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# Innovative-LAB

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***Abstract:*** ***The concept of Internet of Things (IoT) requires the seamless connectivity of millions of heterogeneous devices. In today's World, implementation of IoT based smart Lab has drawn a huge attraction and become a prominent area of research. This research work presents an approach for smart Lab automation using IoT that can be controlled wirelessly. Lab automation system means monitoring and controlling of Lab appliances remotely using the concept of internet of things (IOT). In this method we use mobiles or computers to control the basic Lab appliance and make it function through the designed web page with internet connection/local area network (LAN) servers.***
***This type of Lab is also known as smart Lab. The concept of applying automation in the sectors of housing is selling like hot cake. Western countries have welcomed the concept of automation into their Labs with open arms. Our country is keeping up with the pace of modernization too. Different approaches to automating Labs have been implemented. The best among this is Lab automation system using IOT. IOT provides the feasibility of operating the Lab automation system from anywhere around the world using internet. It reduces use of excessive or unnecessary human efforts and improves the standard of living of the people in our society.***
***Keywords: LAB Automation, Sensors, IOT Technology.***

## I. INTRODUCTION

Pursuing convenient and better living is human nature. Human life is always continuously changed due to technological advancement including Internet, sensor, automatic control, multimedia, etc. Nowadays people not only can monitor but also control the lab appliances via Internet.
The development of device community uses the electric/information/communication technologies (EICT) to integrate devices and to create more intuitional services for digital lab such as such as auto-discovery, auto-communication between devices, etc. The future information appliances (IA) will be regarded as active control rather than passive control such as ubiquitous service based on the digital living network alliance (DLNA) standard.
Therefore, how to develop the technologies of device access and management to implement the ubiquitous service system becomes a base requirement. In this paper, we implement a systemic design to connect the heterogeneous networks and devices in the lab automation network (HAN).

### *A. Purpose*

#### *1) Identify need of Project*

lab automation system using internet of things (IOT) means monitoring and controlling of lab appliances remotely using the concept of internet of things (IOT). In this method we use mobiles or computers to control the basic lab appliance and make it function through the designed web page with internet connection/local area network (LAN) servers. This type of lab is also known as smart lab. Here we have designed system as well as an html page from which we can control the whole communication board. We have used the embedded C language where we have provided the user name and password so that when we start the communication board it automatically gets connects to the devices hotspot

#### *2) Identify methods to Implement*

With advancement of Automation technology, life is getting simpler and easier in all aspects. In today's world Automatic systems are being preferred over manual system. With the rapid increase in the number of users of internet over the past decade has made Internet a part and parcel of life, and IoT is the latest and emerging internet technology. Internet of things is a growing network of everyday object-from industrial machine to consumer goods that can share information and complete tasks while you are busy with other activities.

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*B. Objective Of System*

*1)* Reduced installation costs : First and foremost, installation costs are significantly reduced since no cabling is necessary. Wired solutions require cabling, where material as well as the professional laying of cables (e.g. into walls) is expensive.

*2)* System scalability and easy extension: Deploying a wireless network is especially advantageous when, due to new or changed requirements, extension of the network is necessary. In contrast to wired installations, in which cabling extension is tedious. This makes wireless installations a seminal investment

*3)* Aesthetical benefits: Apart from covering a larger area, this attribute helps to full aesthetical requirements as well. Examples include representative buildings with all-glass architecture and historical buildings where design or conservatory reasons do not allow laying of cables.

## II. LITERATURE SURVEY

The system proposed in [1] explains Human beings are wasting too much of electrical energy by not turning off the lights, fans and many other electrical appliances when they are not using it. To overcome this problem we have developed a device that can be fitted anywhere in offices or homes. As the device will detect the presence of Human and automatically turn on and off the device. To detect the presence of human we are using PIR Sensor. PIR consist of IR sensors and IR sensors are used to the heat of the human body and it will turn on the electrical appliances. Arduino mini pro is used to control the PIR sensor and electrical appliances. Relay modules are used to control the electrical appliances. Similarly, [2] This is the Simple project based on the lab automation. In the modern world or time, the technology is improving day by day. In this time the people want to do work with less efforts. And this can be achieved with the help of this project. The idea is to plant several sensors around the lab and give a calculated feedback to the response these sensors receive. An example would be having PIR sensors around the lab that would detect the presence of human and turns the fan ON or OFF. For light control, there will be LDR and if the illumination in the lab and turns the light ON/OFF according to the room'slighting changes from high to low. And this project is to be overall cost effective. While the idea to improve lab is the priority of this project work, importance is made to ensure that this system is affordable to all those who need it. The setup cost may initially be a bit high, but in the long run it is expected that there will be a reduction in both electricity.[3] developed a practice platform for students to learn the IoT and mobile application technologies. The designed smart lab also helps the university to manage different needed systems such as light and switches control, security, air conditioning and heating. In [4], authors integrated WSNs into IoT to design a secure smart lab platform. They extended the home automation technology to laboratories by implementing environmental sensors to control ambient lighting and passive infrared sensor to build a security module.

## III. PROPOSED SYSTEM

The design and implementation is kind of tough and one must be done with great care. At first one must check that which appliance or load is going to control with the relay, according to that load or appliance one must choose the appropriate relay. In this paper, we have taken tube lights, fans, computers under consideration. Hence, we've used relays for loads. Next, connect relay input to microcontroller and connect to the power supply through buck converter. Since, the relay and microcontroller require 5V DC supply, we've used 230V to 12V DC Switch Mode Power Supply (SMPS) and buck converter to convert 12V DC to 5V DC. Then a smart phone connected to internet with Blynk application as a control panel, and microcontroller kit in other side as a controller that receives control command

## IV. SYSTEM ARCHITECTURE

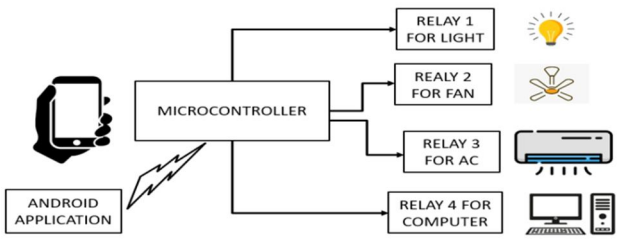



Fig -1: System Architecture Diagram

*A. Advantages*

*1)* Easy to used system
*2)* Control system from anywhere
*3)* Centralized system

## V. SYSTEM REQUIREMENTS

*A. Software Used*

*a)* Operating System: Windows XP and later versions Front End: HTML,CSS
*b)* Programming Language: Python
*c)* Tool: Arduino IDE
*d)* Domain: IOT
*e)* Algorithm: Hashing.

*B. Hardware Used*

*a)* Processor – i3 or above
*b)* Hard Disk – 150 GB
*c)* Memory – 4GB RAM
*d)* NODE MCU Micro Controller
*e)* Relays
*f)* Fan
*g)* Light

## VI. ALGORITHMS

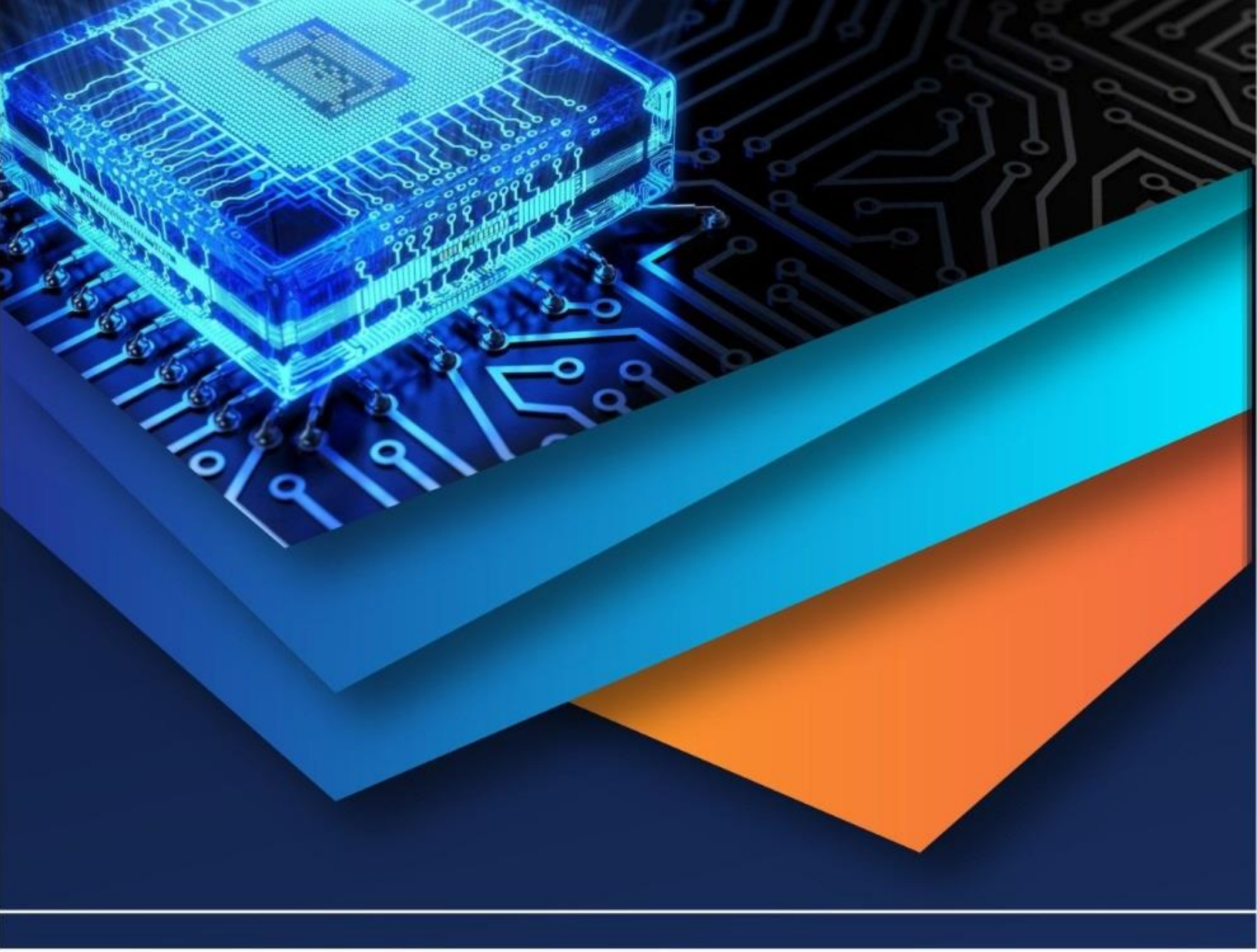
*1)* Hashing & Mapping: A cryptographic hash function (CHF)is a mathematical algorithm that maps data of an arbitrary size (often called the "message") to a bit array of a fixed size (the "hash value", "hash", or "message digest").
*2)* It is a one-way function, that is, a function for which it is practically infeasible to invert or reverse the computation. Ideally, the only way to find a message that produces a given hash is to attempt a brute-force search of possible inputs to see if they produce a match, or use a rainbow table of matched hashes. Cryptographic hash functions are a basic tool of modern cryptography.

## VII. CONCLUSION

Hence, In the proposed framework, IT Lab automation system using IoT that is capable of controlling and automating most of the appliances through an easy manageable web interface. The proposed system has a great flexibility by using Wi-Fi technology to interconnect its distributed sensors to lab automation server. It has the capability to reduce the excess usage of the power consumption and it will reduce the electricity bill upto 10 to 15 and manual switching of the computer and stuffs. So our project is very effective and eco-friendly.IT Lab automation system using IoT that is capable of controlling and automating most of the appliances through an easy manageable web interface. The proposed system has a great flexibility by using Wi-Fi technology to interconnect its distributed sensors to lab automation server. It has the capability to reduce the excess usage of the power consumption and it will reduce the electricity bill upto 10 to 15 and manual switching of the computer and stuffs. So our project is very effective and eco-friendly.

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