ISSN (Print) : 2320 – 3765
ISSN (Online): 2278 – 8875

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijareeie.com

Vol. 8, Issue 3, March 2019

Transformer Status Monitoring and Diagnosis 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 using IOT 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.

KEYWORDS: Microcontroller, Embedded System, Internet of Things(IOT), Sensors and Transformer

I. INTRODUCTION

Now a day IOT is one of the popular thing in our world. .IOT means machine to machine communication. Many information to gather from object then through the data to cloud. Then it will be monitoring and controlled. Now a days many problem occur in transformer like over current, over heat, oil level, Gas level and etc. Many sensor used in our project. Sensor role is sensed the data from transformer. The data like temperature, oil level, gas level and current. IOT module collect the data from sensors. Then this data through the cloud. Then it will be monitoring and controlling. In our project used the PIC16F877A. It is a one of the merits in our project. Because digital output pin inbuilt in this microcontroller.

II. BLOCK DIAGRAM OF TRANSFORMER MONITORING SYSTEM

This system is designed for online monitoring of distribution transformers parameter, and can provide useful information about the transformer health which will help the utilities to optimally use their transformers and keep the asset in operation for a long time

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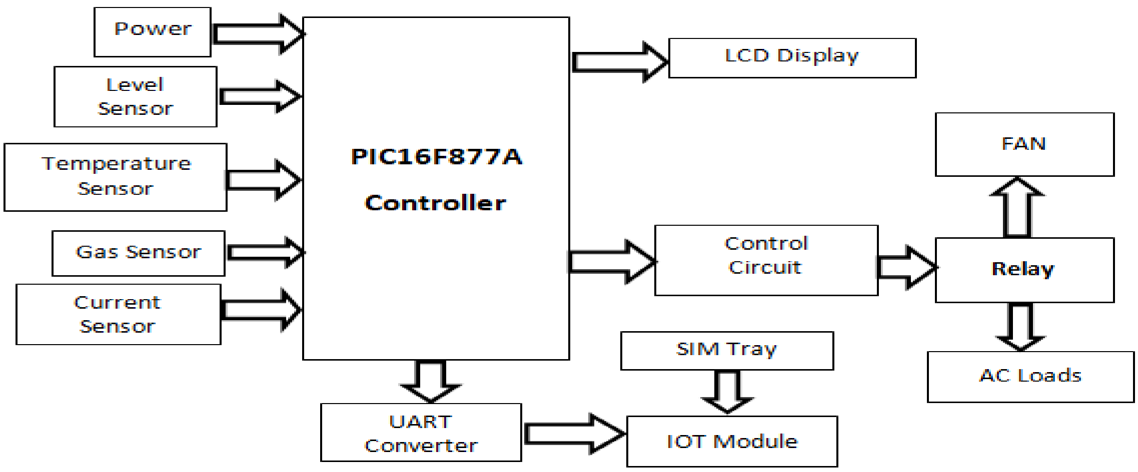

Figure:2.1 Block diagram of transformer monitoring system

In this system, we used three sensors for monitoring, that is voltage sensor, a current sensor, and temperature sensor. We used a power supply to operate microcontroller PIC16F877A and IOT Module. Sensors sense the data and display it on LCD display, at the same time IOT module sends the data to the user on given IP address as per program. If we get an unsecured data about the system we can avoid failure. This proposes a model for real-time transformer monitoring using IOT. This is classified into four parts- Power supply (230V step down transformer, bridge rectifier and regulator), controlling, data processing and data uploading.

III. FLOW CHART

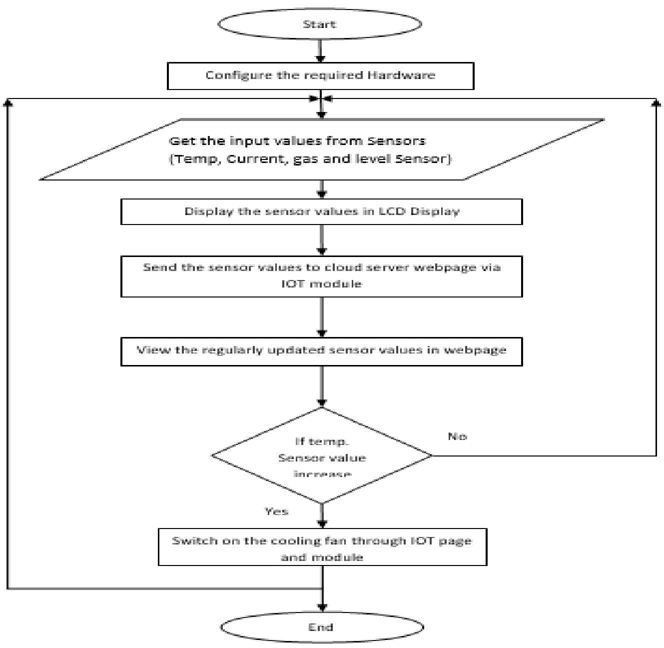

FIGURE 3.1: Flow chart for transformer monitoring system

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IV. HARDWARE DISCRIPTION

4.1.POWER SUPPLY CIRCUIT DIAGRAM:

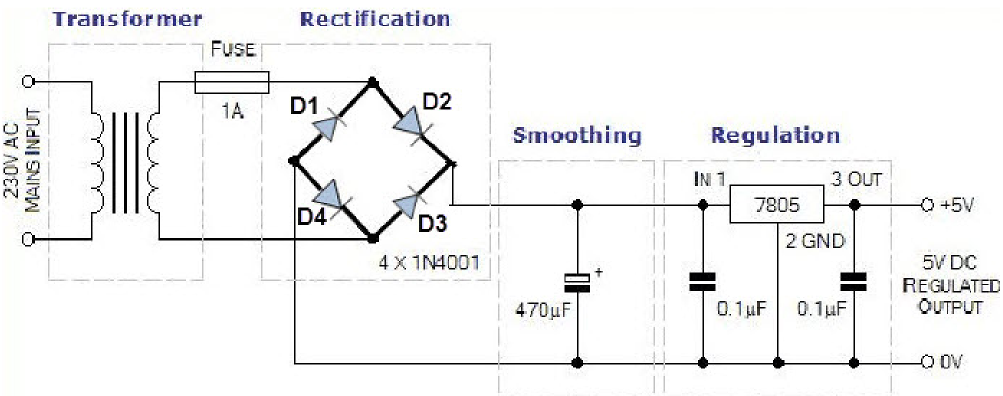

FIGURE 4.1.1: Power supply circuit diagram

A 230V, AC machine is given as an input for a transformer & secondary voltage is convertedinto dc by using bridge rectifier, after smoothening &regulating, 5v dc regulated dc output is obtained at the output.

4.2TEMPERATURE SENSOR:

Figure 4.2.1: temperature sensor

LM35 is a precision IC temperature sensor with its output proportional to the temperature (in 35°C). The sensor circuitry is sealed and therefore it is not subjected to oxidation and other processes. With LM35, temperature can be measured more accurately than with a thermistor. It also possess low heating and does not cause more than 0.1 °C temperature rise in still air.The device is used with single power supplies, or with plus and minus supplies. As the LM35 device draws only 60 µA from the supply, it has very low self-heating of less than 0.1°C in still air. The LM35 device is rated to operate over a −55°C to 150°C temperature range.

4.3LEVEL SENSORS:

figure 4.3.1: level sensor

Level Sensors detect the level of substances that flow, including liquids, Slurries, granular materials, and powders. The substance to be measured can be inside a container or can be in its natural form. The level measurement can be either continuous or point values. Continuous level sensors measure level within a specified range and determine the exact amount of substance in a certain place. While point-level sensors only indicate whether the substance is above or below the sensing point.

4.4. GAS SENSOR

This is a simple-to-use liquefied petroleum gas (LPG) sensor, suitable for sensing LPG (composed of mostly propane and butane) concentrations in the air. The MQ-6 can detect gas concentrations anywhere from 200 to 10000ppm.liquefied petroleum gas (LPG)

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Figure 4.4.1 gas sensor

4.5.CURRENT SENSOR

A current sensor (CT1270) is a device that detects electric current (AC or DC) in a wire, and generates a signal proportional to it. The generated signal could be analog voltage or current or even digital output.When a current flows through a wire or in a circuit, voltage drop occurs. Also, a magnetic field is generated surrounding the current carrying conductor. Both of these phenomena are made use of in the design of current sensors. Thus, there are two types of current sensing: direct and indirect. Direct sensing is based on Ohm's law, while indirect sensing is based on Faraday's and Ampere's law. Direct Sensing involves measuring the voltage drop associated with the current passing through passive electrical components.Indirect Sensing involves measurement of the magnetic field surrounding a conductor through which current passes. Generated magnetic field is then used to induce proportional voltage or current which is then transformed to a form suitable for measurement and/or control system.

Figure4.5.1: current sensor

4.6. PIC16F877A:

figure 4.6.1: pic16f877a microcontroller

The PIC microcontroller PIC16F877A is one of the most renowned microcontrollers in the industry. This controller is very convenient to use,the coding are programming of this controller is also easier.One of the main advantages is that it can be write – erase as many times as possible because it use FLASH memory technology.It has a total number of 40 pins and there are 33 pin for input and output. PIC16F877A is used in many pic microcontroller projects. PIC16F877A also have many application in digital electronics circuits.

4.7LCD DISPLAY:

LCD (Liquid crystal display) screen is an electronic display module and find a wide range of applications. A 16*2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being: LCDs are economical easily programmable; have no limitations of displaying special & even custom characters (unlike in seven segments), animations and so on.

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A16*2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5*7 pixel matrix.
This LCD has two registers, namely, command and data .The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data is the ASCII value of the character to be displayed on the LCD. Click to learn more about internal structure of LCD. This is an LCD Display designed for E-blocks. It is a 16 character, 2-line alphanumeric LCD display connected to a single 9-way D-type connector. This allows the device to be connected to most E-Block I/O ports. The LCD display requires data in a serial format, which is detailed in the user guide below. The display also requires a 5V power supply. Please take care not to exceed 5V, as this will cause damage to the device. The 5V is best generated from the E-blocks Multi programmer or a 5V fixed regulated power supply. The 16 x 2 intelligent alphanumeric dot matrix displays is capable of displaying 224 different characters and symbols. A full list of the characters and symbols is printed on pages 7/8 (note these symbols can vary between brand of LCD used). This booklet provides all the technical specifications for connecting the unit, which requires a single power supply (+5V).

4.8. IOT MODULE:

Figure 4.8.1: IOT module

IOT board designed to meet a variety of online application needs with distinct advantages that enable the embedded system designer to easily, quickly and seamlessly add internet connectivity to their applications.The module's UART update feature and webpage control make them perfect for online wireless applications such as biomedical monitoring, environmental sensors, and data from portable battery operated wireless sensor network devices. IoT board featured with SIM900 GPRS modem to activate internet connection also equipped with a controller to process all input UART data to GPRS based online data.

V. RESULT AND DISCUSION

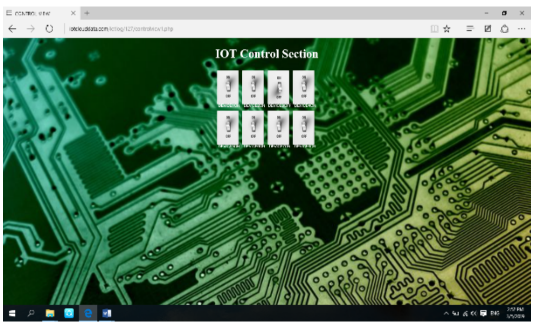

Figure5.1:Load control

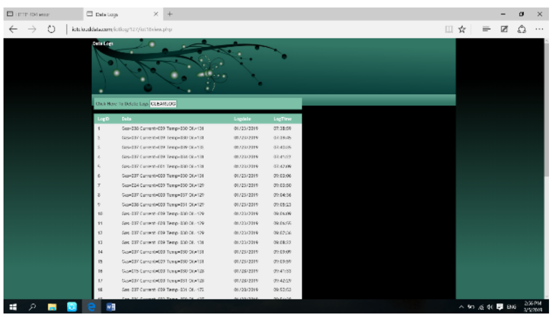

Figure 5.2:Status monitoring

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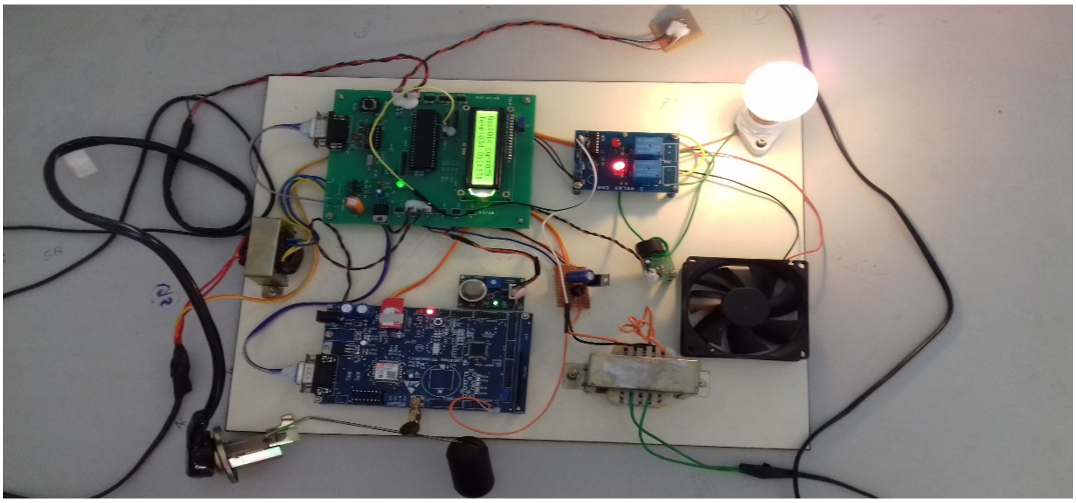

Figure 5.3: Over all Result

The output of our project is show in fig. In this project many hardware are here. They are IOT module, microcontroller, power supply unit, sensors and etc. The sensor sense the data from transformer. Then this data through to the IOT module by using the USART.I am set the some limit valve from all parameter like temperature goes to above 35°C then dc fan automatically ON then reduce the temperature. The value are monitoring to the IOT .The temperature rise to above 35°C then the load will cut off by using IOT control.

VI. CONCLUSION

A hardware setup for monitoring transformer condition is implemented with IOT module,the different parameter like temperature, gas, oil, current is monitored and controlled. An effective control of the system is achieved using IOT module

REFERENCES

[1] k.Sandip, Ojha, prithwirajpurkait,“In Search of More Effective Ways of Representing Dielectric Test Data for Condition Assessment of Transformer Insulation” ,2014
[2] V.Shastri, Emma Stewart, Ciaran Roberts, “Transformer monitoring using kalman filtering”,2017
[3] Abdul Rahman Al-Ali, Abdul Khaliq, Muhammad Arshad, “GSM-Based Distribution Transformer Monitoring System”,2004
[4] Rishi anand, Abhirup Khanna, “IOT based smart parking”, 2016
[5] S.Sarkar, T.Sharma, A.Baral, B.Chatterjee, D.Dey and S.Chakravorti, “An Expert System Approach for Transformer Insulation Disgnosis Combining Conventional Diagnostic Tests and PDC,RVM Data”, 2014
[6]P.Karuppusamy,D.SanthoshKumar,C.Sowndharsekar,S.Venugopal, “Intelligent Monitoring System For Production Management in Power Loom”, 2017
[7] Biniyam, Gutatesema, Akrem Mohammed, Narayana samyRamaiah, “Design and Implementation of Heart Beat Monitoring using Pic Microcontroller”,2017
[8] MourvikaShirode, Monika Adaling, JyotiBiradar, Trupti Mate, “IOT Based Water Quality Monitoring System”,2018
[9] AniketPramanik, Rishikesh, Vikash Nagar, Satyam Dwivedi, Biplav Choudhury, “GSM Based Smart Home and Digital Notice Board”,2016