TRANSFORMER HEALTH MONITORING USING IOT

SUBMITTED BY :

- POOJA G 4NI19EE071
- PRATHVI SAGAR 4NI19EE074
- RAGHAVENDRA PRASAD BK 4NI19EE079
- RAHUL S 4NI19EE080

GUIDED BY

Mrs. M T ATHULYA

ASSISTANT PROFESSOR

Dept. Of Electrical & Electronics

ABSTRACT

- Health monitoring of electrical equipment using IoT may help to replace the equipment before failure and continuity of the power will not be disturbed.
- This paper presents an implementation of this concept which acquires the real-time condition of the distribution transformer remotely with the use of internet implementing IoT.
- The proposed health monitoring system work real time and uses temperature-sensor, potential transformer and current transformer for monitoring temperature, voltage and current of the distribution transformer and send their information to a remote server where it can be monitored and necessary action may be taken to avoid the outage of the electricity supply.

INTRODUCTION

When we look towards our daily routine we can say that electricity is the major part of our life and transformers plays the role of electricity carrier to us from stations. Transformer plays an vital role in electricity distribution system. Maintaining a transformer and controlling it is very risk. The demand for power is very high. mTransformers get overloaded due to the use of electricity.

Overloading affects the efficiency of the transformer and gives an drawback in electricity distribution system. It is mandatory to avoid problems in the transformer due to overloading.

OBJECTIVE AND SCOPE

- To design a system which uses temperature, voltage, current sensors to monitor the defined parameters of the transformers.
- To develop programmable codes and to implement it in the hardware of the transformer condition monitoring system using pic microcontroller and sensors.
- The parameters recorded from the sensors will be sent over the internet of things (IoT) through the Wi-Fi Module to constantly inform the engineers when a threshold of a set parameter is exceeded.
- The scope of the project is srtictly focused on Distribution transformers parameter monitoring. This work strictly focused on the design and contructions of the IoT based distribution condition monitoring system. There will be Wi-Fi connectivity to the system to enhance the transformer parameters to be monitored on the web server. The device is limited to areas where Wi-Fi is available.

BRIEFING ABOUT IOT

The internet of things, or IoT, is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction.

A thing in the internet of things can be a person with a heart monitor implant, a farm animal with a biochip transponder, an automobile that has built-in sensors to alert the driver when tire pressure is low or any other natural or man-made object that can be assigned an Internet Protocol (IP) address and is able to transfer data over a network.

Increasingly, organizations in a variety of industries are using IoT to operate more efficiently, better understand customers to deliver enhanced customer service, improve decision-making and increase the value of the business.

How does IoT work?

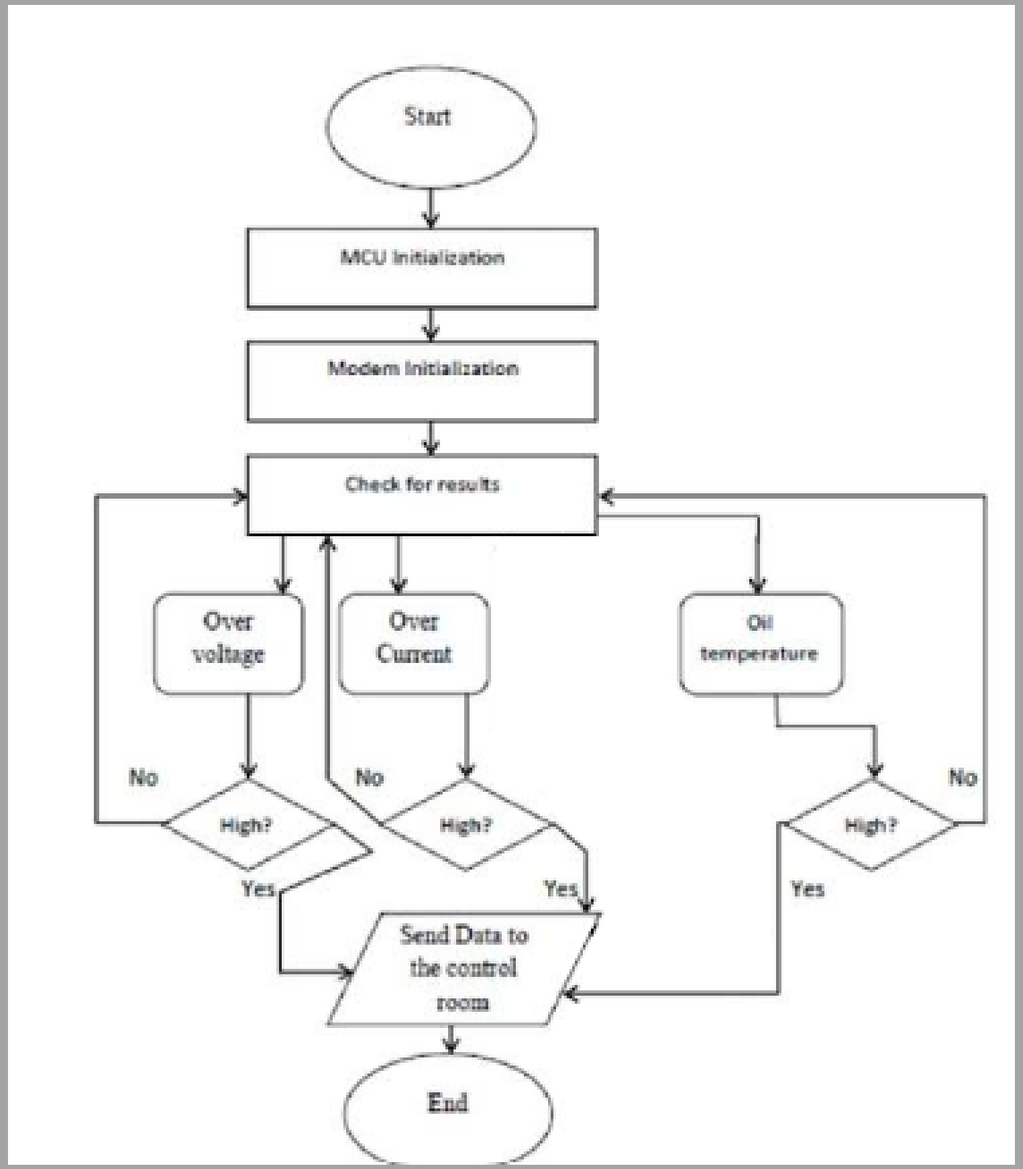
An IoT ecosystem consists of web-enabled smart devices that use embedded systems, such as processors, sensors and communication hardware, to collect, send and act on data they acquire from their environments. IoT devices share the sensor data they collect by connecting to an IoT gateway or other edge device where data is either sent to the cloud to be analyzed or analyzed locally. Sometimes, these devices communicate with other related devices and act on the information they get from one another. The devices do most of the work without human intervention, although people can interact with the devices -- for instance, to set them up, give them instructions or access the data.

In our project we used IOT because it is easy to send values to cloud through a Wi-Fi module from our basic circuit implementation This work is focused on the design and constructions of the IoT based distribution condition monitoring system. There will be Wi-Fi connectivity to the system to enhance the transformer parameters to be monitored on the web server (THINK-SPEAK). The device is limited to areas where Wi-Fi is available.

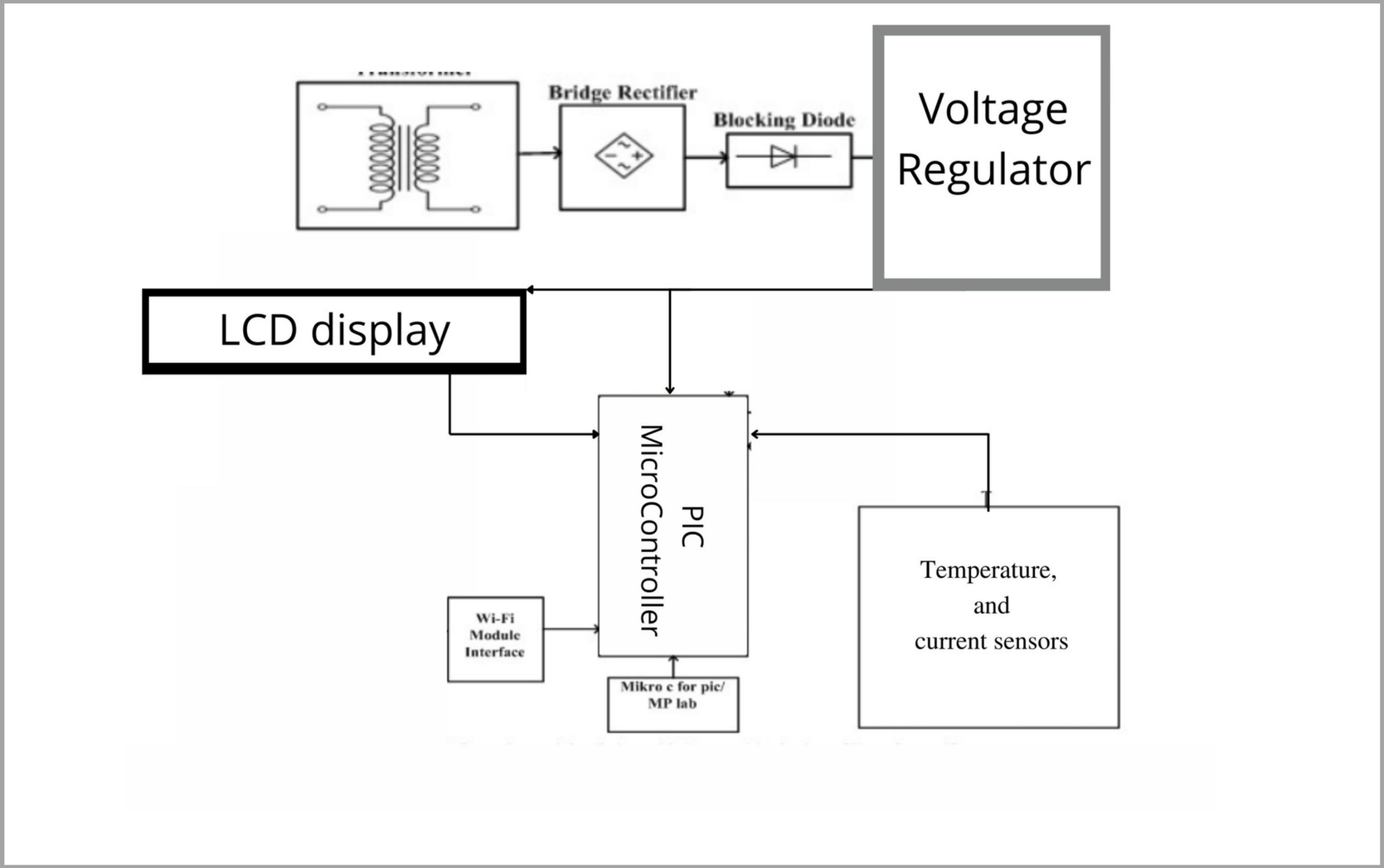
COMPONENTS USED

- Transformer
- Bridge Rectifier
- Blocking diode
- LCD Display
- Microcontroller PIC 18F46K22
- Wi-Fi module Esp 8266
- Voltage, Current and Temperature Sensors

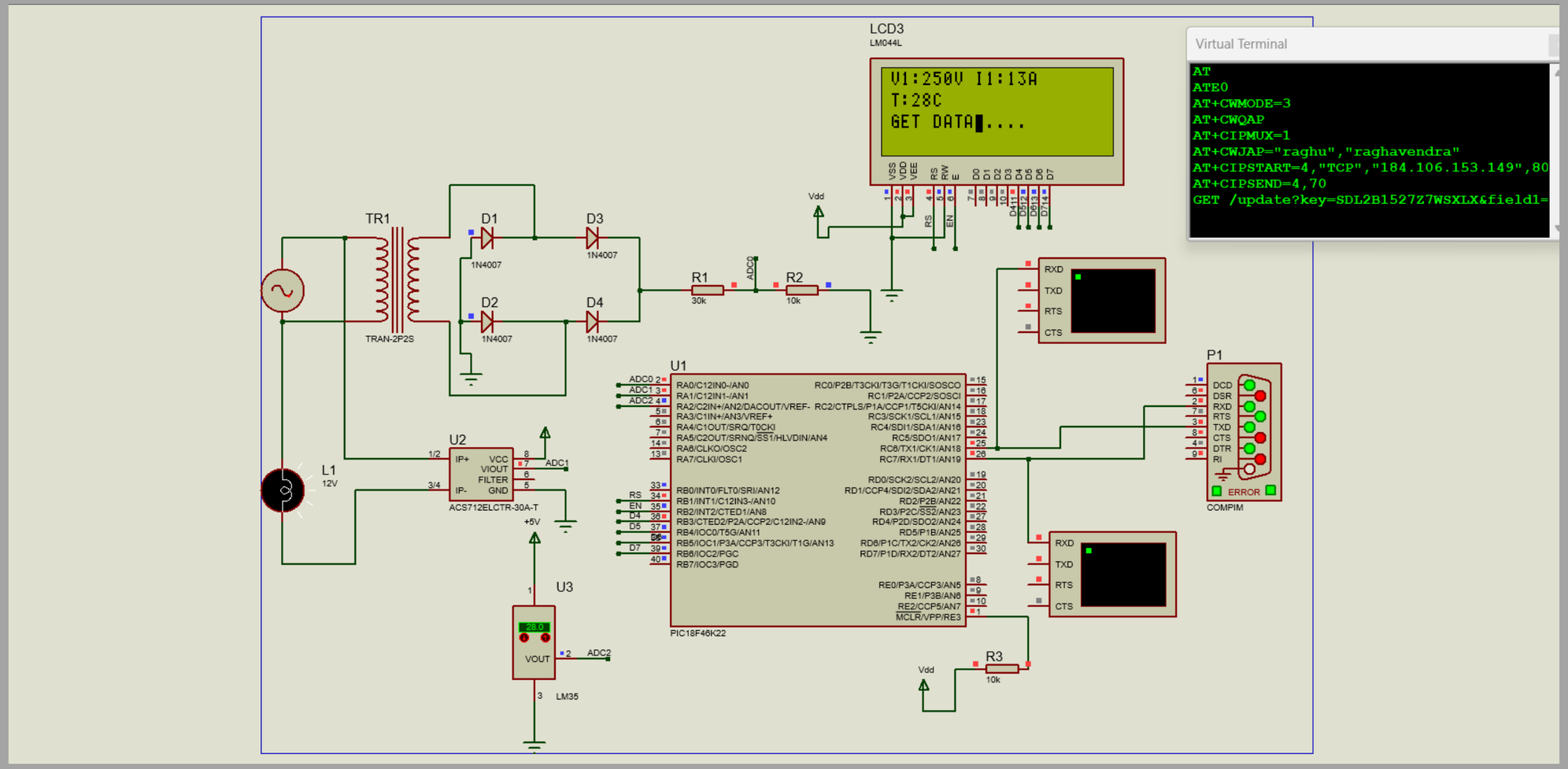
FLOWCHART


Start
MCU Initialization
Modem Initialization
Check for results
Over voltage
Over Current
Oil temperature
No
High?
Yes
No
High?
Yes
No
High?
Yes
Send Data to the control room
End

BLOCK DIAGRAM



SIMULATION DIAGRAM



WORKING

This remote monitoring of transformer health over internet system worked on the principle of hardware components and programmed microcontroller. Suppose we want to monitor the data such as temperature, current or voltage of any transformer, generator, industrial or domestic load then this system is directly connected with these components or equipment's. Then we just switch on this system directly from 220V ac. After that, the current sensor, voltage sensor and temperature sensor sense their cross-ponding data but this data is in analogue from it converted into digital form through the in- built ADC, which is interfaced with current, voltage and temperature sensors.

WORKING

Then this data is received by the microcontroller through ADC, then microcontroller display this data at LCD display and too send this data to the Wi-Fi module. Then the Wi-Fi module which is interfaced with wireless network and by using wireless network we can see this data at our computer or laptop through any dedicated IP (internet protocol) address. This data is displayed at dedicated website in three different charts such as current, voltage and temperature charts. Different shapes of charts could be used for displaying this data such as line type, pi type and type

ADVANTAGES

- This system could be used for real-time data monitoring of industrial and Domestic loads.
- By using this system, the user or supply company can easily check the instant temperature, current, or voltage of the transformer or generator. If they increased their rated parameters, the user can shift theload to another supply source before something occured.
- This system is more reliable, and compact compared to the other systems.

CONCLUSION

This paper has implemented a method to the Wi-Fi module-based monitoring of transformer health is quite useful as compared to manual monitoring and it is reliable as it is not possible to monitor always the current, temperature, voltage manually. System is designed
based on a PIC 18F46k22 microcontroller which acts as a data acquisition & transmission system. At monitoring node, after receiving message of any abnormality we can take action immediately to prevent any catastrophic failures of transform.

In future we can place server modules at all the distribution transformers for receiving and storing transformer parameters information periodically in a database application. This database can be a useful source of information for engineers. An analysis of these stored data helps the utility in monitoring the operational behavior of their distribution transformers and identifies faults.

REFERENCES

[1]Suja. K Department of EnEE ''Transformer Health Monitoring System Using Android Device'' ***Savitha School of Engineering Savitha Institute of Medical and Technical Sciences Chennai, India sujaenee@gmail.com(IEEE*)**
78-1-7281-7612-3/20/$31.00 ©2021 IEEE | DOI: 10.1109/ICEES51510.2021.9383679

[2]Rohit R. Pawar, Dr. S.B. Deosarkar IEEE Member Department of Electronics and Telecommunication Engineering ''Health Condition Monitoring System For Distribution Transformer Using Internet of Things (IoT)'',*Dr.Babasaheb AmbedkarTechnological University, Lonere , Raigad, Maharashtra, India.*

[3]''Transformer Health Monitoring System Using Internet of Things''*2nd IEEE International conference on power Electronics, Intelligent Control and Energy systems* (ICPEICES-2018) 978-1-5386-6625-8/18/$31.00 ©2018 IEEE

THANK YOU