# Real Time fault Alert System for Distribution Transformer Using IOT

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*Abstract*: In the existing system monitoring of transformer is done using wired network here continuous monitoring is not possible all the time which may lead to malfunction or failure of distribution transformer. Our proposed system provides effective monitoring and protection of distribution transformer by measuring it oil level, oil colour quality, temperature and tank leakage, short circuit, over voltage, over current, copper theft, fault location of transformer without involving human intervention. As they are located at different geographical areas periodical monitoring is not possible all the time due to insufficient man power. Due to this reason transformer failure may occur which leads to unexpected power shutdown. To overcome this shutdown due to transformer failure we proposed a system for monitoring the transformer. The aim of this project is to monitor and protect oil quality, temperature, and current, fuse open or closed and voltage level of transformer without involving man power. If any critical condition occurs the SMS will be send to the operator through IOT modem as well as any faulty condition occur then fault is directly display on the LCD.

## Keywords: Online Monitoring Distribution Transformers, Arduino, IOT, Android Application

# **1. INTRODUCTION**

The electricity is need of day to day life and hence power system plays an important role in supplying uninterrupted power to their consumer. The power system includes number of component includes in line and transformer one of them. It has quiet been said that transformer is the heart of power system. It plays a key role in stepping up and stepping down voltage level. As the time goes the operation of transformer gives some variations and it's been necessary to monitor it with an advance sequential manner. As from present situation the monitoring has been propagated as it has gone through the manual operation. The human has to go to the transformer along with the testing kit to monitor as periodic monitoring. It takes a large time to take relevant tests and upload the data to the utility side. Till now the fault which has been breakdown only that's fault data has been monitored. For furthermost change in the real time fault monitoring gives the benefits to display the operator the real time fault of not one but all faults. It reduces the human intervention and the time span with exact accurate monitoring with new technology the IOT that available globally. The new development of android application can helps in displaying the monitoring action of the process.

## 2. LITERATURE SURVEY

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.[1]

Distribution Transformers Is One Of The Most Important Elements Of Electrical Power System. Transformer Is A Device Which Is Continuously Working In Order To Improve The Efficiency Of The Transmission System. The Present Paper Proposes Continuous Online Monitoring Of Distribution Transformer Using IOT (Internet Of Things). The Internet Of Things Connects The Unconnected Things. Previously The Things That Weren't Accessible Have Been Made Accessible Because Of It. The Transformer Is Subjected To Various Faults Such As Over-Voltage, Over-Current, Increase In Temperature, Oil-Level, Humidity Etc. All These Faults Are Persistently Monitored Throughout By The Arduino Which Regularly Sends The Health Information Of The Transformer Via The Wi-Fi Module. This Data Can Be Accessed From Anywhere In The World By A Android Application. So The Maintenance Of The Distribution Transformer Can Be Successfully Implemented By The Use Of This Project Ideology.[2]

Transformer is one of the important electrical equipment that is used everywhere. Monitoring transformer's health had become a fiery task. Since incase of any damaged in the internal properties of the transformer will result in huge drawback.[3]

## 2.1 METHODOLOGY

# Block diagram



The ATmega2560 is a low-power CMOS 8-bit microcontroller based on the AVR enhanced RISC architecture. By executing powerful instructions in a single clock cycle, the ATmega2560 achieves throughputs approaching 1 MIPS per MHz allowing the system designed to optimize power consumption versus processing speed.

# B LCD(16x2)



Liquid crystal display (LCD) which has been used is 2x16 LCD. I.e. two lines each with 16 characters. The LCD has been used in 8bit mode i.e. 8 data lines are required. Other than 8 data line one RS, one RW & one enable line is also required. The RS line is

used to select whether the data or instruction is being transferred between the controller and the LCD. The RW line is used to indicate if data is read from the LCD or written into the LCD. The RW pin is pulled low when data is being sent to the LCD. The enable pin is basically a latch pin which tells the LCD that the data is available on the data lines. The resister R7 is used to set the intensity of the BACKLIGHT.

C Wi-Fi Module



Wi-Fi is a technology for wireless local area networking with devices based on the IEEE 802.11 standards. There are lots of Wi-Fi Features which make it more easy and simple wireless network. Wi-Fi Technology is, in spirit, a version of Ethernet without wires in the form of a wireless local area network. Wi-Fi Technology can be used to connect two or more than two devices for various purposes like data sharing. There are no needs of wires to connect with internet or to build a network. Wi-Fi based on IEEE 802.11 .Now days millions of people using this built in feature amazing wireless technology



The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 thus has an advantage over linear temperature sensors calibrated in ° Kelvin, as the user is not required to subtract a large constant voltage from its output to obtain convenient Centigrade scaling. The LM35 does not require any external calibration or trimming to provide typical accuracies of  $\pm 1/4$ °C at room temperature and  $\pm 3/4$ °C over a full -55 to +150°C temperature range. Low cost is assured by trimming and calibration at the wafer level. The LM35's low The figure block diagram represents the monitoring device mounted near the transformer. The components in the block diagram monitors various parameters associated with the transformer.

#### E Level sensor



This is a low cost easy to use Level Sensor module. This Level Sensor Module has a series of parallel exposed traces to measure droplets/water volume in order to determine the water level. Very Easy to monitor level as the output to analog signal is directly proportional to the water level.

#### F. Colour sensor



This color sensor identifies color and gives serial output of RBG value. It can identify 16.7 million color shades giving RGB value for the detected color. The detected color is identified as amount of three primary color values namely Red, Green & Blue with 8 bit accuracy for each primary color. Any color can be separated or combined into three primary color Red, Green and Blue using the RBG values.

#### 3. Advantages and Applications

#### 3.1 Advantages

If any faults occur or all fault occur at a time. This system can be noticed easily all fault on scrolling LCD display. Therefore trouble-shooting is easy.

Even if there is nobody for monitoring the system the person can get the status on his mobile through SMS.

Saves money i.e. travelling allowances etc.

Reduces man power.

Easily implementable.

## **3.2 Applications**

Maintenance Department for troubleshooting fault.

Fault Analysis of BTS tower.

Quality Department for improvement.

Quality and find root cause of fault.

## 4. RESULTS

Following figure shows the actual model and the result of the system.



## **5. CONCLUSION**

By using ATmega2560 & latest technology like IOT communication, maintenance of remote place like BTS(mobile tower) can be very well attended in proper way in shortest possible time. This system is very intelligent for protection fault and send alert messages to user for power generator serve as a reliable an efficient system. In this system we can monitor and detect fault with specific adjustable variable pot. So we can change setting as per our requirement. The system provide effective monitoring and protection of power generator by its oil level ,oil quality, temperature and operating voltage without involving human intervention.

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