International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 05 Issue: 11 | Nov 2018 www.irjet.net p-ISSN: 2395-0072

VOICE BASED ELDER CARE SYSTEM

Santhakumar S[1], Sanjai T[2], Sakthivel M[3], Sounthararajan V[4], Rangarajan J[5], Sivakumar C[6]

[1,2,3,4]*UG Students, Dept. of ECE, Muthayammal Engineering College, Tamilnadu, India*
[5,6]*Professor, Dept. of ECE, Muthayammal Engineering College, Tamilnadu, India*

Abstract - *The concept of home automation is gaining popularity and it helps the elder people who living alone. Many home automation systems for elder care use different technologies. In this work, a Voice Activated system is developed such that the elders can control the electrical appliances by their voice without any difficulty. Ardunio Uno, HC-05 Bluetooth module and Smart phone with voice control application are the main components of this system. To control home appliance, the elders has to just tell "turn on light", "turn off light", "turn on fan" and "turn off fan" towards the microphone in the voice control app loaded in the smart phone.*

Key Words: Ardunio, Bluetooth, Elder Care, Voice Control App, Smart Phone.

1. INTRODUCTION

Elder care is showing special care to senior citizens regarding their daily needs. Due to aging their physical health begins to fail and they found it difficult to maintain their day to day activities [1]. Even to switch on and off the electrical appliances, they have to get down from their bed or move to the switch board. In case of emergency, it is difficult for them to shout loud for any assistance. In such instants, this type of voice based system will help them a lot.

The issue of population aging seems more and more serious. Health care and safety monitoring for the elderly is becoming an urgent issue to be solved. The concept of home automation is gaining popularity and it helps the elder people who living alone [2,3]. With the help of this type of system, it is possible for them to control the basic electrical appliances like lights, fans and alarm without the help of others. Considering these aspect, a prototype model was developed in this work.

Many home automation systems for elder caring using different technologies like Bluetooth Controlled, Internet Controlled, RF Controlled and Remote Controlled (IR Remote) are available [4,5]. Each type has its own advantages and disadvantages. In this work, a Voice Activated system is developed such that the elders can control the electrical appliances by their voice without any difficulty.

2. SYSTEM DESIGN

Figure 1 shows the block diagram of the proposed system. The proposed system consists of three main components: Ardunio UNO, HC-05 Bluetooth module and Smart phone with voice control application. As shown in the block diagram, the Bluetooth module is interfaced to the Arduino board to provide control commends as input. The electrical appliances to be operated or controlled by the elder people are connected to the output ports of the Adriano board.

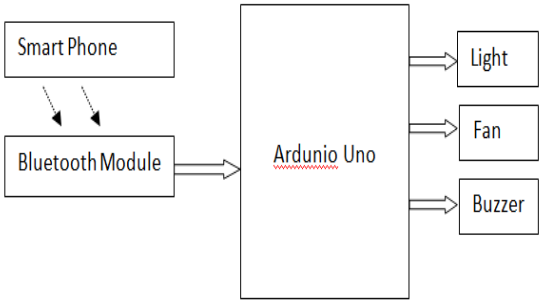

Fig -1: Block diagram of the system

The functional details of the component used are given below.

Bluetooth HC-05: Bluetooth technology is used to have communication between the smart phone and the Arduino board. For this purpose Bluetooth module HC – 05 is used in this work. This module can be interfaced using UART protocol with a wide range of programmable baud rates. This module can be configured as either master or slave. Figure 2 shows the HC – 05 Bluetooth Module used in this work. In this module, pins are available for VCC (5V), GND, TX and RX.

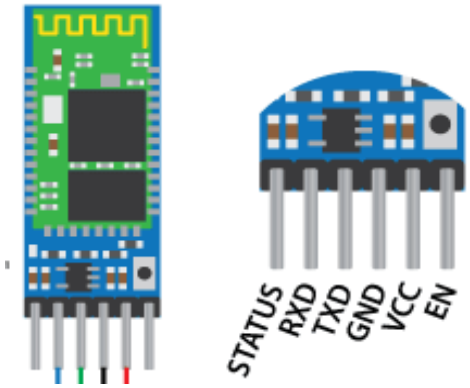

Fig -2: Bluetooth Hc-05 module

Smart phone with BT Voice Control application: This app is developed by SimpleLabsIN for voice based Arduino projects. This Android App will use the phone's voice recognition feature and will convert the voice commands to text and transfer the string via Bluetooth. This voice control application has to be installed in the smart phone which is used by the elder people. Also, the voice recognition feature has to be enabled on the phone The home screen of the app is shown in the figure 3.

Fig -3: BT Voice Control App

Arduino Uno: Arduino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins, 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter.

The Arduino Uno comes preprogrammed with a boot loader that allows uploading new code to it without the use of an external hardware programmer. Each of the 14 digital pins on the Uno can be used as an input or output.

3. WORKING PRINCIPLE

All the connections are made as per the block diagram. Bluetooth uses UART protocol. Therefore, RX and TX pins of the Arduino board are used for receiving and transmitting purpose. In this work Software Serial library is used to define Pin 2 as RX and Pin 3 TX. Next, the paring between the Phone's Bluetooth to the HC – 05 Bluetooth Module is done. Choose the option "Connect Robot" and select the appropriate Bluetooth Device to connect the smart phone with the Bluetooth module.

After making the necessary connections, switch on the power supply and smart phone. Now the system is ready to work. Now, the elders have to just press the microphone icon on the app and start giving voice commands to switch "ON" or "OFF" the appliances they need to control. The prototype of working model is shown in the figure 4 and figure 5.

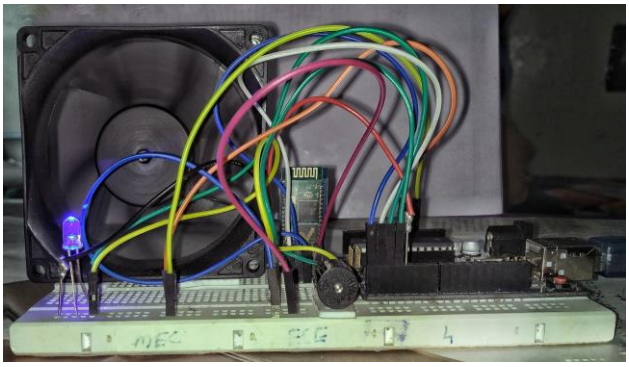

Fig -4: Front view of prototype system

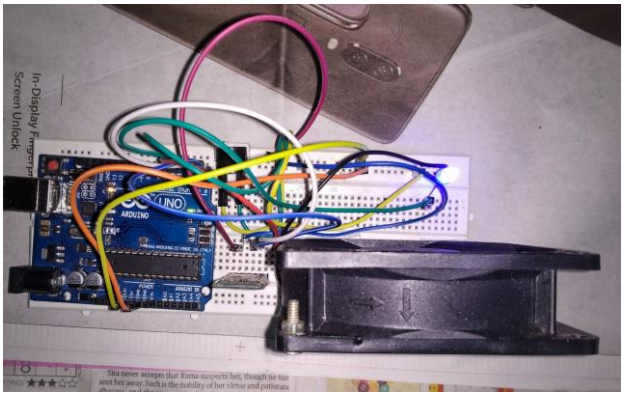

Fig -5: Top view of prototype system

For example, if the elders say "turn on light", the app will recognize the command and transfers it to the Bluetooth Module. Then the light (LED) connected to the output of the Arduino is switched ON. The programs are so written in the Arduino, such that it will enable the pin in which the light (LED) is connected. Also, the command gets displayed on the screen for their reference.

4. SOFTWARE DESIGN

For controlling each appliance, some predefined strings are used in the program. When the string "turn on light" is detected by the app, it will send the string as "*turn on light#". That is, the information received by the bluetooth module is in the format of "*Message#". To indicate the beginning and end of the message, the srings '*' and '#' are used. The received message is compared with the predefined strings. If the message matches with any of them, then corresponding output pin of Arduino board is activated or enabled to switch ON or switch OFF the desired appliance.

To control three home appliance, the following three commands are used in this system : "turn on buzzer", "turn off buzzer", "turn on light", "turn off light", "turn on fan", "turn off fan", "turn on all" and "turn off all".

5. CONCLUSION

In this work a voice based elder care system is designed and a prototype model is developed. The working of proto type model is found satisfactory. If required depending on the demands or needs of the elder, additional appliances can be interfaced to the existing system without much difficulty.

REFERENCES

[1] Aqeel-ur-Rehman , Royda Arif and Hira Khursheed, "Voice Controlled Home Automation System for the Elderly or Disabled People", Journal of Applied Environmental and Biological Sciences, Vol. 4(8S), 2014, pp. 55-64.

[2] Kai Guan, Minggang Shao, and Shuicai Wu, "A Remote Health Monitoring System for the Elderly Based on Smart Home Gateway", Journal of Healthcare Engineering, Volume 2017, Article ID 5843504, 9 pages, doi.org/10.1155/2017/5843504

[3] Morris ME, Adair B, Miller K, Ozanne E, Hansen R, et al., (2013) "Smart-Home Technologies to Assist Older People to Live Well at Home", Aging Sci, Vol. 1(1): 101, 2013, doi: 10.4172/2329-8847.1000101

[4] Pinto, Sandro & Cabral, Jorge & Gomes, T. (2017). "We-Care: An IoT-based Health Care system for Elderly People", Proceeding of IEEE International Conference on Industrial Technology, 2017, doi. 10.1109/ICIT.2017.7915565.

[5] Martin S, Kelly G, Kernohan WG, McCreight B, Nugent C, "Smart home technologies for health and social care support", Cochrane Database Syst Rev, 2008, doi: 10.1002/14651858.CD006412.pub2.

AUTHORS

S. Santhakumar is currently doing his Second year UG course in ECE department of Muthayammal Engineering College, Rasipuram, Tamil Nadu. His area of interest is Embedded Systems.

T. Sanjai is currently doing his Second year UG course in ECE department of Muthayammal Engineering College, Rasipuram, Tamil Nadu. His area of interest is Embedded Systems.

M. Sakthivel is currently doing his Second year UG course in ECE department of Muthayammal Engineering College, Rasipuram, Tamil Nadu. His area of interest is Embedded Systems.

V. Sounthararajan is currently doing his Second year UG course in ECE department of Muthayammal Engineering College, Rasipuram, Tamil Nadu. His area of interest is Embedded Systems.

Dr.J. Rangarajan is currently working as Professor in ECE department of Muthayammal Engineering College, Rasipuram. His area of interest includes Mobile AdHoc Networks, Sensor Networks, Embedded System and Antenna Design.

Mr. C. Sivakumar is currently working as Associate Professor in ECE department of Muthayammal Engineering College, Rasipuram. His area of interest includes **VLSI**, Sensor Networks and Embedded System.