

# Smart Laboratories

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**Abstract:** Lab Automation is the automatic or semi- automatic control and monitoring of household appliances and residential lab features like doors, Gate, light, fans and even the windows. The IOT definition has been evolved due to convergence of multiple technologies like, The Real Time Analysis, Commodities Sensors and Embedded systems. IOT technology is used more for making the home to a smart lab. In this paper, an IOT based low-cost smart lab automation system is proposed. The main objective of this system is to make human life easy and comfortable by using IOT. Now a day as people are so busy with their work pressure so the will be looking for a smarter life style. Lab automation or domestics is building automation for a lab, called a smart lab or smart lab. A lab automation system will control lighting, climate, entertainment systems, and appliances.

**Keywords :**IoT, Sensors, LCD, Relay.

## I. INTRODUCTION

The project proposes an efficient implementation for IT (Internet of Things) used for monitoring and controlling the lab appliances via World Wide Web. lab automation system uses the portable devices like smartphone, laptop, etc. as a user interface. They can communicate with lab automation network through an Inter-net gateway, by means of low power communication protocols like Wi-Fi etc. This project aims at controlling lab appliances via mobile app using Wi-Fi as communication protocol and node MCU as server system. Node MCU is an open source IOT platform. The user here will move directly with the system through a web-based interface over the web, whereas lab appliances like lights, fan, etc. are remotely controlled through easy interface provided by a website/application. The server will be inter-faced with relay hardware circuits that control the appliances running at lab. The server communicates with the corresponding relays. The capabilities of Wi-Fi are more than enough to be implemented in the design. Also, most of the current laptop/notebook or Smartphone come with built-in Wi-Fi adapter. It will indirectly reduce the cost of this system.

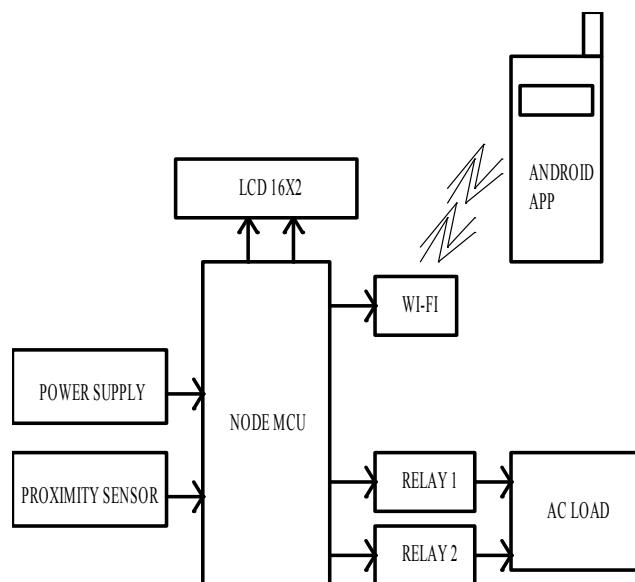


Fig 1: A complete system design

This project aims at controlling lab appliances via mobile app using Wi-Fi as communication protocol and node MCU as server system. Node MCU is an open source IoT platform. The user here will move directly with the system through a web-based interface over the web, whereas lab appliances like lights, fan, etc. are re-motely controlled through easy interface provided by a website/application. The server will be interfaced with relay hard-ware circuits that control the appliances running at lab. The server communicates with the corresponding relays. The capabilities of Wi-Fi are more than enough to be implemented in the design.

## **II.ADVANTAGES**

- Can be implemented at any device and automated
- Alert system is quick in case of an emergency
- Eliminates the use of PC for automation
- Helps old age people to control the remote devices
- Simple interface

## **IV. DISADVANTAGES**

- Replacing humans is dangerous May take time and learning
- Security concerns
- Vulnerable to attacks
- Most of the times range is restricted

## **V. FUTRE SCOPE**

More smartness can be added to this proposed project for making this smart lab highly auto-mated by using artificial intelligence. A camera can also be connected to micro controller so that suspect photograph can be taken and can be forwarded to the police if needed. Also, voice call feature can be included to this system through which user can control the lab appliances.

## **VI. CONCLUSION**

With the help of the design control unit, lab appliance can be converted into a smart and intelligent device using IOT. The working of the proposed model was experimentally shown with help of connecting the two bulbs, a dc fan and an output power socket. Proposed system has two advantages. First, using the IOT connectivity, we can monitor and access our smart lab easily from anywhere, which will definitely will prove to be energy efficient. Secondly, it acts has a helping hand for the old age and differently able person. For future work we would like to add up more controlling units that can make our smart lab more intelligent that can be practically deployed in the real time situation. The designed lab automation system was tested a number of times and certified to control different lab appliances used in the lighting system, air conditioning system, lab entertainment system and many more. Hence, this system is saleable and flexible.

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