

# Review Paper on Automatic Controlling of Classroom Appliances using Voice Control and Sensor

**Prof. Sayali Shivarkar<sup>1</sup>, Atul Mohite<sup>2</sup>, Rushikesh Bhutada<sup>3</sup>,  
Dnyaneshwari Zagade<sup>4</sup>, Vaibhavi Tornekar<sup>5</sup>**

Lecturer, Department of Computer Engineering, Dhole Patil College of Engineering, Pune, India<sup>1</sup>

Student, Department of Computer Engineering, Dhole Patil College of Engineering, Pune, India<sup>2,3,4,5</sup>

**Abstract:** So far we are controlling many electrical devices at homes, colleges, offices, institutions manually. To control all electrical devices we need a lot of “MAN POWER”. If manpower increases maintenance cost also rises. This doesn't cause any benefit to the college. So to avoid these kinds of drawbacks we need some wireless controlling systems. This communication system can be used in all fields like industry, domestic purposes like home appliances controlling using sensor or voice command as a remote. This system can be used by elder or disable persons who are unable to go to the switchboard to control the devices. Remote operation is using smart phones or devices with Android operating system, upon a GUI (Graphical User Interface) based voice command. This Arduino based voice controlled college appliances using Wi-Fi uses the android application that sends voice command to the devices through the Wi-Fi. This system reduces human labour, effort, time and errors due to human negligence. We can control all loads at a time from one place without connecting any physical wire between loads and control room.

**Keywords:** Arduino UNO, Internet of Thing, Home Automation, Arduino, Voice Recognition, Wi-Fi Module, Android Application

## I. INTRODUCTION

Nowadays without electricity we cannot imagine our daily life because electricity has become a necessity for all, without which day-to-day life chores & daily activities become stand still. Due to the depletion of non-renewable resources, conservation of mandatory and by doing so we can reduce electricity bills as well. Also, with the help of an automatic classroom light control system, you need not worry about electricity as the lights get automatically off when there is no one in the classroom. This proposed system is a precise combination of Android smart phone and embedded system which include Arduino Uno Board, Wi-Fi module and Relay circuit.

In this paper, we used a Wi-Fi wireless technology to monitor the device. An android application is installed in a mobile device i.e. android smart phone and it has inbuilt switch interface of all the appliances separately in it. Through which all the respective devices can be control and monitor individually. The Wi-Fi module receives the command from mobile phone and passes to relay circuit. As per the given signal from the user, the relay circuit switched ON/OFF the respective devices. The main purpose of using Wi-Fi wireless technology is to provide a greater extent to range and better feasibility. This paper will provide the future access to control the various classroom appliances with the help of android smart phone.

**Components that are used in this system are as follows:**

**A. Arduino UNO:** The Arduino Uno is an open source microcontroller board based on the Micro chip ATmega328P micro controller and developed by Arduino.cc. The board is equipped with sets of digital and analogue input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The board has 14 digital I/O pins (six capable of PWM output), 6 analogue I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B USB cable.

**B. Node MCU Wi-Fi Module:** NodeMCU is an open source IoT platform. It includes firmware which runs on the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware which is based on the ESP-12 module. The term "NodeMCU" by default refers to the firmware rather than the development kits. The firmware uses the Lua scripting language. It is based on the eLua project, and built on the Espressif Non-OS SDK for ESP8266. It uses many open source projects, such as lua-cjson and SPIFFS.



- C. Relay Board:** A relay is an electrically operated switch. It consists of a set of input terminals for a single or multiple control signals, and a set of operating contact terminals. The switch may have any number of contacts in multiple contact forms, such as make contacts, break contacts, or combinations thereof.
- D. Bread Board:** A breadboard is a construction base for prototyping of electronics. Originally the word referred to a literal bread board, a polished piece of wood used for slicing bread.<sup>[1]</sup> In the 1970s the solder less breadboard (a.k.a. plug board, a terminal array board) became available and nowadays the term "breadboard" is commonly used to refer to these. Because the solder less breadboard does not require soldering, it is reusable. This makes it easy to use for creating temporary prototypes and experimenting with circuit design. For this reason, solder less breadboards are also popular with students and in technological education. Older breadboard types did not have this property.
- E. 5V Power Supply:** A power supply is an electrical device that supplies electric power to an electrical load.
- F. Jumper Cables:** A jump wire is an electrical wire, or group of them in a cable, with a connector or pin at each end, which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering.
- G. Android Application:** A mobile application, also referred to as a mobile app or simply an app, is a computer program or software application designed to run on a mobile device such as a phone, tablet, or watch.

## II. LITERATURE SURVEY

### Paper 1:

**Title:** IoT based Smart Home Automation System using Sensor Node.

**Author:** J.Narsinga Rao, N.T.V.S.Narayana, B.Ramu, D.Aruna, B. Deepika, B Neelima Devi

**Publication Year:** January 2019s

**Summary:** In shortly, many of the smart devices will be communicating over IoT the analyst firm Gartner predicts that by 2020 there will be more than 20 billion devices connected to the Internet of Things. Home Automation has been on the rise in the recent times. Starting from agriculture, to the cities having the tallest of the skyscrapers are inclined towards automation. We are living in a world that is rapidly evolving regarding automation. Automation is the ability to schedule events for the devices connected to the local network or the internet through time-related or stimulus-triggered programs.

### Paper 2:

**Title:** Switch On/Off Home Appliances Using Arduino through Voice Commands

**Author:** J.Narsinga Rao, N.T.V.S.Narayana , B.Ramu , D.Aruna , B. Deepika , B Neelima Devi

**Publication Year:** January 2019

**Summary:** The Internet of things (IoTs) can be defined as connecting the various types of objects like smart phones, personal computer and Tablets to internet, which brings in very newfangled type of communication between things and people and also between things. The main objectives is to design and to execute an cost effective and open source home automation system that's capable of leading most of the home and sustain the house automation system.

### Paper 3:

**Title:** IoT based Monitoring and Control System for Home Automation

**Author:** Pavithra.D, Ranjith Balakrishnan

**Publication Year:** 2018

**Summary:** In general, home automation research targeted any needs like applications that provide the luxury and smart requirements while some threw light on the special needs for elderly and disabled etc. The aim of the report " Voice controlled home appliances using Arduino Bluetooth" is to furnish a system that can respond to voice commands and control the ON/OFF status of electrical devices either ac or dc.

## III. SYSTEM ARCHITECTURE

In this system, we are going to make a classroom automation system using Wi-Fi module and Arduino Uno Controller R3. With the help of these modules, we will be able to control lights, electric fan and other classroom appliances through a Wi-Fi application using our Android Smart phone and via voice commands. All the appliances will be connected to relays, which are controlled by the Arduino. Wi-Fi Module and Arduino together act as a web Server and it will send control commands through the mobile application i.e., android software. We are implementing this with the help of ESP8266 Wi-Fi Module, as it is a self contained SoC with integration of TCP/IP stack, which may help any microcontroller having UART to access a Wi-Fi network.

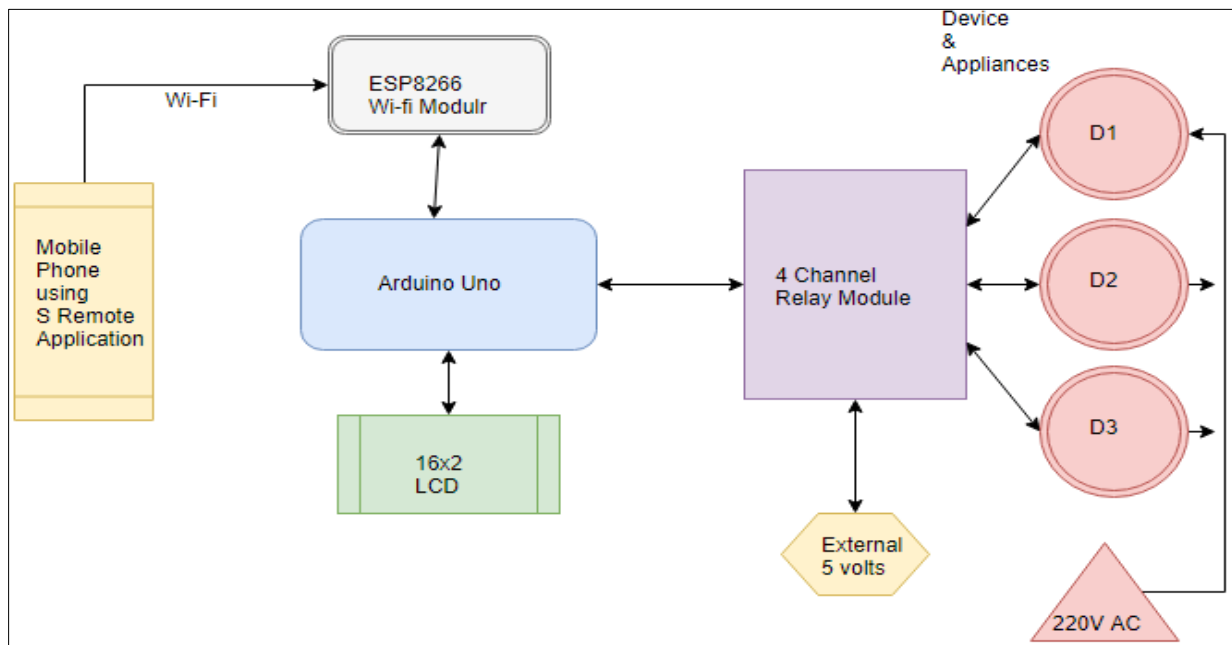


Figure: 1 System Block Diagram

It can act as both Wi-Fi access point as well as a Wi-Fi client. It is pre-programmed with AT commands, so we can easily access and configure it using a microcontroller. First, we can connect ESP8266 with Arduino Uno. The ESP8266 runs on 3.3V, it may damage if you connect it directly to 5V from Arduino. Now we can connect relays to Arduino. Here a ULN IC is connected which is used as relay driver. Then all the AC devices are connected to relay output to ON/OFF the AC devices.

#### IV. CONCLUSION

Today, Android is the world's powerful mobile platform open source operating system to fit easily whatever the functionality we had in our mind. This article is about wireless classroom automation using Android mobile helps you to implement such a fantastic system in our schools or colleges at a very reasonable price using cost-effective devices. Thus, it overcomes many problems like costs, inflexibility, security etc. In addition, will provide greater advantages like it decrease our energy costs. In addition, it is very convenient to use and will improve the comfort of our classroom and provide smarter way to access the classroom appliances.

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