

Zigbee Based Home Automation Control through Voice Command

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Abstract— Home automation or smart home is the residential extension of building automation and it also involves the control and automation of lighting, heating (such as smart thermostats), ventilation, air conditioning (HVAC), and security, as well as home appliances which will be discussed. The main objective of this work is to facilitate the user to control appliances by two ways the first way is remotely via voice command, and the second is using remote control to control the appliances which is also an override Control. This system is most suitable for the elderly people and the disabled persons. So in this paper work our aim is to design a voice recognition wireless home automation system.

Key words: Voice Command, HVAC

I. INTRODUCTION

Home Automation is a term used to describe all household amenities and appliances. Zigbee is the wireless language that every day devices use to connect to one another. In fact zigbee could be at work in your home right now. For example, in a centrally-controlled LCD panel can have the capability to control the things from heating, air conditioning system, audio and video systems, security systems, kitchen appliances, lighting system, and also used in the home theatre installations. Thus the system is portable and constructed in a way that they are easy to install, configure, run, and maintain. Using a remote-control, the ultimate goal for home automation is to give the occupant total control over the house from anywhere from a distant location. Through either method, home automation provides relative ease of use. Much of the work is carried by the system itself, where it detects activity and discerns information based on homeowner input. In ZIGBEE we have the Monitoring devices, such as sensors they are small and can be installed anywhere—inside or outside the home, and they can also worn by an individual. On the account of user's needs, a smart house can include a basic network of wires which can be operated by a central control panel in the home itself, compared to this others might utilize wiring that allows the user to operate the appliances and features which can be operated outside the home. The content demonstrates the system that can be integrated as a single portable unit and allows one to wireless control lights, fan, ac etc. The key system is PC, mobile internet, GSM Bluetooth and ZIGBEE network etc



Fig. 1:

II. RELATED WORK

Zigbee Home automation is the industry leading global standards. It helps to create smarter homes, many experimental works on Zigbee automation system was presented. This system was capable of monitoring doors and also windows, they are also used to control the smoke, gas leak and also water flooding from remote location. Its low power consumption limits transmission distances to 10-100 meters line – of sight. Some simple control systems such as operating a valve and sending signal to security network have also been associated with this application. These features have a significant impact on operational and device cost to service providers and quality of service to consumers. AZIGBEE based home network system is used to track an user that has been proposed. This system periodically tracks a user by using three systems namely Indoor Positioning System (IPS-M), Indoor Positioning System Infrastructure (IPS-M), and Indoor Positioning System Gateway (IPS-G). The main and major features of ZIGBEE automation is

- Easy to install
- Internet connectivity
- Power control
- Security
- Lightening Control

One of such gateway architecture has been proposed to interconnect Digital Living Network Alliance (DLNA) compliant home appliances and a ZIGBEE network. Similar to this another type of gateway architecture is introduced to connect a low rate homework's with internet. A user can control the home appliances via internet from a remote location through this gateway. The growing wide-spread availability of solution ZIGBEE ns dramatically reduces the cost and complexity.

The system is able to detect intruder in a home and send messages via GSM network. This home automation system can also receive various types of instruction from a remote location to control the things from the house appliances. A wireless smart home system based on ZIGBEE has been introduced. The home automation system is mainly composed of three main components namely (i) intelligent environment detection sensor modules; (ii) intelligent home appliances, and (iii) home server with GSM module. This approach results in high degree of flexibility and stability ensuring that devices in the network stay connected and the network performance remains constant even as it is dynamically changing. This module can be controlled by home by giving an alarm message from the remote location. Most of the wireless home automation systems are constrained by limited operating range.

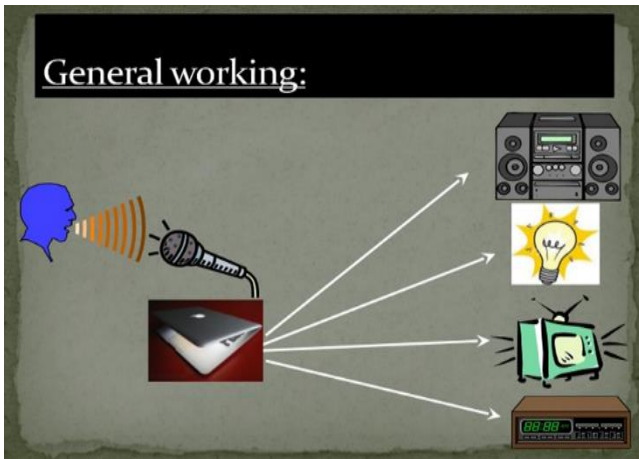


Fig. 2:

A major focus of this technology, which has existed since the 1980s, has been to provide convenience, personal comfort, security, and energy-conservation.

III. EXAMPLE

- All windows and doors can be locked from a central location in the home.
- Traffic lights in the non urban areas.
- Exterior video or movement detectors can alert a homeowner to unusual activity, through sensors that evaluate foot-pressure changes, breaking glass, movement, and contact with windows and doors—and, if a resident is away from home, through a cell phone.
- A telephone call to the house can turn on the coffee, oven, or other elements which is daily to be used.
- Lights can be programmed to turn on and off when someone enters and also leaving the room.
- Exterior sensors can turn lights on and off in response to the amount of daylight in the home.
- Home comfort systems (heating, air-conditioning, ventilation) can be set to automatically change in response to the time of day or to external temperatures.
- Stove controls can detect high temperatures and automatically shut off burners and ovens.
- Room-to-room video and audio communication systems allow viewing and talking among people in different rooms and floors of the home.

IV. BLOCK DIAGRAM

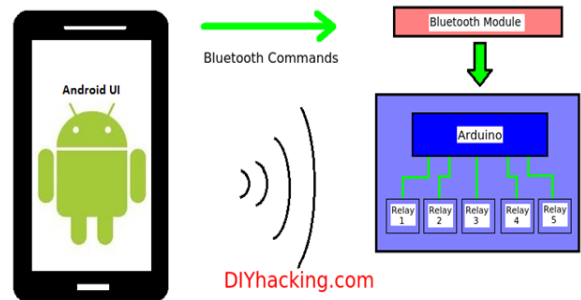


Fig. 3:

V. BASIC COMMANDS:

VOICE COMMAND Sand SMS COMMANDS

- The Main console on 'MCONE'
- The Main console off 'MCOFFE'
- The Zone 1 appliances off 'Z1OFFE'
- The Zone 1 appliances on 'Z1ONE'
- The Zone 2 appliances off 'Z2ONE'
- The Zone 2 appliances on 'Z2ONE'
- The Light zone 1 off 'LZ1OFFE'
- The Light zone 1 on 'LZ1ONE'
- The Fan zone 2 on 'FZ2ONE'

On the receiver side these commands are received and transfer to the controller using Bluetooth medium which is further preceed. A snapshot of proposed system algorithm.



Fig. 4:

VI. HARDWARE

The Hardware design is subdivided in to three parts due to different functionality of the system, the main purpose of the system is to receive the commands and apply action accordingly. The first part, which is the heart of this work is the control unit; it initialize the devices which attached to the control unit which is Bluetooth Device and ZIGBEE transceiver, after this it looks for the command when it is received it simply transfer the command to the remote unit. At the remote unit checks for the incoming command when it is received it applies action and sends a feedback to the user for the completion and the proper operation of the command. The override control is a simply remote control which is programmed to check for the user entered key, when key is pressed it decode the pressed key and send the authorized

command to the user. Control unit: The heart of this hardware is PIC16F877A when the command is completely received it is transferred to the microcontroller PIC16F877A through Bluetooth. Remote unit: The remote unit consists of a micro controller PIC16f877A and ZIGBEE transceiver MC13211. These transceivers are programmed to communicate with the main using serial communication protocol to acknowledge for data transmission and reception. When the command is completely received the controller switch on the concern appliance. The circuit which is used to switch on the device consist of MOC3021 an optical triac and BTA16 triac benefits. This is where the various parameters of zigbee in home automation enable key benefits.

- 1) Multi-source products
- 2) Lighting control
- 3) Single touch without obstruction
- 4) One app to control everything
- 5) Security attributes of Zigbee

VII. CONCLUSION

This paper concludes that how the Zigbee can be used in controlling through spoken commands by means of handling devices. In this proposal, the wireless component is added by the means of GSM and also for the use of home networking Zigbee technology is used. For this purpose of voice command processing an application is developed step by step and it has been installed in the mobile phone.

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