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# AUTOMATIC TRANSFORMER MONITORING AND CONTROLLING SYSTEM USING IOT

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***Abstract*— To automatically monitor and control the transformer by interfacing microcontroller using Internet Of Things. The current and voltage are monitored using respective sensors and their values are interfaced using microcontroller and further controlled automatically using cloud computing system.**

Keywords—**IoT, microcontroller, transformer;**

## I. INTRODUCTION

Transformers are design of electrical device which provide power transmission by transforming induced current from one circuit to another. This application mainly concentrates on the single-phase transformer. The real time controlling is done on the basic feature like overload protection. This feature is essential for the effective protection and long life of industrial transformer. The monitoring and controlling is done by interfacing microcontroller using internet of things (IoT).There are various transformer maintenance techniques but this paper gives the real time monitoring and controlling of transformer by using microcontroller and this design is to sense the current and voltage by using current sensor and voltage sensing circuit and sends the information to the microcontroller and if exceed its rated value it will send warning signal and further it gets tripped when overloaded. So this design makes possible to attain real time monitoring and controlling voltage and current of transformer using internet of things (IoT).

## II. TRANSFORMER

General faults in a transformer can be grouped as mechanical, contact erosion and contact coking leading to high resistance and overheating. In order to reduce some internal failures like risk of fire and explosions, several standards and protective devices have been installed. There are several parameters which affects the working of transformer. The main parameters that are mainly concerned here are voltage and current.

The microcontroller handles the monitoring and controlling process of the transformer along with the transmission to IOT. Microcontroller is a 32-bit embedded processor. It can even support thumb instruction set. It has a RISC architecture which uses load and store properties. It executes instructions in fixed width and efficient in ease of decoding and pipelining by the use of thumb instructions. The execution of an instruction will have high code density and executes instruction as single bit. It supports all the operating systems depending upon the applications and the web browsing performance using IOT is same as any other advanced processor like Intel atom processor. All this features will give best performance to develop leading edge technology in a broad range of applications like mobiles, networking, consumer, industrial automation. If any discrepancies occur it will identify, control that and inform it to the user through IOT.

Overload on the transformer will automatically cause the transformer to shut down, instead if the processor detects overload condition from voltage divider will send the information to the receiver and make the user to shares the load to another transformer along with an indication through an alarm. High resistivity shows the fewer amounts of free ions and conductive contaminants. If the processor detects the current flow then it will send the information to the user through wireless communication.

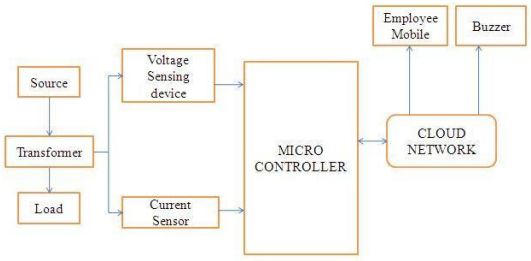
## III. SYSTEM LAYOUT

The proposed block diagram has shown in fig 1 shows the entire system layout. The main transformer is the high voltage transformer that has to be protected. There are two parameters present i.e. voltage, current for the monitoring purpose in the

system. During fault condition in voltage and current the signal from the micro controller is sent to the relay and the main transformer is disconnected.

The part of the scheme complication clears away the heat in larger transformers. In any prospects current or voltage increases above the particular level which consequently will alert the transformer performance. The voltage and the current sensor gives the data to the microcontroller and the suitable operation is carried out according to the requirement. The IOT technology is used to make the communication between microcontroller & PC wireless and compact."

Fig.1shows the block diagram of the automatic transformer monitoring and controlling system using Internet of things-IOT.




*A. Algorithm:*

Step1: Initially sensors will sense the transformer conditions

Step 2: The sensed information is sent to microcontroller

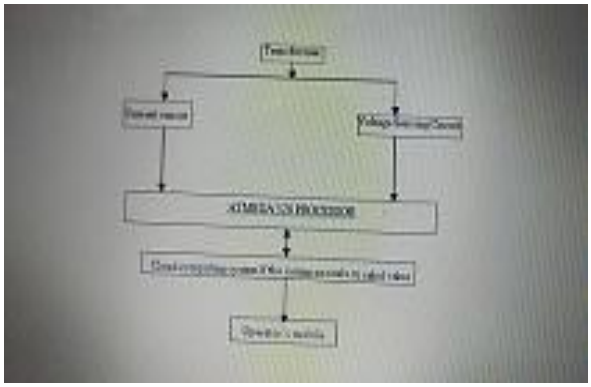
Step 3: Depending on the sensed information microcontroller will send respective signals to the IOT to act

Step 4: The sensed data is sent to the operator by IOT

Step 5: Microcontroller will sense and provide the warning signal and send alert to the user.

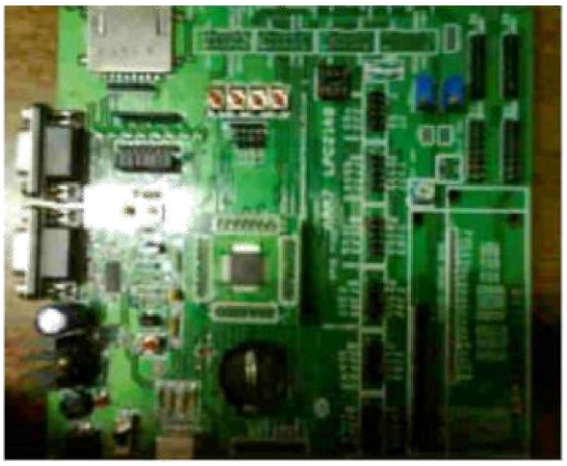
Step 6: If no action take place it will enter into emergency state and trip the circuit.

## IV. FLOW CHART SHOWS THE STEP BY STEP PROCESS



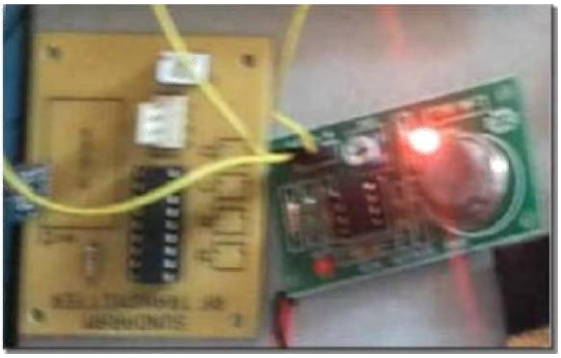
The Fig, shows the step by step process of the control and monitoring of transformer using the atmega328 processor.

## V. SNAPSHOT OF ATMEGA328 PROCESSOR



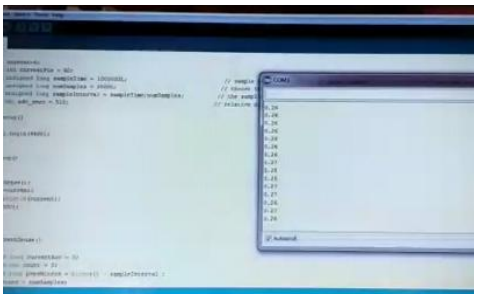
The Fig, shows the snapshot of atmega328 processor board where all the peripherals will be interfaced in it. It is interfaced with current sensor and voltage sensing circuit.

## VI. TRANSMITTER MODULE ALONG WITH CURRENT SENSOR



The Fig, shows the transmitter module along with current sensor and voltage sensing circuit.

## VII. SNAPSHOT DURING INTERFACING WITH IOT AND CURRENT SENSOR



## CONCLUSION AND FUTURE WORK

This study gives remedies from the faults occurring in transformer and it overcomes the drawbacks of previous working methods. The paper focuses much on the efficiency of controlling process of the transformer and mainly through wireless communication that eliminates the use of large cables which are of high cost, low reliability and maintenance.

The IOT 'Transmission helps in better way of communication which enhances the improvement steps in this process.

So, use of ATMEGA328 processor makes the system real time embedded system and aids very much in industry needs. This work can also be extended to handle several numbers of transformers on industrial units by assigning tags to each transformer which in turn is monitored and controlled by a single ATMEGA328 processor.

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