Bluetooth Based Home Automation Using Arduino

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ABSTRACT

The world is moving fastly towards automation. People have less time to handle any work so automation is simple way to handle any device or machine will work to our desire. This paper aim is to develop and design a Home automation using Arduino with Bluetooth module. Home automation system gives a simple and reliable technology with Android application. Home appliances like fan, Bulb, AC, automatic door lock are controlled by Home automation system using Arduino Uno with Bluetooth module. The paper mainly focuses on the monitor and control of smart home by Andorid phone and provide a security based smart home, when the people does not present at home. This paper motive is controlled home appliances in smart home with user friendly, design at low cost, simple installation.

Keywords : Home automation, Arduino UNO, Bluetooth, smart phone, Security

I. INTRODUCTION

Wireless technologies are becoming more popular around the world and the consumers appreciate this wireless lifestyle which gives them relive of the well-known "cable chaos" that tends to grow under their desk. Now with the embedded Bluetooth technology, digital devices form a network in which the appliances and devices can communicate with each other. Today, home automation is one of the major applications of Bluetooth technology. Operating over unlicensed, globally available frequency of 2.4GHz, it can link digital devices within a range of 10m to 15m at the speed of up to 3Mbps depending on the Bluetooth device class. With this capability of Bluetooth; we propose a home automation system based on Bluetooth technology.
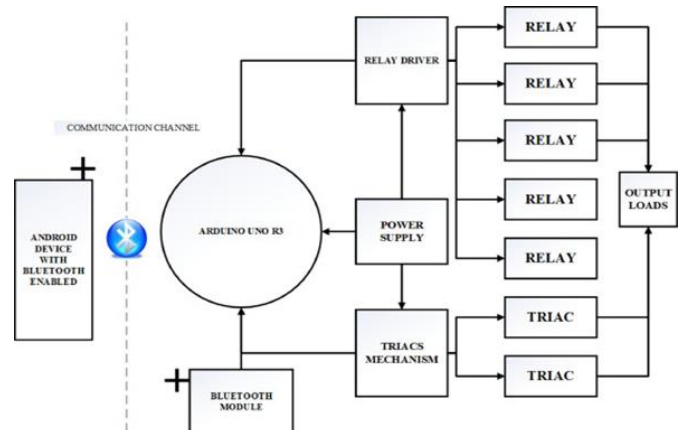

Fig 1. Block diagram for Bluetooth based home automation

Smartphones are the new craze and they have made life easier than ever. They are portable and always in the pockets. This portability of smartphones has led the marketers and the designers to develop services and solutions around the mobile domain. There are apps to shop online, do banking, trade stocks and uncountable day to day tasks. Then how can home automation systems remain isolated from the mobile technology.

II. IMPORTANCE

Managing all of your home devices from one place being able to keep all of the technology in your home connected through one interface is a massive step forward for technology and home management. Flexibility for new devices and appliances. Smart home systems tend to be wonderfully flexible when it comes to the accommodation of new devices and appliances and other technology. No matter how state-of-the-art your appliances seem today, there will be newer, more impressive models developed as time goes on.

Maximizing home security. When you incorporate security and surveillance features in your smart home network, your home security can skyrocket. There are tons of options here -- only a few dozen of which are currently being explored. Remote control of home functions. Don't underestimate the power of being able to control your home's functions from a distance. On an exceptionally hot day, you can order your house to become cooler in just enough time before you get home from work. Remote control of home functions. Don't underestimate the power of being able to control your home's functions from a distance. On an exceptionally hot day, you can order your house to become cooler in just enough time before you get home from work. Improved appliance functionality. Smart homes can also help you run your appliances better. A smart TV will help you find better apps and channels to locate your favourite programming. Ultimately, connecting your appliances.

III. ARCHITECTURE

This venture centres around the robotization of machines with the assistance of an android application. In this day and age, enhancement is the primary thought process. Any framework created goes for streamlining the human endeavours to a negligible and our control many appliances of smart home. framework goes for doing likewise. The architecture of this device as shown in figure 2. The user will communicate to Android application through the Arduino Uno via Bluetooth module. This model is very resilient and gauge able, maximum efficiency, safety and securely added smart home appliances with least amount of human effort. The Bluetooth signal having most efficient energy to connect any signal without loss of information with least harmonics. Home automation system main part consists of Arduino with microcontroller. The people must have mobile application with proper connection. It should be used as multi appliances works as together. The Arduino board is configured for each home appliances using coding in microcontroller. By the help of Microcontroller, we can control the electromagnetic relay which works as a switch to receive a signal from the Arduino through Bluetooth module HC-05. When the signal transmits from transmitter as datasheet to relay then the relay works as switch.
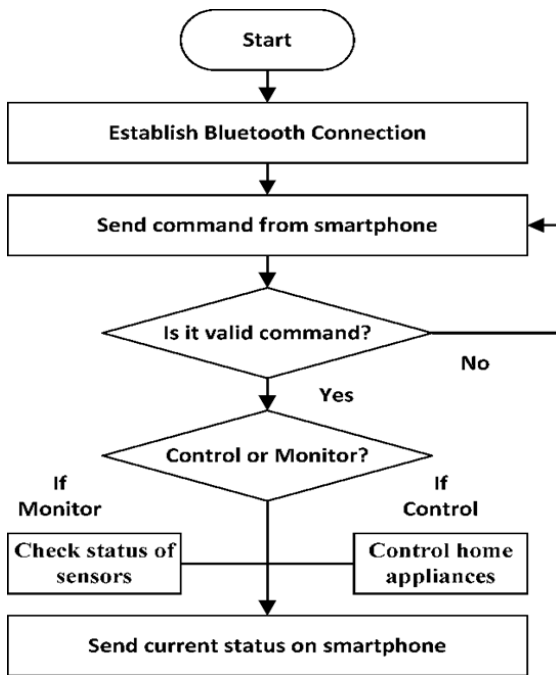
Fig 2. Flow chart

IV. SIMULATION

Simulation is the process of using a model to study the performance of a system. It is the operation of a model in terms of time or space, which helps to analyse the performance of an existing or a proposed system. It is a technique that involves modelling a situation and performing experiments on that model. The software selected in this project to execute the simulation is Proteus software.
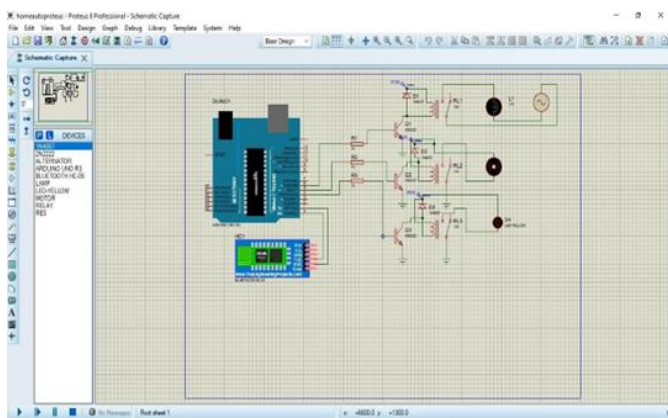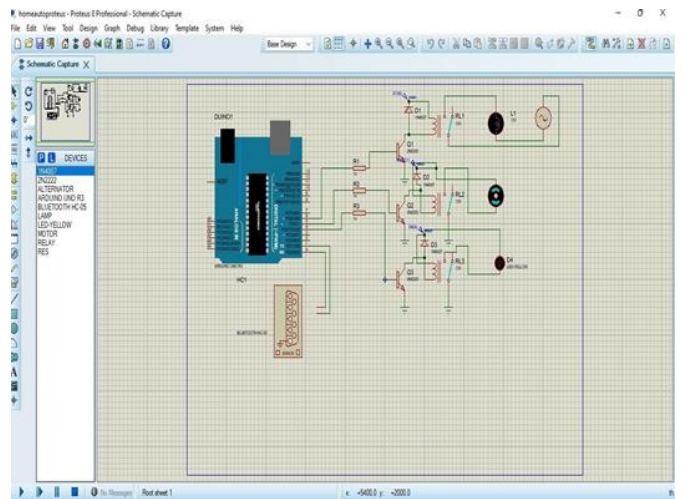

Fig 3 circuit before execution

Fig 4 circuit after execution

V. HARDWARE DESCRIPTION

Arduino Uno: -

 Arduino Uno is a microcontroller chip reliant on the Atmega328(datasheet) with 14 modernized I/o pins, in which 6 pins can be used as yields, 6 pins are used as straightforward data sources. It has 16 MHz earth resonator, a USB affiliation, a force jack and a reset button. The microcontroller has 32kB of ISP streak memory, 2kB RAM and 1kB EEPROM. The board gives sequential correspondence capacity through UART, SPI and 12C.Because of well plan the Arduino is straightforward. In Arduino we utilize significant level of programming language like C language, C++ language etc. It is straightforward and easy to use language. It has a lot of favorable position like performing multiple tasks, robotization, time area and so on.

Fig 5 Arduino UNO

Bluetooth Module

HC-05 Bluetooth module is utilized to associate the microcontroller with android application. Bluetooth get the data from client and send to the microcontroller (Arduino Uno). It is easy to utilize Bluetooth Serial Port Protocol (SSP), planned as remote sequential association setup. The Bluetooth of sequential port module is Advanced Bluetooth v2.0+Enhanced information Rate at 3Mbps regulation with 2.4 GHz radio recipient with BB (base band). The Bluetooth of Rx and Tx pins are associated with the Arduino pins of Tx and Rx individually. HC-05 module is an easy-to-use Bluetooth SPP (Serial Port Protocol) module, planned for direct distant consecutive affiliation.

Fig 6 Bluetooth module

Relay Drivers

Relay is an electromagnetic switch which is used to defer two circuits electrically and connect magnetically. When Arduino transmit the signal then relay driver receive signal and start its work. They are frequently used to interface an electronic circuit (working at low voltage) to an electrical circuit which works at extremely high voltage. For instance, a hand-off can make a 5V DC battery circuit to switch 230V AC mains circuit. In this way a little sensor circuit can drive, say, a fan or an electric knob. A transfer switch can be separated into two sections: information and

yield. The info area has a loop which creates attractive field when a little voltage from an electronic circuit is connected to it. This voltage is known as the working voltage. Generally utilized transfers are accessible in various arrangement of working voltages like 6V, 9V, 12v, 24V and so on. In a basic hand-off there are three contactors: ordinarily shut (NC), regularly open (NO) and normal (COM). At no info express, the COM is associated with NC. At the point when the working voltage is connected the transfer curl gets charged and the COM changes contact to NO. Diverse transfer setups are accessible like SPDT and DPDT which have distinctive number of changeover contacts. By utilizing legitimate blend of contactors, the electrical circuit can be turned on and off.

VI. CONCLUSION

An Arduino based home automation system using Bluetooth and an android application with voice command has been designed and implemented. The Home automation system used an Android application and a Bluetooth technology in the design; this is because they are easy to use, fast, readily available, and reliable in communications between the remote user and devices. A low cost and highly reliable home automation system that can assist handicapped/old aged people, as well as a user-friendly device was developed. Other features can be added in the future such as biometrics so that un authorized persons can not have access to the appliances and an also timing schedule can developed for each appliances connected this will effectively conserve energy.

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Cite this article as :