NATURAL LANGUAGE PROCESSING BASED HOME AUTOMATION SYSTEM USING SMART PHONE AND AURDINO MICROCONTROLLER BOARD

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Abstract

The main attraction of any automated system is reducing human labor, effort, time and errors due to human negligence. With the development of modern technology, smart phones have become a necessity for every person on this planet. Another latest technology is natural language processing which enables us to command and control things with our voice. Combining all of these, this paper presents a micro controller based voice controlled home automation system using Smartphone's. The control circuit consists of an Arduino Uno microcontroller, which processes the user commands and controls the switching of devices.
Keywords: Aurdino, Bluetooth, IOT, android smart phone

1. Introduction

The foremost aim of technology has been to increase efficiency and decrease effort. With the advent of Internet of things in the last decade, we have been pushing for ubiquitous computing in all spheres of life. It thus is of extreme importance to simplify human interfacing with technology. Automation is one such area that aims that achieves simplicity whilist increasing efficiency.[1] [4]. Voice controlled House automation system leverages the power of aurdino to provide a holistic voice controlled automation system. Using Natural language processing and the available hardware in most smart phones, it translates voice to be used for controlling electrical devices. The performance of the home automation can be increased by avoiding signal distortion. The home automation cannot able to switch ON/OFF if the speech recognisation is poor. The voice commands such as light ON/OFF with some noise will taken as an input [8].

Bluetooth is a wireless technology [8] general for exchanging data over short distances (the usage of brief-wavelength UHF radio waves inside the ISM band from 2.four to 2.485 GHz) from constant and cell devices and building non-public area networks (PANs).

Android OS is the most common OS for over 80% of the mobile phones users [3]. We have deployed an android OS application as user entrance end mostly due to reduce at which the program provide us with means to use COMPLEX technology and as a result of widespread re-homing in the mobile industry.
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2. Literature survey

The primitive man realized that an effective way to communicate with one another is through voice. With minimum effort, ideas could be narrated with relative ease. When the first computers came around, achieving the level of sophistication so as to narrate commands using voice to a machine was only realized in science fiction. However with tremendous breakthroughs in the field, we are at the precipice of truly using voice to interface with devices [7]. Home automation industry increases with increasing of user needs the automation and security is the main issue in domestic environment. As electronic technologies are emerging, the field of home automation is expanding. The home automation were designed using various technologies such as Bluetooth, Zigbee, Internet, short message service (SMS) based [6],[2]. These latest technologies give a user friendly home automation system with low cost. The capabilities of Bluetooth are good and current cell phones, laptop, tablets have built-in

adapter that will indirectly reduce the cost of the system [6],[2].

Android is a mobile operating system (OS) based on the Linux kernel and currently developed by Google. With a user interface based on direct manipulation, the OS uses touch inputs that loosely correspond to real-world actions, like swiping, tapping, pinching, and reverse pinching to manipulate on-screen objects, and a virtual keyboard. We have used the Android platform because of its huge market globally and it's easy to use user interface .Applications on the Android phones extend the functionality of devices and are written primarily in the Java programming language using the Android software development kit (SDK). The voice recognizer which is anin built feature of Android phones is used to build an application which the user can operate to automate the appliances in his house [5].
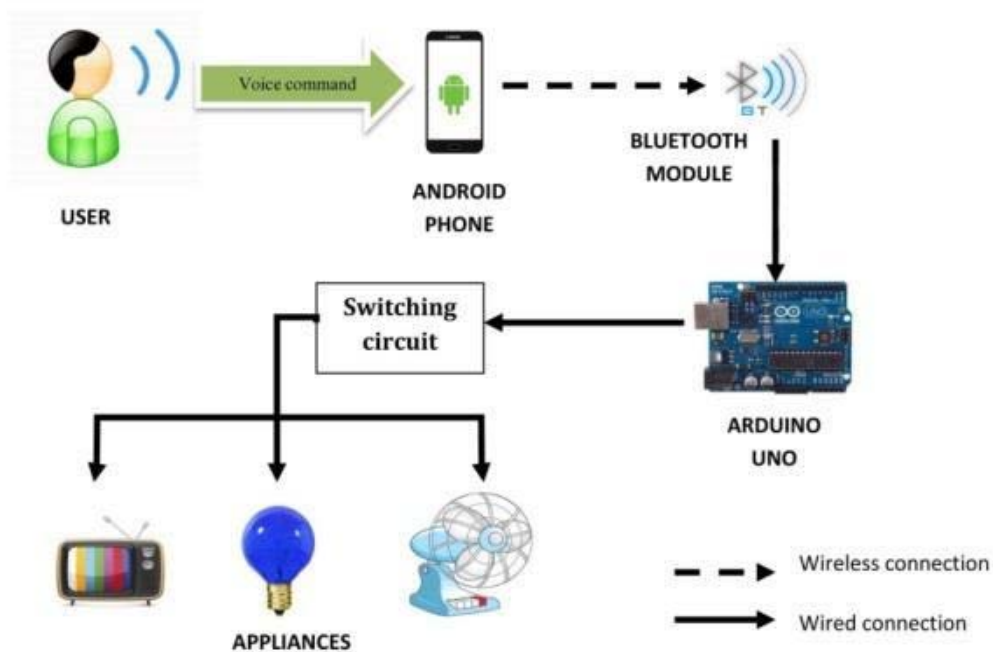
Proposed system

Fig1. Block diagram of proposed system

In the implementation of the project, connect the power supply to the kit. Launch the android application on the mobile phone. In the android mobile check for available Bluetooth devices. If the Bluetooth module is available then connect to it and if not display an error message that the device is not available. Give the voice command by tapping on the mic button on the screen according to the code. The voice command is converted into text required to transmit to the module by the application. Converted voice command is sent to the Arduino Uno at the serial port. Text matching according to the code is done using sketch. If the matching text is found then execute the command otherwise display an error on the serial monitor that the appliance is not found. Switch the selected appliance on/off or control its operation accordingly.

Proposed systems have been implemented with the following Procedure and the flow chart is shown in fig2**.**

Step 1: Connect the power supply to the kit.
Step 2: launch the android application on the mobile phone.
Step 3: In the android mobile check for available Bluetooth devices
Step 4: If the Bluetooth module is available then connect to it and if not display an error message that the device is not available.
Step 5: Give the voice command by tapping on the mic button on the screen according to the code.
Step 6: The voice command is converted into text required to transmit to the module by the application.

Step 7: Converted voice command is sent to the Arduino Uno at the serial port.

Step 8: Text matching according to the code is done using sketch.

Step 9: If the matching text is found then execute the command otherwise display an error

on the serial monitor that the appliance is not found.

Step 10: Switch the selected appliance on/off or control its operation accordingly.
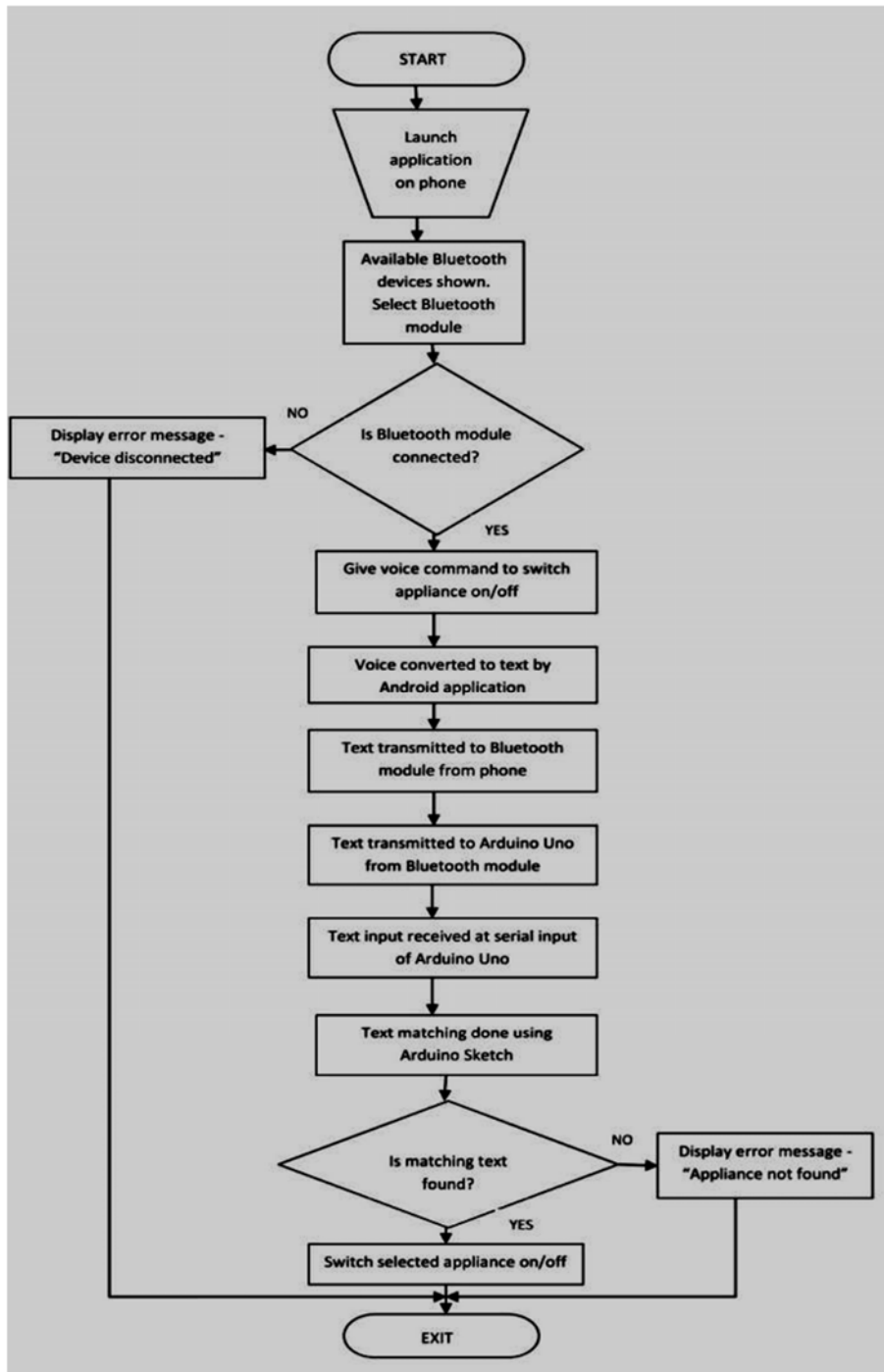
Step 11: stop

Fig 2. Flow chart for the implementation of the project

3. Results and discussions

Some images to illustrate the working of the system have been given below point without having to get up and manually switch on or off

the appliance. The use of a Bluetooth module assists the use of this system from various locations in our house. The system is further simplified by allowing appliances to be

controlled by our voice. The user need not have to have to immense knowledge over the language of English. Just by saying the appliance name and the corresponding number assigned to that particular appliance, and telling it to switch on or off will enable the user to have complete control over any appliance without any effort.

SOFTWARE   :ARDUINO IDE

MICROCONTROLLER   : ARDUNIO UNO

POWER SUPPLY   : +5V
HARDWARE   :   HC-05 Bluetooth
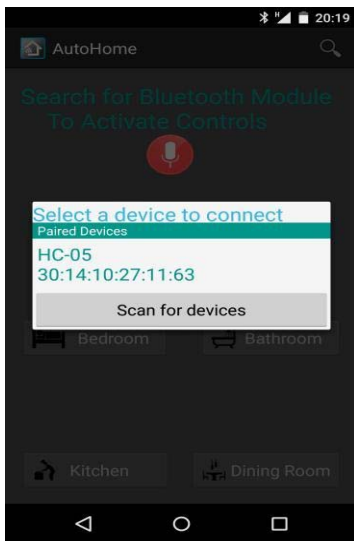COMPONENTS   :Module

Fig3. Connecting the Bluetooth module with mobile

In above resut pairing can be done and it may be connected to that device for switching operation.

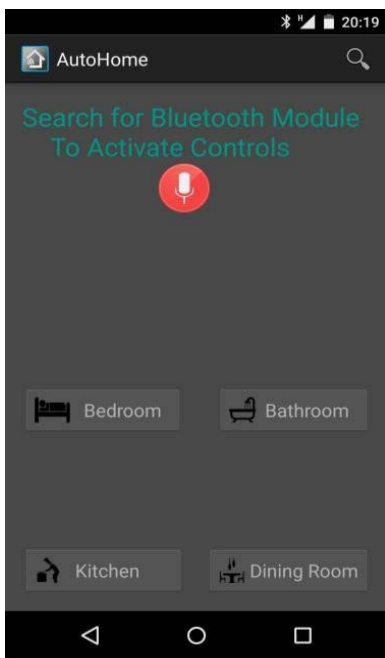Then do switching operations of bedroom, bathroom, kitchen, dining room

Fig4. Interface for the Voice Control Application.

In above resut device address is given and blue tooth must be on and it may be connected to particular address . Then do switching operations of bedroom, bathroom, kitchen, dining room.

In this project here we are add to IP adress and get conneced by smart phone and operate swtching ON/OFF by the smart phones
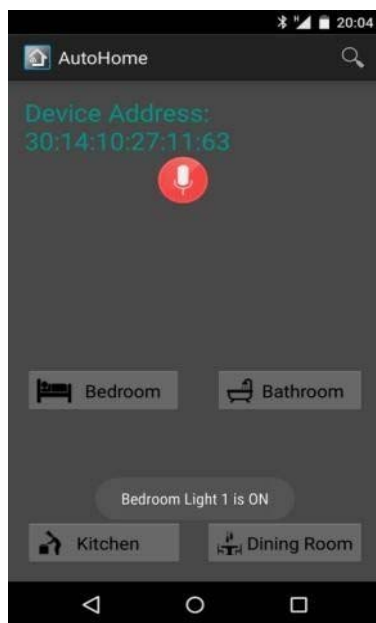
Fig5. Controlling the module with the help of appliances.

In above resut bedroom light is on and indicated on the figure by this we can operate all the appliances.

4. Conclusion

The proposed project undertakes a viable solution the need of automation at the very basic level, that is, in our homes. The project will enable us to bring every appliance at every corner of our home under our control from a single point without having to get up and manually switch on or off the appliance. The use of a Bluetooth module assists the use of this system from various locations in our house. This system, though primarily aimed to reduce human effort, will be of much importance to old aged people and physically handicapped people. It will enable them to control their home devices with ease, without going through much pressure or stress of moving about.

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