



Bluetooth Based Home Automation by using Android Phone

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ABSTRACT:

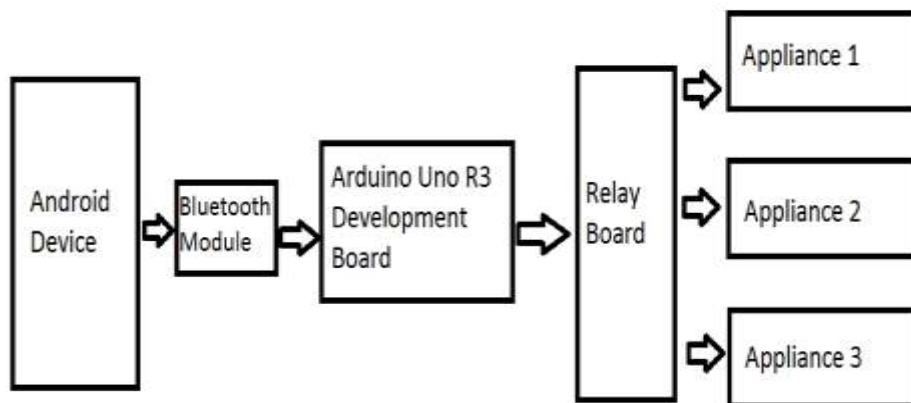
This paper presents the design and implementation of a low cost but yet flexible and secure cell phone based home automation system. The design is based on a standalone Arduino BT board and the home appliances are connected to the input/ output ports of this board via relays. The communication between the cell phone and the Arduino BT board is wireless. This system is designed to be low cost and scalable allowing variety of devices to be controlled with minimum changes to its core. Password protection is being used to only allow authorized users from accessing the appliances at home.[1]

Keywords: Bluetooth Wireless Technology, Smartphones, Home Automation System, Arduino Uno, Android, Bluetooth Module.

Introduction:

Today, we have remote controls for our TV sets and various electronic systems, which have made our lives easier in reality. Have you ever been confused about home automation that might enable prominent lighting, fan, and receiver of various electrical appliances that use a remote control? Without a course, Yes! But, does square measure the available options less expensive? If there is no solution, get an answer for that. we also have a new system known as Arduino based mainly Bluetooth for home automation. this process is very expensive and may give the user, flexibility | control | manage } any device while there is no external control fee. This project helps the user to control all the electronic devices on his smartphone.[2] This system is super-cost effective and can give the user, the ability to control any electronic device without even spending for a remote control. This project helps the user to control all the electronic devices using his/her smartphone. Time is a very valuable thing. Everybody wants to save time as much as they can. New technologies are being introduced to save our time. To save people's time we are introducing Home Automation system using Bluetooth via smart phone. With the help of this system, you can control your home appliances from your mobile phone. You can turn on/off your home appliances within the range of Bluetooth via smart phone. Home automation refers to providing the capability to control as well as monitor various household activities. Theses may include lighting, heating and air conditioning, security locks on the doors, multimedia, and various appliances. Our system will provide proper notifications to users for such incidences when some unwanted person enters in our house by sending messages on our mobile phone. Smart home is a very promising area, which has various benefits such as providing increased comfort, safety and security to people.

Block Diagram

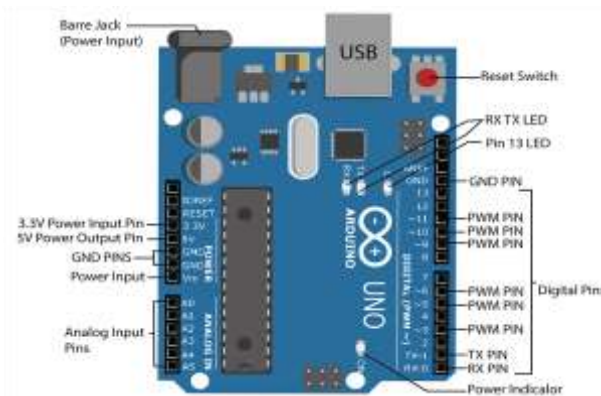


System Components

Our Home automation system uses an Android based Bluetooth enabled phone for its application and the Arduino Uno as the microcontroller. The key components of this system are:

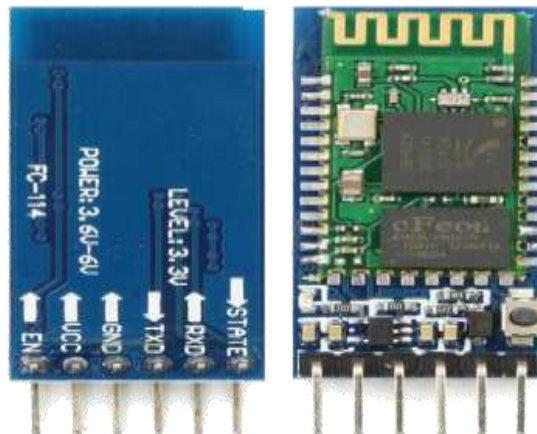
Arduino UNO

The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. Arduino board designs use a variety of microprocessors and controllers.



Bluetooth Module:

Bluetooth is a wireless technology standard for exchanging data over short distances (using short-wavelength UHF radio waves in the ISM band from 2.4 to 2.485 GHz) from fixed and mobile devices, and building personal area networks (PANs). The Bluetooth module being used allows us to transmit and receive signals. It receives the text from the Android phone and transmits it to the serial port of the Arduino Uno. The Bluetooth module being used here is the HC-05 module.



Android based phone:

Android is software stack for mobile devices that includes an O.S, middleware and key applications. For this automation system and security we are using open source android platform. Our Android application consisting of controlling device list as lights, fans according to rooms. First user has to start application, for safety purpose username and password is given for authorized user.

Working:

For controlling devices of home or office, firstly Bluetooth connection of mobile and Arduino BT board will be done. The devices will be connected to Arduino BT board using relays. The person who want to switch ON/OFF particular device will send the signal from Mobile(1) to Controller through Bluetooth. Then as per requirement the controller will operate devices. Secondly, if the person is not at home/office still want to operate the devices then can operate them using Web Server. The user will simply have to login to the website where he/she will be able to see the connected devices and their

status. Then as per their need the devices will be operated. The person will log in, then the request will be send to server which will be at home. The server will forward it to mobile. Mobile and controller will be connected through Bluetooth and then devices will be operated.[6]

Bluetooth Communication:

Bluetooth is a wireless technology which is used for transmission and reception of data over short distances from mobile devices. It is a technology that is simple, secure, and everywhere. It is used as a replacement for cables which are used for connecting the devices, while providing improved security. The main features of this technology is low power, robustness, and low cost.[7]

Advantages

- Home appliances can be controlled remotely.
- Home Automation System (HAS) is helpful for disabled persons.
- No need for internet connection.
- Saving time.
- Saving money.
- Easy to assemble home app[8]

Conclusion:

The system as the name indicates, 'Home automation' makes the system more flexible and provides attractive user interface compared to other home automation systems. In this system we integrate mobile devices into home automation systems. A novel architecture for a home automation system is proposed using the relatively new communication technologies. The system consists of mainly three components is a BLUETOOTH module, Arduino microcontroller and relay circuits. Wi-Fi is used as the communication channel between android phone and the Arduino microcontroller. We hide the complexity of the notions involved in the home automation system by including them into a simple, but comprehensive set of related concepts. This simplification is needed to fit as much of the functionality on the limited space offered by a mobile device's display. Home Automation is undeniably a resource which can make a home environment automated. People can control their electrical devices via these Home Automation devices and set up controlling actions through mobile app. → In future this product may have high potential for marketing. Old people can make use of this technology and they will not needing anymore to walk up the stairs to switch of the terrace lights or the water pump; now it can be done sitting in your bedroom just by a touch on their Smartphone.[9]

Future Scope:

1. Home automation and Device controlling can be done using Internet of Things – IOT technology.
2. We can replace Bluetooth with GSM modem so that we can achieve [device controlling by sending SMS using GSM modem](#). [11]
3. By adding some sensors such as light sensors, temperature sensors, and safety sensors, the project can be expanded to a smart home automation system that can automatically adjust different parameters such as room lighting, air conditioning (room temperature), door locks, and transmit the information to our phone.
4. Further more, we may link to the internet and control the property from a remote location while simultaneously monitoring security. It is primarily designed for handicapped people and can be used in an emergency. [12]

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