

# AUTOMATIC CONTROL HOME APPLIANCES USING ANDROID SMART PHONE

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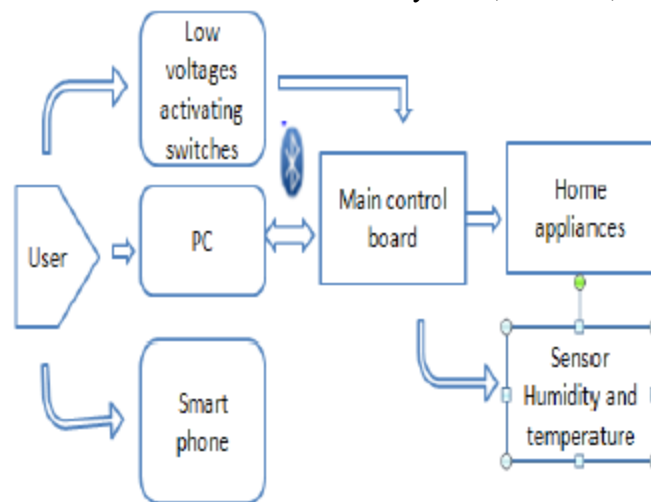
## Abstract:

The remote appliances control system based on the Android smart phone GUI is designed on Android Smartphone. A user logs into the smart Android phone interface, and clicks the buttons gently to send message commands from the GUI which will be transmitted to home information center through the GSM network. Then the AVR ATmega processor recognizes the specified command, and controls the home appliance switches in the wireless radio frequency manner to achieve remote control of appliances ultimately. This seminar focuses on the design of Android terminal, the communication between PIC and GSM module, the realization of the wireless module device's driver, the difficulty in supplying the appropriate low-voltage DC for MCU and wireless module just by a single live wire. The users can manipulate appliances anytime, anywhere, letting our houses become more and more automated and intelligent. There are some problems in the PC monitor terminal, such as its great bulk, inconvenience to carry, high cost, limited monitoring range and so on. Therefore, it's a good choice to design a terminal based on phone.

**Keywords:** android phone; GSM; Bluetooth; wireless switch; SDK.

## 1. INTRODUCTION

With the development of technology and the continuous improvement of people's living standard, people are in pursuit of automated, intelligent and convenient home control systems. At present, the PC is used as the remote control terminal for most home control systems; however, there are some problems in



**Fig.1. Functional Block Diagram of the System**

the PC monitor terminal, such as its great bulk, inconvenience to carry, high cost, limited monitoring range and so on. Therefore, it's a good choice to design a terminal based on phone. With the popularity of smart phones, particularly, the phone based on Android system is rapidly developed. At its I/O developer conference, Google showed a sneak preview of its Android Home project, which will extend the Android

platform into household objects. It means that the remote control based on Android phone will become a mainstream way. After logging into the control interface, users can easily control the lights, TVs and air conditionings anytime, anywhere, which brings great convenience to people and improves the quality of life.

## 1.2 LITERATURE SURVEY

For this proposed Seminar, following IEEE papers were studied as part of literature survey. Smart Home System for Disabled People Via Wireless Bluetooth gives moneywise concept by using GPRS as the medium to control and monitor home appliances. Design and Realization of Home Appliances Control System Based on The Android Smartphone present the information about the remote appliances control system based on the Android smart phone is designed and realized. A user logs into the smart phone interface, and clicks the buttons gently to send message commands which will be transmitted to home information Centre through the GSM network. Then the PIC processor recognizes the specified command, and controls the home appliance switches in the wireless radio frequency manner to achieve remote control of appliances ultimately. Exploiting Bluetooth on android mobile devices for home security application present the information about mobile device has been integrated into our everyday life. Home automation and security are becoming increasingly prominent features on mobile devices the mobile device and security system communicates via Bluetooth because a short-range-only communication system was desired. With the help of android mobile we can control task such as locking the doors, turning on/off lights remotely. According to kaue, home automation can be useful to those who need to access home appliances while away from their home and can improve the lives of the disabled.

## 1.3 MOTIVATION

Disabled people are more likely to be exposed to daily life problems than other healthy people. While deaf people cannot hear the door bell, Alzheimer diseased people can forget the gas open in the kitchen. These are some encountered examples when they 4 are alone at home. With the help of technology, assistant projects can be developed to overcome their difficulties. Smart homes can also be used to support disabled people, providing safe, secure and empowering environments. The system can allow the user to control many features or automate them. The environment can also be monitored by the smart home system to ensure safety and alert people when there is some dangerous situation.

## 2. SYSTEM ARCHITECTURE

The system is composed of android mobile terminal, GSM network, home information center and wireless switch. And the architecture of the system is shown in Fig.2.1 at any moment; the GUI in phone allows the user to manually control any of applications in the room. First of all, the action listener should be set for each button which will be clicked to send message command via the GSM network. After reading and parsing the commands, PIC processor controls the wireless module to send the address and data codes to achieve remote control of appliances ultimately. The terminal based on android phone is designed, which contains GUI design, user management and message command sending event. After entering the lighting control interface, users send predefined commands just by touching the appropriate button or the light bulb icon. The user management includes user registration, login, user information storage and its security. The user registration is to create a legitimate user, and give him the appropriate permissions. The current user ID and the message command will be sent to the home information center together. Meanwhile, the user ID must be registered in the home information center, so that the center can identify it effectively. Once the user reveals his information or loses cell phone, he has to cancel the valid

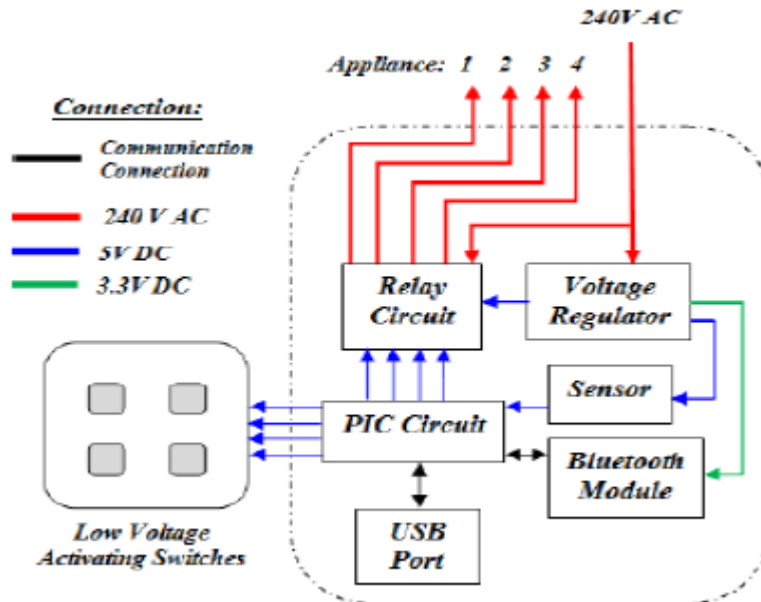


Fig.2. Main Control Board Hardware Block Diagram

ID in the home information center to prevent illegal users from operating appliances, aiming at improving the system security. Because the user name and password are simple data types, user information can be stored by the Shared Preferences class, which stores private primitive data in key-value pairs.

### 3. SOFTWARE DESIGN

First check Bluetooth position of Android SmartPhone (Bluetooth is ON or OFF). If Bluetooth of android SmartPhone is ON then it check the surrounding Bluetooth Module and if Bluetooth Connection

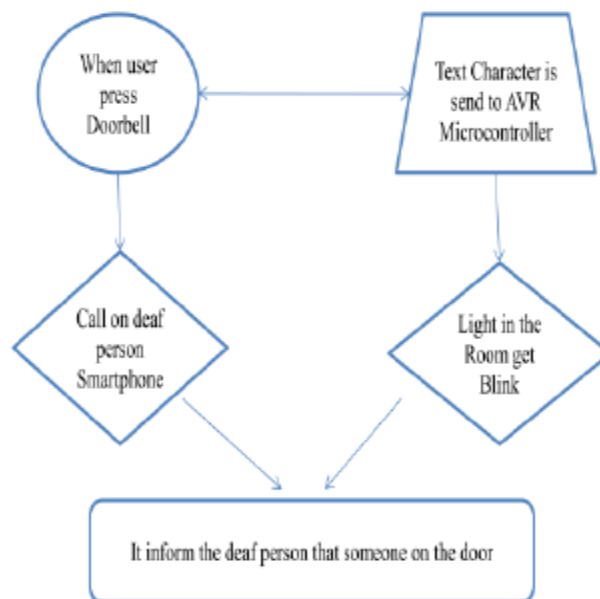
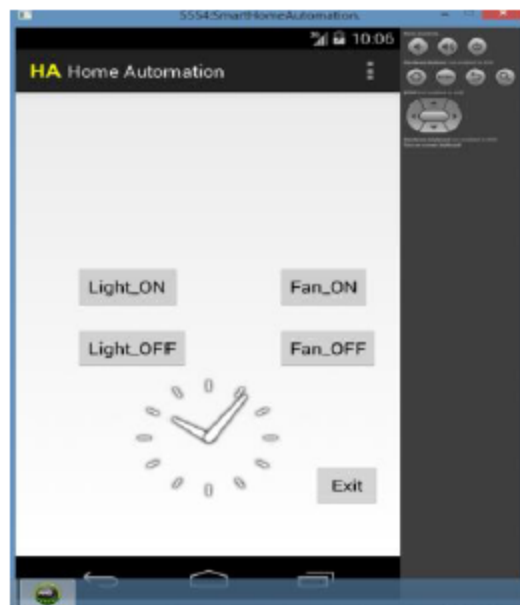


Fig.3. GSM System Flowchart

is off then user have to start the Bluetooth condition from OFF to ON of Android Smartphone. Then Smartphone search for the surrounding Bluetooth Module. After searching the Bluetooth Module it start pairing between Bluetooth Module and Android Smartphone. And if paring is occurs then hardware initialize the serial port. And Then PCB Hardware gets ready to receive the data (Character) which is send by the Android Application software. When the application software send the Text character to the microcontroller then this character get compare with the internal bourn code of the ATmega controller and accordingly the respective relay get ON and OFF. the passion of relay is depending on receiving character. if A or B is received by Bluetooth Receiver then Light is ON for turning On the UI button and Light OFF for Turning OFF the UI button. This is applicable for the entire button on the UI. Depending on the Button press respective character get send by Android Smartphone. After pressing the button of the doorbell (push Button) GSM system call on SmartPhone of deaf person as well as send character to AVR Microcontroller and depending of send character respective relay get on and off (Blinking) this two things inform that deaf person that is someone on the door or someone knock the door.

#### 4. ANDROID APPLICATION

Android's releases prior to 2.0 (1.0, 1.5, 1.6) were used exclusively on Android mobile phones. Most Android SmartPhone and some Android tablets now use a 2.x release and Android 3.0 was a tablet-oriented release but does not officially run on mobile phones. The current Android version is 4.3. Android's releases are nicknamed after sweets or dessert items like Frozen Yogurt ("Froyo") (2.2), Ginger Bread (2.3), Honeycomb (3.0), Ice Cream Sandwich (4.0), Jelly Bean (4.1) and KitKat (4.4) being the recent one. Android applications are written in the Java language. The Android Software Development Kit



**Fig.4. Android app simulation**

(SDK) provides all necessary tools to develop Android applications (API). This includes a compiler, debugger and a device emulator, as well as its own virtual machine (emulator) to run Android programs. The Android SDK provides tools for code compilation and packaging data and resource files into an archive file with „.apk“ extension called as an Android package. Android devices used the „.apk“ file to install the application. Android's application framework allows for the creation of extremely feature rich and novel applications by using a set of reusable components. The amalgamation of the Android

development environment with the Bluetooth wireless technology is known by Android's support for the Bluetooth network stack, which permits a device to wirelessly exchange data with another Bluetooth device (SmartPhone Bluetooth with Bluetooth Module). The application framework enables access to the Bluetooth functionality using the Android Bluetooth APIs. These APIs allow wireless applications to connect to other Bluetooth devices for point-to-point and multipoint wireless features. Using the Bluetooth APIs, an Android application can carry out the following functions:

## CONCLUSION

By designing the Android user interface and Home information centre, home appliance control system based on the Android phone can be designed. It has combined android client, network transmission, and wireless switch, home information center to form a complete system, and the whole system works normally. Identifying message commands and wireless encoding are the two major tasks for home information center. Android phone have advantages such as humane interface, customizable and extendible applications and android phone is easy to carry so on. By constantly improving the control function, android phone allows us anytime, anywhere to control any device, and finally realizes the highly intelligent home.

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