

# ATmega328P Based Light Control Using Mobile

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**Abstract** - In today's world automation has played a key role in developing human's life and enhancing safety and security protocol. Mobile phones nowadays are very common to all people. Everyday household work like switching ON /OFF the fan or lights, decrease or increase in air conditioner temperature can be easily done using smartphone. Today home automation system (HAS) has been a key area of research in recent times. Home automation using android platform eliminates the process of individual involvement and enhancing easier and faster daily household needs for everyone. The home automation system (HAS) designed on android platform has been interfaced with 8 bit microcontroller i.e. Arduino to control the home appliances using relay. Bluetooth has been used as the most reliable and efficient technology for short range communication. This paper provided a novel approach enhancing automation in household works and eliminating the traditional method of switching.

**Index Terms**- Arduino, Relay, Android, Home automationsystem, Bluetooth

## I. INTRODUCTION

Today most home uses the electronic appliances such as fans, light, air conditioner etc. As the mobile phones are very common to all people nowadays using mobile as the key for controlling the home appliances will enhance the affordability and simplicity of the HAS. Mobile phones with android based operating system are regarded as smart phone. This smart phone has the capability of connecting to most electronics equipment. The android application needed for the operation of HAS is designed in Android platform. To increase the security feature of the android application password protection has been implemented. Arduino has been used as a microcontroller. Bluetooth has been used for the short range efficient connections.

## II. HARDWARE PLATFORM

The hardware platform comprises of an Arduino UNO, digital computer, Bluetooth and relay module which are discussed below with their function in the home automation system.

### A. Arduino UNO

Arduino UNO [2-3] is an 8 bit microcontroller board which is based on ATmega328P. It comprises of 14 digital input and output pins, a 16 MHz quartz crystal, USB connection for easy computer connectivity and a reset button to eliminate and restart in case of malfunction. It has an operating voltage of 5V, a flash memory of 32KB and a clock speed of 16 MHz for faster data processing.

### B. Relay module

The relay module is an electrically operated switch that allows you to turn on or off a circuit using voltage and/or current much higher than a microcontroller could handle. There is no connection between the low voltage circuit operated by the microcontroller and the high power circuit. The relay protects each circuit from each other. The each channel in the module has three connections named NC, COM, and NO. Depending on the input signal trigger mode, the jumper cap can be placed at high level effective mode which 'closes' the normally open (NO) switch at high level input and at low level effective mode which operates the same but at low level input.

#### Specifications

- On-board EL817 photoelectric coupler with photoelectric isolating anti-interference ability strong.
- On-board 5V, 10A / 250VAC, 10A / 30VDC relays.
- Relay long life can absorb 100000 times in a row.
- Module can be directly and MCU I/O link, with the output signal indicator.
- Module with diode current protection, short response time.
- PCB Size: 45.8mm x 32.4mm

**E. Bluetooth Module**

Bluetooth module HC-05 provides radio communication between almost all communications enabled devices enabling user with efficient wireless communication on an unlicensed radio spectrum. It typically operates on a frequency of 2.4GHz and has a range of up to 20m to communicate with other devices.

**III. SYSTEM ARCHITECTURE**

In the Home Automation System (HAS) the user interfaced android application has been implemented in android platform enabling easy access for the user and Arduino has been used as a microcontroller with relay circuit and Bluetooth module for wireless access.

**A. Interfacing of instruments**

A Bluetooth based mobile with android OS has been interfaced with the Bluetooth module and the Bluetooth module has been interfaced with Arduino UNO. The relay circuit has been interfaced with the appliances and the relay circuit has been connected to Arduino. A detail description has been illustrated in the Block diagram below Fig1.

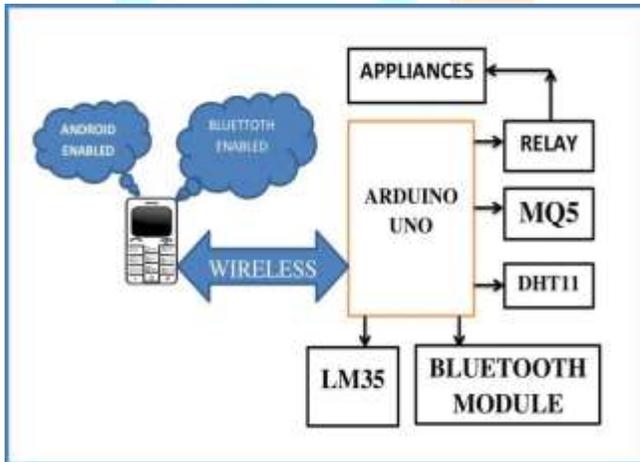


Fig1: System Architecture Overview

**B. Bluetooth Application Controller for Arduino**

Bluetooth application controller for Arduino is available in GOOGLE play store it serves as a eight controlling devices which is touch operated android application. It makes the home automation system more

easily accessible, enhances easy operation and eliminates the traditional method of switching. It has been linked via the Bluetooth module HC-05. The control action has been done by relay. The Fig1.1 provides the snapshot of the used android application.

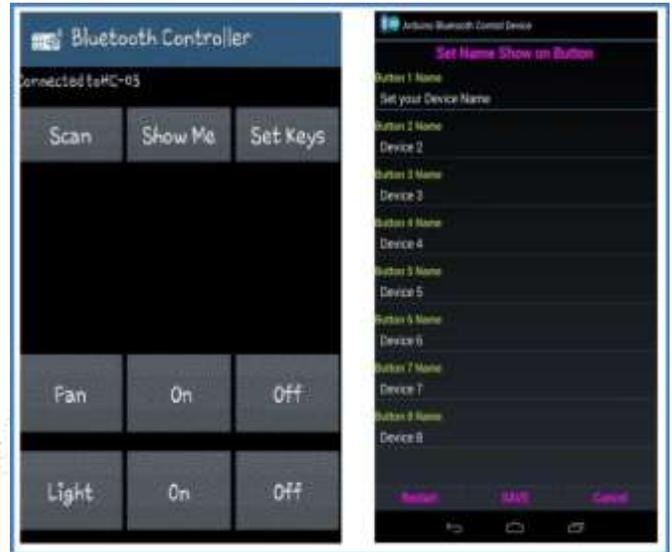


Fig1.1: Snapshot of the Application

**IV. APPLIANCES IMPLEMENTATION**

In this section the appliances used are illustrated. Various daily house hold required devices in day to day life are used. The following devices used are given below:-

- Bulb

The appliances are simulated using relay and the dc motor drives the appliances when the command is given using the application. Below in Table1 the simulation for appliances for different input is illustrated.

Table1. Simulation Table for Appliances

SL.NO	TOUCH INPUT	OUTPUT
1.	DEVICE ON	BULB ON
2.	DEVICE OFF	BULB OFF
3.	DEVICE ON	TELEVISION ON
4.	DEVICE OFF	TELEVISION OFF

**V. CONCLUSION**

The home automation system using android application has been tested and successfully implemented. This system is highly reliable and efficient for the aged people and paralyzed person on a wheel chair who cannot reach the switch for the switching of ON/OFF the device and are dependent on other. This system has a wide scope development and modification.

The voice control system can be implemented with accuracy in voice recognition and better pitching analysis. More devices can be simulated and timer could be set for automatic operation.

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