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Android Based Home Automation Using Bluetooth Technology

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Abstract - *This paper represents the design and implementation of reliable, compact and low-cost android based smart phone home automation system. Home automation is useful for numerous advantages. It gives a way to have things around your home happens automatically. In today world every people have smart phone with them at every moment of time. So, it makes sense to use these to control home appliance in home automation system by using a simple android app, one can control any home appliances with single click. Commands are sent via Bluetooth to microcontroller AT89S52, so we need not get up to switch on or switch off the device while doing some work. This system is designed to assist an provide support in order to fulfill the need of physically challenged & old people. To switch ON & OFF the device automatically, we use motion sensor/PIR Sensor to switch on & off light automatically when detecting the presence of a person within certain range automatic room light using Arduino is a very useful project.*

Key Words: Arduino, Bluetooth Module, PIR Sensor, Smart Phone, Electrical appliances.

1. INTRODUCTION

The aim of the proposed system is to develop a cost-effective solution that will provide controlling of home appliance using android phone. Home automation is the control of any or all electrical appliances in our home. Generally, when we go out of the house, we switch off the light are the electrical equipment's to avoid accidents such as short circuit, firing etc. but sometimes we forget to have switched them off. We must come back home to do so. This is wastage of time and creates lost of chaos and tension so to avoid any such kind of situation the latest technology coming up worldwide is the smart home technology. We use PIR Sensor to switch off the electrical appliance PIR sensor work like a motion sensor it detect the person when in home or without home sometimes people forget to switch off electrical appliances like fan, light etc. PIR Sensor which detects the infrared energy omitted from human's body when human go out home the PIR Sensor automatically off the electrical appliances.

In this project we have integrated technologies like android with Bluetooth to execute home automation system we designed user interface using android because android operating system is capturing most of the mobile market. It has technical advantages of scalability, flexibility, availability, security and its ease of use for users we have selected Bluetooth technology to be used in this project because it will keep home automation system active and user can interact with the system from anywhere in the house.

The aim of this article to propose a wireless remote control that permits elderly people with physical challenges handicapped and disabled people, to command their desired device without moving around to the nearest control point.

2. BLOCK DIAGRAM OF PROPOSED MODEL

The block diagram of the home automation system is shown in figure 1. It shows a simple sketch of the implementation of home automation and the various part involved in it. The microcontroller is the controlling devices through which application interacts with home appliances. Android application is used to send the command to microcontroller which gives the input to the relay control unit for controlling the appliances like fan & light.

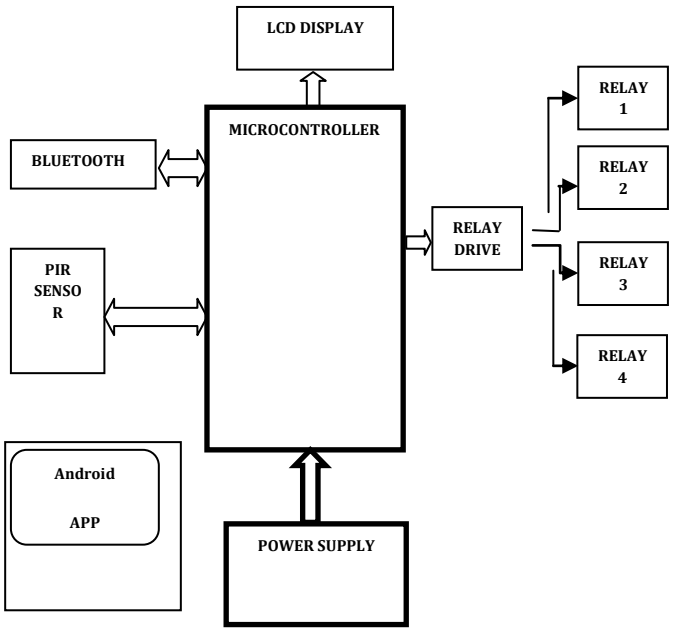


Fig -1: Block Diagram of Home Automation

2.1 Bluetooth Module

Bluetooth is a wireless communication technology used for exchanges of data our short distances. It is found in many devices ranging from mobile phone and computers. Bluetooth is a combination of hardware and software. It is intended to create a personal area network our short range the biggest advantages of using Bluetooth technology is that there are no cables or wires required for the transfer of the data our short ranges.

Fig -2: Bluetooth

2.2 PIR Sensor

We use PIR Sensor to switch off the electrical appliance PIR sensor work like a motion sensor it detect the person when in home or without home sometimes people forget to switch off electrical appliances like fan, light etc. PIR Sensor which detects the infrared energy omitted from human's body when human go out home the PIR Sensor automatically off the electrical appliances.

Fig -3: PIR Sensor

3. WORKING OF PROPOSED MODEL

In this project we have used AT89S52 microcontroller for controlling the whole process of this project. AT89S52 is an (8-bit) microcontroller and it requires supply voltage of 5V DC. Then the main power supply is 230V AC. We used step down transformer to convert 230V to 12V. At output of step-down transformer, but we need DC for microcontroller circuit then rectifier circuit convert AC voltages to DC voltage. The output of rectifier circuit is 12V DC. But this voltage is not pure DC then filter is used to get pure DC from impure DC, at the output of filter circuit 12V DC is get but microcontroller need 5V DC, then we regulate 12V DC into 5V DC. Circuit connection of this project this are very simple Bluetooth module Rx and Tx Pins are directly connected to the Tx and Rx pins of microcontroller, four 5-volt relay are used as a switch for doing toggle on and off the home appliances running on AC mains and a relay driver ULN2003 is used for driving relays. Fan, lights are connected at microcontroller port2 via relays and relay driver. An 11.0592 MHz crystal oscillator used in this circuit for generating clock signal for microcontroller and a 5V voltages regulator LM 7805 used for providing 5volt for the whole circuit. LCD board is used to indicate the status of electrical load and used to display received data from Bluetooth here LCD Display is interfaced to the port1 of the microcontroller. i.e. data pins of LCD are connected to port0. The three control pins of the LCD RS, RW, EN are connected to P2.5, P2.6 and P2.7 pins respectively. Electrical loads like lamp and fan are connected to the P0.0 to P0.3 pins through the four-channel relay module Here relays are used to switch AC loads using small DC voltages. NPN transistor is used to drive the relay. Follow circuit diagram on page 3.

4. WORKING OF ANDROID APPLICATION

In this app ON and OFF buttons are used to ON-OFF the light and fan of home. Now when we touch any buttons in Bluetooth controller app the android phone sends a value to Bluetooth module after receiving this value, Bluetooth module sends the received this value to Bluetooth module sends the received value to the microcontroller and then microcontroller reads it and compare it with predefine value, if any match is occurred then microcontroller perform comparative operation same operation will performed each time when button pressed. Now when user touch fan on button in Bluetooth controller app then microcontroller receives via Bluetooth module and then controller switch 'ON' the fan by using relay driver and relay. And when user touch fan off button in Bluetooth controller app then microcontroller receives via Bluetooth module then controller switch 'OFF' the fan by using relay driver and relay.

Here we have used Bluetooth controller app.

- Download and install Bluetooth controller.
- Turned ON mobile Bluetooth.
- Now open Bluetooth controller app.
- Press scan.
- Select desired Bluetooth device. (Bluetooth module HC-05)
- Now set keys by pressing set buttons on screen.

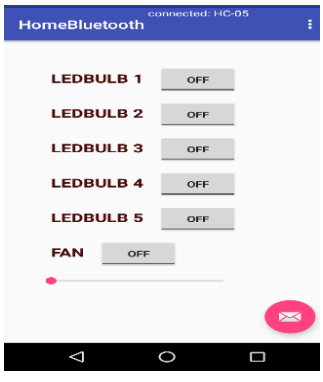
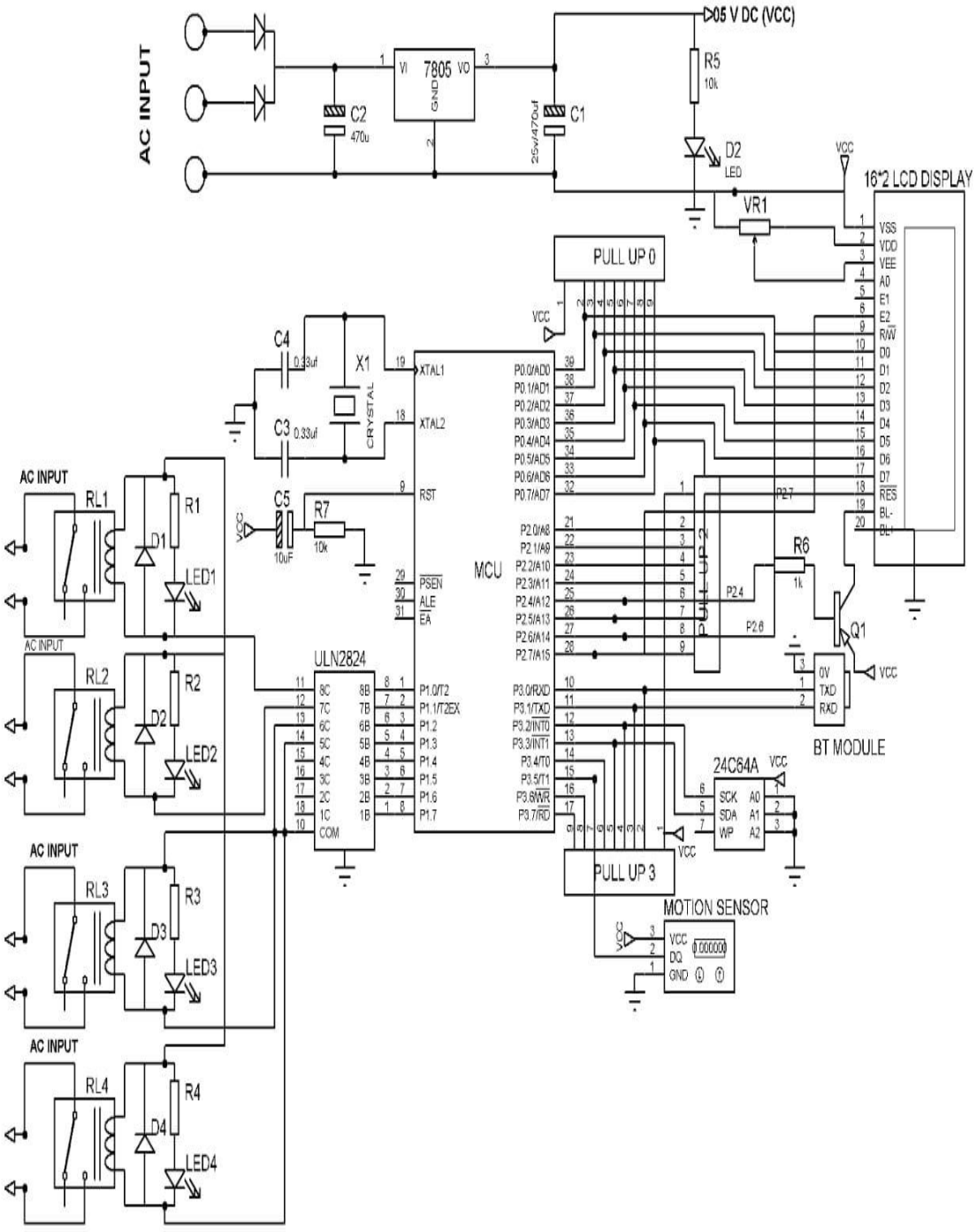


Fig -4: Android App, Home Automation Screen.

Fig -4: Circuit diagram of home automation.



4. RESULT

We successfully completed our project using Android Based Home Automation System. On basis of program coded into Arduino the LED glows and goes of depending on the pressing of button on keypad. Our project useful for physically challenged disabled people.

5. CONCLUSION

The project has proposed the idea of smart homes that can support a lot of home automation system. Android App act like a remote-control device provides help and assistance especially to disabled and elderly. A smart home that having a connection between wireless communication sensors, monitoring and tracking. Smart home is an enormous system that part of multiple technologies and applications that can be used to provide security and control of home easily.

In future, the window GUI will be invoked with speech recognition voice control. The android GUI will be invoked as a remote Bluetooth.

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