Bluetooth Based Automation and Security System
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Abstract— Technology is a never ending process. In today’s life automation is an important role in life. We all use mobile devices in our daily life. Because of this, home automation and security are becoming popular features on mobile devices. It also provides features like home security and emergency system. Home automation reduces human efforts and also increases efficiency and saves the energy. The main purpose of home automation and security project is to help handicapped, disabled and old people to control home appliances easily. We have designed a home automation and security system using Arduino UNO board. Home appliances are connected to the Arduino UNO with relay and they are controlled by using our mobile phones. The command is given by the android application from mobile phone which is connected to Bluetooth module. The Bluetooth module is interfaced with Arduino UNO board and the home appliances are connected to the input/output ports of this Arduino via relays. Since, Bluetooth communication is wireless, it is advantageous. For more security purpose we also can use password protection so that only authorized users can access the appliances.

Key words: Bluetooth, Security System

I. INTRODUCTION
Nowadays, the wireless technologies have become very popular all over the world. This is because of its advantages over the traditional wired communication. The one of the very popular wireless technology is embedded Bluetooth technology. By using this, digital devices can communicate with each other. Today, home automation is one of the major and important applications of Bluetooth technology. In modern houses home automation and security systems are become very common. The operations such as switching ON/OFF the lights, operating the fans, lock-unlock the doors are done wirelessly using our mobile phones.

Home Automation System becoming popular nowadays and enter quickly in this emerging market. However, end users, especially the disabled and old aged due to their complexity and cost, do not always accept these systems. Home automation can be useful to those who need to access home appliances while away from their home and can greatly improve the lives of the disabled.

Mobile devices have become a part of daily life. So, mobile devices are the best option for the home automation and the security system. In this project, we have developed a security system that interfaces with a mobile device. The mobile device and security system communicate via Bluetooth. We use the Bluetooth technology because we only need a short-range communication system. Bluetooth technology operating over unlicensed, globally available frequency of 2.4GHz, it can communicate with digital devices within a range of 10m to 100m at the speed of up to 3Mbps depending on the Bluetooth device class. Because of all these characteristics of Bluetooth technology we’ve chosen the Bluetooth technology for our project.

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II. HARDWARE & IMPLEMENTATION
The working of the home automation and security system was tested and the wireless communication between the android phone BT and BT module connected with Arduino UNO was found to be limited to <50m in a concreted building and maximum of 100m range was reported to be applicable in an open range.[1]

Fig. 1: Controller (Arduino)

Fig. 2: Hardware & Implementation
Bluetooth device (user mobile) which used to send the command to Arduino UNO via Bluetooth module HC-05. Mobile phone contains feature of Bluetooth which is operating on principle of frequency hopping technique. The microcontroller ATmega328 is mounted on Arduino UNO board. User mobile device is connect with the Arduino controller via Bluetooth module HC-05 and sends command. According to the commands given by user mobile phone application relay circuit block is driven by controller. According to that relay can drive ON or OFF and controls the working of home appliances.

HC-05 module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. Serial port Bluetooth module is fully qualified Bluetooth V2.0+EDR (Enhanced Data Rate) 3Mbps Modulation with complete 2.4GHz radio transceiver and baseband. [1]

Arduino board is an open-source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board and a piece of software, or IDE (Integrated Development Environment)
that runs on your computer, used to write and upload computer code to the physical board. Unlike most previous programmable circuit boards, the Arduino does not need a separate piece of hardware called a programmer in order to load new code onto the board, you can simply use a USB cable. [11]

III. SOFTWARE IMPLEMENTATION

For the automation using BT module and Arduino, we uses the Arduino IDE (Integrated Development Environment) for programming of Arduino.

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The mobile application for controlling the home devices is developed using Android language. The figure below shows the flow chart (Figure no. 4) for the execution of program for the android mobile application as well as the layout of android application.

According to flow chart android application Consist a main window in that user can choose the appliance which they want. Also they have an option for searching a Bluetooth module and exit option. After selecting appliance user can send a command through BT module to Arduino for change the status.

The flow chart (Figure no. 5) given below shows the whole flow of working of automation project. The programing for connecting BT module to Arduino controller as well as to drive relay from commands of controller we use Embedded C language.

IV. CONCLUSION

Bluetooth based automation and security system is a challenging concept and has research opportunity in a technical field. In our project, Arduino Uno boards with ATmega 328 controller contain software code. Arduino Uno board support USB flashing of software code either than ARMv7 controller which requires programmable hardware for flashing software code. Bluetooth technology is an unlicensed ISM band which operates at frequency range of 2.4 Ghz. In modern lifestyle, Bluetooth technique is a easily available to human community. Bluetooth based automation and security system provide very flexible interface and cost effective concept.

The main goal of our project is to achieve high quality standard of living in human community and in society. We can easily control home appliances like fan, bulb, tube, AC etc. through Bluetooth based automation system. For security system, we developed lock or unlocking mechanism for door, by rotating DC motor in forward and reverse order. Our project create innovation and excellence in electronics field. Controlling appliances are connected to relay which acts as electromagnetic switch to...
ON/OFF applications. Arduino Uno board have ATmega 328 controller which monitor or control relay by respective software code. Many future scope applications are related to our project. These applications play an important role in modern era.

Bluetooth based automation and security system developed aspect evolution in modern lifestyle. Finally, our project helpful to improve standard of living in human society and in modern human community.

V. RESULT

When our project was completed, all the circuitry works properly. The mobile device connects with Bluetooth module HC-05; initially password (1234) is required for establishing pairing with BT module. Then we send command to controller from our mobile device via BT module. The signal send from mobile is received by controller and forwards signal to relay circuitry to drive it. Relay circuit gets signal from the Arduino and start to working as like command we given from our mobile. When we send command to Arduino to ON lamp 1 then controller alerts the relay 1 to ON the lamp 1.when we sends command from mobile phone it takes one second to ON/OFF the appliance.

We test for the distance or range of our mobile Bluetooth and Bluetooth module then we found that range is approximately 20-30 meter. We uses android application to send command to controller it works properly with any android phone. For security purpose we give security code to the android application.

Some picture of our project is given below:

VI. FUTURE SCOPE

A. Detection System:

This system also for the detection purpose, like kid finder, Bluetooth zone etc. Most of the existing systems require an extra gadget other than a mobile phone. So, to avoid the inconvenience of carrying various devices, the proposed Kid Finder system is to be embedded into parents’ hand-phone that comes with Bluetooth technology. Kid Safe Monitoring System can monitor up to 3 children and designed to alert parents when their children are beyond the safe distance that they have pre-selected. Employee Detection is an example of Bluetooth zone system. In Bluetooth zone, every employee has unique Bluetooth ID.

B. Security System:

In this system we use the electronic wireless switch which replaces physical keys by specific Bluetooth ID. And uses it in our banking locker system or personal locker. In this system same Bluetooth ID is accessed by account holder and manager. When Bluetooth ID of user and manager is matched then and then only locker unlocked. Nowadays locker key is replaced by Bluetooth ID. So there is a no need for take care of locker key in a today’s lifestyle.

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