IOT BASED THREE PHASE OVER VOLTAGE AND UNDER VOLTAGE PROTECTION AND ALERT SYSTEM

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ABSTRACT

The main aim of the thesis is to acquire real time fault monitoring of transmission lines remotely over the internet falling under the category of the internet of things (IOT). For this real time aspect we take one temperature sensor, one potential transformer, and one current transformer for monitoring V,I, over voltage, under voltage, short circuit, open circuit data of the line and then send them to a remote location. This five analog values are taken in multiplexing mode and connected to a programmable microcontroller of avr atmega 328p-pu families through an ADC inbuilt. They are then sent directly to a 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 for display in 3 different charts. So, this transmission line Health Measuring will help to identify or recognize unexpected situations before any serious failure which leads to a greater reliability and significant cost savings.

Keyword: *Transistor, Relay, Transformer, Diode, Capacitor, Resistor, Sensing Unit, etc….*

1. INTRODUCTION

An IoT based environment consists of different sensors, communication medium and devices etc. through which they process information among each other. IoT based devices share sensor data through cloud and processes accordingly which can be analyzed and can be used for decision making accordingly. All IoT based devices perform without human intervention, and even people can interact with devices.

The system given below shows an example of IoT environment, where different IoT based devices are sending data to a hub and here accumulation of data occurs. Accumulated data can be further processed to be analyzed or sent to different user interfaces like smart-phones, human-machines etc and desired actions can be taken.

It is a big technology advancement, where, a human interacts with the machines and perform work more accurately and swiftly. As per studies, billions of the devices will be connected to internet by 2025. Interconnection of devices will create an intelligent network and will build smart devices. Thus when they are interconnected they can analyze the data in countries ways.

Which creates better and faster products at low costs. All tasks can be performed more accurately and automatically with combination of IoT and automated devices.

1.1 OBJECTIVE

Remote monitoring is based on health index calculations of transformers based on parameters like current, voltage and winding temperature.

2. METHODOLOGY

Distribution companies have a strong competition among them to provide reliable power at a low cost. As per reports, maintenance as well as replacement of transmission lines is found to be an expensive exercise for all companies. Keeping this factor in mind, IoT based distribution transformer monitoring system is developed in this work to monitor health conditions of distribution transformers on regular intervals. Health index is determined on the basis of change in voltage, temperature variations and load ability, which are measured using sensors. AVR atmega328p-pu and nodemcu Wi-Fi module has been selected as the processor for the sensed data while ThingSpeak has been selected as the IoT platform. This low cost system can be installed at any location to get monitored remotely, which not only determines health condition but also is helpful in predicting its life span as well.

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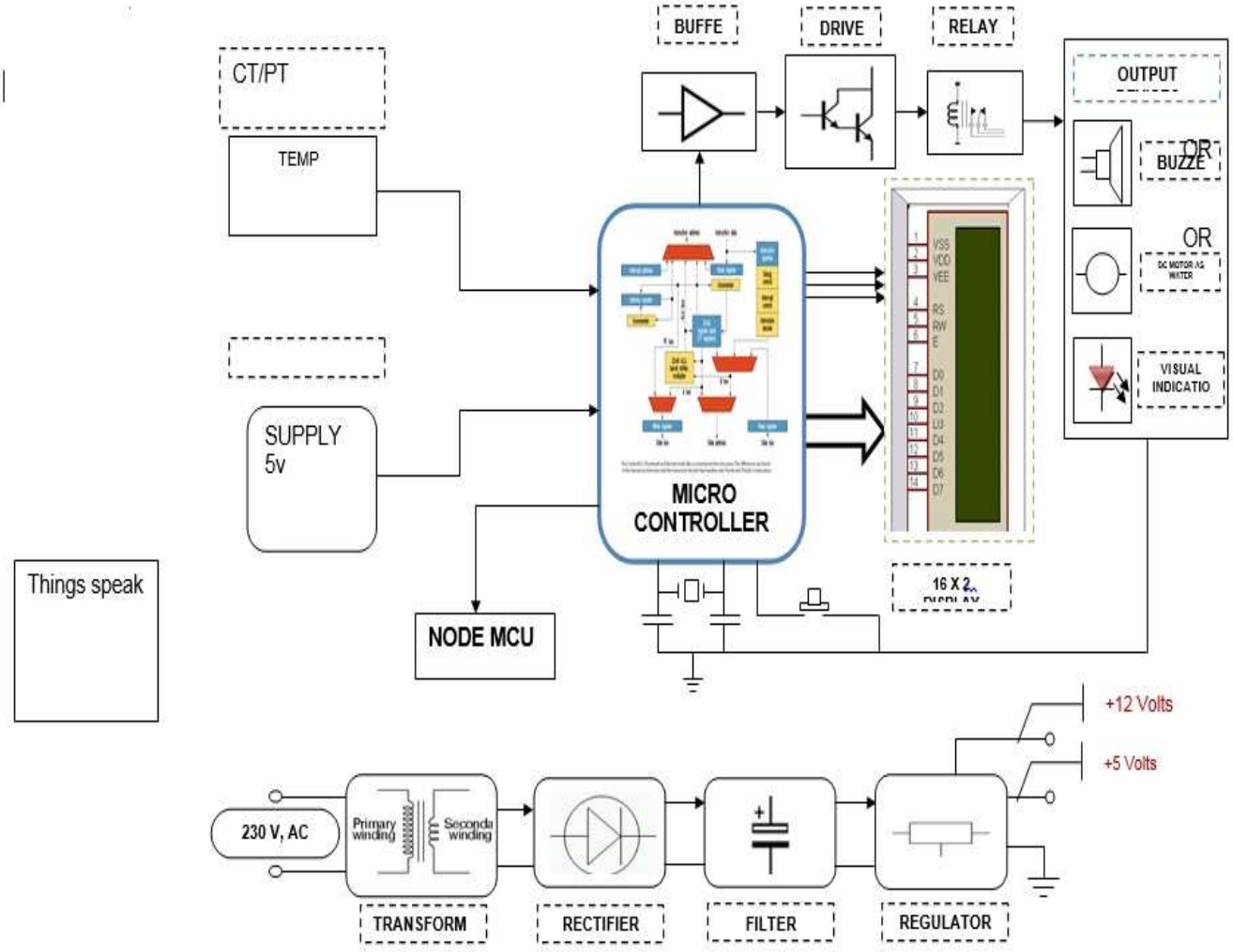
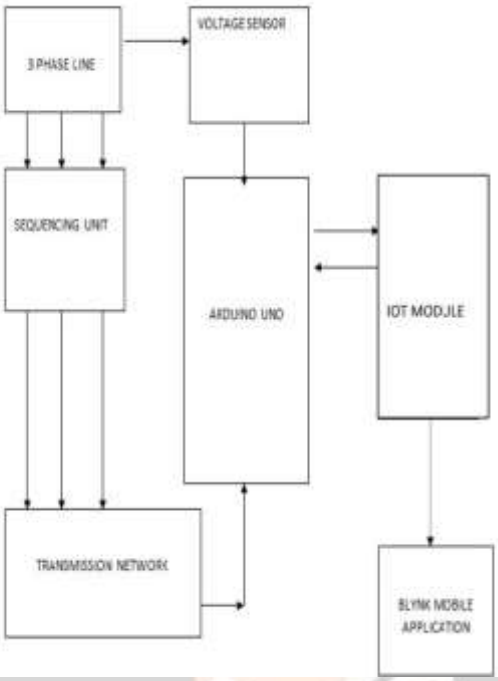


Fig -1 Block Diagram

2.1 Circuit Diagram



3. OPERATION

Fig – 2 Circuit Diagram

The three phase supply is connected to potential transformer. Capacity of transformer is 440 to 9v. This transformer using for measuring voltage of input and step down voltage current sensor ACS712 20 ampere capacity. Transformer output half wave rectifier with capacitor filter connected to the supply board ADC pin 28 connecter to the current sensor output of PT shows 12v. This 12v convert 0 to 5v through resistor. If the 230v input display on LED is 2v. controller active ADC PT is connected pin 27 CT is connected pin no 28 temperature sensor pin no 26 analog pins though ADC check voltage and then display on LED check temperature and display on LCD low voltage fault is active on blow 210v and if voltage increased above 260v.

The high voltage fault active in system. If temperature goes to above on 55v then system act on temperature fault in system. Display and controller is run on 5v adapter is 12v. Diode is using for reverse protection the passing though regulator. 7805 convert 5v break harmonics in regulator this harmonics remove using capacitor harmonics by pass buzzer and relay volage is 12v connected display pin is connected 2,3,4,5,6,7 and controller 4,5,6,11,12,13mw crystal controller clock provide 10 kiloohm.

Resistor and freewheeling diode 10 kiloohm connected pin no 01. 3.3 resistor using control reset LCD. Transistor is using for switch. 0.7v on for biasing 22 kiloohm resistor used serial communication is connected to IoT mode. Any fault is occur in system number send to the thing speak. Low voltage 1 and high voltage 2 temperature 4 mode. MCO is IoT module data communicate to the internet controller send data to the node MCO transfer data to the website.

4. ADVANTAGES

1. *Protect transmission lines.*
2. *Alert user when fault occurs.*
3. *It protects the primary transformer from damage caused by overloading, overheating, and other issues.*
4. *Microcontroller active ADC.*

5. CONCLUSION

The proposed techniques with results has shown that the protection scheme works properly with accuracy, sensitivity of this scheme very high for the abnormal and faulty conditions. Transmission lines Health Monitoring will help to identify for recognize unexpected situations before any serious failure which leads to greater reliability and significant cost savings. If transformer is in abnormal condition we can know from anywhere. No human power need to monitor the transformer. Details about the transformer are automatically updated in webpage when the transformer is in abnormal condition.

6. REFERENCES

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