

# IOT Based Circuit Breaker Monitoring And Control

<sup>1</sup>Kalyani S. Shewale, <sup>2</sup>Disha D.Kamble, <sup>3</sup>Samruddhi B.Parbat,  
<sup>4</sup>Mr.V.S.Kamble



<sup>123</sup>Department of Institute of Information Technology  
<sup>4</sup>Professor, Department of Institute of Information Technology

AISSMS's Institute Of Information Technology, Pune  
Savitribai Phule Pune University.

## ABSTRACT

This paper describes IOT(internet of things) based circuit breaker monitoring and control. Circuit breaker is switching as well as protecting device in electrical system. In very simple terms an ideal circuit breaker must be:-

- A good conductor in its close position, ideal in fact, it should have nil internal losses
- A perfect supply isolator in its open position able to go from closed to open position in very short time.
- Not developed over voltages during switching operation and be reliable over its service life.

Therefore preventive maintenance is essential in order to certain reliability of circuit breaker. This paper takes the effort to develop automated circuit breaker monitoring and control by arduino and other electronics components. As circuit breaks are operated very frequently so carrying out the time to time maintenance of the circuit breaker is very much needed or to carrying out the time to time maintenance of the circuit breaker is essential.

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## I. INTRODUCTION

As we all know that circuit breaker is very important and main component present in our electrical system so the reliable and safe operation of that is very essential so that we are going to modify our circuit breaker by using some electronic devices. Circuit breaker sense the various electrical problems like over current, overvoltage and other sensitive faults and makes and break the contacts according to the need of the operations.

So in our project we are going to use some electronic devices to make the circuit breaker more reliable and safe.

We are using the arduino by which are going to sense the various electrical faults and that data can be directly provide to the relay coil, and our relay coil is directly connected to the circuit breaker and it operates the circuit breaker according to the

condition of the faults. Also all these data can be displays on the computer or on the PC and can be available to the user so can user get any information regarding to the status of the circuit breaker, to make the circuit breaker smart and make the safe operation the time to time checking and availability or up gradation of the the current status of the circuit breaker is very much needed so operator can get this information, also he can operate the circuit breaker from the mobile or PC.

## II. DETAILED DESIGN OF THE PROJECT

### A. Why we need this particular system

There are so many uses of IOT based circuit breaker but also can be used in switching for protection purpose . Most of the electrical companies consist of the circuit breaker .But need of this online monitoring of the circuit breaker is

that to reduce the downtime of the system and make it reliable or also by doing these we can make circuits more reliable and available for all data on there computers, etc.

We all know that circuits breakers are there in all the electrical system to protect the system and for protection purpose also but implementing it in software we can reduce the maintenance cost also it can increase the efficiency and also increase the accuracy of the system.

Development of software based control of circuit breaker avoids the breakdown of whole system . Since, all loads are parallel connected to the system so breakdown of one may damage the whole system. IOT based circuit breaker avoid this by switching and present whole system.

Manually this process takes employment of one or more persons but also to make it working in conditions we use software based circuit breaker , in which we are going to use many electronic component .

This system provides automated monitoring , high efficiency ,security of the safety related application as complete code implementation is open and user friendly also . Modification can also be done in source code.

Also it reduces the maintenance cost and hardwire and also going to reduce the unnecessary downtime of the system and also minimizes the chances of blackout which is very major problem in electrical system.

**II. OBJECTIVES**

1. As we can do, modification in source code that means this is user friendly. So, this paper provides user to explore their knowledge and modify the code according to their user by which user can access the all information when needed through the cloud and by using internet of things.

2. To avoid the maintenance of hardware and reduce the cost of the maintenance and service this technology is very helpful that it can continuously update the present data of the circuit breaker and also the status of load and over current ,etc.

3. By using such a smart technology the no of labour are going to decrease and also it reduces the human errors.

So, this technology is going to help the fast and reliable operation of the circuit breaker which is very important in the electrical system.

**IV. BLOCK DIAGRAM OF OUR PROJECT**

We are going to use electronic components in our project like arduino mega 2560 and modem router to access the hardware data and the condition of the circuit breaker .

We are access the data like load current , trip coil current, load status,etc and this data is given to the arduino mega 2560 and this is connected to the relay driver board which is directly connected to the circuit breaker.

Data from the arduino can be access by the relay coil and according to that data relay coil can make and break the contact with the circuit breaker.

And as there is two way communication between the relay and the arduino the data from the relay coil and circuit breaker can be displays on the computer or PC through the modem with the help of the cloud and internet systems.

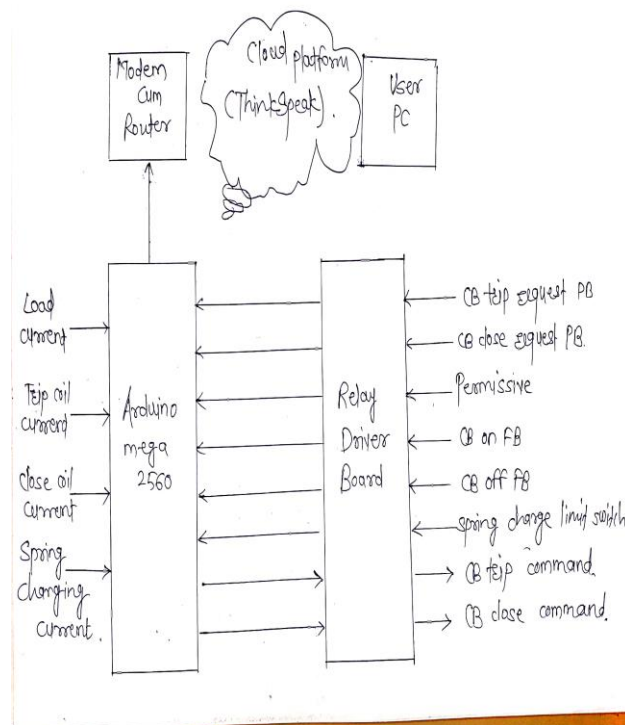


Fig 1. Block dia of IOT based circuit breaker

**V. HARDWARE REQUIRED FOR PROJECT**

- Board of arduino megs 2560
- Relay coil board
- Current sensors

- Lamp with the simulating board
- Mechanism of circuit breaker and its simulation
- Modem or router
- PC or mobile ,etc

In this way we are going to make circuit breaker smart and making its operation very reliable and makes its data available for all the users by using the internet of things. Also maintenance time and downtime of the system reduces and also security of the system get increase. By using the smart electronic components data can be available in operators hand so he can makes changes according to the requirements of the system.

## VI. EXPERIMENTAL SETUP

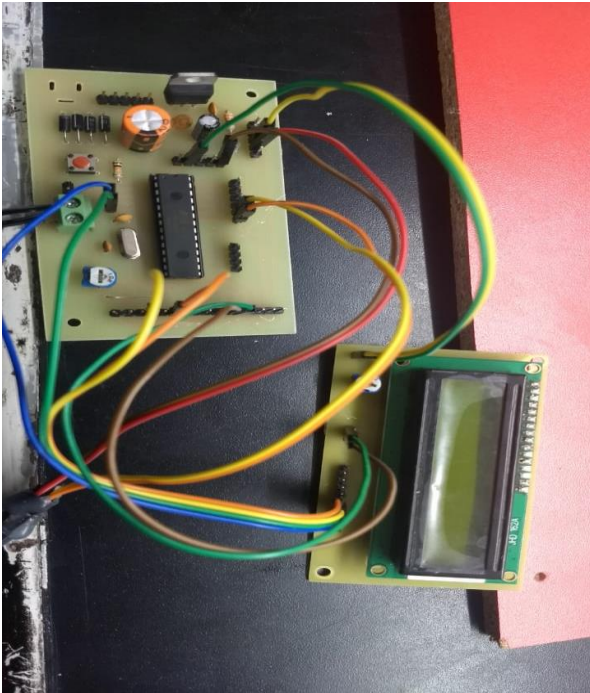


Fig 2.Circuit diagram of IOT based circuit breaker

## VII. ADVANTAGES OF OUR PROJECT

- We can access the detailed information about healthy as well as faulty operations from anywhere in the world.
- Manufacturing and maintenance cost is reduced by using IOT based circuit breaker.
- Efficiency of this circuit is high as compared to hardware based circuit.
- Blackout of the system is avoided i.e minimized downtime.
- Cost of conditions monitoring is reduced.
- Use of computerized maintenance management software provides automated facilities.

## VIII. CONCLUSION