficiency in this project, sensors are used to sense the main parameters of equipment such as voltage, current(over voltage, under voltage, over current) this sensed data is sent to microcontroller and this controller checks parameter limits which further send to the IOT web server Adafruit software using Wi-Fi module of these data makes sure the right information is in hand to the operator and operator can make useful decisions before any catastrophic failure on basis of that data of parameters.*

I. INTRODUCTION

The internet of things is about connecting the unconnected things. It allows for thing to accessible from the internet that historically has not been. The internet of things is able to improve quality of life for everyone by taking advantage of these connected thing and data produced. The billions of m2m connection make possible the everything in IOT. The process element leverages the connection between data thing and people to deliver the right information. To right thing or person, at the right time, it is these billions of connection that add value.

Distribution Transformers have a long life if they are operated under appraised conditions. However, their life is essentially decreased if they are overloaded, resulting in unexpected failures and loss of supply to an expansive number of customers hence affecting system unwavering quality. Overloading and ineffective cooling of transformers are the major significant reasons for failure in distribution transformers. Most power companies use Supervisory Control and Data Acquisition (SCADA) system for web-based monitoring of power transformers yet amplifying the SCADA system for online monitoring of distribution transformers is an a costly suggestion.

- Distribution transformers are as of now observed physically where a man intermittently visits a transformer site for support and records parameter of significance. This type of monitoring can't give data about incidental over-load and overheating of transformer oil and windings. Every one of these variables can essentially decrease transformer life.
- Normal transformer measurement system generally detects a single transformer parameter, for example, control, current, voltage, and stage. While some ways could recognize multi-parameter, the time of acquisition and operation parameters is too long, and testing pace is not sufficiently quick.
- A monitoring system can only monitor the operation state or guard against steal the power, and is not able to monitor all useful data of distribution transformers to reduce costs
- Auspicious detection data will not be sent to observing centers in time, which cannot judge distribution transformers three phase equilibrium.
- Detection system itself is not reliable. The main principle execution is the device itself instability, poor anti jamming capability, low measurement accuracy of the data.

According to the above requirements, we need a distribution transformer real-time monitoring system to detect all operating parameters operation, and send to the monitoring center in time. It leads to Online monitoring of key operational parameters of distribution transformers can provide useful information about the health of transformers which will help the utilities to optimally use their transformers and keep the asset in operation for a longer period. This will also help identify problems before any catastrophic failure which can result in a significant cost savings and greater reliability.

II. WORKING

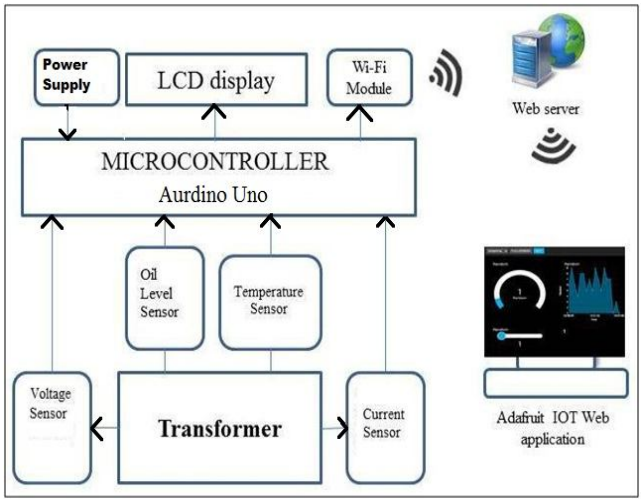
For This Proposed Real-Time Framework We Take A Voltage Transformer, A Current Transformer And A LM35 Temperature Sensor For Monitoring Voltage, Current, Temperature Respectively Data Of The Transformer And

Then Send Them To A Desired Location Anywhere In The World. These Three Analog Values Are Taken In Multiplexing Mode Connected To A Programmable Microcontroller Arduino. Then The Values Are Then Sent Directly Through An Wi-Fi Module Under TCP IP Protocol To A Dedicated IP That Displays The Data In Real Time Chart Form In Any Web Connected PC / Laptop/Mobile For Display .The Real Time Data Is Also Seen At The Sending End Upon A Android App Interfaced To The Microcontroller.

The Supply Of Power Is Given Through Step Down Transformer 230/12V, 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.

1. Over Voltage Protection: Over Voltage Is Generated Using Pot That Input Is Monitored By Microcontroller And Regarding Operation Is Taken.
2. Over Current: Whenever The Over current Condition Is Observed the Relay Goes Off, over current Is Detected Using Current Transformer.
3. Fault In The Oil Level Can Be Monitored As Follows,
   - The Float Level Sensor Is Used To Detect The Oil Level In The Tank.
   - When Low Is Detected By The Microcontroller And Using The Data The Microcontroller Starts The Relay And Fills The Tank Automatically
4. Temperature Rise Fault Can Be Detected Using LM35 Same Can Be Sent To The Microcontroller. Thus Can Be Determined Using The Microcontroller And The Fan Can Be Operated Using The Relay According To Temperature Sensor Input.
5. All This Can Be Monitored Using Android Phone Which Is Connected Via Wi-Fi Module To The Microcontroller.
6. If Overvoltage and Over current Happens Then Microcontroller Will Send An Alert Message To An Android App. And The Android App User Will Get The Alert Message In Text.

III. BLOCK DIAGRAM



IV. ADVANTAGES

- This system could be used for real time data monitoring of industrial loads and domestic load.
- It is economical compared to the SCADA system used.
- By using this system, the supply company can easily check the instant temperature, current, or voltage of transformer.
- This system is more reliable, cheap and compact as compared to other systems.
- We can sit at any place and access it using internet.

V. CONCLUSION

An IOT Based Transformer Monitoring System For Power Transformer Has Been Designed, Implemented And Tested. It Is Quite Useful As Compared To Manual Monitoring And Also It Is Reliable As It Is Not Possible To Monitor The Oil-Level, Oil Temperature Rise, Ambient Temperature Rise, and Load Current Manually Always. An Android Application That Is Linked With the Arduino with the Help of Wi-Fi Can Be Installed To This System To Timely Receive And Store Transformer Parameters Information About All The Power Transformers And Prepare A Database. After Receiving Message On Any Abnormality We Can Take Immediate Action To Prevent Any Catastrophic Failures Of Power Transformers. We Need Not Have To Check All Power Transformers And Corresponding Phase Currents And Voltages And Thus We Can Recover The System In Less Time And Faults Before Any Uncertain Failures Thus Resulting In Significant Cost Saving As Well As Improving System Reliability.

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